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Growth and Distribution of Factor Incomes in Kenya: A Social Accounting Matrix Perspective

Mwende Mwendwa

DP/87/2008

THE KENYA INSTITUTE FOR PUBLIC POLICY RESEARCH AND ANALYSIS (KIPPRA)

YOUNG PROFESSIONALS (YPs) TRAINING PROGRAMME

Growth and Distribution of Factor Incomes in Kenya: A Social Accounting Matrix Perspective

Mwende Mwendwa

Macroeconomics Division
Kenya Institute for Public Policy
Research and Analysis

KIPPRA Discussion Paper No. 87
2008

The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS

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Published 2008

Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4; fax: +254 20 2719951
email: **admin@kippra.or.ke**
website: http://www.kippra.org
ISBN 9966 777 35 0

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KIPPRA acknowledges generous support from the European Union (EU), the African Capacity Building Foundation (ACBF), the United States Agency for International Development (USAID), the Department for International Development of the United Kingdom (DfID) and the Government of Kenya (GoK).

Abstract

Economic growth and income distribution are two issues that are currently dominating policy decisions of both developed and developing countries. Governments across the globe are struggling to find an economic solution that ensures both GDP growth and a fair distribution of incomes for members of society to help improve living standards for low income earners. This paper specifically highlights Kenya's existing and previous growth strategy, and how it has affected the distribution of income in the economy. More specifically, it uses a Social Accounting Matrix methodology to simulate the distribution of factor incomes based on the economy's GDP growth focusing on different sectors. Through simulation of three different growth strategies, this paper recommends a development strategy for Kenya that ensures the most equitable distribution of factor incomes in the economy.

Abbreviations and Acronyms

ERS	Economic Recovery Strategy
ERSWEC	Economic Recovery Strategy for Wealth and Employment Creation
GDP	Gross Domestic Product
IPRS	Interim Poverty Reduction Strategy
NARC	National Rainbow Coalition
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of Petroleum Exporting Countries
PRSP	Poverty Reduction Strategy Paper
SAM	Social Accounting Matrix
SID	Society for International Development

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1. Introduction

Economic growth is vital in low income countries such as Kenya because, through it, other aspects and sectors of the economy are able to improve and cater for the development of the country and improve living standards for all. In Kenya, there has been fluctuating performance in economic growth, starting in the 1960s after independence, to present day. The kind of economic stability that Kenya has strived for to achieve economic growth includes, among others, attaining a sustainable balance-of-payments deficit, low inflation, a competitive exchange rate, and an improvement in the living standards of Kenyans living in poverty.

Kenya's economic performance has fluctuated from impressive highs in the 1960s and 1970s, which were a result of but not solely due to growing exports of primary commodities such as coffee and tea, and capital inflows from the West, including foreign direct investment. This came to an end in the early eighties following the second OPEC oil price rise that led to a world recession, fall in commodity prices and changes in terms of trade against developing countries such as Kenya. These factors led to the implementation of structural adjustment programmes in the 1980s, which came with conditionalities that were unfavourable to the domestic economic climate. This and other shortcomings of the Government, including corruption and poor economic policy, resulted in poor economic performance in the 1980s and 1990s, with recovery only beginning in the early 2000's with the installation of a new Government and new economic recovery strategies.

Kenya's policy makers over the years have researched and implemented several policies aimed at economic growth and stability of the country. The Economic Recovery Strategy for Wealth and Employment Creation (ERSWEC) 2003 divided the strategy for economic recovery into four pillars. The first pillar focused on economic growth and stability through various monetary and fiscal policies aimed at strengthening the economy. Subsequently, overall growth in the economy has been observed and certain sectors have performed well, making contributions to overall GDP growth. Agriculture contributed 23.3 per cent of GDP growth in 2003, manufacturing 19.6 per cent, while transport and communication contributed 12.0 per cent.

