MANUFACTURING INDUSTRY AND ECONOMIC GROWTH IN KENYA:

A KALDORIAN APPROACH FOR (1971-2013)

BY

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DECLARATION

This research paper is my original work. I have not used any other than permitted reference sources or materials nor engaged in any plagiarism. All references and other sources used have been appropriately acknowledged in the work. The work has not been submitted for the purpose of academic examination, either in its original or similar form, anywhere else.

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DEDICATION

This paper is dedicated to my late father, Francis Rioba, my mother Eunice Rioba and my siblings. May this paper be an emblem of the ripe fruits of your labor and support. May the Almighty bless you greatly.

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OLS	Ordinary Least Squares
BoP	Balance of Payments
FDI	Foreign Direct Investments
GDP	Gross Domestic Product
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
KIPPRA	Kenya Institute of Public Policy and Research Analysis
OECD	Organization for Economic Co-operation and Development
RPED	World Bank's Regional Programme on Economic Development
ROK	Republic of Kenya
UNDP	United Nations Development Programme
Vision 2030	Kenya's long-term Development Policy Framework (2008-2030)
LR	Likelihood Ratio
ZA	Zivot Andrews
AR	Autoregressive

ABSTRACT

This study sought to determine the importance of manufacturing industry for the growth of Kenyan economy from Kaldorian perspective. Over the last four decades, the Kenyan economy has experienced mixed growth rates growing at low average of 3.93% annually against Vision 2030 set target of 10% annually. Using regression research design, the paper tested Kaldor's' three growth laws using sample of 42 observations during the period 1971-2013. The estimate results do not appear to support Kaldor's laws in Kenya thus Kaldor's theory "manufacturing is the engine of growth" is not proven in Kenya. According to the study, manufacturing industry only accounts for 8% of overall GDP growth differences in Kenya which is below 25% target set by Vision 2030. Structural transformation has occurred in reverse with non-manufacturing output constituting the major component of GDP as opposed to manufacturing output contrary to Kaldor's view. The result concurs with similar studies using Kaldorian approach carried in developing countries like Kenya. The results indicate that 1980s and 1990s as the important period during which structural changes were most significant in determining growth. This is essential for exact evaluation of policy implementation that will bring about structural transformation in the economy. Given the results, the paper recommends appropriate policy implementation that will bring about structural transformation that will stimulate growth.

CHAPTER ONE

1.0 INTRODUCTION

This chapter will introduce Kaldor's growth theory and relate it to Kenya's sectoral economic performance, state research problem, question, objective and justification for the study.

1.1 BACKGROUND OF THE STUDY

Economists have discussed the causes and determinants of economic growth for a long time. In recent times, the rise of 'endogenous growth' models after Lucas (1988) and Romer (1986, 1990) has eclipsed neoclassical growth theory of Solow and Swan exogenous growth models of 1956. The main feature of this 'new growth' approach is the role of increasing returns to scale in explaining economic growth. Nicholas Kaldor (1966), the first economist to consider this aspect, emphasized the importance of exogenous components of demand in determining long-run economic growth. Kaldor presented the positive relationship between increased share in manufacturing output in aggregate GDP and augmented economic growth. He considered the interaction process between increases in demand induced by increase in supply to arise from increase in demand as a result of increase in industrial activities as the source of growth.

Kaldor's perspective originates from the fact that economic development process is described by principal changes in the structure of production and employment. These changes result from either sectoral differences in growth of productivity or sectoral differences in income elasticities of demand which is the foundation of Kaldor's theory. Structural changes resulting from differences in income elasticities of demand across sectors are founded on the premise that households expand their consumption along the hierarchy of needs (Thirlwall, 2013). Engel's (1857) consumption hypothesis also postulates that consumption pattern is the origin of structural changes and product innovations. Romer (1990), Grossman and Helpman (1992) endogenous growth model concur that when growth is driven by product innovations, a significant two way causality between structural changes and growth arises. The growth of new industries determines innovative incentives leading tohigh aggregate growth when structural changes in favour of manufacturing activities (Güçlü, 2013).

Manufacturing industry is the principal source of economic growth, the leading edge of modernization and skilled job creation, fundamental cause of positive spillovers thus foundation for industrialization (Libanio and Moro, 2007). It plays a key role of structural dynamics and transformation in the form of increased share in aggregate output leading to accelerated growth and reduced volatility (Elhiraika, 2008). Through its derived demand for labour resources, it helps in transfer of labour resources from low productive sectors (or disguised employment) in agriculture and informal sectors to more productive economic segment of industrial sector (Kaldor, 1966). Kaldor characterized this process as transition from "immaturity" to "maturity" economy, where an immature economy is the one with a large amount of labour resources available in agriculture and informal service sectors as in example of Kenya.

Given this positive association between manufacturing output growth and economic growth, this study will analyze the relationship between manufacturing growth output and growth in Kenya using Kaldor's approach. The paper will use Kaldor's laws to determine the nature of the relationship between manufacturing output growth and economic growth. The paper will use time series data from 1982-2013 to ascertain whether the growth of GDP is positively related manufacturing output in a fundamental sense as opposed to definitional sense.

Within the last 50 years, the sectoral structure of the Kenyan economy has experienced a series of structural transformation[1]. Within this period, the share of agriculture, service and informal in GDP has increased from approximately 87.81% in 1970 to 89.76% in 2012 while the share of manufacturing has decreased from 12.19% to 10.31% in the same period (Appendix 1). The structural transformation in favour of manufacturing sector which constitute approximately 13% of cumulative GDP, makes the relationship between manufacturing production and economic growth vital for analysis.

Structural changes in Kenya are explained by successive structural transformation by the order of policies implemented. In1960-70s, import substitution and stabilization policies with high administrative interventions and controls prevailed in economic management (Ndung'u 1997). In 1980-90s's of open policy reforms in form of privatization and liberalization of trade were adopted following1980s Washington consensus initiatives of structural adjustment programmes aimed at enhancing export production[2] (Were, 2006). The policies proofed insufficient to support growth as the economy recorded lowest growth rates of -1.08 per cent, unemployment rose, informal employments increased and exports declined (Ng'eno et al., 2001). The millennium era of 2000s marked a spectacular change of policy to 'investment climate' characterized by institutional policy and regulatory environment where firms will operate freely (ROK 2003). The focus was anchored on factors that will reflect the concept of free market economy and private sector performance as the prime system of promoting economic activities (Rama, 2001). Major

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[1]Foellmi, R. and Zweimüller, J. (2005) defines Structural transformation as the transfer of resources from low productive sectors of agriculture and informal activities to higher productive economic activities in manufacturing activities.

[2]These were in the form of export process zones (EPZs), establishment of industrial parks, international agreements in form of Preferential Trade Area (PTA), Common Market for East and Central Africa (COMESA) and African Growth Opportunity Act (AGOA) to boost regional collaboration and to promote exports through trade

blue print policy reforms were developed to propel the country into industrialized status by supporting the industrial sector[3] (ROK 2008a, 2008b). Real GDP grew remarkably reaching a high growth rate of 7 per cent in 2007 with modest formal employments a replica of mid 1960s (Manda, 2002; ROK, 2011).

The paper is organized into four chapters. The present chapter provides background of manufacturing industry, sectoral economic structure, economic growth and research problem. Chapter two reviews theoretical and empirical literature. Chapter three presents Kaldor's growth laws specifications and Chapter four will do data analysis.

1.2 Kenya's GDP Composition, Manufacturing Industry and Growth: Stylized facts

Kaldor's hypothesis links increased output from manufacturing as a share of GDP to economic growth which forms the basis for structural economic transformation in favour of manufacturing (Thirlwall and López, 2013). Successful structural transformation is thus reflected in GDP output when manufacturing output commands highest % share. As the sector expands, it draws resources from agriculture and service sectors simultaneously raising productivity in these sectors (Mamgain, 1999). Table-1.1 gives an overview of Kenya's economic structure and composition.

