Analyzing the Relationship between the Gross Domestic Product (GDP) of Lesotho and Manufacturing: 1997 to 2007

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Keywords

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Abstract

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The manufacturing industry in Lesotho is an important employer directly and indirectly at both formal and informal level. It contributes a major share not only to the economy of Lesotho but to the livelihood of mainly unskilled Basotho people. The manufacturing industry is constrained by the export structure that is heavily dependent on textile and clothing. Lesotho has significantly managed to diversify its textile and clothing export structure. Its contribution in the GDP of Lesotho has been substantial. This was due to Lesotho qualifying for the trade benefits contained in the Africa Growth and Opportunity Act of 2000.

However this was threatened by the end of the Multi-Fiber Agreement in December 2004 which resulted in the decrease in the export of textile and clothing hence the decrease in the contribution of manufacturing to the economy of the country. This study analyzes the relationship between the GDP of Lesotho and the GDP of manufacturing. It focuses on the textile and clothing sub-sector of manufacturing and considers a time scope of 11 years (from 1997 to 2007).

The study draws on secondary data from the Bureau of Statistics in Lesotho. Simple and multiple linear regression models techniques are used to analyze the relationship between the GDP of Lesotho and the GDP of manufacturing. The secondary data is analyzed using Statistical Packages for Social Sciences (SPSS) and Excel.

The major finding is that there exists a strong positive linear relationship ($r = 0.986$) between the GDP of Lesotho and the GDP of manufacturing. This means that every time the GDP of manufacturing increases the GDP of Lesotho does the same. Based

on this finding, the study recommends that in order to improve, sustain and maintain the economic growth and to avoid further deterioration in the manufacturing industry, the manufacturing capacity must be strengthened for it to effectively deal with growing competition and rapid economic changes.

Declaration

I declare that **Analyzing the Relationship between the Gross Domestic Product (GDP) of Lesotho and Manufacturing: 1997 to 2007,** is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Likese Angelinah Mota **November 2009**

Signed:.....

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Finally, I would like to dedicate this thesis to my mother ‘M’e ‘Mamahlape and to my son Mohato Karabo Fredrick as his seventh birthday present.

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Abbreviations

AGOA ..... African Growth and Opportunity Act

ATC..... Agreement on Textiles and Clothing

CMA..... Common Monetary Area

EBA..... Everything But Arms

EU ..... European Union

GDP..... Gross Domestic Product

GSP ..... Generalized System of Preferences

IMF..... International Monetary Fund

LHWP ..... Lesotho Highlands Water Project

LNDC..... Lesotho National Development Corporation

MFA ..... Multi-Fiber Agreement

MLRM ..... Multiple Linear Regression Model

SACU ..... Southern African Customs Union

SADC ..... Southern African Development Community

SLRM..... Simple Linear Regression Model

SA..... United States of America

Contents

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Lesotho is one of the poorest and least developed countries in the world with a Gross Domestic Product (GDP) estimated at $5.124 billion in 2005 (US$1= R7.63). It is a small mountainous country with approximately 30,355 km² in land area of which about 10% is arable. It is geographically surrounded by South Africa, making it one of only three countries in the world that are enclaves within one country. The fact that it is completely land-locked by South Africa makes its economy to be integrated with that of South Africa as well (World Health Organization, 2008; Bureau of Statistics, 2009).

Apart from its status as an enclave, Lesotho is the only independent country in the world that lies entirely at altitude of 1,000 meters (3,300 ft) above sea level. Its lowest point is at 1,388 meters (4,600 ft), the highest lowest point of any country. Three quarters of the country is made up of highlands, which rise to nearly 3,500 meters in the Maluti Mountain, and the remaining one-quarter of the country are the lowlands with altitudes between 1,500 and 2,000 meters. The capital city, Maseru lies in the lowlands region (Bahta, 2007; Bureau of Statistics, 2009).

These two regions are characterized by significant climatic differences. Temperature fluctuates from -7° C in winter to 30° C in summer in the lowlands. In the highlands, winters are very severe and cold with heavy snowfalls that often cut off the population from essential services such as health services, food supply and education facilities and the temperatures drop to −18° C at times (Bahta, 2007; Bureau of Statistics, 2009).

Approximately 1,881 million people populated Lesotho in 2006 and the population is growing at the rate of 2.6% per annum. Of this 1,881 million population, 80% of it lives in the rural areas and almost half of the population lives below the poverty line (Bureau of Statistics, 2009).

Based on 1996 Population Census, Lesotho's population is relatively young with about 37% of the total population below 15 years, 58.6% between 15 and 64 while those above 65 years constitute about 4.4% of the total population. With the economically active population of about 788,541, the labor force participation rate of 63.5%, the 2008 unemployment rate was estimated to be 22.9% (Bureau of Statistics, 2009).

With regard to education, Lesotho boasts one of the highest literacy rates in Africa. It has an adult literacy rate of about 82%. Among women, the literacy rate was around 85.9 %, and among men around 80.6% in 2003. Lesotho has a high primary enrollment rate which is due to Free Primary Education which was introduced in 2000 by the Government of Lesotho (World Health Organization, 2008).

Lesotho is a member of the Southern African Customs Union (SACU), the oldest customs union in the world. Other members of the union are South Africa, Botswana, Namibia and Swaziland. SACU allows free trading among its member's countries. It also provides for a common external tariff and a common excise tariff to this common customs area. Customs and excise that are collected in the common customs area are paid into the South African National Revenue Fund and the revenue is then shared among the member countries according to a revenue-sharing formula as described in the agreement (Southern African Customs Union, 2002; Bahta, 2007; Lesotho National Development Corporation, 2008).

Lesotho is also one of the 14 members of the Southern African Development Community (SADC). SADC is an intergovernmental organization, which aims at furthering the socio-economic cooperation and integration, to achieve development and economic growth as well as political and security cooperation among its member countries (Bahta, 2007).

The currency used in Lesotho is called Loti (plural: Maluti). The currency is interchangeable with the South African rand. The Loti is pegged to the South African rand at parity under the Common Monetary Area (CMA), which allows access to the South African capital market for the Lesotho banking system. The rand is a legal tender in Lesotho and one rand equals one loti (Matlanyane, 2005; Bahta 2007).

Lesotho's people are known as Basotho (singular: Mosotho) and the official language is Sesotho but English is widely spoken in business, education and commerce. Lesotho is unique in that unlike most countries its society is homogenous in terms of ethnicity. The population consists of 99.7% Basotho tribe and 0.03% Europeans, Asians, and others (Ministry of Education, 2005; Bahta 2007).

1.2. Aims and objectives of the study

The main purpose of this study is to investigate and analyze the relationship between the GDP of Lesotho and the GDP of manufacturing industry, mainly the GDP of textile and clothing sub-sector. The following objectives are investigated to guide the study:

1. To describe the economic activity of the manufacturing industry mainly the textile and clothing sub-sector.

2. To profile the trends of the GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing from 1997 to 2007.

1.3. The research questions

1. What type of relationship exists between the GDP of Lesotho and the GDP of manufacturing/ GDP of textile and clothing?

2. How much of the variation in the GDP of Lesotho is explained by the GDP of manufacturing?

1.4. Hypotheses of the study

Manufacturing, mainly textile and clothing is a key to economic growth in Lesotho and its contribution in the GDP of Lesotho has been substantial in recent years. The hypotheses to be tested in this study are:

1. There has been an increase in the GDP of manufacturing/GDP of textile and clothing due to the African Growth Opportunity Act (AGOA) of 2001.

2. There has been a decline in the contribution of the manufacturing industry on the GDP of Lesotho due to expiry of the Multi-Fiber Agreement (MFA) in December 2004.

1.5. Delimitations of the study

The manufacturing industry in Lesotho has four different sub-sectors namely: textile and clothing, leather and footwear, food products and beverages and other manufacturing (furniture, printing, chemical and non-chemical products etc). This study will mainly focus on the textile and clothing sub-sector. However, the other three sub-sectors will still be highlighted for the purpose of analyzing the whole manufacturing industry in Lesotho.

1.6. Importance of the study

The manufacturing sector in Lesotho is an important employer directly and indirectly at both formal and informal level. It contributes a major share not only to the economy of Lesotho but to the livelihood of mainly unskilled Basotho people.

This study intends to shed light on how the economic performance of the manufacturing industry affects the GDP of Lesotho by investigating and analyzing the relationship between the GDP of Lesotho and the GDP of manufacturing/GDP of textile and clothing. This will be of great use in the formulation of policy intervention to help stimulate and sustain economic growth in the manufacturing sector in Lesotho hence the overall economic growth of the country.

1.7. Definitions

Gross Domestic Product (GDP):

Is the total market value of all final goods and services produced in a country in a given period. It is a measure of the economy of a country. In the context of this research the following definitions are used:

GDP of manufacturing:

Is the contribution to the GDP of Lesotho which has been generated from all the manufacturing economic activities.

GDP of textile and clothing:

Is the contribution to the GDP of Lesotho or GDP of manufacturing which has been generated from all the textile and clothing sub-sector economic activities.

GDP of footwear and leather:

Is the contribution to the GDP of Lesotho or GDP of manufacturing which has been generated from all the footwear and leather sub-sector economic activities.

GDP of food-products and beverages:

Is the contribution to the GDP of Lesotho or GDP of manufacturing which has been generated from all the food-products and beverages sub-sector economic activities.

GDP of other manufacturing:

Is the contribution to the GDP of Lesotho or GDP of manufacturing which has been generated from all other manufacturing economic activities.

1.8. Organization of the study

The study is organized into five chapters. The first chapter deals with the introduction. The second chapter reviews the relevant literature on manufacturing and presents the overview of the Lesotho economy. The source of data and preferred research methodology are discussed in Chapter three. The analyses and the results are presented in the fourth chapter. The comparison between the research findings and the literature review, the conclusions and the recommendations are presented in Chapter five.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2. Introduction

This chapter is divided into three sections. Section 2.1 and section 2.2 present an overview of the Lesotho economy and the review of the existing manufacturing literature relevant to the study highlighting some of the policy developments /agreements in the industry from 1997 to 2007, respectively and section 2.3 presents the conclusion of the chapter.

2.1. An overview of the Lesotho economy

The economy of Lesotho is small and market- oriented. Lesotho is comparatively poor in natural resources with water and diamond being the main ones. Lesotho's economy is mainly based on manufacturing, subsistence farming, livestock, revenue from SACU, natural resources, receipt of royalties from supplying water to South Africa and some earnings of laborers employed in South Africa, especially those working in the mines**.** The economy is still primarily based on subsistence agriculture, especially livestock, although drought has decreased agricultural activities in recent year (Bahta, 2007).

Its structural rigidities and its unusual geographical position are still considered major burden to economic growth and development. However, significant improvements are observed in the economic performance during the period of this study. Since the late 1980s, a major structural economic boom was observed that was largely due to foreign investments in the Lesotho Highlands Water Project (LHWP), a surge in

export manufactures led by textile and footwear sub-sectors and receipts from the Southern African Custom Union (Bahta 2007; Matlanyane, 2005).

The LHWP, which sells water to South Africa, has aided the economic growth in the country. Among Lesotho's major industry groups, the primary beneficiary of LHWP expenditures has been the building and in the construction industry. The economic growth in construction has been twice that of manufacturing but this has leveled off with the end of the construction boom associated with the LHWP in the late 1990's (Lesotho Highlands Development Authority, 2004; Bahta, 2007).

The Government of Lesotho is pursuing an export-led economic growth strategy documented in the Poverty Reduction and Growth Facility programme signed in collaboration with the International Monetary Fund (IMF). Lesotho is an outstanding location for export-oriented manufacturing industries. Lesotho's export promotion strategy takes advantage of duty-free access and exemptions on the rules of origin offered for the United States of America's markets under the AGOA (Central Bank of Lesotho, 2004a; Bahta, 2007; Lesotho National Development Corporation, 2008).

Three major productive sectors namely, primary, secondary and tertiary make up the real sector of the Lesotho's economy. The primary sector is mainly dominated by agriculture, mining(diamond) and quarrying; the secondary sector is dominated by manufacturing and construction sectors while the tertiary sector is mainly dominated by government services, wholesale and retail, trade, finance and insurance (Sandrey, Maleleka, Matlanyane and Seventer, 2005; Matlanyane, 2005).

The growth rate of Lesotho's economy has been estimated to be respectively 3.1% and 1.2% in 2004 and 2005. The downtrend in the economic growth largely reflected the poor economic performance of the secondary sector, as manufacturing output declined (Central Bank of Lesotho, 2006).

However, major favourable developments have taken place since then. The positive economic performance, especially strong in 2006-7.2% and 4.9% in 2007, was driven by a booming diamond production, a recovery in the textile and clothing industry helped in part by the extension of AGOA trade preferences through 2012, and good performance in agriculture as well as improved service sector activities (International Monetary Fund, 2007; African Development Bank, 2008).

This section is divided into three sub-sections which give the highlights of the three sectors of Lesotho's economy. Sub-section 2.2.1 deals with the primary sector while sub-sections 2.2.2 and 2.2.3 deal with the secondary and the tertiary sectors respectively.

2.1.1. The primary sector

The primary sector consists of the agricultural sector, mining and quarrying. Agriculture remains an important economic sector in Lesotho as more than half of the population still depends on subsistence agriculture. The agricultural activities include crop production, keeping of livestock, forestry and related activities. Livestock includes cattle, sheep and goats. Livestock production is a substantial contributor to rural income. Major exports are wool and mohair, but cattle are also exported and a small amount of agricultural output is commercialized (Sandrey et al., 2005; Bahta, 2007).

Although about 10% of the total of Lesotho's land is arable, agriculture has contributed about 31% of the country's GDP in the 1980's. This contribution to the GDP of Lesotho has decreased to about 16% in 1997. This decrease was mainly due to a decrease in the availability and quality of the country's arable land. This scenario can be accounted for by the following factors: overgrazing by an increasing population of livestock, soil-erosion, expanding urban settlements and unfavourable weather conditions.

The mining and quarrying sub-sector has been the smallest contributor to the GDP of Lesotho and has contributed about 0.1% although the recent high rate of diamond discoveries will increase this share. The primary sector accounted for 17.1% of the GDP of Lesotho in 2003 (Sandrey et al., 2005; Matlanyane, 2005; Bahta, 2007).