The second pillar involves strengthening of governance institutions. This means instituting reforms in public administration, national security and law and order. The third pillar involved rehabilitation and

expansion of physical infrastructure, in particular roads, railways and telecommunications. The fourth pillar involved investment in the human capital of the poor through education and adequate health services for the population to increase productivity (ERSWEC, 2003).

As per the Millennium Development Goals (MDGs) and ERS, Kenya needs to implement a growth strategy that impacts factor incomes and ensures their equitable distribution. Kenya's policy makers need to ensure that pro-poor growth strategies not only focus on economic growth but also incorporate income redistribution policies to achieve the desired results (Bigsten and Levin, 2000). For most Third World or developing countries, such as Kenya, development strategies are founded on growth strategy or distribution of factor incomes, which in turn affect poverty alleviation.

Past efforts by the Government to redistribute wealth have proved futile, as indicated in the 2004 report by Society for International Development (SID, 2004). This has been attributed to, among other things, lack of proper institutions and mechanism to guarantee deliberate government effort targeted especially at the poor. The distribution of factor incomes and its effect on economic, social and political development of the country has been a key aspect since 1963. This will become clearer in the next chapter as the study outlines Kenya's economic and social policy from 1963 to date.

Where growth and distribution in Kenya is concerned, there have been concern that majority of citizens are not benefiting from this economic growth. There is need to ensure that the growth strategy allows for equitable distribution of factor incomes. This paper aims at identifying and recommending a growth strategy that will ensure simultaneous improvement and fair distribution of factor incomes in the economy. The paper analyses Kenya's sectoral growth options and their effect on economic growth and factor incomes using a Social Accounting Matrix framework. The basic methodology involves use of multiplier analysis to identify sectors in which growth simulations will be carried out based on their linkages, and consequently assess the impact of these options on factor incomes.

Section two outlines the policy history implemented in Kenya while section three provides a review of the theoretical and empirical literature on growth and income inequality. Section four discusses the methodology, section five presents the simulation results, and section six the conclusion and policy recommendations.

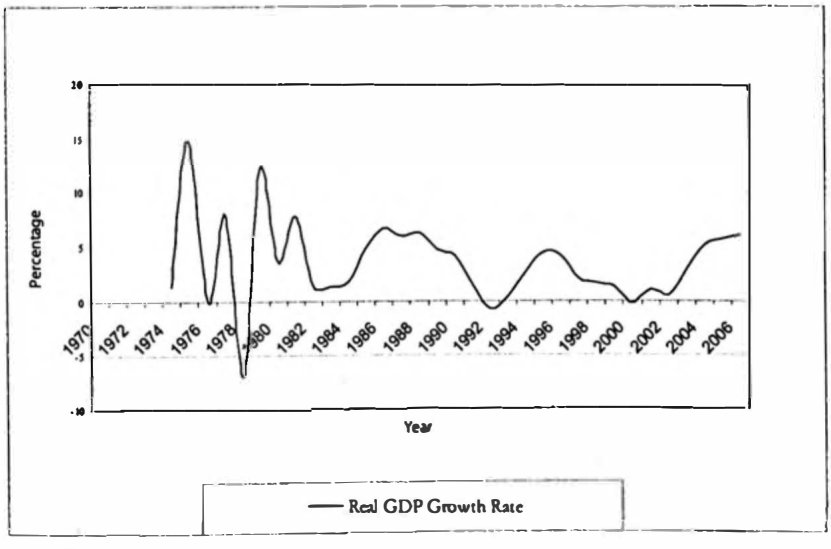
2. Economic Growth and Inequality in Kenya

Kenya's post-independence economic growth has been a major area of focus for policy makers since independence. Research and debate on the appropriate strategy and policy for sustainable economic growth has and is still being conducted widely. Kenya's real GDP growth rate has been fluctuating over the years (Figure 2.1) from 1.3 per cent in 1974 to 12.3 per cent in 1979, 6.2 per cent in 1988, 0.5 per cent in 1997 and 5.8 per cent in 2005.