[3] Poverty Reduction Strategy Paper of 2001-2004 (PRSP), the Economic Recovery Strategy for Wealth Creation and Employment 2003-2007 (ERS), Kenya Vision 2030, Medium Term Plans series derived from Kenya Vision 2030 long-term blue print policy framework, Medium Term Expenditure Framework (MTEF) and Programme Based Budgeting (PBB)

Table 1.1: GDP Composition

Average share of GDP Composition Output and Growth Trends in Kenya: 1971-2013

	1971-1979	1980-89	1990-99	2000-13	Average
Agriculture (% share of GDP)	37.00	33.18	30.69	27.65	**32.13**
Services (% share of GDP)	49.02	52.74	56.35	61.11	**54.80**
Manufacturing (% share of GDP)	13.98	13.93	12.85	11.38	**13.03**
Manufacturing (% share growth)	-0.890	-0.716	-1.354	-0.781	**-0.94**
Agriculture (% share growth)	-0.21	-0.961	0.506	-0.686	**-0.34**
Services (% share growth)	0.60	0.845	0.129	0.652	**0.56**
GDP growth rate	5.10	4.44	2.21	3.93	**3.92**
Manufacturing Growth Rate	5.20	4.79	1.36	3.58	**3.73**
Formal employment Growth Rate	4.02	3.74	2.03	1.58	**2.84**
Informal employment Growth Rate	9.78	10.95	29.30	8.63	**14.67**

Source: UNDP National Accounts

In Table-1.1 the percentage share of manufacturing output in GDP is expected to be positive and increasing while agriculture and service sectors to be decreasing. However, as observed in table-1, from 1971-2013 manufacturing and agriculture growth output as a % share of GDP grew at an average of -0.94% and -0.34% respectively compared to services sector and others increasing by 0.60% per year. In same period, real GDP growth rate followed the same trend and decreased by approximately 25%grow at an annual average of 3.92%.

In his conventional model, Kaldor proposed growth of exports as the true component of aggregate demand at both national and regional levels because investments and consumption demands are principally stimulated by growth of output itself. This explains the importance of greater exports in industrializing and industrialized countries and regions. Exports are also closely related to manufacturing growth, exports growth will depend on the structure of production in favour of manufacturing and income elasticity of demand for different products as per Engel's law (Foellmi, R. and Zweimüller, J. 2005). Hence the growths of exports are endogenously related to the growth rate of manufacturing output since all manufactures are basically tradable. According to Kaldor (1966) and Engels' law, primary products and services though basically tradable, the demand growth for primary products at international market and income elasticity for services in world markets are both low compared to medium to high-technology manufactured goods (Thirlwall and López, *op cit*).

Kaldor (1981) considered Harrod-multiplier more important in understanding the pace and rhythm of economic growth than Keynesian-investment multiplier. That is to say, it is easier rather difficult to rectify import-export gap than savings-investment gap. The model refers to openness to trade of a country, broadly measured in terms of exports and imports as a share of GDP. A large body of literature supports the positive relationship between economic growth and openness to trade (Edwards, 1992; Krueger, 1997; Wacziarg and Horn Welch, 2003). As a measure of openness, when $\varepsilon > \pi$ (imports>exports), balance of payment constraint will show up and if the capital inflows do not finance the deficit, slow growth and unemployment will result.

Tables-1.2 shows Kenya's imports-exports, FDI and balance of payments trends.

Table 1.2: Kenya's Balance of Payments Performance: 1971-2013

	1971-79	**1980-89**	**1990-99**	**2000-13**	**Average**
FDI net inflows (% of GDP)	0.410	0.423	0.604	0.722	0.588
Exports Growth (% of GDP)	0.652	-0.712	0.479	3.088	0.952
Imports Growth (% of GDP)	-0.891	-0.07	-0.24	4.74	1.477
Exports (Annual % Growth)	0.412	3.378	4.153	6.081	4.537
Imports (Annual % Growth)	4.163	1.41	8.03	8.1	5.847
Current Account Balance ($)	-0.423	-0.397	-0.252	-0.753	-0.467

Source**: World Bank**

In table-1.2, FDI inflows have been all time low growing at an annual average of 0.588% per year. Although growths of exports have improved to grow at an average of 0.952% they are still below imports which increased at an average of 1.477% per year. The grand average of FDI net inflow and exports are still below average of imports hence the BoP constraint of US$ -0.467 per year. Corollary from table 2 in view of Kaldor's first proposal, trade is the foundation upon which growth of Kenya's manufacturing industry rests (Feder, G. 1983).

Yanikkaya (2002) who argue that trade liberalization does not always have a direct positive relationship to growth. Kenya's liberalization policy regimes did not work in her favour as per the law of comparative advantage conceptualized in the standard trade theory[4] (Swamy, 1994). The policy regimes negatively affected growth because the country did not gain in its best economic activities from exchange, specialization, and economies of scale (David, L. 2007).

[4] The Convention and dominant theory of international trade *aka* the neoclassical model of international trade advocating for perfect competition theorem. However, it has been challenged by imperfect competition models, increasing returns and the learning effects lead by Linder (1961), Posner (1961), Vernon (1966), Krugman (1979), Caves (1985), Helpman and Krugman (1985) and Rodik (1988)

Arguably, Kenya's economic growth has not been unsustainable due to the nature of manufacturing industry. Kenya's manufacturing sector is largely agro-processing and consumer production with food producing, wood processing, textile and small metal fabrication known as jua-kali constituting over 73 per cent of total production turnover from the sector (Bigsten *et al*. 2010). Over 74 percent of manufacturing firms are small in size and in primary production (Kimuyu, 2007). This is against Kaldor's concept of export of advanced manufactured goods (Thirwall, 2013). Tybout 2000 also confirm that as a function of income, a higher share of food, clothing and textiles in manufacturing output exhibits a negative correlation to GDP per capita. Although trade liberalization reforms increased the share of the value of trade from 42.5 to 60% from 1980s to 2000, as a measure of openness, trade deteriorated as the value of imports outstripped exports resulting in trade deficit leading to balance of payment constraint (International Monetary Fund, 2012). Kenya's reform policies have not been successful in creating structural transformations due to corruption, transaction costs, constraints to doing business, taxes, access to finance and credit have negatively hampered manufacturing growth by discouraging foreign and domestic investments.

1.3 Statement of the Problem

As shown in table-1.1 and table-1.2, the growth rate of the share of manufacturing output in aggregate GDP output from 1971-2013 was -0.940% per year signifying de-industrialization. The economy has experienced structural transformation in reverse as the share of resources going to services and informal sectors has increased by a significant 0.911% per year with agriculture loosing 0.366% per year. As a result, the share of manufacturing output in aggregate GDP output is lowest at 13 per cent compared to agriculture, services and others sectors at 31% and 56% respectively indicating vast resources to be transferred to the industry.

The growth rate of manufacturing industry at 4.98%annually is below Vision 2030 target of 25% for the sector. At this growth rate, Kenya will not attain and maintain a sustained economic growth of 10% per annum in order to be an industrializing nation by the year 2030 (Kenya Vision 2030). Resources continue to accumulate at low productive sectors of the economy as the growth of sector is not able to keep pace with growth of agriculture, services and informal resources (Bigsten *et al*., 2010). It is essential to analyze the relationship between manufacturing production and economic growth for Kenya using Kaldor's insights on economic growth. Performing this analysis at the national level will be important in determining the role of manufacturing activities in economic growth so as to ascertain to what extent manufacturing production account for GDP growth rate to inform policy formulation.