2.1.2. The secondary sector

The secondary sector is mainly dominated by the construction and the manufacturing industries. The manufacturing industry has largely been dominated by the textile and clothing sub-sector since 2001. The clothing and textile industry is Lesotho's most important exporter and has grown significantly mainly due to Lesotho qualifying for trade benefits contained in the AGOA. The inception of the AGOA in Lesotho in 2001 has made a positive impact on the country's economic performance (Hayes, 2003; Central Bank of Lesotho, 2006).

Lesotho's textile and garments exports make a greater contribution to the foreign revenue- which is collected by the SACU. As we have stated earlier, Lesotho's economy also depends on SACU for revenue. The SACU payments accounted for about 49% of the Lesotho government revenue from 2005. The manufacturing industry has contributed about 19% of the country's GDP and approximately 74% and 77% of Lesotho's total exports in 2002 and 2003 respectively, were textile and clothing garments (Bennet, 2006; Langton, 2008).

However, the manufacturing economic performance deteriorated, owing to the end of the Multi-Fiber Agreement (MFA). This sub-sector is the key economic driver in Lesotho hence, a drop in its performance does not bode well for the overall economy of the country. The secondary sector accounted for 41.9% of the GDP of Lesotho in 2003 (Central Bank of Lesotho, 2005; Sandrey et al., 2005; Matlanyane, 2005; Bennet, 2006).

2.1.3. The tertiary sector

The tertiary sector has remained the second largest contributor to GDP of Lesotho after the secondary sector. The tertiary sector accounted for 41% and 47.2% as a share of GDP in 2003 and 2007, respectively. Education is the largest sub-sector of this sector. The performance of the education sector has been boosted by the free primary education programme adopted in 2000 by the Government of Lesotho (Stanbic Africa, 2003; Sandrey et al., 2005; Central Bank of Lesotho, 2005; Central Bank of Lesotho, 2007; African Development Bank, 2008).

2.2. Theoretical framework: manufacturing industry

Lesotho has a very well developed manufacturing industry. The manufacturing industry in Lesotho is made up of large, small, medium and micro enterprises. It has four different sub-sectors namely, textile and clothing, footwear and leather, food products and beverages and other manufacturing industries. The manufacturing sector has largely been driven by textile and clothing industries in Lesotho since 2001 with about 80% of all the manufacturing products from it (Central Bank of Lesotho, 2004b; Thabane 2009).

The manufacturing sector has been the second largest formal sector employer in Lesotho, shedding jobs mainly to unskilled Basotho women who constitute 80% of the manufacturing workers. This is significant in a country like Lesotho where the unemployment rate prevails around 22.7% and the majority of the population works in agriculture and the informal sector, where the returns are very low (Central Bank of Lesotho, 2005; Bureau of Statistics, 2009).

Manufacturing output has risen on average by 15% per annum since 1993 and has contributed about 17% of the country's GDP in 1998 and 20% in 2003. This growth has been due to the creation of export markets and the significant foreign investment inflows mainly from China, Taiwan, Europe and South Africa. It is also a result of a

strong expansion in the textile and clothing exports, driven by the combined effects of comparatively low labor costs and the duty-free access by the United States of America under the African Growth and Opportunity Act (AGOA) (Central Bank of Lesotho, 2005; Foreign Investment Advisory Service, 2006; Senyane, 2007; Bahta, 2007).

The Lesotho National Development Corporation (LNDC) promotes manufacturing investment in Lesotho. LNDC is a parastatal of the Government of Lesotho that is charged with the implementation of the country's industrial development. Its role is to promote Lesotho as an attractive and a preferred investment location to private, foreign investors and indigenous investors. LNDC also offers to supply factory shells as well as a series of market and tax incentives to investors (Lesotho National Development Corporation, 2006; Bahta, 2007).

Lesotho as one of the least developed countries is also eligible to several non-reciprocal preferential trade agreements that are offered by the developed countries to developing and least developed countries. These developed countries extend preferential market access into their respective markets as a way of promoting development in these least developed countries through trade (Lesotho National Development Corporation, 2008).

The benefits come from trade arrangements such as the Generalized System of Preferences (GSP). To cite but the few of these trade agreements, in 2003 the Australian government improved its access so that all goods including textile and clothing from least developed countries were eligible for duty free entry into the Australian markets and in 2000 the Japanese government adopted the 99% initiative. Under this initiative 99% of the least developed countries' industrial products including textile and clothing can be exported duty and quota free to Japan (Lesotho National Development Corporation, 2008).

Lesotho is an outstanding location for export-oriented manufacturing industries. The government of Lesotho is pursuing an export-led economic growth strategy that is documented in the Poverty Reduction and Growth Facility programme signed in collaboration with IMF (Central Bank of Lesotho, 2004a; Bahta, 2007).

Lesotho's export strategy takes advantage of the USA's African Growth and Opportunity Act (AGOA) under GSP that allows duty free access to the United States of America's markets and the European Union's (EU) Everything But Arms (EBA) initiative under the GSP. The EBA also extends duty free and quota free market access to all products except arms and ammunitions from the least developed countries subject to their products meeting the rules of origin requirement accompanying this arrangement (Central Bank of Lesotho, 2004a; Bahta, 2007; Lesotho National Development Corporation, 2008).

Lesotho's trade has increased significantly since the AGOA and the United States has remained the largest single-country recipient of exports from Africa. Lesotho's manufacturers are the single largest users of the apparel provisions of the AGOA (Hayes, 2003; Bennet, 2006; Lesotho Clothing and Allied Workers' Union, 2006; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

The Lesotho labour laws regulate the minimum wages and the working conditions of workers in the manufacturing industry even though there may be some instances where agreements between unions and the representative employer's association do regulate the working conditions. Due to the government's lax enforcement of collectively different agreements and its promotion of lower labor costs in the manufacturing industry as a way of attracting foreign investors, workers are usually paid the minimum salary that is comparatively low compared to the international standards and are characterized by poor working conditions. This is done regardless of the fact that the country has given a formal approval to its relevant International

Labor Organization Conversions (Lesotho Clothing and Allied Workers' Union, 2006).

This section is divided into four sub-sections. Sub-section 2.2.1 deals with the economic activity of the textile and clothing sub-sector highlighting some of the policy developments and agreements in the sub-sector. The last three sub-sections, sub-section 2.2.2, sub-section 2.2.3 and sub-section 2.2.4 highlight the three sub-sectors (footwear and leather, food-products and beverages and other manufacturing) respectively and does not go into detail due to the limited literature review.

2.2.1. The economic activity of textile and clothing sub-sector

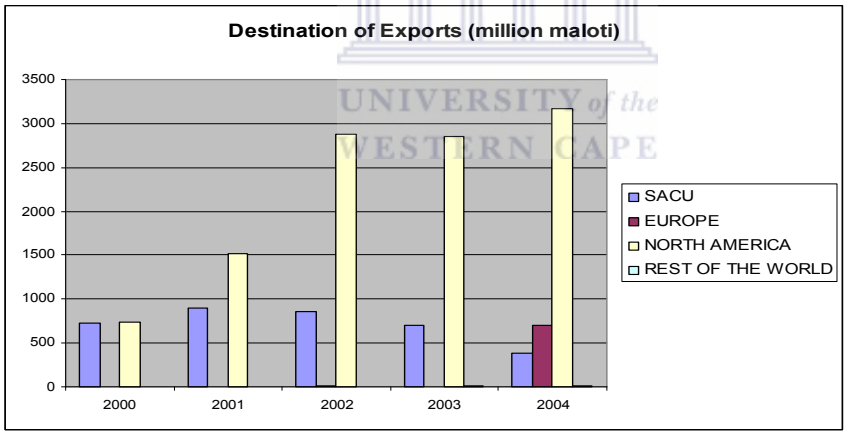
The main economic activity of the textile and clothing sub-sector is based on the imports of raw materials to Lesotho and the exports of finished goods to other countries. The textile and clothing sub-sector in Lesotho has the following profile: Denim Fabric and Cotton Yarn, Denim Garments, Knitted Garments, Wovens, Dual Production – Knits and Wovens, Embroidery and lastly Screen-printing. There are about 47 major factories that operate in the textile and clothing sub-sector in Lesotho (Bennet, 2006; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

The USA's AGOA of 2001 was the major incentive for industrial development in Lesotho. It was under AGOA that numbers of textile and clothing factories were established in Lesotho. Under the AGOA Lesotho garment manufacturers are allowed customs and quota free access to the USA markets. The initiative of the AGOA was designed to promote the per capita income of the least developed Sub-Sahara countries to expand and diversify their exports and to build a manufacturing and production base that will support long-term economic growth and development in the Sub- Saharan countries (Southern African Customs Union, 2002; Hayes, 2003; Bennet, 2006; African Development Bank, 2008).

Lesotho has an export focused textile and clothing manufacturing industry. Before 2000 most of Lesotho's textile and clothing exports targeted the SACU market place although some were exported out of SACU mainly in the EU but the market focus switched to the United States after the AGOA of 2001 (Bennet, 2006).

Limited amounts of textile and clothing exports go to other destinations such as Canada; even smaller volumes go to Dubai, Qatar, Chile, Japan and Taiwan. In spite of EU trade preferences under EBA, Lesotho's EU garment exports are negligible. The Lesotho's clothing and textile firms have recently started to export small but growing amounts of clothing to South Africa (Bennet, 2006). The following graph, Graph 2.1 shows the growth in exports by million maluti and by destination respectively from 2000 to 2004.

Graph 2.1: Destination of exports in million maluti.



(Source: Senyane, 2007)

The textile and clothing industry is Lesotho's most important exporter and has been claimed to contribute about 19% of the country's GDP. In 2002 and 2003, it was estimated that about 74% and 77% respectively of the total Lesotho exports were textile and garments (Bennet, 2006).

Textile and clothing imports to Lesotho have also been increasing, signifying increased production levels boosted by preferential market access accorded to Lesotho by the AGOA and other arrangements. The textiles imports are used as inputs into the production of clothing for the USA markets and are mainly imported from Asia. Lesotho has benefited from relatively low-cost raw materials due to low inflation rates in the Asian region that emanated from a slowdown in domestic demand in that region in 2003 despite the challenge of exchange rate volatility between the two countries (African Development Bank, 2008).

Lesotho's imports of textiles from SADC region include semi-finished products and cotton from mainly Mozambique, Madagascar and Malawi and the technological equipment is imported predominantly from South Africa. Most of the import categories to Lesotho are inputs of manufactured products, with a bias towards clothing and garments (African Development Bank, 2008).

The AGOA in Lesotho have made a positive impact in the country's economic performance and the economy has responded positively to AGOA in attracting additional foreign investors. This resulted in growth in the textile and clothing exports, the foreign exchange revenue, creation of thousands of jobs and source of income hence contributing to poverty reduction in Lesotho (United Nations, 2003; Central Bank of Lesotho, 2004a; Bureau of Statistics 2009).

However, the AGOA challenge for Lesotho is a time bound initiative as it will come to an end in 2015. This will mean that Lesotho made products will no longer have the privilege to enter the United States market. Hence Lesotho has little time to prepare itself for full global competition once trade privileges are withdrawn (United Nations, 2003; Foreign Investment Advisory Service, 2006; International Momentary Fund, 2007; Lesotho National Development Corporation, 2008; African Development Bank, 2008).

As a result of AGOA by 2001/2002 the textiles share of manufacturing in GDP of Lesotho increased by 15%. More than five new garment factories opened in Lesotho in 2002 elevating total employment in the textile and clothing sector to about 45,000 (Hayes, 2003; Lesotho Highlands Development Authority, 2004; Lesotho National Development Corporation, 2005; Foreign Investment Advisory Service, 2006).

Pullanikatil, Tlali and Thamae (2007) indicated that the textile and clothing exports from Lesotho to the USA increased from US$ 140.3 million to US$ 215 million when AGOA was introduced in 2001 and reached a peak in 2004 when it reached USA$ 466.9 million and reduced slightly to US$403.6 million in 2005.

This growth however declined in 2003 due to currency depreciation and weak global economic developments. The loti depreciated gradually from 2001 until it reached 6.56 maluti a dollar in December 2003 but recovered again in 2004. This currency depreciation weakened the Lesotho's textile and clothing demand (Central Bank of Lesotho, 2004a; Central Bank of Lesotho, 2004b).

The textile exports decline after 2004 was due to the challenges the textile and clothing sub-sector faced after 2004: Firstly, the depreciation of the USA dollar against other major currencies contributed to the depreciation of the loti against the USA dollar. This minimized the growth of Lesotho's export earnings in terms of maluti as well as the profitability of the textiles and clothing factories in Lesotho. Hence resulted in some factories being liquidated because of financial problems they were experiencing. This led to loss of jobs in the textile and clothing sub-sector and the exports decreased traumatically (Central Bank of Lesotho, 2005; Bennet, 2006).

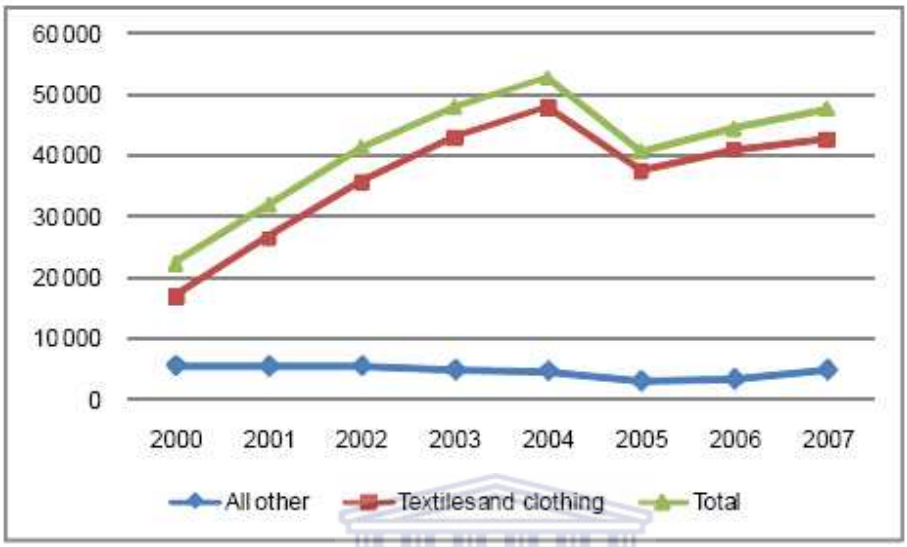
Secondly, the World Trade Organization's Agreement on Textiles and Clothing (ATC) known also as Multi-Fiber Agreement (MFA) in December 2004 expired. This intensified global competition for the market of Lesotho's textile and clothing as it opened up the USA markets to the Asian countries. This competition negatively

affected the demand for Lesotho's textile and clothing exports in the USA markets and resulted in poor economic performance of the manufacturing sector because of a drop in Lesotho clothing exports. This also resulted in the loss of jobs in the manufacturing sub-sector (Central Bank of Lesotho, 2004b; Central Bank of Lesotho, 2005; Bennet, 2006).