(i) Period of growth (1965 to 1979)

Kenya's post-independence growth rate was a record 8.5 per cent between 1967 and 1973. This was attributed to growing exports of primary commodities such as coffee, tea and capital inflows from the West, including foreign direct investment. In spite of this, her high dependence on oil imports for the survival of extensive exports of petroleum products, domestic needs and inappropriate responses to the oil shocks meant that the oil price rise of 1973 adversely affected the economy. This resulted in a decline in the rate of growth from 5.6 per cent in 1973 to 1.2 per cent in 1975, but the boom in coffee and tea prices in 1977 increased GDP growth rate to 8.8 per cent and, unfortunately, there was no respite after the 1979 oil price increase (Hazelwood, 1991).

Figure 2.1: Kenya's overall GDP growth rate, 1970-2006



Source: Economic Survey (various issues)

(ii) Period of recession (1980 to 1984)

The second oil shock in 1979 set the stage for debt crisis as developing countries, including Kenya, found themselves confronted by a sudden increase in oil prices, which led to higher oil import bills and also impacted on the imports of industrial goods (Kenya's economy was especially affected by the increased prices in imports, as the growth strategy employed at the time was import substitution industrialisation). Macroeconomic policies, such as increased interest rates to curb inflation in some developed countries, also contributed to the magnification of the debt crisis as rates of interest on loans increased (Todaro and Smith, 2003).

The Government was expanding at this point, and so did its expenditure by 60 per cent between 1970 and 1992, resulting in fiscal imbalances that place pressure on inflation and domestic credit. From a low average of 5 per cent in the 1960s, inflation fluctuated between 10 and 20 per cent annually from the mid 1970s to the mid 1980s (Legovini, 2002).

(iii) Period of stability (1985 to 1990)

The late 1980s saw Kenya's favour with donors increase due to deficits caused by increasing Government expenditure, low-productivity of public investments, increasing number of non-performing loans, and low investor confidence and increasing interest rates signalling lack of investor confidence in the economy. From 1986 onwards, fiscal expenditures kept rising, so did the debt. With deficits in between 5 and 9 per cent of GDP a year, external debt jumped from 64 per cent of GDP in 1986 to 86 per cent in 1992 (Legovini, 2002). By 1991, GDP growth rate stood at 1.4 per cent (Economic Survey, various issues).

(iv) Period of decline (1992 – 2002)

By 1992, controls of foreign exchange transactions were relaxed. A floating exchange rate was adopted. The 81 per cent devaluation of the Kenyan shilling in 1993 resulted in an overnight jump of external debt to 143 per cent of GDP. Inflation fell back to pre-1970s level. Fiscal adjustment, which started in 1994 with severe cutting of expenditures, successfully brought down the deficit to zero by 1999. Economic performance in the 1990s and beginning of 2000 continued to be very

poor (Legovini, 2002). There was slight improvement in 1995 and 1996 when GDP growth rate was 4.4 and 4.1 per cent, respectively, but in 2000, GDP growth rate stood at - 0.2 per cent and in 2002, it increased to 0.5 per cent.

(v) Period of recovery (2003 to 2006)

Commitment by the Government to implement the policy changes highlighted in the 2003 ERS led to an increase in GDP growth in 2003 to 2.9 per cent, 5.7 per cent in 2005, and 6.1 per cent in 2006. Between 2003 and 2006, the Kenyan economy recorded improved performance in GDP growth, which has been reported in the Economic Survey publications for the mentioned years. Despite this, evidence from the 2004 study by the Society for International Development suggests that income distribution in Kenya remains unequal, with the bottom poor 10 per cent earning Ksh 76 cents for every Ksh 42 shillings the top rich 10 per cent earn.