1.4 Research Question

To what extent does growth of manufacturing output account for economic growth in Kenya?

1.5 Research Hypothesis

The null hypothesis for the research question is that Kenya's manufacturing output growth rate leads to increased economic growth rate against the research hypothesis that manufacturing output growth rate does not lead to increased economic growth rate.

1.5 General Research Objective

To establish the nature of the relationship between manufacturing production and economic growth rate in Kenya

1.6 Specific Research Objective

To establish whether economic growth rate in Kenya is positively related to manufacturing output growth rate

1.8 Justification for the Study

The outcome of this study will be of interest to academics, government, stakeholders and investors. As far as available literature indicates, this is the first time Kaldor's approach will be applied in Kenya hence its important contribution to macro-economic and development literature. The study aims to assess the net contribution of manufacturing sector, expected spillovers and role in Kenya's economic growth as opposed to other studies in the sector that do not indicate the net contribution from the sector to economic growth. To the government and stakeholders, the study will be important to as it will determine whether the current manufacturing production rate will enable Kenya achieve industrialized status as envisaged in Kenya's vision 2030. The findings of the study will be important to policy makers as it will inform the necessary policy formulation required to increase manufacturing production output in aggregate GDP.

1.9 Scope of the Study

The paper will use data on GDP and manufacturing growth rate from the sector at (2000 US$) per year constant prices from the year 1982 to 2013.

The paper will not consider the growth and depreciation of capital stock on labour productivity and therefore will assume constant capital-output ratio in estimating output in manufacturing and employment creation.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will review theoretical and empirical literature. Section 2.1 reviews the foundation of Kaldor's laws in theory and conceptual framework, section 2.2 studies that have been carried out on Kaldor's theory while section 2.3 will wind the chapter with overview of literature.

2.2 THEORETICAL LITERATURE REVIEW

2.2.1 Kaldor's 1970 Model of Economic Growth

Kaldor's' model of economic growth came forth in mid-1960s during his study on Europe's regional economic growth. In the *Scottish Journal of Political Economy's* sixth anniversary in 1973, Kaldor's 1970 paper "The case for Regional Policies" was quoted as the most cited paper in 1963-1973. In his study, he concluded the slow growth rate of the manufacturing sector which was unable to absorb resources from agriculture as the cause of slow growth of United Kingdom economy. The underlying problem is the balance of payment constraint on the growth of demand within and outside the economy. Widely reputed as "the new growth theory", the model is relatively an extension of Romer (1986, 1990) and Lucas (1988) growth models *aka* 'endogenous' growth models.

Kaldor's model concepts are ascribed to Myrdal's 1957 *Economic Theory and Underdeveloped Regions* book in which Myrdal presented a general model of 'circular and cumulative causation'. Following the same idea, he verbally presented the model of regional economic growth in his inaugural lecture to the *Scottish Journal of Political Economy* in 1970 which was later formalized by Dixon and Thirwall in 1975. In his growth model, heverbally put forth three growth laws:

Kaldor' first law states: *the growth rate of an economy is positively related to the growth rate of its manufacturing sector* i.e. "manufacturing is the engine of growth," The second law (Kaldor-Verdoorn law) states: *an increase in the rate of growth of manufacturing output leads to increases in labour productivity in that sector*. This is due because of existence of increasing returns to scale in the sector due to learning by doing and efficiency changes. The Third law states: *productivity in the non-manufacturing sector increases as the rate of manufacturing output increases*. The growth of manufacturing sector increases productivity in non-manufacturing sector of agriculture and informal sectors by drawing surplus labor in these sectors reducing disguised unemployment (Mamgain, 1999).

Kaldor's laws arestylized facts that describe the growth of an economy.The laws have micro-economic underpinnings associated with work of Romer (*op cit*) but Verdoorn (1949) provided a micro-economic model that formed the origin of Kaldor-Verdoorn law. Kaldor's technical progress function$P = f\ (k - e)$, where p, k, and e represent the growth rates of labor productivity, capital and labor respectively can be derived from Cobb-Douglas production function. Although with second-order identification problem, Thirwall (1986) and Amable (1993) have used the Kaldor-Verdoorn law in theoretical models of growth (McCombie, 1982).

A key feature in Kaldor's' traditional model of circular and cumulative causation is the existence of increasing returns within the industry provided in his second law (Verdoorn's law)(Kaldor 1970, Dixon and Thirwall, 1975). According to this law, initial growth output stimulate gains in productivity that permit decline of unit labour costs rate leading to fall in prices, and given the make-up pricing rule, this increases a country or region's competitiveness. These gains, sequentially allow further output expansion through increasing exports which in turn re-initiates the cycle.

Despite the advancement of recent endogenous growth models, empirically testing the knowledge of spillovers, returns to scale and learning-by-doing still remains a daunting task. This challenge has made it nearly impossible to model and estimate the very intangibles of growth economics (Benhabib and Jovanvic, 1998). This hasenabled Kaldor's model get awesome reception and has found a very significant niche in applied economic theory and which perhaps explain a lasting advantage and popularity of Kaldor-Verdoorn law as a test of endogenous growth (Cripps and Tarling, 1973, Perelman, 1995). The laws have been empirically proven to explain causes of growth and early differences in growth rates as well as per capita income levels in developing countries and regions.

According to Kaldor 1996, Cripps and Tarling, *op cit*; Thirlwall*et al*., 1982; Drakopoulos and Theodossiou, 1991; Hansen and Zhang, 1996, as the industry output expands, it absorbs labour resources from disguised unemployment therefore leading output to increased output in agriculture and service sectors. Therefore, the faster the growth of manufacturing sector, the faster the transfer of labour resources from sectors with high opportunity costs subjected to diminishing returns. Most importantly manufacturing industry possesses superior forward and backward linkages effect in the economy, the "cumulative nature" due to its attribute of both static (size and scale of production) and dynamic ("learning by doing") increasing returns to scale (Arrow, 1962). In this case, Ally Young's 1928 concept of increasing returns influenced Kaldor's interpretation. Young considered this concept, as a macro-economic phenomenon in the process of economic expansion based on the interaction between economic activities. Kaldor's interpretation also echoes Adam Smith's thought of increasing productivity arising from division of labor which consecutively depends on the extent of external market.

2.3 EMPIRICAL LITERATURE REVIEW

Growth and development literature infer a strong positive casual relation between GDP growth and growth of manufacturing output. This is empirically confirmed in industrialized and newly-industrializing countries that this is realized when the share of manufacturing output in GDP aggregate output is increasing rapidly as hypothesized by Kaldor (Thirwall and Wells, 2003).

A rising body of empirical work has confirmed Kaldor's laws at international and national stages. In particular, they have been exceptionally confirmed to play a prime role in accelerating growth in developing countries. International studies include those of Libanio and Moro (2006), Wells & Thirlwall (2003), Pons-Novell & Vildecans-Marsal (1999), McCombie (1983), Thirlwall (1983), Cornwall (1976), Parkih (1978), Chatterji & Wickens (1983), while at national stage include Millin & Nichola (2005), Atesoglu (1993), Drakopoulos & Theodossiou, (1991) and Bairam (1991).

P.J. Verdoorn's 1979, was the first to find empirical regularity between the growth of output in manufacturing and growth of labour productivity in manufacturing. Verdoorn's law (second law) regarding theoretical interpretation of the connection between productivity growth and output growth has generated a lot of theoretical and empirical secondary literature with regard to its interpretation [Rowthorn (1979), Soro (2002), Ros (2000), Dixon and Thirwall (1975), McCombie (*op cit*), Gomulka (1983), Atesoglu (1993), Bianchi (2002)]. According to Verdoorn (1949, p.3) " one could have expected a *priori* to find a correlation between labour productivity and output, given that the division of labour only comes about through increases in the volume of production; therefore the expansion of production creates the possibility of further rationalization which has the same effects as mechanization".