The World Trade Organization's MFA was introduced in 1974. This agreement was a set of formal quota agreements and restrictions governing textiles and the clothing industry mainly intended to allow developed countries to adjust to import from the developing countries. This agreement came to an end in December 2004 and resulted in a number of factories closing down in Lesotho leaving about 7,000 people unemployed (Bennet, 2006).

The manufacturing sector has been the second largest formal sector employer in Lesotho. About 80% of employment in the manufacturing sector is in the textile and clothing sub-sector. In 2003, 49,662 people were employed in manufacturing industry and about 42,602 of them were employed in the textile and clothing sub-sector. From January 2005, more than 6,850 jobs were lost in Maseru, Maputsoe and Ha Nyenye industrial estates when about 10 factories closed their gates. Most firms that did not close their gates were forced to retrench staff and short time working resulted as an alternative. All these factories were involved in the production of knitted garments (Bennet, 2006; Bureau of Statistics, 2008). The graph below, Graph 2.2 shows the level of employment in the manufacturing sector from 2000 to 2007.

Graph 2.2: Employment in the manufacturing sector, in numbers



(Source: Bureau of Statistics, 2009).

Bennett (2006) stated that the contribution of manufacturing industry to the Lesotho economy goes beyond the immediacy of the textiles and clothing sub-sector itself in that there are also important employment and economic multipliers associated with it. There are other formal and informal sector economic activities that take place in Lesotho, which indirectly or directly feed off the textile and clothing sector. These include the taxi industry; the street traders that sell food to workers that work in the factories, rented out accommodation, electricity and communications.

This means that the manufacturing industry in Lesotho is an important employer directly and indirectly at both formal and informal level. It contributes a major share not only to the economy of Lesotho but to the livelihood of mainly unskilled Basotho people. Hence its slowdown had an adverse impact not only to the economy of Lesotho but to Basotho people as well.

As we have indicated earlier, manufacturing in Lesotho is promoted by LNDC. Under these circumstances of the MFA expiry LNDC has responded in a number of ways for this negative economic performance of Lesotho. It undertook several studies to assess business sentiment in order to proactively identify measures that could be taken to improve the deleterious effects of the expiry of the MFA as well as to advise the government. These studies were specifically aimed at establishing the level of textile and clothing firms' financial distress that was associated with the reduced orders as well as to identify appropriate interventions to curb further closures of the garments operations (Lesotho National Development Corporation, 2006).

Some policy interventions were also taken by LNDC and the immediate one was that of freezing rentals to the manufacturing companies for three consecutive years. In some special cases, rental reductions were applied on a case by case basis depending on the extent of the financial distress. LNDC also resolved to:

1. Undertake immediate missions to the USA in order to enhance relationships with major buyers. The objective was to ensure that despite the changes associated with the expiry of the MFA Lesotho should continue to be on the radar screen of major USA policy makers and USA buyers.

2. Aggressively embark on investment promotion campaigns to attract investors that can develop relevant supply chains to foster integration of the textile and garments industry.

3. Aggressively embark on investment promotion campaigns to attract investors interested in production of high value garment products to promote diversification within the garment industry.

4. Encourage investors interested in other areas in order to promote diversification outside the garment industry.

The policies intervention and the actions that were taken by the LNDC did well for the manufacturing industry and the diversification objective was achieved as the corporation attracted four new textile and clothing firms with the investment value of 7 million maluti and the employment started to increase again (Lesotho National Development Corporation, 2006).

First National Bank, 2008 showed that the clothing and textile sub-sectors have been recovering following a decline created by the expiry of MFA in December 2004, government intervention and sanctions imposed on Chinese imports, as well as growth opportunities stemming from the AGOA. The sub-section that follows highlights the footwear and leather manufacturing sub-sector.

2.2.2. Footwear and leather sub-sector

The footwear and leather industry in Lesotho is still at its nascent stage although it also qualifies for the same benefits under AGOA as textile and clothing sub-sector. Lesotho has three shoe-manufacturing firms. These firms produce mainly for export while a large share of the domestic market has to rely on imports from South Africa (Lesotho National Development Corporation, 2009; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

The footwear and leather industry is constrained by the lack of leather, which is imported from South Africa, shortage of basic components, absence of both technical and entrepreneurial skills. The lack of leather is due to inadequate proper slaughter facilities and scarcity of skills of personnel operating in these slaughtering facilities hence the hides and the skins produced in the country is of poor quality (United Nations Industrial Development Organization, 2007; Lesotho National Development Corporation, 2009)

Although this sub-sector is still in its infancy there is a better chance for investment which can boost its production level particularly in tanning and finishing, footwear

and footwear components, leather garments, leather goods including bags, car seats, wallets, belts, gloves and other accessories. The leather and footwear production index registered a 23.5% drop at the end of September 2004 as against a 32.4% slump recorded in June. Although this industry signaled an improvement in September, its performance has been lethargic since the second quarter of 2003 (Central Bank of Lesotho, 2004b; Lesotho National Development Corporation, 2009).

2.2.3. Food-products and beverages sub-sector

Lesotho food-products and beverages manufacturing sub-sector encompasses food processing in terms of dairy, meat, grain and vegetable farming as well as the related fields of milling, canning, reserving, bottling and containerization. Beverages include fruit juices and cool drinks as well as alcoholic drinks from ciders to different brands of beer (Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

This industry is constrained by the financial resources and limited capacity in terms of skills and modern equipment and machinery for improved production to better meet current and future demand in terms of quantities and quality of products. A lot of food-products and beverages manufacturing activities in Lesotho take place at the small scale level constrained by lack of proper standards and quality, which is a contributing factor that hinders penetration of these products into international markets (Lesotho National Development Corporation, 2009; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

However, there are other companies that operate at large scale on food-products and beverages manufacturing activities in Lesotho even though there is little production of these companies taking into consideration the demand in the markets. Most of these companies rely on raw materials mainly from South Africa and then export their products to South Africa and other international markets while some of the products are sold in the local markets (Bureau of Statistics, 2008; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

The Lesotho National Dairy Board is a leader on imported and exported milk and milk products; Maluti Mountain Brewery is a particular leader in the local beverages field. Basotho Fruits and Vegetable Canners is a leader in the case of canning and preserving and Lesotho Flour Mills and Lesotho Milling Company are leaders in the field of milling (Bureau of Statistics, 2008; Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

Lesotho also makes use of its major natural resource-water by bottling it for commercial purpose. Bottled water is also considered a food product internationally. Thus investment in water bottling is necessary since this would result in a positive impact on public health by providing safe drinking water for areas with poor water supply. However, the technical skills, management and finance are still the major constraint in the water bottling industry also (Lesotho National Development Corporation, 2009).

Most of food-production, especially agricultural products and livestock products are usually associated with weather conditions that prevail within different seasons with less production during winter and the trend increases with months from October. The food-products and beverages production index rose marginally by 0.8% in the third quarter of 2004 following a 17.4% increase observed at the end of June (Central Bank of Lesotho, 2004b; Bureau of Statistics, 2008).

2.2.4. Other manufacturing sub-sector

This sub-sector of manufacturing includes manufacturing of furniture, printing, chemical and non-chemical products, electronics, pharmaceutical products etc. The Lesotho Pharmaceutical Company is registered as a manufacturer of pharmaceutical products (Lesotho National Development Corporation, 2009; Thabane, 2009).

There are also local resource-based projects that include the manufacturing of ceramic ware, bricks, sand stone, wool and mohair processing. The sand stone

deposits are found all over Lesotho and are exported in different forms, sizes and thicknesses. The whole sub-sector is in the hands of small artisans with limited investment capabilities. The sandstone is extensively used in the construction of buildings, and special monuments (Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

The sandstone and brick industry is an emerging industry in Lesotho and it has not yet been fully explored yet there is a potential in it since it is based on a natural resource of the country. Despite the complexity of diversification in the manufacturing sector, the stone and brick industry has the potential to boost the economy of Lesotho (Ministry of Trade and Industry, Cooperatives and Marketing, 2009).

2.3. Conclusion

Out of the four sub-sectors of manufacturing, textile and clothing has been the main driver of the economic growth in Lesotho. It has mainly benefited from the AGOA that resulted in increased clothing exports to the USA markets hence increased contribution to the overall economy of Lesotho. The textile and clothing sub-sector also has the significant employment potential in the country.

However, the regulatory environment in the manufacturing industry has not been in line with the international policies because of the poor working conditions and lower wages. This study draws from this literature review and proceeds to investigate the relationship between the GDP of Lesotho and the GDP of manufacturing/textile and clothing. The next chapter presents the research methodology of the study.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3. Introduction

This chapter presents the research methodology used in order to address the aims of this study. The chapter is divided into five sections. Section 3.1 and section 3.2 respectively present the aims and the hypotheses of the study while section 3.3, section 3.4 and section 3.5 respectively present the study population, source of data and method of quantitative data analysis.

3.1. Aims and objectives of the study

The main purpose of this study is to investigate and analyze the relationship between the GDP of Lesotho and the GDP of manufacturing mainly the GDP of textile and clothing sub-sector. The following objectives are investigated to guide the study:

1. To describe the economic activity of the manufacturing industry mainly the textile and clothing sub-sector.

2. To profile the trends of the GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing from 1997 to 2007.

3.2. Hypotheses of the study

Manufacturing, mainly textile and clothing, is a key to economic growth in Lesotho and its contribution in the GDP of Lesotho has been substantial in recent years. The hypotheses to be tested in this study are:

1. There has been an increase in the GDP of manufacturing due to the AGOA of 2001.

2. There has been a decline in the contribution of manufacturing industry on the GDP of Lesotho due to expiry of MFA in December 2004.

3.3. Study population and delimitations of the study

This study intends to focus primarily on one sub-sector of manufacturing: textile and clothing. However, the other three sub-sectors of manufacturing will also still be highlighted. The sub-sector was chosen due to its significant employment potential and its contribution in the GDP of Lesotho.

The simple techniques of the linear regression model will be used to investigate the relationship between the dependent (response) variable (GDP of Lesotho) and five independent (predictor) variables (GDP of manufacturing, GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing).

Given a sample $(Y_i, X_i), i = 1,2,...,n.$ the simple linear regression model is given by: $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$.Where Y_i is the dependent variable, β_0 is the y - intercept, β_1 is the gradient or slope of the line (the change in y value / change in x value), X_i is the predictor variable and ε_i is the random term associated with each observation. The random term is assumed to follow the normal distribution with mean 0 and variance σ^2 that is it is uncorrelated. Due to this assumption, this study will not consider the application of regression where there is a natural effect on results over time, autocorrelation.

A multiple linear regression will be done between the GDP of Lesotho (response variable) and all the four sub-sectors of manufacturing (independent variables). This

will be done in order to investigate the overall contribution of the manufacturing industry into the GDP of Lesotho based on its four sub-sectors. The insignificant variables from the model will be removed from the model. This study will not go into details on multicollinearity problem.

Multicollinearity in multiple regression linear regression model occurs when independent variables in the model are highly correlated with each other than with the dependent variable and provide redundant information about the dependent variable (Montgomery, Peck and Vining, 2001; Myers, 1989).

It can be detected by computing correlations between all pairs of the independent variables and if the correlation is close to ± 1 then there is a problem of multicollinearity. Again it can be detected by computing the variance inflation factors (VIF_i) for each independent variable x_i.

$$VIF_i = \frac{1}{1 - R_i^2}$$

where R_i^2 is the coefficient of determination of the model that includes all independent variables except the ith independent variable. Then multicollinearity problem exists if $VIF_i \geq 10$ (Montgomery, Peck and Vining, 2001; Myers, 1989).

3.4. Source of data, data and methods of data collection

The study is based on the analysis of secondary data on economic activity of different sub- sectors of manufacturing and their contribution in millions maluti and percentages into the economy of Lesotho (GDP of Lesotho). The secondary data were obtained from the Bureau of Statistics and considers a time scope of 11 years (44 quarters as the data collection is done quarterly), 1997 to 2007. This secondary data is the representative of the whole country therefore this study will allow the analysis for the whole country in the manufacturing industry.

The data collection on manufacturing is done quarterly and a three-paged questionnaire is used to collect the data. The methods of data collection include emailing of questionnaires and hand delivery of questionnaires to micro, small, medium and large manufacturing enterprises. The questionnaires are distributed on the first week that follows the last day of the quarter and the collection of the questionnaires is done on the third week (Thabane, 2009).

Note: The results of this study must be interpreted with caution since the GDP of textile and clothing and the GDP of footwear and leather were given as aggregate so their production indices were used to disaggregate the combined GDP.

3.5. Method of quantitative data analysis

The quantitative descriptive research method is used to address the research questions of the study. Bivariate analysis is also undertaken to study the relationship between the dependent variable and the independent variable. Simple linear regression model and the multiple linear regression model will be undertaken to respectively analyze the relationship between the dependent variable (GDP of Lesotho) and the independent variable/variables.

The trend analysis of the GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing over the study period will also be given. The data will then be analyzed using Statistical Packages for Social Sciences (SPSS) and Excel.

This section is divided into five sub-sections. The first, the second and the third sub-sections respectively describe assessing the normality of data, the simple linear regression model and the interpretation of the Pearson correlation coefficient while the fourth and the fifth sub-sections respectively present the estimation of the parameters of the simple linear regression model and the multiple linear regression model.