Distribution of factor incomes

Distribution of factor incomes in Kenya has always been considered a priority by policy makers, along with economic growth. A stable and healthy economy translates to a better standard of living for all citizens in the form of better healthcare, level of education, infrastructure, housing and an equally distributed factor income for the entire population. Recent statistics for Kenya show that income is skewed towards the rich and away from the poor. The countries top 10 per cent of households' control 42 per cent of the total income, while the bottom 10 per cent control less that 1 per cent (SID, 2004).

Information and data on income distribution and income inequality in Kenya in the past is inadequate, as not many studies have actually measured the inequality or distribution of income in the country before the above mentioned studies. In 1992, Kenya's gini coefficient was 0.58, in 1997 it was estimated to decline slightly to 0.57 but estimates showed an increase in 1998, 1999 and 2000 to 0.61, 0.65 and 0.69, respectively. This indicates that inequality was increasing in Kenya over this time, because the gini coefficient ranges from zero to one, with values closer to one signifying higher inequality.

Previous growth and inequality policy options

The Government of Kenya, as previously mentioned, has published numerous papers and publications aimed at differentiating aspects of development in society. This paper highlights some of the papers published over the years and the policies recommended for the country's development.

Sessional Paper No. 10 of 1965 on 'African Socialism and its Application to Planning in Kenya' was the first post-independence Government policy paper aimed at boosting development in Kenya. The policies outlined in the paper were all geared towards reducing the limitations on growth in order to increase the nations growth potential, among other things (Government of Kenya, 1965).

In addition to other publications between these periods, Sessional Paper No. 1 of 1986 titled on 'Economic Management for Renewed Growth', aimed to forecast the type of strategy that policy makers needed to employ to achieve economic growth and stability between 1986 and 2000. The paper recommended an average GDP growth rate of 5.6 per cent a year from 1984 to 2000 for new development and provision of basic needs for the growing population (Government of Kenya, 1986). The paper went on to advise that rapid economic growth would be generated through job creation; increased productivity in agriculture; widespread rural non-farming activity; a dynamic informal sector; and a restructured industry. With economic growth channelled into these directions, widespread benefits would be felt by Kenyans of all income levels, hence improvement in dincome distribution.

By 1994, it was clear that the previous strategies for economic growth were not producing the desired results, as real GDP growth rate declined from 4.2 per cent in 1990 to 1.4 per cent in 1991 and 0.4 per cent in 1993 (Economic Survey, various issues). This resulted in the publication of Sessional Paper No. 1 of 1994 titled 'Recovery and Sustainable Development', which was to enforce the theme from the previous sessional paper that economic growth is the most vital factor for wealth creation and improved living standards for all (Government of Kenya, 1994). The goal of this paper was to introduce policies that would enhance economic recovery, maintain economic stability and accelerate development. In this paper, a framework of strict macroeconomic management, controlled domestic currency that is not overvalued, trade policies that are export biased, development of human resources,

liberalized labour markets and reliance on the private sector for industrial expansion was suggested.

In November 2002, the Kenya Government completed its interim Poverty Reduction Strategy Paper (PRSP) that later served as a foundation for the Economic Recovery Strategy Paper for Wealth and Employment Creation of 2003. As per the PRSP, the primary development goal for Kenya was to achieve a broad-based, sustainable improvement of welfare standards of all Kenyans. Kenya's Interim Poverty Reduction Strategy (IPRSP) had five basic components and policy objectives:

- to facilitate sustained and rapid economic growth;
- to improve governance and security;
- to increase the ability of the poor to raise their incomes;
- to improve the quality of life of the poor; and,
- to improve equity and participation.