However, Kaldor's interpretation is that Verdoorn's law provides a technical relationship with clear evidence of increasing returns to scale in manufacturing hence the correct specification of Verdoorn's model equation is that neither output nor employment is likely to be exogenous (Libanio and Moro, 2007). It is a technical progress function expressed as: $P = f\ (k - e)$, $f' > 0$ and $f'' < 0$ where p, k, and e represent the growth rates of labor productivity, capital and labor respectively (Black, 1962).

As opposed to levels of growth, Kaldor's view is that this is a 'dynamic' relationship between growth rates of output and productivity explained by factors like increasing specialization among firms, induced technical progress, positive externalities and greater product differentiation. Dixon and Thirwall (*op cit* p. 209) agree with Kaldor's interpretation Verdoorn's coefficient is determined by "the rate of induced disembodied technical progress, the degree to which capital accumulation is induced by growth and the extent to which technical progress is embodied in capital accumulation"

According to Kaldor's view, economic growth is demand-determined rather than resource-constrained. Exogenous growth of effective demand determines output growth and both employment growth and productivity growth are endogenous.Using endogenous growth framework, Foellmi, R. and Zweimüller, J. (*op cit*) empirically reconciled the two leading features of long-run growth process: the dramatic changes in the structure of production and employment and Kaldor's economic growth facts. Using a model focused on demand-explanation, they concluded that structural changes results from differences in income elasticity across sectors.

Using time series analysis, Pacheco-López, P. and Thirlwall†, P. (*op cit*) empirically estimated the positive correlation between GDP growth and manufacturing growth, manufacturing growth and export growth, export growth and GDP growth using 89 open developing countries in the period 1990-2011. Vaishali Mamgain (1999) using macroeconomic data studied the relation of manufacturing sector and economic growth of South Asian economies in 1960-88 and confirmed that Kaldor's laws although controversial in the global era, they provide the first step in analyzing the growth process in developing economies. He specifically singled out the first law as very convincing in determining the growth path of an economy in early stages of development.

Using time series analysis Felipe, J. (1998) empirically verified Kaldor's first law in South East Asia between 1950 and 1995 and concluded a higher share of manufacturing output growth as a determinant of growth for newly industrializing countries of Singapore and Malaysia. Unique from the study is the high growth rate of manufacturing sector due to successful structural transformation in favour of manufacturing accelerated by high inflows of foreign investments. Using co-integration and causality analysis he confirms FDI-Led-Growth Hypothesis in Singapore, Malaysia and Thailand due to high inflows of FDI. Gilbert Libanio (2006) also tested Kaldor's laws in Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) in the period 1985-2001 using regression analysis and confirmed that "manufacturing is the engine of growth" hypothesis and confirmed the existence of significance increasing returns in the sector in the largest economies in Latin America.

Heather Wells and A.P. Thirwall (2003) tested Kaldor's laws across 45 African countries using regression analysis in 1980-96 and concluded that fastest growth of GDP is articulated to rapid growth of manufacturing sector in Botswana, Cape Verde, Equatorial Guinea, Lesotho, Mauritius, Swaziland and Uganda. Güçlü, Mehmet (2013) empirically analyzed the regional economic growth of Turkey within the context of Kaldor's laws in 1990-2000 and validated Kaldor's laws using spatial and traditional econometric methods and concluded that manufacturing is the determinant of economic growth in turkey.

Das Panchanan (2007) using time series data for different periods 1970-2000, 1970-1985, 1986-2000 empirically tested Kaldor's three laws in different states in India and concluded that manufacturing is the engine of growth. Atesoglu Sonmez (2006) tested Kaldor's laws in the United States during the post-world war II and concluded that Kaldor's laws are compatible with economic growth process of United States.

2.4 Overview of Literature Review

Empirical studies confirm the positive association between manufacturing output growth and economic growth in developing countries using different periods of time and countries. Manufacturing sector has a significant positive impact on overall economic growth and the most distinctive features of rapid manufacturing growth is the existence of dynamic and static returns to scale. The studies concur with Kaldor's view that growth is demand-determined rather than resource-constrained. Kaldor's model provides somewhat simplified endogenous growth model of testing knowledge spillovers and learning-by-doing necessary for estimating the daunting task of growth economics.

In Kaldor's view, Kenya's successive policy regimes implemented since independence have not been successful in creating sustainable growth. Throughout the reform period, structural transformation has occurred in reverse against Kaldor's' theory as resources continue to amass at low productive segments of agriculture and informal services sectors. The causal problem is that gains from agriculture and service sectors are subject to diminishing returns and therefore not the basis for industrialization as envisioned in Kenya's Vision 2030.

Contrary to Kaldor's of export of advanced manufacturing goods, a higher share of Kenya's GDP growth is driven by export of consumables, non-tradable services particularly hospitality industry, transport, retail, distribution and construction plus a combination of external resources such as commodity windfalls, debt relief, aid and increase of prices for goods and demand for services. In Kaldor's view, benefits from non-tradable services and high prices for commodities will only be maximized and sustained to the extent to which revenues collected from commodity prices are effectively utilized through increased sources of growth and exports base through increased manufacturing output.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter examine Kaldor's laws in theory and practice, equations to be estimated, definition of variables, estimation technique and data diagnostic tests.

3.2Conceptual Framework of Kaldor's laws

Kaldor's three growth laws are summarized into four-equation structural models with cumulative features (Thirwall, 2013). Kaldor's original proposal is that growth is driven by growth of export as export is the only true independent element of demand both at national and regional level because investment and consumption demand are primarily induced by growth of output itself. This explains the importance of exports in developed countries and regions. Second, export growth is a function of the economy's changing price competitiveness and income growth within and outside the economy.

Third, as a determinant of export growth, the rate of change of an economy's price is determined by difference in the growth of labour productivity and wage growth. Fourth, labour productivity is partially determined by rate growth of output itself through static and dynamic increasing returns to scale, referred to as Verdoorn's Law.

In functional forms, the four propositions can be specified as;

$$\boldsymbol{G_t = \lambda X_t} \quad (1)$$

Where $\boldsymbol{G_t}$is economic growth output, $\boldsymbol{X_t}$is growth of exports, (t is a time subscript)

$$X_t = \mu[P_{dt} - P_{ft}] + \pi Z_t \quad (2)$$

Where $P_{dt}$is the growth of domestic prices and P_{ft} is the growth of foreign prices measured in a universal currency; $Z_t$is income growth outside the region, μ<0 is price elasticity of export demand, and π>0 is income elasticity of demand for exports.

$$P_{dt} = W_t - R_t \quad (3)$$

Where W_t is wage growth and R_t is growth of labour productivity.

$$R_t = R_{at} + \beta (g_t) \quad (4)$$

R_{at} Is the autonomous productivity growth and β is the Verdoorn coefficient. Equations (2)to (4)are derived from equation (1)

Substituting equation (4) into (3) and plugging the result into (2) and then(1)gives the equilibrium growth of the economy presented in equation (5) below.

$$G_t = \frac{\lambda [\mu (W_t - R_{at} - P_{ft}) + \pi (Z_t)]}{1 + \lambda \mu \beta} \quad (5)$$

From equation (5)given μ <0 then growth (G_t) is; a) Positively related to increase in foreign price and independent growth of productivity; b) Positively related to growth of external demand (π) and size of Verdoorn coefficient, β; b) Negatively related to increase in domestic wages (W_t).

The Verdoorn coefficient β makes the model 'circular' but 'cumulative' growth depends on the behavior of the model out of equilibrium. The model is made stable and dynamic by introducing a one-period lag into the four equations yielding a time series data of one period in time.