3.5.1. Assessing the normality of data

The normality of data will be assessed and the graphical presentation will be done on a Normal Q-Q plot, which shows a linear (line) relationship between the observed and the expected values if our data is normal. Shapiro-Wilk's statistical test will be used to test the normality of our data. The Shapiro-Wilk will be tested at the significant level of 5%. The results will be not significant (accept the null hypothesis of data normal) if the probability value (p -value) is greater than 0.05 (Chan, 2003).

3.5.2 .Simple Linear Regression Model (SLRM)

Simple Linear Regression Model is used to evaluate or to analyze the linear relationship between two variables or it is used to develop or construct an equation, which can be used to predict or estimate a dependent/independent given an independent/dependent variable respectively. Given a sample $(Y_i, X_i), i = 1,2,...,n.$ the simple linear regression model is given by: $Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$.

Where Y_i is the dependent variable, β_0 is the y - intercept, β_1 is the gradient or slope of the line (the change in y value / change in x value), X_i is the predictor variable and ε_i is the random term associated with each observation. The random term is assumed to follow the normal distribution with a mean 0 and variance σ^2 .

In order to test for the existence of the relationship between the two variables the hypothesis to be tested will be:

$H_0 : \rho = 0$

$H_1 : \rho \neq 0$

The null hypothesis of no relationship between the two variables will be rejected at the 5% level of significance in favor of the alternative hypothesis. There is a relationship between the two variables if the probability value (p -value) is less than 0.05 (Hinkle, Wiersma and Jurs , 1994).

The scatter plot will also be used to assess if there is a relationship between our dependent and independent variables. The scatter plot will show a straight line if there is a linear relationship between the two variables. Scatter plots also provide the information about the direction, the shape, the strength of the linear relationship and the presence of outliers between two variables (Hinkle et al., 1994). The strength of the relationship can be measured by using a correlation coefficient e.g. Pearson correlation coefficient, r (Rovine and Von Eye, 1997; Dawson-Saunders and Trapp, 2004).

Correlation coefficient r values always range from -1 to +1, that is $-1 < r < 1$. The sign of r indicates the direction of the relationship or pattern between the two variables. The negative direction means that as X_i values increase Y_i values decrease whereas the positive direction means that as X_i values increase Y_i values also increase (Dawson-Saunders and Trapp, 2004).

According to Dawson-Saunders and Trapp (2004) and Willemse (1990) the formula for the Pearson correlation coefficient is given by:

$$r = \frac{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)\left(Y_i - \overline{Y}\right)}{\sqrt{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2}\sqrt{\sum_{i=1}^{n}\left(Y_i - \overline{Y}\right)^2}} = \frac{n.\sum_{i=1}^{n} X_i Y_i - \sum_{i=1}^{n} X_i . \sum_{i=1}^{n} Y_i}{\sqrt{\left[n.\sum_{i=1}^{n} X_i^{\,2} - \left(\sum_{i=1}^{n} X_i\right)^2\right]\left[n.\sum_{i=1}^{n} Y_i^{\,2} - \left(\sum_{i=1}^{n} Y_i\right)^2\right]}}$$

Where

$$\overline{X} = \sum_{i=1}^{n} X_i / n, \overline{Y} = \sum_{i=1}^{n} Y_i / n$$

and n is the number of observations in a given sample.

3.5.3 Interpretation of the Pearson correlation coefficient

Several authors have offered guidelines for the interpretation of the Pearson correlation coefficient and according to Dawson-Saunders and Trapp (2004) the

interpretation is as follows: r >0.75-indicates a very good to excellent relationship; 0.5< r ≤0.75-indicates a moderate to good relationship; 0< r <0.25- indicates a small relationship and r = 0 indicates no relationship.

A perfect correlation ± 1 occurs only when the data points all lie exactly on a straight line. If r = +1, the slope of this line is positive and if r = -1, the slope of this line is negative. Another measure that will be used in the study will be the coefficient of determination, r^2. The coefficient of determination is the square of the correlation coefficient and is usually reported in percentages. It is such that $0 \leq r^2 \leq 1$ (Dawson-Saunders and Trapp, 2004).

The coefficient of determination is the proportion of variability in a data set that is accounted for by the statistical model. The r^2=0.59 will mean that 59% of the variation in the dependent variable is explained by the variation in the independent variable (Dawson-Saunders and Trapp, 2004).

3.5.4 Parameter estimation of the simple linear regression model

The ordinary least square method can be used in order to determine or to estimate the parameters of the simple linear regression model that will provide a good fit to the points between the dependent variable and the independent variable. The ordinary least square method finds the line that minimizes the sum of the squares of errors $\sum_{i=1}^{n} \varepsilon_i^2$ .The estimates of the regression parameters, $\hat{\beta}_0$ and $\hat{\beta}_1$ can be calculated using the following formulas (Willemse, 1990; Dawson-Saunders and Trapp, 2004):

$$\hat{\beta}_1 = \frac{\sum_{i=1}^{N}(X_i - \overline{X})(Y_i - \overline{Y})}{N\sum_{i=1}(X_i - \overline{X})^2} = \frac{n.\sum_{i=1}^{n} X_i Y_i - \sum_{i=1}^{n} X_i . \sum_{i=1}^{n} Y_i}{n.\sum_{i=1}^{n} X_i^2 - \left(\sum_{i=1}^{n} X_i\right)^2}$$

$$\hat{\beta}_0 = \overline{Y} - \hat{\beta}_1 \overline{X}$$

Where $\overline{X} = \sum_{i=1}^{n} X_i / n$ and $\overline{Y} = \sum_{i=1}^{n} Y_i / n$

and n is the number of observations in the sample.

The estimated regression equation will be $\hat{y}_i = \hat{\beta}_0 + \hat{\beta}_1 x_i$. The fitted value of any y_i that corresponds to any observed data point can be determined from the regression equation and the residual at that point can also be determined. The residual will be given by: $\varepsilon_i = y_i - \hat{y}_i$.

The applicability of our estimated regression equation, $\hat{y}_i = \hat{\beta}_0 + \hat{\beta}_1 x_i$ will be tested at the significance level of 5%. The hypotheses to be tested will be

$H_0 : \beta_1 = 0$
$H_1 : \beta_1 \neq 0$

The results will be significant (reject the null hypothesis of not applicable) if the F-ratio from the ANOVA table is significant that is if the p-value is less than 0.05. This will mean that the slope is different from zero and our regression model fits the data better than the baseline model. Hence the conclusion, that our independent variable can be used to reliably predict the dependent variable (Hinkle et al., 1994; Dawson-Saunders and Trapp, 2004).

The statistical significance of our two parameters β_0 and β_1, will then be tested at the significance level of 5% and the hypotheses to be tested will be as follows:

For the constant:

$H_0 : \beta_0 = 0$
$H_1 : \beta_0 \neq 0$

The results will be significant (reject the null hypothesis of constant not significant) if the p-value is less than 0.05. This will mean that our constant is significantly different from zero hence it is statistically significant thus knowing the value of the

independent variable will enhance the prediction of the dependent variable (Hinkle et al., 1994).

For the slope:

$H_0 : \beta_1 = 0$

$H_1 : \beta_1 \neq 0$

The results will be significant if the p-value is less than 0.05. This will mean that our slope is also significantly different from zero hence it is statistically significant thus knowing the value of the independent variable will enhance the prediction of the dependent variable (Hinkle et al., 1994).

3.5.5. Multiple linear regression model (MLRM)

The multiple linear regression model will be of the form

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

where: Y is the dependent variable (GDP of Lesotho), x_1, x_2, x_3 and x_4 are respectively the independent variables GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing, β_0 is the y - intercept, $\beta_1, \beta_2, \beta_3$ and β_4 are respectively the coefficient of the independent variables x_1, x_2, x_3 and x_4 and ε is the random term associated with each observation. The random term is assumed to follow the normal distribution with a mean 0 and variance σ^2.

A multiple linear regression will be done in order to investigate the overall contribution of the manufacturing industry into the GDP of Lesotho based on its four sub-sectors.

The overall significance of the model will also be assessed from the significance of the F-ratio in the ANOVA table as in section 3.5.4 above. The null hypothesis of not applicable will be rejected in favor of the alternative hypothesis, the model is

statistically significant, if the F-ratio from the ANOVA table is significant, that is if the p-value is less than 0.05 (Hinkle et al., 1994; Dawson-Saunders and Trapp, 2004).

Then the significance of each independent variable will be assessed at the 5% level, based on T-test. The null hypothesis of not significant will be rejected in favor of the alternative hypothesis (the variable is significant) if the p-value is less than 0.05. This will mean that the parameter is significantly different from zero, hence the variable's contribution to the model is statistically significant (Hinkle et al., 1994). Insignificant variables will then be removed from the model since their presence in the model may affect the coefficients of the significant variables. The resulting model will then be analyzed. The next chapter presents the analysis and results of the study.

CHAPTER FOUR

ANALYSIS AND RESULTS

4. Introduction

This chapter presents the analyses and the results of the study. The chapter is divided into three sections. Section 4.1 and section 4.2 respectively present assessing the normality of data and the trend analysis while the last section, section 4.3 represents the analysis of the linear regression models.

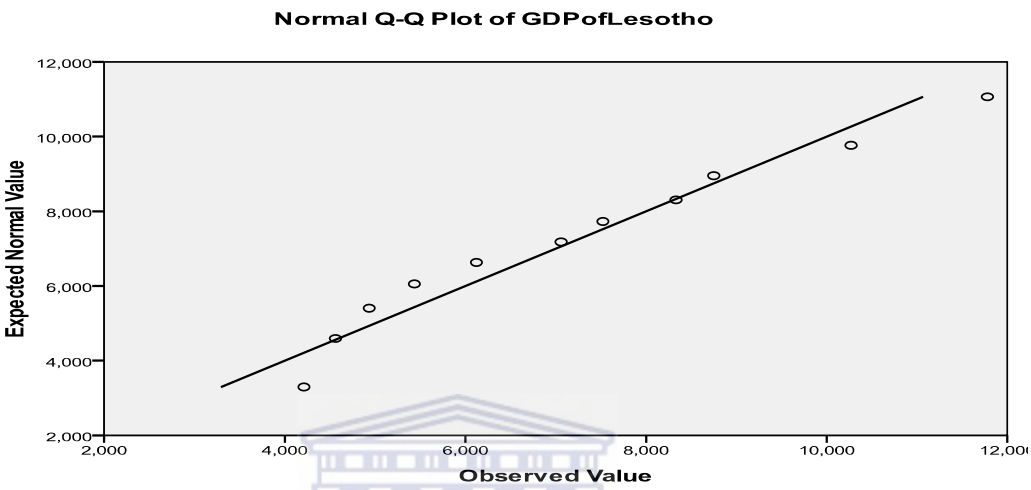
4.1. Assessing the normality of data

Normality of data is one of the prerequisites before statistical tests can be applied for analysis. The graphical presentation of assessing the normality of our data is done on the normal Q-Q plot while the statistical test used to assess the normality is the Shapiro-Wilk test.

This section is divided into six sub-sections. Sub-sections 4.1.1, 4.1.2 and 4.1.3 respectively present assessing the normality of the: GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing while sub-sections 4.1.4, 4.1.5 and 4.1.6 respectively present assessing the normality of the: GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing.

4.1.1. Assessing the normality of the GDP of Lesotho

Graph 4.1: Q-Q Plot of the GDP of Lesotho



Graph 4.1 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of Lesotho is normally distributed.

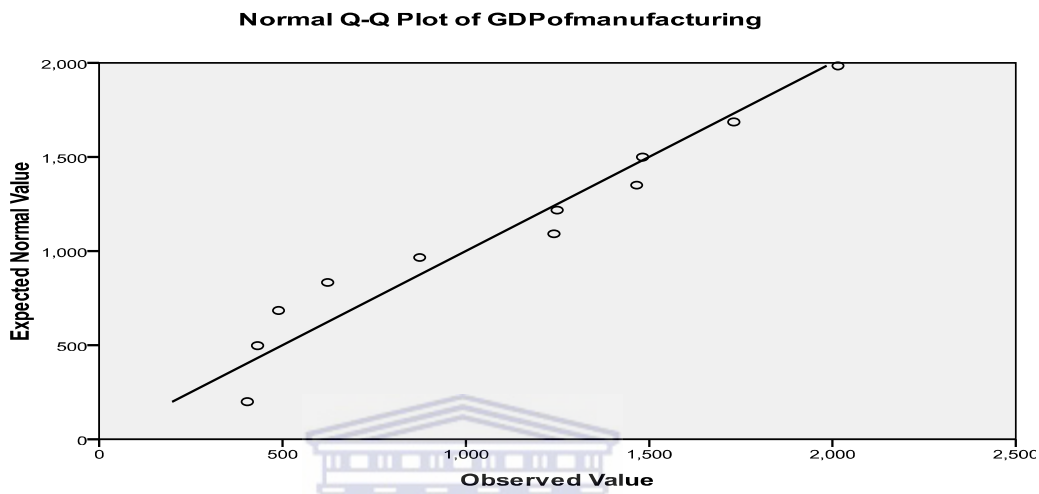
In Table 4.1, the Shapiro-Wilk test shows that our p-value (0.603) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of Lesotho is statistically normally distributed.

Table 4.1: Shapiro-Wilk test of normality for the GDP of Lesotho

	Shapiro-Wilk		
	Statistic	Df	Sig.
GDP of Lesotho	.947	11	.603

4.1.2. Assessing the normality of the GDP of manufacturing

Graph 4.2: Q-Q Plot of the GDP of manufacturing



Graph 4.2 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of manufacturing is normally distributed.