When the NARC Government came into power in 2003, it came up with an Economic Recovery Strategy for Wealth and Employment Creation drawing heavily from the IPRSP and NARC manifesto, which was aimed at improving a number of economic, social and institutional issues in the country. The ERS centred around four pillars, with the first focusing on establishing a stable macroeconomic environment to facilitate rapid economic growth. Some of the macroeconomic targets that the ERS set were:

- Achieving a high real GDP growth rate—rising from an estimated 1.1 per cent in 2002, to 2.3 per cent in 2003 and 7 per cent in 2006;
- Creating 500,000 jobs annually; and,
- Containing average inflation rate to below 5 per cent (ERSWEC, 2003)

Following the implementation of this strategy, real GDP grew by 5.1 per cent in 2004 and 6.1 per cent in 2006. In regard to the employment creation in 2004, employment outside small scale and pastoralists activities increased by 5.9 per cent to stand at 7.8 million and and 8.3 million in 2005 (Economic Survey, 2006). It is clear in regard of GDP growth that the Government has been able to deliver as per the ERS target (Mwabu *et al.*, 2002).

3. Theoritical and Empirical Literature

3.1 Theoretical Literature

Early neoclassical models emphasized the role of capital accumulation in economic growth, one such example was the Solow-Swan model where output is produced by capital and labour. Economic growth is compatible with labour, augmenting technical progress, which acts as if it were increasing the available amount of labour. In the long term, output per capita and labour productivity grow at an exogenously given rate of technical progress (Solow, 1956; Swan, 2002). The neoclassical theory assumes that the lower the starting level of per capita income of a country, the higher the growth rate and the faster the economy will reach the point of convergence where it will have achieved a steady rate of growth.

Todaro (2000) builds on the neoclassical view that economic growth depends on three vital factors:

(i) Capital accumulation, including land, equipment and human resources;

(ii) Population growth, which means a larger labour force; and,

(iii) Technological progress.

'...economic progress can be traced to a variety of factors...investments that improve the quality of existing physical and human resources...(and) raise the productivity of all or specific resources through...technological progress. (These) will continue to be the primary focus in stimulating economic growth in any society' (Todaro, 2000). For any economy whether developed or developing, these are the factors that historic economic theory require for growth to prevail and some of these factors clearly spill over into other areas of the economy, such as the social aspect of improving physical and human resources.

In the course of 1980, various theories and models emerged that aimed at explaining economic growth as endogenous to the model. Romer (1986) observed that endogenous growth is basically economic growth from within a system. 'Output per hour worked in the US today is 10 times as valuable as output worked per hour 100 years ago' (Romer, 1990). It became clearer that output of industrialized countries was higher than it was say a century ago and economics needed a model to

explain the high growth rates being experienced, and technological progress was identified as a factor that was present in economies centuries ago. The key drivers of growth in the endogenous theories and models are a number of different variables that refer not only to technical progress but also to public capital, human capital, and financial efficiency. In particular, in this framework, fiscal variables and the behaviour of human capital, among others, are relevant factors that can affect growth.

Classical economics writers such as Adam Smith and Karl Marx were interested in how income was distributed among the population although they focus mainly on the functional distribution of income, meaning ownership of the factors of production—land, labour and capital. Classical economists were interested in this functional distribution because they believed that it was through this functional distribution that growth was achieved (Sundrum, 1992). More recent research into income distribution has been concerned with how national income is distributed at a personal/household level.

There is no specific theory on the distribution of income, although there are works brought forward by varying schools of thought on the theory of distribution. These generally tend to explain how factor prices are determined and how they in turn determine the shares of total output accruing to each of these factors of production. First, it is worth noting that other factors associated with income distribution in the economy, such as per capita income and personal incomes change at a more rapid pace than the distribution of income as a whole, which displays a more stable pattern (Sundrum, 1992).

3.2 Empirical Literature

There is a shortage of literature on the effect of growth on factor incomes but there are various theories and publications on growth and income distribution and equality that we will examine for the purposes of this paper. For instance, Kuznet's (1955) hypothesises that economic growth increases income inequality over time to a critical point and then starts decreasing. Other studies such as Dadhkah (2006) have interpreted their findings to suggest that there is a bi-directional influence on income distribution and economic growth.