The model suggest that observed differences in growth rates are basically associated with differences in income elasticities of export demands (π) and imports (ε) arising from differences in economic structure with respect production and trade (Bhattacharjea, 2010). A key characteristic is whether an economy specializes in primary production or higher level of manufactured goods and advanced services (Kaldor, 1970).

If we assume that economic competitiveness is constant by ignoring Verdoorn's coefficient without lags equation (5) reduces to equation 6 below;

$$G_t = \pi\ (Z_t) / \varepsilon \qquad (6)$$

Where ε is the income elasticity of demand for imports equal to 1/ λ assuming that economic balance of payments equilibrium is necessary when growth of imports equal growth of exports. Equation (6) is a standard centre-margin of Prebisch (1959) model where the growth of an economy in relation to others (G_t/Z_t) is equi-proportional to the ratio of income elasticity of demand for exports and imports π/ ε. Equation (6) is a reminiscent of the Harrod multiplier, X=Y/m, where X is output level, Y is the level of exports and m is the marginal propensity to import (Harrod, 1933; Thirwall, 1982).

According to Kaldor, in an open economy the Harrod multiplier compared to Keynesian investment multiplier is superior in explaining the rhythm and speed of the growth of the economy (Kaldor 1981). The implication of this is that, it is easier to correct a savings-investment gap than to correct an import-export gap. In the model, Kaldor did not factor in the exchange rate because regional economies are open and share a common currency an evocative of the relevance of regional integrations for Kenya's economic growth.

Eequations(5) and (6)demonstrates that if imports growth exceeds exports growth ε >π then the balance of payments constraint will show up and if capital transfers (inflows) do not finance the difference, slow growth and unemployment will be the outcome. Critical to orthodox equilibrium growth theory i.e. neoclassical models *aka* Solow and Swan, Kaldor's growth model has brought a new inspiration to macroeconomic growth and development with its essential element of increasing returns to scale.

3.3 Empirical Testing of Kaldor's laws

Amongst other empirical studies, empirical equations (1) to (4) specified below have been used to test Kaldor's hypothesis by Gilberto Libanio (*op cit*), Güçlü, Mehmet (*op cit*), Das Panchanan (*op cit*), Wells H. and Thirlwall, A.P. (*op cit*) in Latin America, Turkey, India and Africa respectively using individual country and cross-country panel data. Equations (1) to (4) have also been used by Felipe Jesus (Op cit) to test Kaldor's first law in Southeast Asia (section 2.2 of empirical literature review).

Thus, this paper will use equations (7) to (10) specified below to evaluate the relationship between manufacturing industry and economic growth in Kenya from 1982-2013 using manufacturing net output growth rate, real GDP growth rate, non-manufacturing and employment growth rates in manufacturing sector.

Kaldor's first law will be tested using equation 7 as specified below;

$$Y_t = a + bX_{mt} + e_t \qquad (7)$$

Where Y_t is real GDP growth rate and $X_{mt}$is the growth rate of manufacturing output, t is the time period subscript and e_t is the error term. In the equation, the correlation between X_t and $Y_t$is due to the fact that industrial output normally represents a large component of aggregate GDP output.

The regression coefficient b is expected to be positive and less than a unit implying that high economic growth rates is found where there is excess growth rate of manufacturing output over the growth rate of non-manufacturing output and this will be tested using equations (8) and (9):

$$Y_t = a + b\ (X_{mt} - X_{nmt}) + e_t \qquad (8)$$

Where, X_{mt} is output growth from manufacturing, X_{nmt} is the growth rate of non-manufacturing output while b is regression coefficient. Equation (8) eliminates spurious correlation that emerges in equation (7) as manufacturing output is expected to constitute a significant part of GDP.

Additional evidence to equation (7) is when the growth rate of non-manufacturing output responds positively to growth rate of manufacturing and will be evaluated using equation (9):

$$X_{nmt} = a + \mu X_{mt} + e_t \qquad (9)$$

Equation (9) s Kaldor's third law, together with equations (8) they provide additional support for equation (7).

In 'endogenous' growth models, Kaldor's second law (Verdoorn's Law) has endured some difficulty in measuring the degree of returns to scale due to different interpretations of the law arising from the use of cross-country panel data that represent countries with different 'exogenous' productivity growth. Using this kind of data generates a spurious Verdoorn coefficient.

This study will circumvent this problem by using of individual country time series data which present data without significant technological disparities compared to cross country panel data (McCombie and De Rider, 1983; Bernat, 1996; Hansen and Zhang, (*op cit*); Fingleton and

McCombie, 1998; Leon-Ledesma, 2000). Therefore, the paper will use equation (10) as traditionally proposed by Kaldor (1966)[5]:

$$\gamma_t = a + \lambda X_t + e_t \qquad (10)$$

Where γ_t and X_t represent the growth rates of employment in manufacturing and output from manufacturing respectively while λ is the Verdoorn's regression coefficient that will measure existence of increasing returns to scale. Equation 10;(a) does not consider influence of growth of capital stock on labour productivity as indicated in the scope since capital accumulation results from economic growth, (b) assumes constant capital output ratio justified by Kaldor as a 'stylized fact' (c) assume constant capital growth and employment ratio in a steady-state growth.

3.4 Empirical Model Specification

Equations (7) to (10) time series data linear equations, hence an auto-regressive model equations using a $\boldsymbol{X}$-variable lagged at 1 time period (1 year) given as;$Y_t = f(X_{t-1}, X_{t-2}, \dots \dots X_{t-p,} e_t)$

where p is the auto-regressive rank, in this case the number of years.

Therefore, the equation is a linear function modeled as;

$$\boldsymbol{Y_t = b_0 + b_i \Sigma X_{t-i} + e_t} (11)$$

[5]I will use this modified version instead of regressing productivity on output growth in order to avoid spurious correlations due to the fact that the two variables are correlated (by definition)

where; Y_t, is the dependent variable values at the moment t, X_{t-i}(i=1, 2,….., p) is the independent variable values at the moment $t-i$, b_0 is the regression constant, b(t=1….., p) are regression coefficients at time $t-i$, p is the auto-regression rank and e_t is the disturbance term.

3.5 Definition of Variables, Measurement and Data Type

This study intends to provide estimations for the Kenyan economy in the period 1971-2013as shown in table 3-1 below. As one of the endogenous growth theory Kaldor approach advocates for policy measures that will promote openness, competition, change and efficiency. Therefore, the choice of time period is important because this is the period in which the Kenyan economy has experienced substantial policy reforms (section 1.0 p.2) especially in 2002-2007 in order to capture these policy measures. One advantage of this paper is that it uses longer data time periods compared to similar studies (empirical literature review, section 2.2).

Table 3.3: Variables, data type, source and period.

Variable	Data type	Source	Period
Real GDP growth rate	Ratio	UN National data accounts	1971-2013
Manufacturing output growth rate	Ratio	UN National data accounts	1971-2013
Non-Manufacturing output growth rate	Ratio	UN National data accounts	1971-2013
Manufacturing Employment growth rate	Ratio	KNBS, RPED	1971-2013

Source: Author

3.6 Estimation Technique

The study used OLS estimation technique to analyze the impact of manufacturing output growth on economic growth using EVIEWS 7 software. OLS estimator is consistent when the regressors are exogenous, homoscedasticity and the error terms are normally distributed.

3.7 Expected Sign of Estimated Coefficient

The regression coefficient *b* of equation 7 is expected to be positive and less than a unit to demonstrate the impact of manufacturing sector on economic growth. Equations 8 and 9 are used eliminate spurious regression arising from equation 7 as manufacturing output is expected to constitute majorpart of GDP (reverse causality). The regression coefficient in equation 10 is also expected to be positive and will indicate existence of returns to scale.