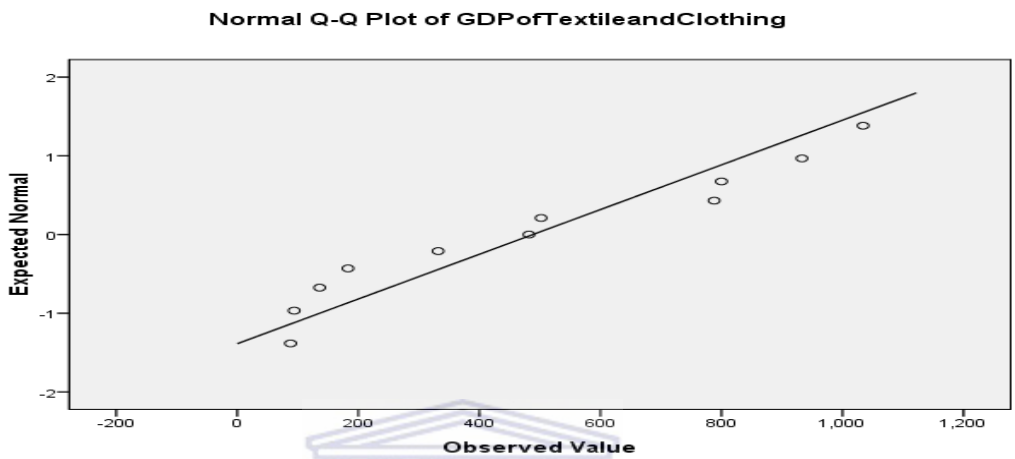
In Table 4.2, the Shapiro-Wilk test shows that our p-value (0.365) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of manufacturing is statistically normally distributed.

Table 4.2: Shapiro-Wilk test of normality for the GDP of manufacturing

	Shapiro-Wilk		
	Statistic	df	Sig.
GDP of Manufacturing	.925	11	.365

4.1.3. Assessing the normality of the GDP of textile and clothing

Graph 4.3: Q-Q Plot of the GDP of textile and clothing



Graph 4.3 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of textile and clothing is normally distributed.

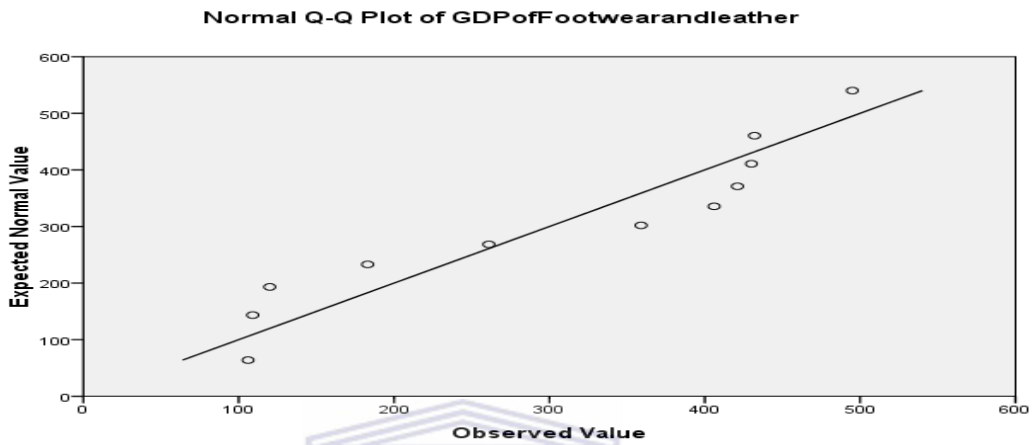
In Table 4.3, the Shapiro-Wilk test shows that our p-value (0.185) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of textile and clothing is statistically normally distributed.

Table 4.3: Shapiro-Wilk test of normality for the GDP of textile and clothing

	Shapiro-Wilk		
	Statistic	df	**Sig.**
GDP of Textile and Clothing	.900	11	**.185****

4.1.4. Assessing the normality of the GDP of footwear and leather

Graph 4.4: Q-Q Plot of the GDP of footwear and leather



Graph 4.4 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of footwear and leather is normally distributed.

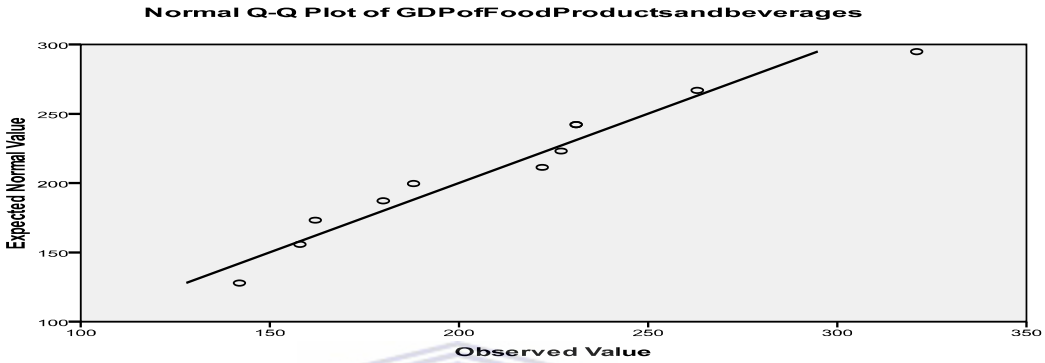
In Table 4.4, the Shapiro-Wilk test shows that our p-value (0.064) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of footwear and leather is statistically normally distributed.

Table 4.4: Shapiro-Wilk test of normality for the GDP of footwear and leather

	Shapiro-Wilk		
	Statistic	df	Sig.
GDP of Footwear and leather	.864	11	.064

4.1.5. Assessing the normality of the GDP of food-products and beverages

Graph 4.5: Q-Q Plot of the GDP of food-products and beverages



Graph 4.5 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of food-products and beverages is normally distributed.

In Table 4.5, the Shapiro-Wilk test shows that our p-value (0.530) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of food-products and beverages is statistically normally distributed.

Table 4.5: Shapiro-Wilk test of normality for the GDP of food-products and beverages

	Shapiro-Wilk		
	Statistic	df	Sig.
GDP of Food Products and beverages	.941	11	.530

4.1.6. Assessing the normality of the GDP of other manufacturing

Graph 4.6: Q-Q Plot of the GDP of other manufacturing

Graph 4.6 shows a linear (line) relationship between the observed and the expected values from the normal distribution. Therefore we conclude that our data for the GDP of other manufacturing is normally distributed.

In Table 4.6, the Shapiro-Wilk test shows that our p-value (0.625) is not signifcant (p-value>0.05) at 5% level hence we accept the null hypothesis of normality and we conclude that our data for the GDP of other manufacturing is statistically normally distributed.

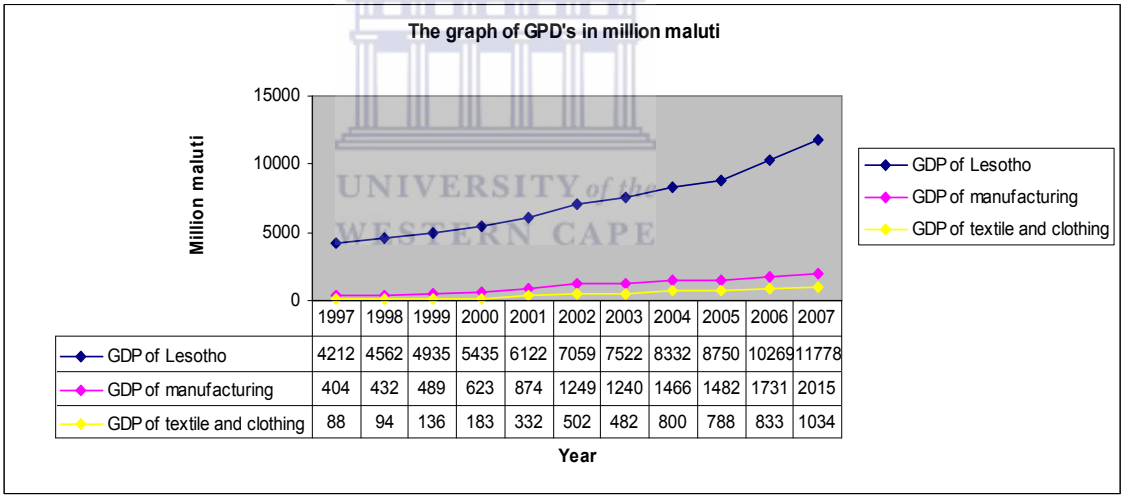
Table 4.6: Shapiro-Wilk test of normality for the GDP of other manufacturing

	Shapiro-Wilk		
	Statistic	df	Sig.
GDP of Other manufacturing	.949	11	.625

4.2. Trend analysis

In this section the trend analysis of the GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing in million maluti will be shown. This section is divided into three sub-sections. Sub-section 4.2.1, 4.2.2 and 4.2.3 respectively presents the trend analysis for the GDP of Lesotho, trend analysis for the GDP of manufacturing and the trend analysis for the GDP of textile and clothing. Graph 4.7, shows the GDP of Lesotho, GDP of manufacturing and the GDP of textile and clothing in million maluti.

Graph 4.7: The GDP of Lesotho, the GDP of manufacturing and the GDP of textile and clothing in million maluti.



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
GDP of Lesotho	4212	4562	4935	5435	6122	7059	7522	8332	8750	10269	11778
GDP of manufacturing	404	432	489	623	874	1249	1240	1466	1482	1731	2015
GDP of textile and clothing	88	94	136	183	332	502	482	800	788	833	1034

4.2.1. Trend analysis for the GDP of textile and clothing

In Graph 4.7, the uptrend is observed from the GDP of textile and clothing from 1997 to 2002 and again from 2005 to 2007. In 2001, the GDP of textile and clothing increased by 81.4% from 34.6% in 2000 on a year to year basis, while in 2003 and 2005 the downtrend was observed in the GDP of textile and clothing. The GDP of textile and clothing increased respectively by 44.7% and 34.6% in 1999 and 2000 while it decreased respectively by -4.0% and -1.5% in 2003 and 2005.

The uptrend and downtrend in the textile and clothing sub-sector affected its contribution in the GDP of manufacturing industry hence the contribution of the manufacturing industry to the GDP of Lesotho. The contribution of textile and clothing to the GDP of manufacturing decreased from 40.2% in 2002 to 38.9% in 2003 and from 54.6% in 2004 to 53.2% in 2005.

This affected the overall contribution of the manufacturing industry to the GDP of Lesotho. The contribution of the manufacturing industry to the GDP of Lesotho decreased from 17.7% in 2002 to 16.5% in 2003 and from 17.6% in 2004 to 16.9% in 2005. This shows that the economic performance of the textile and clothing sub-sector has an impact on the GDP of manufacturing hence on the GDP of Lesotho.

4.2.2. Trend analysis for the GDP of manufacturing

In Graph 4.7, the graph of the GDP of manufacturing behaved like that one of the GDP of textile and clothing. There is an observed uptrend in the GDP of manufacturing from 1997 to 2002 and again from 2005 to 2007. In 2001 The GDP of manufacturing increased 40.3% from 27.4% in 2000.

The GDP of manufacturing decreased from 42.9% in 2002 to -0.7% in 2003 and from 18.2% in 2004 to 1.1% in 2005. This decline in the manufacturing industry affected its contribution to the GDP of Lesotho. The contribution decreased from 17.7% in 2002 to 16.5% in 2003 and from 17.6% in 2004 to 16.9% in 2005.

4.2.3. Trend analysis for the GDP of Lesotho

The GDP of Lesotho has been increasing over the period of this study; this is shown in Graph 4.7. In 2001 and 2002, respectively the growth rate was about 12.6% and 15.3%. However, the GDP of Lesotho increased with the decreasing rate of 6.6% and 5.02% respectively in 2003 and 2005. This decrease was due to the performance of textile and clothing sub-sector of manufacturing. The contribution of textile and clothing into the GDP of Lesotho decreased from 7.1% in 2002 to 6.4% in 2003 and

from 9.6% in 2004 to 9.0% in 2005. The economic performance of the textile and clothing sub-sectors has a serious impact on the GDP of Lesotho. The section that follows presents the regression model analysis.

4.3. Regression models analysis

This section presents the analysis and the interpretation of the regression models. The section is divided into two sub-sections. In Sub-section 4.3.1, we outline the results of the simple linear regression models while that of multiple regressions is outlined in sub-section 4.3.2.

4.3.1 Simple Linear Regression Model (SLRM)

In this sub-section, we analyze the relationship between the GDP of Lesotho and each of the five independent variables (GDP of manufacturing, GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and the GDP of other manufacturing). The section is divided into four sub-sections. Sub-section 4.3.1.1 presents the correlation analysis while Sub-sections 4.3.1.2, 4.3.1.3 and 4.3.1.4 present the applicability of our SLRMs, analysis of regression model and the coefficient of determination respectively.

4.3.1.1 Correlation analysis

The correlation coefficients between the dependent variable and each of the five independent variables are presented in Table 4.7. The correlation between the dependent variable and each of the four independent variable, (GDP of manufacturing, GDP of textile and clothing, GDP of footwear and leather and the GDP of food-products and beverages) is significant at 5% level since all the four p-values (0.000) are less than 0.05. Hence, the null hypothesis of no relationship is rejected in favor of the alternative hypothesis- there is a relationship between each of the four independent variables and the dependent variable.