Table 3.4 Expected Sign of estimated Coefficients

Equation	Expected Sign
$Y_t = a + bX_{mt} + e_t$	**Positive**
$Y_t = a + b\ (X_{mt} - X_{nmt}) + e_t$	**Positive**
$X_{nmt} = a + \mu X_{mt} + e_t$	**Positive**
$\gamma_t = a + \lambda X_t + e_t$	**Positive**

CHAPTER FOUR

4.0 DATA ANALYSIS

4.1 Introduction

This chapter will test the four equations, present the results and interpret the findings. Data analysis will be done using Eviews 7. The growth rates of the data used for analysis shown in appendix I is obtained from the share of GDP composition data shown in appendix II.

4.2 Descriptive Statistics

A descriptive analysis of the growth rates data in appendix I was conducted to give sectoral performance overview and the result is presented in table 4.5 below

Table 4.5: Descriptive statistics

	GDP	Man Growth	Man Emp	Man-Nonman	Non-Man
Mean	3.88	-0.52	2.89	-0.57	0.05
Median	4.18	-0.75	2.62	-0.84	0.01
Maximum	9.18	11.78	26.16	13.50	2.07
Minimum	-0.79	-13.05	-26.06	-15.12	-1.72
Std. Dev.	2.35	4.98	6.53	5.70	0.78
Skewness	0.01	0.09	-0.90	0.06	0.00
Kurtosis	2.73	3.05	13.90	3.09	2.96
Jarque-Bera	0.13	0.06	213.45	0.04	0.00
Probability	0.94	0.97	0.00	0.98	1.00
Sum	162.86	-21.99	121.35	-23.98	1.98
Sum Sq. Dev.	226.34	1014.95	1748.21	1333.94	24.63
Observations	42	42	42	42	42

Source: Author's Eviews computation

Table 4.5 shows that on average Kenya has a mean growth rate of 3.88% with standard deviation of 2.32 for the sample. Manufacturing output growth rate registered a mean of -0.52% with standard deviation of 4.98. Non-Manufacturing output growth rate had a mean of 0.05% with standard deviation of 0.78. The excess of manufacturing over non-manufacturing had a mean of -0.57% with standard deviation of 6.53. Manufacturing employment growth rate had a mean growth of 2.89 with standard deviation of 6.53.

Except for manufacturing employment growth rate, all other variables have a skewness value relatively equal to zero showing a symmetric distributions around the mean and a kurtosis value relatively equal 3 indicating a mesokurtic distribution which shows that the data is normally distributed. Although data for employment manufacturing is skewed to the left with leptokurtic distribution, this will not affect OLS estimates of the model.

4.3 ZA- Unit Root Test with Structural Breaks Results

Since the study uses time series it is important to determine any structural breaks in the series arising from structural changes. This will enable to avoid spurious results of unit root tests of the data. This paper employs ZA unit root test to endogenously determine the timing of structural breaks as opposed to exogenous phenomenon of ADF or Perron (1989) tests. ZA is a unit root test with structural breaks.

The testing procedure is used for non-stationary of the data in the presence of potential structural breaks. ZA test the null hypothesis of structural stability against the alternative hypothesis of one-time structural breaks in each variable as shown in table 4.6.

Table 4.6: Result of ZA one-break unit root test

Variables	k	t-statistics	Break Year
GDP growth rate	I_0	-4.04**	1992
Man. Growth rate	I_0	-6.95	1995
Non-Man. Growth	I_0	-7.01	1990
Man-Non-Man growth	I_0	-5.35	1995
Man Emp growth	I_0	-8.27	1980

The critical values for Zivot and Andrews test are -3.52,-2.83, and -4.29 at 1 %, 5 % and 10% levels of significance.
** Significant at 10% significance level
Source: Author's Eviews Computation

The ZA unit root test results fail to reject the null unit root at 5% significance level for the five variables thus concludes unit root structural stability. Although it fails to reject the null unit root, it endogenously identifies points of potential single mot structural breaks in each series as shown in table 4.6. The knowledge of potential break point is essential to precise evaluation of programmes intended to bring about structural changes in the economy.

4.4 Testing Kaldor's First Law- Equation 7

Kaldor's first law postulates that Y_t = f (X_{mt}), where Y_t is the GDP growth rate and X_{mt} is the growth rate of manufacturing output. Fitting a linear specification function for 1971-2013 for Kenya gives (t-statistics are in brackets):

$Y_t = 3.94 + 0.13X_{mt}$ $\qquad$ $R^2 = 0.08$

(t = 11.14) (t = 1.85) $\qquad$ $F_{STAT}(1, 41) = 3.44$

Diagnostic tests *Critical values*

Functional Form F (1, 39) = 0.34 < 0.89

Normality Chi^2 (2) = 0.26 < 0.88

Heteroscedasticity F (1, 41) = 0.002 < 0.95 (Breusch-Pagan-Godfrey)

At 5% significance level, data diagnostic tests for functional form, normality and heteroscedasticity are all passed. The result shows that only 8 per cent of the growth rate of the Kenyan's GDP is related to the differences in the growth of manufacturing output. Manufacturing output growth rate of 1% point above the mean for the sample data is associated with GDP growth rate of 0.13% points above the mean above the mean growth rate of 3.88%.

However, the OLS results is open to the possibility of 'spuriousness' since manufacturing is expected to be a major component of GDP, although in this case it is rather small averaging 13 %. All the same, two side tests of Kaldor's first law will be performed to eliminate any chance of this happening. First is to regress growth of GDP on the excess of manufacturing output over non-manufacturing (equation 8) and the second is to regress growth of manufacturing output on the growth of manufacturing output (Kaldor's third law, equation 9).

4.5 Testing Kaldor's First Law- Equation 8

The law proposes that Y_t = f$(X_{mt} - X_{nmt})$, where Y_t is the GDP growth rate and $(X_{mt} - X_{nmt})$ is the excess of manufacturing output over non-manufacturing output. Fitting a linear specification function for sample data for Kenya gives (t-statistics are in brackets):

$Y_t = 3.94 + 0.12(X_{mt} - X_{nmt})$ $R^2 = 0.08$

(t = 11.15) (t = 1.87) $F_{STAT}(1, 41) = 3.51$

Diagnostic tests		*Critical values*	
Functional Form F (1, 39)	= 0.36	< 0.92	
Normality Chi^2 (2)	= 0.25	< 0.88	
Heteroscedasticity F (1, 41)	= 0.00	< 0.99	(Breusch-Pagan-Godfrey)

4.6 Testing Kaldor's Third Law –Equation 9

The law assumes that X_{nmt} = f (X_{mt}) where X_{nmt} is the non-manufacturing output growth rate and X_{mt} is manufacturing output growth rate. Fitting a linear specification function for sample data for Kenya gives (t-statistics are in brackets):

X_{nmt}= -0.15 -0.03X_{mt} $R^2 = 0.87$

(t = -16.12) (t = -0.65) F_{STAT} (1, 41) = 259.93

Diagnostic tests		*Critical values*	
Functional Form F (1, 39)	= 0.58	< 0.76	
Normality Chi^2 (2)	= 2002.70	> 0.00	
Heteroscedasticity F (1, 40)	= 0.28	< 0.60	(Breusch-Pagan-Godfrey)

The results of equation 8 and 9 confirm the results of equation 7; manufacturing output growth is not the driving force behind Kenya's GDP growth. The low R^2 of 0.08 of equation 8 is same as equation 7; it shows that the excess of manufacturing growth output over non-manufacturing growth is not statistically significant in explaining GDP at 5% significance level. In equation 9, a high R^2 of 0.87 with negative coefficient shows that manufacturing output growth rate is statistically significant in explaining the differences in negative growth of non-manufacturing output growth.

4.7 Testing Kaldor's Second Law-the Verdoorn Law-Equation 10

The law proposes $\gamma_t = f(X_t)$, where $\gamma_t =$ manufacturing employment growth rate, and $X_t =$ manufacturing output growth. Fitting a linear specification function for sample data for Kenya gives (t-statistics are in brackets):

$\gamma_t = 3.07 + 0.34X_t$ $R^2 = 0.07$

(t = 0.20) (t = 0.99) $F_{STAT}(1, 41) = 2.96$

Diagnostic tests		*Critical values*	
Functional Form F (1, 39)	= 0.58	< 0.76	
Normality Chi^2 (2)	= 2002.70	> 0.00	
Heteroscedasticity F (1, 40)	= 0.28	< 0.60	(Breusch-Pagan-Godfrey)

The results shows that manufacturing output growth difference of one percentage point above the mean for the sample accounts for 0.34 percentage points of employment growth rate in manufacturing above the mean growth rate of 2.89. At 5 per cent significance level, manufacturing output growth rate is not statistically significant in explaining employment growth rate in manufacturing sector. Manufacturing output growth rate accounts for only 7 per cent ($R^2 = 0.07$) of the growth rate of employment in manufacturing industry.

CHAPTER FIVE

5.0 STUDY FINDINGS AND CONCLUSIONS

5.1 Introduction

This chapter will give summery of study findings and conclusion in the light of research question, objectives and hypothesis and recommendations for further research.

5.2 Summary of Study findings

The results do not support Kaldor's laws in Kenya. Manufacturing industry is not the engine of growth in Kenya. Non-manufacturing sector (Agriculture and services sectors) which constitute the major component of GDP as not served as the engine of growth which explains the low GDP growth of 3.93 per cent per annum. Non-manufacturing sector activities exhibit diminishing returns and do not possess back and forth linkages compared to manufacturing sector.

Equation 9 results shows that the slow growth of manufacturing output negatively affects growth of non-manufacturing sector. Therefore the growth of agriculture and service sectors depends on the growth of manufacturing sector. Equation 10 results shows no relationship between employment growth in manufacturing and manufacturing output growth which is consistent with disguised unemployment in non-manufacturing sectors as proposed by Kaldor in developing economies.

5.3 Conclusions

There exists a positive relationship between manufacturing production and growth in Kenya but this relationship is weak to spur GDP growth of 10 percent per annum target set by Vision 2030. Manufacturing production only accounts for 8 percent of total GDP which is way below 25 per cent Vision 2030 target set for the sector. The results of equation 10 (Kaldor's second law) conclude alternative hypothesis that manufacturing industry does not exhibit increasing returns to scale. The study concludes the alternative hypothesis that manufacturing industrial production in Kenya does not lead to increased economic growth in Kenya.

The results agree with similar study by Thirlwall and Wells (2003) in 45 African countries (1980-1996) including Kenya where the results show that Kenya is one of the countries in which GDP growth is not associated with rapid expansion of manufacturing sector. The results also concur with similar studies in developing economies in Latin America, South East Asian Countries, India, turkey (see empirical literature). These results in these studies show that GDP growth is fastest in economies which expansion of manufacturing sector is growing and manufacturing output constitute significant component of GDP contrary to Kenya.

Therefore to realize Vision 2030, the government need to implement policies that will create structural change in favour of industrial production activities. This will definitely accelerate GDP growth and improve living standards for Kenyans. The ZA results determined that 1980-2007 as the most important periods when structural changes occurred in the Kenyan economy. The series exhibits structural changes in Kenya occurred during 1981-2007 and it clusters around early 1980s- early 1990s. This coincides with SAPs programmes in 1980s-1990s period of lowest GDP growth and 2006/ 2007 period of highest progressive economic growth rate.

5.4 Recommendations for further Research

Undoubtedly, there is need for more research to inform the government which policies to formulate and implement to stimulate structural transformation in the economy. This remains the biggest challenge for the government which calls for more research in this field.

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Appendix1: Data

Year	GDP growth rate Y_t	Man. Growth rate X_{mt}	Non-Manufacturing sector growth rate X_{nmt}	Manufacturing-Non-Manufacturing growth rate $(X_{mt} - X_{nmt})$	Manufacturing Employment growth rate y_t
1972	**5.00**	**-0.15**	**0.02**	**-0.18**	**-26.06**
1973	**5.20**	**7.51**	**-1.13**	**8.64**	**10.13**
1974	**4.90**	**4.69**	**-0.77**	**5.46**	**11.47**
1975	**-0.37**	**-4.87**	**0.84**	**-5.72**	**0.00**
1976	**4.03**	**-6.30**	**1.03**	**-7.33**	**6.94**
1977	**9.18**	**-3.02**	**0.46**	**-3.48**	**6.94**
1978	**8.99**	**11.78**	**-1.72**	**13.50**	**11.61**
1979	**3.76**	**2.69**	**-0.45**	**3.14**	**4.97**
1980	**5.59**	**4.92**	**-0.85**	**5.76**	**26.16**
1981	**3.76**	**-3.58**	**0.65**	**-4.23**	**3.11**
1982	**3.69**	**-3.04**	**0.53**	**-3.57**	**0.27**
1983	**1.37**	**-3.97**	**0.67**	**-4.64**	**1.29**
1984	**1.77**	**1.21**	**-0.19**	**1.40**	**2.96**
1985	**4.27**	**-1.37**	**0.22**	**-1.59**	**3.72**
1986	**7.17**	**0.79**	**-0.13**	**0.91**	**3.78**
1987	**5.92**	**-2.64**	**0.43**	**-3.07**	**2.31**
1988	**6.20**	**0.46**	**-0.07**	**0.53**	**5.22**
1989	**4.70**	**0.06**	**-0.01**	**0.07**	**3.04**
1990	**4.21**	**2.37**	**-0.37**	**2.74**	**2.68**
1991	**1.41**	**4.48**	**-0.72**	**5.20**	**0.64**
1992	**-0.79**	**-4.88**	**0.83**	**-5.71**	**0.74**
1993	**0.36**	**-5.87**	**0.94**	**-6.81**	**1.68**
1994	**2.63**	**5.24**	**-0.78**	**6.03**	**2.12**
1995	**4.41**	**-13.05**	**2.07**	**-15.12**	**3.64**
1996	**4.14**	**8.46**	**-1.15**	**9.61**	**2.78**
1997	**0.27**	**-2.61**	**0.39**	**-2.99**	**1.9**
1998	**3.36**	**-4.72**	**0.68**	**-5.40**	**1.12**
1999	**2.10**	**-7.32**	**1.00**	**-8.32**	**1.24**
2000	**0.50**	**3.00**	**-0.37**	**3.37**	**-0.77**
2001	**4.47**	**-5.15**	**0.67**	**-5.81**	**-0.6**
2002	**0.57**	**0.92**	**-0.11**	**1.03**	**6.09**
2003	**2.91**	**-1.35**	**0.17**	**-1.51**	**4.35**
2004	**5.10**	**3.21**	**-0.39**	**3.60**	**0.92**
2005	**5.91**	**4.98**	**-0.63**	**5.60**	**2.27**
2006	**6.33**	**-2.47**	**0.33**	**-2.79**	**2.55**
2007	**6.99**	**1.89**	**-0.24**	**2.14**	**4.33**
2008	**1.53**	**4.49**	**-0.59**	**5.08**	**-0.26**
2009	**2.74**	**-8.92**	**1.23**	**-10.15**	**0.87**
2010	**5.76**	**0.66**	**-0.08**	**0.74**	**0.64**
2011	**4.38**	**-3.86**	**0.48**	**-4.34**	**2.83**
2012	**4.65**	**-3.79**	**0.46**	**-4.25**	**-1.74**
2013	**3.81**	**-2.88**	**-1.34**	**-1.54**	**3.47**