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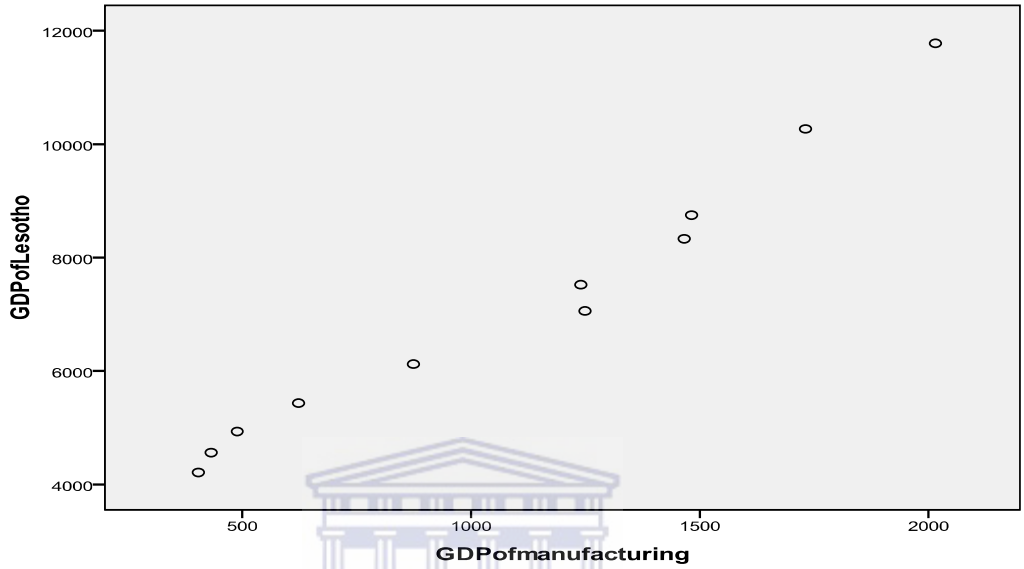
Table 4.7: The pair-wise correlation between the GDP of Lesotho and each independent variable

	GDP of Lesotho
GDP of Lesotho	1.000
	11.000
GDP of Manufacturing	.986**
Sig. (2-tailed)	.000
N	11
GDP of Textile and clothing	.980**
Sig. (2-tailed)	.000
N	11
GDP of Footwear and leather	.897**
Sig. (2-tailed)	.000
N	11
GDP of Food-products and beverages	.970**
Sig. (2-tailed)	.000
N	11
GDP of Other manufacturing	.586
Sig. (2-tailed)	.058
N	11

However the correlation between the GDP of Lesotho and the GDP of other manufacturing is not significant at 5% level since the p -value (0.058) is greater than 0.05. Hence we do not reject the null hypothesis of no relationship and we conclude that the two variables are not correlated- there is no relationship between the two

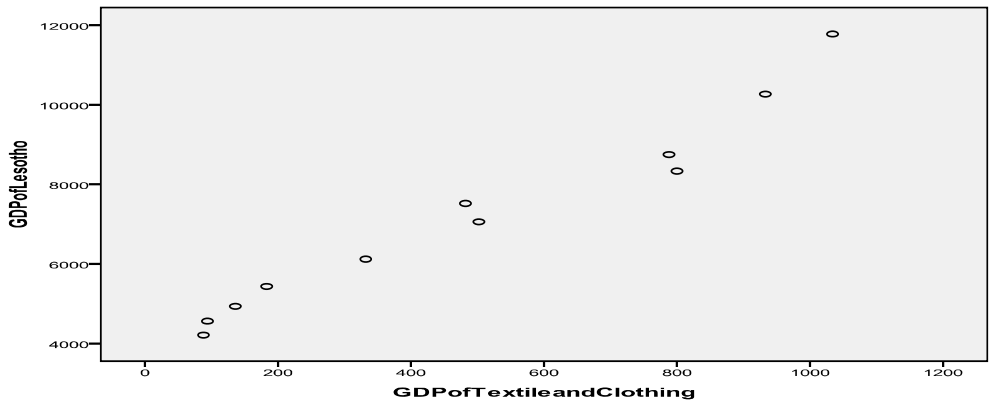
variables. The scatter plots that follow show the graphical representation of each relationship between the dependent variable and the independent variable.

Graph 4.8: The scatter plot of GDP of Lesotho and GDP of manufacturing



This linear relationship was shown by the Pearson Correlation Coefficient (r=0.986) in Table 4.7 to be positive and strong since r is close to 1. Hence we conclude that there is a strong positive linear relationship between the GDP of Lesotho and the GDP of manufacturing sector.

Graph 4.9: The scatter plot of GDP of Lesotho and GDP of textile and clothing

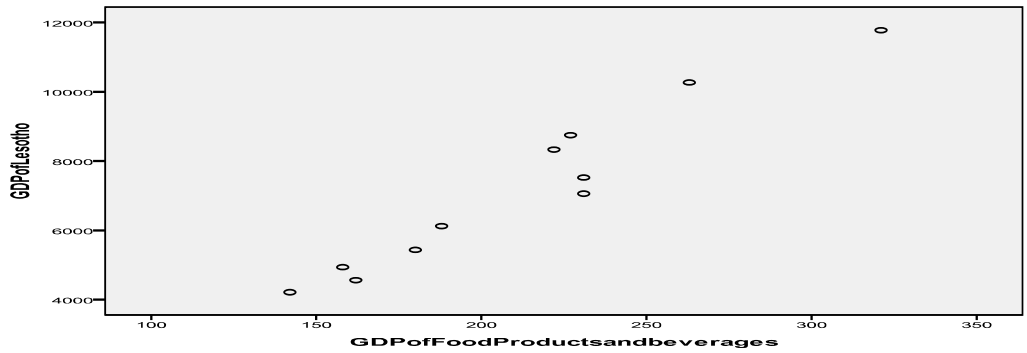


This linear relationship was shown by the Pearson correlation coefficient (r=0.980) in Table 4.7 to be positive and strong since r is close to 1. Hence we conclude that there is a strong positive linear relationship between the GDP of Lesotho and the GDP of textile and clothing.

Graph 4.10: The scatter plot of GDP of Lesotho and GDP of footwear and leather

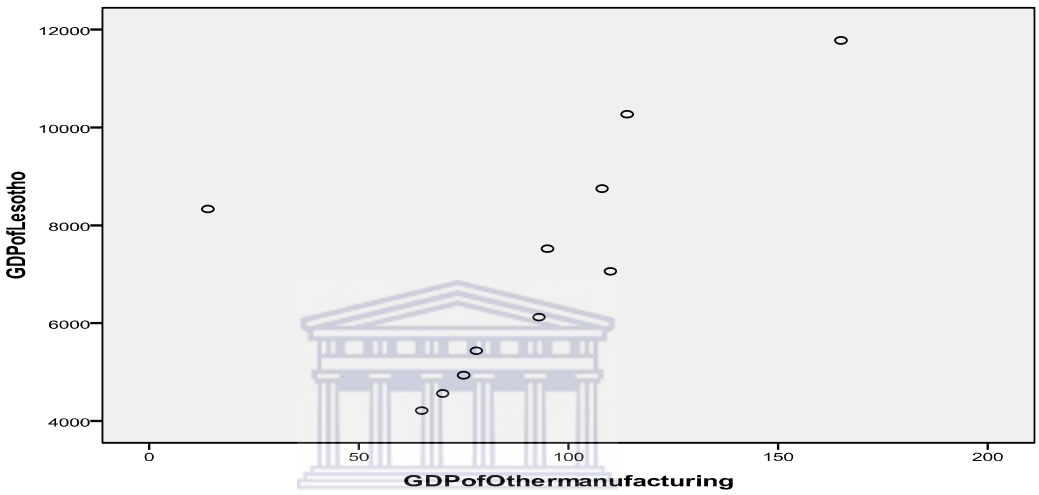
This linear relationship was also shown by the Pearson Correlation Coefficient (r=0.897) in Table 4.7 to be positive and strong since r is close to 1. Hence we conclude that there is a strong positive linear relationship between the GDP of Lesotho and the GDP of Footwear and leather.

Graph 4.11: The scatter plot of GDP of Lesotho and GDP of food-products and beverages



This linear relationship was shown by the Pearson Correlation Coefficient (r=0.970) in Table 4.7 to be positive and strong since r is close to 1. Hence we conclude that there is a strong positive linear relationship between the GDP of Lesotho and the GDP of food-products and beverages.

Graph 4.12: the scatter plot of GDP of Lesotho and GDP of other manufacturing



In Table 4.7, the Pearson Correlation Coefficient between the GDP of Lesotho and the GDP of other manufacturing was found to be (r=0.586). This shows that there is a moderate positive relationship between the two variables but the relationship is not significant at 5% level. The next section assesses the applicability of our simple linear regression models from the ANOVA tables.

4.3.1.2 Applicability of simple linear regression models

Table 4.8 : The ANOVA table between the GDP of Lesotho and the GDP of manufacturing

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.776E7	1	5.776E7	304.064	.000[a]
	Residual	1709777.130	9	189975.237		
	Total	5.947E7	10			

In Table 4.8, the null hypothesis of the SLRM between the GDP of Lesotho and the GDP of manufacturing not applicable is rejected in favor of the alternative, the model is applicable since the F-ratio (304.064) is significant at 5% level; the p-value (0.000) is less than 0.05. Hence the SLRM between the GDP of Lesotho and the GDP of manufacturing is applicable.

Table 4.9 : The ANOVA table between the GDP of Lesotho and the GDP of textile and clothing

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.714E7	1	5.714E7	220.027	.000**
	Residual	2337149.132	9	259683.237		
	Total	5.947E7	10			

In Table 4.9, the null hypothesis of the SLRM between the GDP of Lesotho and the GDP of textile and clothing not applicable is rejected in favor of the alternative, the model is applicable since the F-ratio (220.027) is significant at 5% level; the p-value (0.000) is less than 0.05. Hence the SLRM between the GDP of Lesotho and the GDP of textile and clothing is applicable.

Table 4.10 : The ANOVA table between the GDP of Lesotho and the GDP of footwear and leather

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.785E7	1	4.785E7	37.043	.000
	Residual	1.163E7	9	1291720.956		
	Total	5.947E7	10			

In Table 4.10, the null hypothesis of the SLRM between the GDP of Lesotho and the GDP of footwear and leather not applicable is rejected in favor of the alternative, the model is applicable since the F-ratio (37.043) is significant at 5% level; the p-value (0.000) is less than 0.05. Hence the SLRM between the GDP of Lesotho and the GDP of footwear and leather is applicable.

Table 4.11 : The ANOVA table between the GDP of Lesotho and the GDP of food-products and beverages

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.595E7	1	5.595E7	143.019	.000[a]
	Residual	3521079.083	9	391231.009		
	Total	5.947E7	10			

In Table 4.11, the null hypothesis of the SLRM between the GDP of Lesotho and the GDP of food-products and beverages not applicable is rejected in favor of the alternative, the model is applicable since the F-ratio (143.019) is significant at 5% level; the p-value (0.000) is less than 0.05. Hence the SLRM between the GDP of Lesotho and the GDP of food-products and beverages is applicable.

Table 4.12 : The ANOVA table between the GDP of Lesotho and the GDP of other manufacturing

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.041E7	1	2.041E7	4.702	.058[a]
	Residual	3.906E7	9	4340534.566		
	Total	5.947E7	10			

In Table 4.12, the null hypothesis of the SLRM between the GDP of Lesotho and the GDP of other manufacturing not applicable is accepted since the F-ratio (4.702) is not significant at 5% level; the p-value (0.58) is greater than 0.05. Hence the SLRM is not significant at 5% level. This is consistent with Table 4.7, where we found that there is no relationship between the two variables. The section that follows gives the analyses of the significant SLRMs.

4.3.1.3 Analysis of simple linear regression models

This section gives the analysis of the SLRMs. The SLRM is of the form:

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i .$$

The section is divided into five subsections. Sub-section 4.3.1.3.1, 4.3.1.3.2 and 4.3.1.3.3 respectively presents the analysis of the SLRM between the GDP of Lesotho and the GDP of manufacturing, analysis of the SLRM between the GDP of Lesotho and the GDP of textile and clothing and the analysis of the SLRM between the GDP of Lesotho and the GDP of footwear and leather. The analysis of the SLRM between the GDP of Lesotho and the GDP of food-products and beverages and the SLRM between the GDP of Lesotho and the GDP of other manufacturing are respectively presented in Sub-section 4.3.1.3.4 and Sub-section 4.3.1.3.5.

4.3.1.3.1 The SLRM between the GDP of Lesotho and the GDP of manufacturing

Table 4.13: The parameters of the SLRM between the GDP of Lesotho and the GDP of manufacturing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2497.780	298.931		8.356	.000
	GDP of Manufacturing	4.290	.246	.986	17.437	.000

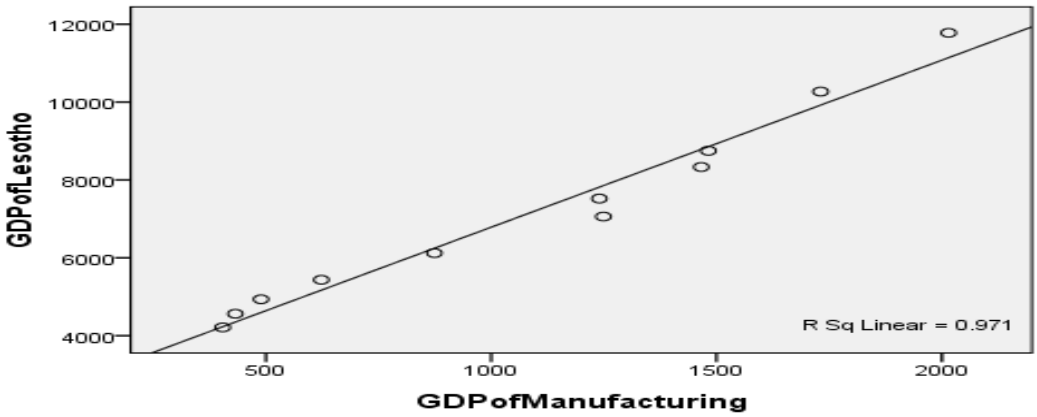
In Table 4.13, the simple linear regression equation between the GDP of Lesotho and the GDP of manufacturing was found to be $\hat{y} = 2497.78 + 4.29x$. This means that the best-fit straight line intersects the y - axis at 2497.78, and when the value of the GDP of manufacturing increases by 1 loti the value of GDP of Lesotho increases by 4.29

maluti. The positive slope (4.29) means that the value of the dependent variable increases as the value of the independent variable increases.

We reject the null hypothesis of our constant β_0 being not significant in Table 4.13 since our p-value (0.000) is less than 0.05 and conclude that our constant β_0 is significantly different from zero hence it is statistically significant. The slope β_1 is also statistically significant at 5% level since our p-value (0.00) in Table 4.13 is also less than 0.05 hence we reject the null hypothesis of not significant and conclude that our slope is significantly different from zero. Hence, we conclude that the GDP of manufacturing can be used to reliably predict the GDP of Lesotho- GDP of manufacturing is useful as a predictor of the GDP of Lesotho.

Graph 4.13 shows the graph of the regression equation together with the data points. There do not appear to be any data point that lies far from the cluster of data points or far from the regression line; thus there are no possible outliers between the two variables.

Graph 4.13: The scatter plot of the regression equation and the data points between, the GDP of Lesotho and the GDP of manufacturing.



4.3.1.3.2 The SLRM between the GDP of Lesotho and the GDP of textile and clothing

Table 4.14:The parameters of the SLRM between the GDP of Lesotho and the GDP of textile and clothing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3864.857	271.193		14.251	.000**
	GDP of Textile and Clothing	6.788	.458	.980	14.833	.000**

In Table 4.14, the simple linear regression equation between the GDP of Lesotho and the GDP of textile and clothing was estimated to be $\hat{y} = 3864.86 + 6.79x$. This means that the best-fit straight line intersects the y - axis at 3864.86 and when the value of the GDP of textile and clothing increases by 1 loti the value of GDP of Lesotho increases by 6.79 maluti. The positive slope (6.79) means that the value of the dependent variable increases as the value of the independent variable increases.