Source: calculation from appendix II

Appendix II: Sectoral % Distribution Share of GDP

Year	GDP growth rate	Agriculture	Manufacturing	Services	Non-Manufacturing sector (Agriculture+ services sectors)	Employment Growth rate in manufacturing industry(000s)
1971	**6.50**	**34.65**	**13.15**	**52.20**	**86.85**	**92.1**
1972	**5.00**	**35.69**	**13.13**	**51.18**	**86.87**	**68.1**
1973	**5.20**	**35.75**	**14.12**	**50.13**	**85.88**	**75.00**
1974	**4.90**	**35.80**	**14.78**	**49.42**	**85.22**	**83.60**
1975	**-0.37**	**34.70**	**14.06**	**51.24**	**85.94**	**83.60**
1976	**4.03**	**38.45**	**13.17**	**48.38**	**86.83**	**89.40**
1977	**9.18**	**42.40**	**12.77**	**44.82**	**87.23**	**95.60**
1978	**8.99**	**37.20**	**14.28**	**48.52**	**85.72**	**106.70**
1979	**3.76**	**34.69**	**14.66**	**50.65**	**85.34**	**112.00**
1980	**5.59**	**32.83**	**15.38**	**51.78**	**84.62**	**141.30**
1981	**3.76**	**32.87**	**14.83**	**52.29**	**85.17**	**145.70**
1982	**3.69**	**34.15**	**14.38**	**51.47**	**85.62**	**146.80**
1983	**1.37**	**34.95**	**13.81**	**51.23**	**86.19**	**148.70**
1984	**1.77**	**34.68**	**13.98**	**51.34**	**86.02**	**153.10**
1985	**4.27**	**33.33**	**13.79**	**52.88**	**86.21**	**158.80**
1986	**7.17**	**33.54**	**13.90**	**52.56**	**86.10**	**164.80**
1987	**5.92**	**32.09**	**13.53**	**54.38**	**86.47**	**168.60**
1988	**6.20**	**31.96**	**13.59**	**54.45**	**86.41**	**177.40**
1989	**4.70**	**31.37**	**13.60**	**55.03**	**86.40**	**182.80**
1990	**4.21**	**29.90**	**13.92**	**56.18**	**86.08**	**187.70**
1991	**1.41**	**27.69**	**14.55**	**57.77**	**85.45**	**188.90**
1992	**-0.79**	**28.72**	**13.84**	**57.44**	**86.16**	**190.30**
1993	**0.36**	**30.94**	**13.02**	**56.03**	**86.98**	**193.50**
1994	**2.63**	**30.71**	**13.71**	**55.58**	**86.29**	**197.60**
1995	**4.41**	**32.60**	**11.92**	**55.48**	**88.08**	**204.80**
1996	**4.14**	**31.07**	**12.93**	**56.00**	**87.07**	**210.50**
1997	**0.27**	**31.23**	**12.59**	**56.19**	**87.41**	**214.50**
1998	**3.36**	**31.45**	**12.00**	**56.56**	**88.00**	**216.90**
1999	**2.10**	**32.60**	**11.12**	**56.28**	**88.88**	**219.60**
2000	**0.50**	**32.79**	**11.45**	**55.76**	**88.55**	**217.90**
2001	**4.47**	**30.93**	**10.86**	**58.21**	**89.14**	**216.60**
2002	**0.57**	**28.85**	**10.96**	**60.19**	**89.04**	**229.80**
2003	**2.91**	**28.74**	**10.81**	**60.45**	**89.19**	**239.80**
2004	**5.10**	**27.82**	**11.16**	**61.02**	**88.84**	**242.08**
2005	**5.91**	**26.96**	**11.72**	**61.33**	**88.28**	**247.50**
2006	**6.33**	**26.48**	**11.43**	**62.10**	**88.57**	**254.90**
2007	**6.99**	**24.70**	**11.64**	**63.65**	**88.36**	**264.80**
2008	**1.53**	**25.59**	**12.17**	**62.25**	**87.83**	**264.83**
2009	**2.74**	**26.70**	**11.08**	**62.22**	**88.92**	**261.29**
2010	**5.76**	**24.80**	**11.15**	**64.04**	**88.85**	**261.66**
2011	**4.38**	**27.14**	**10.72**	**62.13**	**89.28**	**270.25**
2012	**4.65**	**29.61**	**10.32**	**60.08**	**89.68**	**277.81**
2013	**3.81**	**28.63**	**10.02**	**61.35**	**89.98**	**280.26**

Source: World Bank, KNBS Economic surveys

Appendix III: OLS Regression Results

Regression Results for Equation 7

Dependent Variable: GDP_GROWTH_RATE
Method: Least Squares
Date: 11/21/14 Time: 16:00
Sample: 1972 2013
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN__GROWTH_RATE	0.132959	0.071647	1.855768	0.0709
C	3.947203	0.354196	11.14414	0.0000

R-squared	0.079272	Mean dependent var	3.877579
Adjusted R-squared	0.056254	S.D. dependent var	2.349578
S.E. of regression	2.282536	Akaike info criterion	4.534899
Sum squared resid	208.3988	Schwarz criterion	4.617645
Log likelihood	-93.23288	Hannan-Quinn criter.	4.565229
F-statistic	3.443874	Durbin-Watson stat	1.346838
Prob(F-statistic)	0.070865		

Source: Eviews computation

Regression Results for Equation 8

Dependent Variable: GDP_GROWTH_RATE
Method: Least Squares
Date: 11/21/14 Time: 16:06
Sample: 1972 2013
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MANUFACTURING_NONMANUFAC	0.117040	0.062446	1.874253	0.0682
C	3.944392	0.353725	11.15102	0.0000

R-squared	0.080731	Mean dependent var	3.877579
Adjusted R-squared	0.057749	S.D. dependent var	2.349578
S.E. of regression	2.280727	Akaike info criterion	4.533313
Sum squared resid	208.0686	Schwarz criterion	4.616059
Log likelihood	-93.19958	Hannan-Quinn criter.	4.563643
F-statistic	3.512823	Durbin-Watson stat	1.350469
Prob(F-statistic)	0.068212		

Source: Eviews computation

Regression Results for Equation 9
Dependent Variable:
NON_MANUFACTURING_SECTOR
Method: Least Squares
Date: 11/21/14 Time: 16:09
Sample: 1972 2013
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN__GROWTH_ RATE	-0.145014	0.008994	-16.12251	0.0000
C	-0.028724	0.044466	-0.645982	0.5220

R-squared	0.866638	Mean dependent var	0.047212
Adjusted R-squared	0.863304	S.D. dependent var	0.775033
S.E. of regression	0.286549	Akaike info criterion	0.384631
Sum squared resid	3.284404	Schwarz criterion	0.467377
Log likelihood	-6.077246	Hannan-Quinn criter.	0.414960
F-statistic	259.9354	Durbin-Watson stat	0.968805
Prob(F-statistic)	0.000000		

Source: Eviews computation

Regression Results for Equation 10
Dependent Variable:
MANUFACTURING_EMP_GROWTH
Method: Least Squares
Date: 11/21/14 Time: 16:12
Sample: 1972 2013
Included observations: 42

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MAN__GROWTH_ RATE	0.344658	0.200229	1.721315	0.0929
C	3.069666	0.989865	3.101096	0.0035

R-squared	0.068965	Mean dependent var	2.889187
Adjusted R-squared	0.045689	S.D. dependent var	6.529883
S.E. of regression	6.378968	Akaike info criterion	6.590338
Sum squared resid	1627.649	Schwarz criterion	6.673084
Log likelihood	-136.3971	Hannan-Quinn criter.	6.620667
F-statistic	2.962924	Durbin-Watson stat	1.544119
Prob(F-statistic)	0.092921		

Source: Eviews computation