We reject the null hypothesis of our constant β_0 being not significant since our p-value (0.000) is less than 0.05 and conclude that our parameter β_0 is significantly different from zero hence it is statistically significant. The slope β_1 is also statistically significant at 5% level since our p-value (0.00) in Table 4.14 is also less than 0.05 hence we reject the null hypothesis of not significant and conclude that our slope is significantly different from zero. Hence we conclude that our independent variable can be used to reliably predict the dependent variable-that is GDP of textile and clothing is useful as a predictor of the GDP of Lesotho.

Graph 4.14 shows the graph of the regression equation together with the data points. There do not appear to be any data point that lies far from the cluster of data points or far from the regression line; thus there are no possible outliers between the two variables.

Graph 4.14: The scatter plot of the regression equation and the data points between, the GDP of Lesotho and the GDP of textile and clothing.

4.3.1.3.3 The SLRM between the GDP of Lesotho and the GDP of footwear and leather

Table 4.15: The parameters of the SLRM between the GDP of Lesotho and the GDP footwear and leather

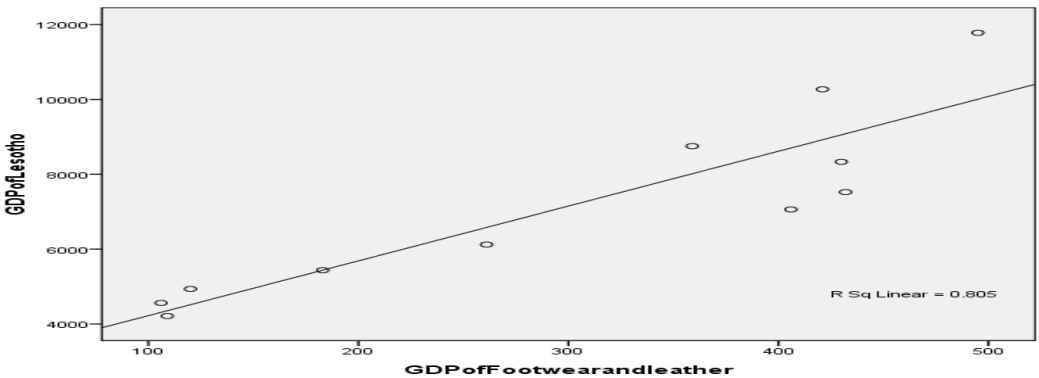
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2759.746	802.996		3.437	.007
	GDP of Foot wear and leather	14.635	2.405	.897	6.086	.000

In Table 4.15, the simple linear regression equation between the GDP of Lesotho and the GDP of footwear and leather was estimated to be $\hat{y} = 2759.75 + 14.64x$. This means that the best fit straight line intersects the y - axis at 2759.75and when the value of the GDP of footwear and leather increases by 1 loti the value of GDP of Lesotho increases by 14.64maluti. The positive slope (14.64) means that the value of the dependent variable increases as the value of the independent variable increases.

The constant β_0 and the slope β_1 are statistically significant at 5% level since our p-values 0.007 and 0.000 respectively in Table 4.15 are less than 0.05 therefore we reject the null hypothesis of not significant and conclude that the two parameters are significantly different from zero- they are statistically significant. Hence we conclude that our independent variable can be used to reliably predict the dependent variable- that is GDP of footwear and leather is useful as a predictor of the GDP of Lesotho.

Graph 4.15 shows the graph of the regression equation together with the data points. There do not appear to be any data point that lies far from the cluster of data points or far from the regression line; thus there are no possible outliers between the two variables.

Graph 4.15: The scatter plot of the regression equation and the data points between, the GDP of Lesotho and the GDP of footwear and leather



4.3.1.3.4 The SLRM between the GDP of Lesotho and the GDP of food-products and beverages

Table 4.16: The parameters of the SLRM between the GDP of Lesotho and the GDP food-products and beverages.

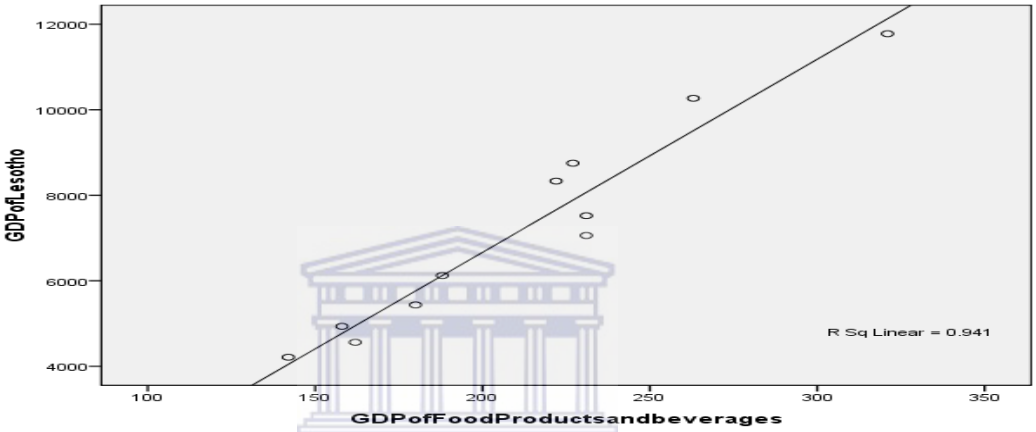
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2364.732	820.067		-2.884	.018
	GDP of Food-Products and beverages	45.156	3.776	.970	11.959	.000

In Table 4.16, the simple linear regression equation between the GDP of Lesotho and the GDP of food-products and beverages was estimated to be $\hat{y} = -2364.73 + 45.16x$. This means that the best fit straight line intersects the y - axis at -2364.73 and when the value of the GDP food-products and beverages increases by 1 loti the value of GDP of Lesotho increases by 45.16 maluti. The positive slope (45.16) means that the value of the dependent variable increases as the value of the independent variable increases.

The constant β_0 and the slope β_1 are statistically significant at 5% level since our p-values respectively (0.018, 0.000) in Table 4.16 are less than 0.05 hence we reject the null hypothesis of not significant and conclude that the constant and the slope are significantly different from zero; they are statistically significant. Hence we conclude that our independent variable can be used to reliably predict the dependent variable- . that is GDP of food-products and beverages is useful as a predictor of the GDP of Lesotho.

Graph 4.16 shows the graph of the regression equation together with the data points. There do not appear to be any data point that lies far from the cluster of data points or far from the regression line; thus there are no possible outliers between the two variables.

Graph 4.16: The scatter plot of the regression equation and the data points between the GDP of Lesotho and the GDP of food-products and beverages.



4.3.1.3.5 The SLRM between the GDP of Lesotho and the GDP of other manufacturing

Table 4.17: The parameters of the SLRM between the GDP of Lesotho and the GDP of other manufacturing

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3769.282	1693.535		2.226	.053
	GDP of Other manufacturing	38.008	17.528	.586	2.168	.058

In Table 4.17, the parameters β_0 and β_1 are not significant at 5% level since our p-values respectively 0.053 and 0.0580 are greater than 0.05 hence we accept the null hypothesis of not significant and conclude that both parameters are not significant. This means that our independent variable cannot be used to predict the dependent variable. This is consistent with the ANOVA Table 4.12 in section 4.3.1.2 where we found that the SLRM between the two variables was not applicable and also in Table 4.7 where we found no relationship between the two variables. The section that follows presents the coefficient of the determination of the SLRMs.

4.3.1.4: Coefficient of determination of the simple linear regression models

Table 4.18: Coefficient of determination between the GDP of Lesotho and the GDP of manufacturing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	.971	.968	435.861

The coefficient of determination r^2 was found to be 0.971 in Table 4.18 for the SLRM between the GDP of Lesotho and the GDP of manufacturing. This means that 97% of the variation in the GDP of Lesotho is explained by the GDP of manufacturing and only 3% is unexplained. Since r^2 value is close to 1 then the regression equation obtained above can be very useful for making predictions.

Table 4.19: Coefficient of determination between the GDP of Lesotho and the GDP of textile and clothing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.980[a]	.961**	.956	509.591

The coefficient of determination r^2 was found to be 0.961 in Table 4.19 for the SLRM between the GDP of Lesotho and the GDP of textile and clothing. This means that 96% of the variation in the GDP of Lesotho is explained by the GDP of textile and clothing and only 4% is unexplained. Since r^2 value is close to 1 then the regression equation obtained above can be very useful for making predictions.

Table 4.20: Coefficient of determination between the GDP of Lesotho and the GDP of footwear and leather

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.897[a]	.805	.783	1136.539

The coefficient of determination r^2 was found to be 0.805 in Table 4.20 for the SLRM between the GDP of Lesotho and the GDP of footwear and leather. This means that 81% of the variation in the GDP of Lesotho is explained by the GDP of footwear and leather and only 19% is unexplained.

Table 4.21: Coefficient of determination between the GDP of Lesotho and the GDP of food-products and beverages

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.970[a]	.941	.934	625.485

The coefficient of determination r^2 was found to be 0.941 in Table 4.21 for the SLRM between the GDP of Lesotho and the GDP of food-products and beverages. This means that 94% of the variation in the GDP of Lesotho is explained by the GDP of food-products and beverages and only 6% is unexplained. Since r^2 value is close to 1 then the regression equation obtained above can be very useful for making predictions. The section that follows presents the analysis of the multiple linear regression model (MLRM).

4.3.2. Multiple Linear Regression Model (MLRM)

In this section, we analyze the relationship between the GDP of Lesotho (dependent variable) and the four sub-sectors of manufacturing as the independent variables.

The MLRM takes the form:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

where Y is the dependent variable and the $x_i^{'s}, i = 1,2,3$ and 4 are respectively the independent variables, GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing. The section is divided into five sub-sections. Sub-sections 4.3.2.1, 4.3.2.2 and 4.3.2.3 respectively present the correlation analysis, applicability of our MLRM, analysis of MLRM while sub-sections 4.3.2.4 and 4.3.2.5 respectively present the coefficient of determination and the analysis of the resulting MLRM.

4.3.2.1. Correlation analysis

The correlation coefficients between the dependent variable and each of the four independent variables are presented in Table 4.22 on the next page. The pair-wise correlation between the three independent variables (GDP of Lesotho, GDP of textile and clothing, GDP of footwear and leather and the GDP of food-products and beverages) and the dependent variable are significant at 5% level. The GDP of other manufacturing becomes significant only when correlated with the GDP of food-products and beverages.

The pair-wise correlations between each of the following independent variables (GDP of textile and clothing, GDP of footwear and leather and the GDP of food-products and beverages) are very high-close to one.

Table 4.22: The pair-wise correlation coefficients between the variables.

		GDP of Lesotho	GDP of Tex and Clothing	GDP of Footwear and leather	GDP of Food Products and beverages	GDP of Other manufacturing
GDP of Lesotho	Pearson Correlation	1.000	.980**	.897**	.970**	.586
	Sig. (2-tailed)		.000	.000	.000	.058
	N	11.000	11	11	11	11
GDP of Textile and Clothing	Pearson Correlation	.980**	1.000	.907**	.923**	.453
	Sig. (2-tailed)	.000		.000	.000	.162
	N	11	11.000	11	11	11
GDP of Footwear and leather	Pearson Correlation	.897**	.907**	1.000	.915**	.430
	Sig. (2-tailed)	.000	.000		.000	.187
	N	11	11	11.000	11	11
GDP of Food-Products and beverages	Pearson Correlation	.970**	.923**	.915**	1.000	.673*
	Sig. (2-tailed)	.000	.000	.000		.023
	N	11	11	11	11.000	11
GDP of Other manufacturing	Pearson Correlation	.586	.453	.430	.673*	1.000
	Sig. (2-tailed)	.058	.162	.187	.023	
	N	11	11	11	11	11.000

4.3.2.2. Applicability of the multiple linear regression model

Table 4.23: The ANOVA table of the multiple linear regression model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.917E7	4	1.479E7	293.693	.000[a]
	Residual	302215.178	6	50369.196		
	Total	5.947E7	10			

Table 4.23 gives the ANOVA table between the GDP of Lesotho and the four independent variables. The null hypothesis of the multiple linear regression model not applicable is rejected in favor of the alternative- MLRM is applicable since the F-ratio (293.693) is significant at 5% level; the p-value (0.000) is less than 0.05. Hence, the MLRM between GDP of Lesotho and the independent variables the fits the data better than the baseline model.

4.3.2.3. Analysis of multiple linear regression model

Table 4.24: The parameters of the multiple linear regression model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	822.464	729.792		1.127	.303		
	GDP of Textile and Clothing	4.680	.648	.676	7.222	.000	.097	10.339
	GDP of Footwear and leather	-2.743	1.504	-.168	-1.824	.118	.100	10.033
	GDP of Food-Products and beverages	22.409	6.999	.481	3.202	.019	.037	26.687
	GDP of Other manufacturing	1.824	3.705	.028	.492	.640	.260	3.851

In Table 4.24, the multiple linear regression

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \varepsilon$$

was estimated to be $\hat{y} = 822.464 + 4.680x_1 - 2.743x_2 + 22.409x_3 + 1.824x_4$.

The GDP of textile and clothing and the GDP of food-products and beverages are the only independent variables that have an impact on the GDP of Lesotho since their t-values respectively 7.222 and 3.202 are significant at 5% level-their p-values respectively (0.000) and (0.019) are less than 0.05.

The other two independent variables are not significant at 5% level therefore they cannot be used as the predictor of the GDP of Lesotho. Hence the GDP of textile and clothing and the GDP of food-products and beverages are the only independent variables that can be used as the predictor of the GDP of Lesotho. The VIF values in Table 4.24 (VIF's > 10) confirm the presence of multicollinearity in three predictor variables the GDP of textile and clothing, GDP of footwear and leather and the GDP of food-products and beverages.

4.3.2.4. Coefficient of determination of the multiple linear regression model

Table 4.25: Coefficient of determination of the multiple linear regression model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.997[a]	.995	.992	224.431

The coefficient of determination r^2 was found to be 0.995 in Table 4.25 for the MLRM between the GDP of Lesotho and the four independent variables. This means that multiple linear regression model accounts for 99.5% of variance in the GDP of Lesotho hence our multiple linear regression model is a good model.

In Table 4.24, the GDP of textile and clothing and the GDP of food-products and beverages were found to be significant at 5% level and the other two independent variables were insignificant. Their presence in the MLRM affects the coefficient of our significant independent variables hence we remove them from the MLRM. The resulting MLRM is presented in the following section.

4.3.2.5: The analysis of the resulting multiple linear regression model

Table 4.26:The ANOVA table of the resulting MLRM

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.886E7	2	2.943E7	383.693	.000[a]
	Residual	613624.204	8	76703.026		
	Total	5.947E7	10			

Table 4.26 gives the ANOVA table between the GDP of Lesotho and the two significant independent variables. The null hypothesis of the multiple linear regression model not applicable is rejected since the F-ratio (383.693) is significant at 5% level-the p-value (0.000) is less than 0.05. Hence the MLRM between the GDP of Lesotho and the two significant independent variables fits the data better than the baseline model.

Table 4.27: The parameters of the resulting multiple linear regression model

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	899.749	642.645		1.400	.199
	GDP of Tex and Clothing	3.969	.645	.573	6.157	.000
	GDP of Food-Products and beverages	20.542	4.333	.441	4.740	.001

In Table 4.27, our multiple linear regression equation is estimated as follows:

$$\hat{y} = 899.749 + 3.969x_1 + 20.542x_3 .$$

The two independent variables, the GDP of textile and clothing and the GDP of food-products and beverages are still significant at 5% level-their p-values respectively (0.000) and (0.001) are less than 0.05. Hence the GDP of textile and clothing and the GDP of food-products and beverages are the only two independent variables that can be used as the predictor of the GDP of Lesotho.

Table 4.28 gives the coefficient of determination of the resulting model. The GDP of textile and clothing and the GDP of food-products and beverages accounts for 99% of variation in the GDP of Lesotho. The chapter that follows presents the discussions of the findings, conclusion and the recommendations.

Table 4.28: Coefficient of determination of the resulting multiple linear regression model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.995[a]	.990	.987	276.953

CHAPTER FIVE

DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5. Introduction

This chapter is divided into three sub-sections. Section 5.1, presents the discussion of the findings of the study. The conclusions and the recommendations are respectively presented in section 5.2 and section 5.3.

5.1. Discussion of the findings of the study

This section is divided into two sub-sections. Sub-section 5.1.1 will present the discussion on the trend analysis of the GDP of Lesotho, the GDP of manufacturing and the GDP of textile and clothing while Sub-section 5.1.2 will present the discussion on the regression models analysis.

In order to investigate and analyze the relationship between the GDP of Lesotho and the GDP of manufacturing/GDP of textile and clothing, the study explored the following questions:

1. What type of the relationship exists between the GDP of Lesotho and GDP of manufacturing/ GDP of textile and clothing?

2. How much of the variation in the GDP of Lesotho is explained by the GDP of Manufacturing?

And the following hypotheses were tested:

1. There has been an increase in the GDP of manufacturing due to the AGOA of 2001.

2. There has been a decline in the contribution of manufacturing industry on the GDP of Lesotho due to expiry of MFA in December 2004.

5.1.1. The trend analysis

In Graph 4.7, the GDP of textile and clothing was found to increase by 81.4% in 2001 from growth rate of 34.6% in 2000. This massive increase was due to the AGOA in 2001 which allowed customs and quota free access of the Lesotho textile and clothing exports to the USA markets.

It was under this AGOA that numbers of textile and clothing firms were established in Lesotho resulting in thousands of job creation and growth in the textile and clothing sub-sector hence the growth in the whole manufacturing industry (Central Bank of Lesotho, 2004a; Central Bank of Lesotho, 2004b; Lesotho National Development Corporation, 2005; Bureau of Statistics, 2009).

This resulted in the increase in the production volume of textile and clothing hence the increase in the GDP of textile and clothing. This increase in the textile and clothing sub-sector resulted in the increase in the whole manufacturing industry hence an increase in the GDP of Lesotho. The GDP of manufacturing increased by 40.3% in 2001 from 27.4% in 2000. In 2001 and 2002 respectively manufacturing accounted for 14.3% and 17.7% of the total GDP of Lesotho and textile and clothing accounted for respectively 38.0% and 40.2% of the GDP of manufacturing.

The downtrend in 2003 and 2005 of the GDP of textile and clothing, GDP of manufacturing and the GDP of Lesotho in Graph 4.7 was observed. In 2003 the decrease was due to Lesotho currency depreciation and weak global economic developments. The loti depreciated gradually from 2001 until it reached 6.56 maluti per dollar in December 2003 but recovered again in 2004 (Central Bank Lesotho, 2004b).

This currency depreciation weakened the textile and clothing demand. Hence economic performance of the textile and clothing sub-sector declined. The GDP of textile and clothing decreased by -4.0% in 2003 from 51.2% increase in 2002. This poor economic performance affected the whole manufacturing sector and the GDP of manufacturing decreased by -0.7% in 2003 from 42.9% in 2002. The contribution of the whole manufacturing industry to the GDP of Lesotho decreased by 16.5% in 2003 from 17.7% in 2002. The GDP of Lesotho still increased under this circumstance but the increase was at the decreasing rate of 6.6% in 2003 from 15.3% in 2002.

In 2005, the downtrend in Graph 4.7 was due to the expiry of MFA in December 2004 which intensified global competition for the market of Lesotho's textiles and clothing exports as it opened up the USA markets to the Asian countries. This competition negatively affected the demand for Lesotho's textile and clothing exports in the USA market and resulted in poor economic performance of the manufacturing sector especially textile and clothing as a result of a drop in Lesotho clothing exports (Central Bank of Lesotho, 2004b; Central Bank of Lesotho, 2005; Bennet, 2006).

Since manufacturing is a key economic driver this slowdown had an adverse impact on the overall economy of Lesotho. The growth rate of the GDP of Lesotho decreased by 5.0% in 2005 from 10.8% in 2004 and that of the GDP of textile and clothing decreased by -1.5% in 2005 from 66.0% in 2004.

5.1.2. Regression models analysis

This study has investigated the relationship between the GDP of Lesotho and each of the five independent variables (GDP of manufacturing, GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing) and the relationship between the GDP of Lesotho and each of the four manufacturing sub-sectors as independent variables over the period of 11 years, 1997-2007. This section is divided into two sub-sections. Sub-section 5.1.2.1 presents the discussion of the SLRMs and sub-section 5.1.2.2 presents the discussion of the Multiple Linear Regression Model (MLRM).

5.1.2.1. The Simple Linear Regression Models (SLRMs)

In this study, the simple linear regression model as defined in Chapter 3 section 3.5 was used to investigate the relationship between the GDP of Lesotho as the dependent variable and each of the five independent variables (GDP of manufacturing, GDP of textile and clothing, GDP of footwear and leather, GDP of food-products and beverages and the GDP of other manufacturing). All the SLRMs except the one between the GDP of Lesotho and the GDP of other manufacturing were found to be linear, positive and strong.

This means that each of the four independent variables (GDP of Manufacturing, GDP of textile and clothing, GDP of footwear and leather and the GDP of food-products and beverages) can be used as the predictor of the GDP of Lesotho. The GDP of Lesotho increases every time the GDP of these independent variables increase. The SLRMs of interest were the ones between the GDP of Lesotho and the GDP of manufacturing and the GDP of Lesotho and the GDP of Textile and clothing.

The correlation between the GDP of Lesotho and GDP of manufacturing was found to be positive linear and strong (0.986). This means that there exists a positive linear relationship between the two variables- the two variables are highly correlated. The simple linear regression equation between the GDP of Lesotho and the GDP of

manufacturing was found to be $\hat{y} = 2497.78 + 4.29x$. This means that the best-fit straight line intersects the y - axis at 2497.78 and the positive slope (4.29) means that every time the GDP of manufacturing increases so does the GDP of Lesotho- when the GDP of manufacturing increases by one loti the GDP of Lesotho increases by 4.29 maluti.

The SLRM between the GDP of Lesotho and the GDP of manufacturing was found to be applicable from the ANOVA Table 4.8 and the two parameters were also found to be significant at 5% level. The coefficient of determination r^2 was found to be 0.971 for SLRM in Table 4.18. This means that 97% of the variation in the GDP of Lesotho is explained by the GDP of manufacturing and only 3% is unexplained. Since r^2 value is close to 1 then the regression equation obtained above can be very useful for making predictions. Hence, we conclude that the GDP of manufacturing can be used to reliably predict the GDP of Lesotho - GDP of manufacturing is useful as a predictor of the GDP of Lesotho.

The correlation between the GDP of Lesotho and GDP of textile and clothing was also found to be positive linear and strong (0.980). This means that there exists a positive linear relationship between the two variables- the two variables are highly correlated. The simple linear regression equation between the GDP of Lesotho and the GDP of textile and clothing was estimated to be $\hat{y} = 3864.86 + 6.79x$. This means that every time the GDP of textile and clothing increases by one loti the GDP of Lesotho increases by 6.79 maluti.

The SLRM between the GDP of Lesotho and the GDP of textile and clothing was found to be applicable from the ANOVA Table 4.9 and the two parameters were also found to be significant at 5% level. The coefficient of determination r^2 was found to be 0.961 in Table 4.19. This means that the GDP of textile and clothing accounts for 96.1% of the variation in the GDP of Lesotho. Since r^2 value is close to 1 then the

regression equation obtained above can be very useful for making predictions. Hence, we conclude that the GDP of textile and clothing can be used to reliably predict the GDP of Lesotho- GDP of textile and clothing is useful as a predictor of the GDP of Lesotho.

5.1.2.2. The Multiple Linear Regression Model (MLRM)

The multiple linear regression model as defined in Chapter 3 Section 3.5 was used to investigate the relationship between the GDP of Lesotho as the dependent variable and the four sub-sectors of manufacturing as the independent variables.

The MLRM was found to be statistically significant and the GDP of textile and clothing and the GDP of food-products and beverages were the only significant independent variables in the model. The other two independent variables did not make any significant contribution into the model hence they were removed from the model. The resulting MLRM was then $\hat{y} = 899.749 + 3.969x_1 + 20.542x_3$. The GDP of textile and clothing and the GDP of food-products and beverages accounted for 99% of variation in the GDP of Lesotho. This means that the GDP of textile and clothing together with the GDP of food-products and beverages are good predictors of the GDP of Lesotho.

5.2. Conclusion

As mentioned in Chapter one, Lesotho is one of the poorest and least developed countries in the world with about 80% of its population living in the rural areas and almost half of the population lives below the poverty line. The unemployment rate prevails around 22.7% and the majority of the population works in agriculture and the informal sector, where the returns are very low.

The manufacturing industry in Lesotho is labor intensive shedding jobs mainly to unskilled Basotho women who make 80% of the manufacturing workers. Although the manufacturing industry is still recovering after the expiry of the MFA in 2004, much more needs to be done to put the manufacturing industry on a path of sustainable economic growth and development. There are still some constraints most importantly the financial constraint that hinders the production and performance of other manufacturing sub-sectors. This results in poor economic performance of the whole manufacturing industry hence the decrease in its contribution into the GDP of Lesotho.

The evidence in this study supports the view that manufacturing especially textile and clothing is the key economic driver of the Lesotho's economy. However, the manufacturing industry is vulnerable to changes in other countries as its success depends on trade privileges Lesotho has with the other countries.

5.3. Recommendations

In this study, it was shown that the GDP of manufacturing/GDP of textile and clothing is a good predictor of the GDP of Lesotho. There existed a positive linear relationship between the two variables meaning that as the value of the GDP of manufacturing/GDP of textile and clothing increases so does the value of the GDP of Lesotho.

The economy of Lesotho depends for growth, employment and foreign revenue on the manufacturing sector. This is entirely driven by the export-oriented foreign investors in the manufacturing sector and depends on certain trade privileges Lesotho has with other countries.

Lesotho's export trade is highly concentrated in terms of its manufacturing textile products and markets. Its performance in U.S.A markets indicates that Lesotho's textile exporters have been competitive under the AGOA agreement. Based on major findings of this study, we therefore recommend that in order to improve and maintain the economic growth and to avoid further deterioration in the manufacturing industry:

1. The Government of Lesotho should try to diversify its other manufacturing sub-sector products by attracting more investors in order to fully exploit the trade agreements it has with other countries. This will help in markets creation of manufacturing products hence increased economic growth in the whole manufacturing industry resulting in sustainable development of the whole country.

2. Although loti is pegged to South African rand at parity, the exchange rate instability is also a major constraint to manufacturing industry economic performance. Due to the AGOA of 2001 most of garment exports from Lesotho are bound for the U.S. markets. The currency depreciation against the USA dollar weakens the Lesotho's textile and clothing demand as it was

the case in 2003. Diversifying export markets outside of the United States would reduce concern about the dollar rand exchange rate and make the economy less vulnerable to exchange rate fluctuations.

3. The Government of Lesotho must also try to reduce its full dependence on trade agreements as some of them are on a time bound initiative like the AGOA which will come to an end in 2015. The expiry of these trade agreements negatively affects the economic performance of the whole manufacturing industry as this was the case with the expiry of the MFA in December 2004. The government policy makers should try to develop permanent comparative advantages in order to avoid the deterioration in the manufacturing industry when these trade agreements are discontinued. The manufacturing capacity must also be strengthened so that can effectively deal with growing competition and economic rapid changes.

4. Some of the manufacturing sub-sectors are still constrained by the financial resources and both technical and entrepreneurial skills for improved production to better meet current and future demand. Facilitating the manufacturing trade finance can also help to overcome some of these constraints the manufacturing sub-sectors face as this tends to hinder their production in terms of quantities and quality hence resulting in poor economic performance of the whole manufacturing industry hence the decrease in its contribution into the GDP of Lesotho.

5.4. Further research

The future research on this study will assess the influence of multicollinearity on the coefficients of the regression equation. The errors $\varepsilon_i^{'s}$ in the regression model will not be assumed uncorrelated so that the autocorrelation can also be assessed.

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