Initial conventional literature suggests that income inequality encourages economic growth. The basis for this argument is in Keynes

theory that the average propensity to save increases with income, thus re-distributing income to the rich will increase the economy-wide propensity to save, and *ceteris paribus* the fraction of GDP devoted to capital formation will rise and hence increase economic growth (Odedokun and Round, 2001). This paper, though, will be focusing on the effect that economic growth has on income distribution and not vice versa as put forward by Keynes.

Many theoretical and empirical studies have focused on the question of how inequality is generated and how it is related to economic growth (Kuznets, 1955; Kakwani, 1980; Lambert, 1989; Aghion, Caroli, and Garcia-Penalosa, 1999). Kuznets (1955) began the search for a general relationship between economic growth and income inequality and found an inverted U-shape relation between income inequality and per capita income based on both cross-country and time series data. Kuznets hypothesis used the rationale that the rich tended to have a greater propensity to save than spend and, by increasing the savings in the economy, the growth rate was increasing too. The theory also put forward lack of equality necessary in the wage market so that inequality would motivate workers to be more productive in the hope of higher wages and in doing so increase productivity and growth.

Kuznets (1955) explains it as follows: as an economy begins to grow, there is a shift from low income, low-inequality agricultural production, to high income, medium-inequality industrial production but this will narrow over time because: 1) increasing efficiency of the established urban population decreases inequality within the industrial sector or 2) the growing political power of the poor urban population results in protective and supporting legislation.

Kuznets thus concluded that inequality would spur growth at an increasing rate up to a point where inequality would begin to decline, hence the inverted U-shaped relation between income inequality and economic growth. Kuznets hypothesis seemed to account for US and several OECD countries experience from the 1770s to 1970s (Deininger and Square, 1997). As historical literature theorizes that inequality causes growth, this has put to question the causal relationship between inequality and growth. Does income inequality cause growth or can economic growth lead to equitable income distribution?

Dadkhah tests the relationship between economic growth and income distribution, and using vector autoregression to answer the question of causality and cointegration between the two, Dadkhah concludes that

there is a two-way causal relationship between a more equal distribution of income and higher rate of economic growth. This means that policies undertaken to encourage equitable income distribution will promote economic growth and those aimed at promoting growth will support an equitable distribution of income. That being the case, then we have a good system whereby equality cultivates growth and the latter results in a more equal distribution.

There are other works that have attempted to investigate the link between economic growth and income distribution, both using a social accounting matrix and other tools of analysis. Cohen (2004) reports on the multiplier analysis of Social Accounting Matrices for Russia and China. Through the use of growth multipliers for each of these economies and studying the distribution of the multiplier effects on respective sectors and households, Cohen was able to observe, during the period, economic trends of recession with inequity in Russia during the transition phase, and strengthened growth with restrained redistribution in China. Also observed were distribution multipliers that were less regressive in China than Russia, which reflect stronger trickle down effects.

Wang and Shi (2006) used the Lorenz curve and Gini coefficient to establish the relationship between economic growth and income distribution in China, and they concluded that the estimated Gini coefficients indicate that the level of income inequality in both urban and rural China has increased significantly since 1981. Because of the socialist economic system that was in place in China for many years, China's subsequent market-oriented economic reforms have resulted in a new set of socio-economic problems and challenges.

One of the studies that diverts from the previous theories of economic growth and income distribution is Birdsall, Ross and Sabot (1995), who present a more contemporary idea that it is possible to achieve economic growth and equitable income distribution simultaneously as was witnessed in the East Asian economies. Through various policies ranging from land reforms to infrastructure and labour-demanding export-led strategies, Birdsall *et al.* (1995) are able to conclude from their regressions that in the East Asian case, there is a negative relationship between income inequality and economicgrowth. This allows for further investigation into the theory that pro-poor growth strategies can be implemented in developing countries.

4. Methodology

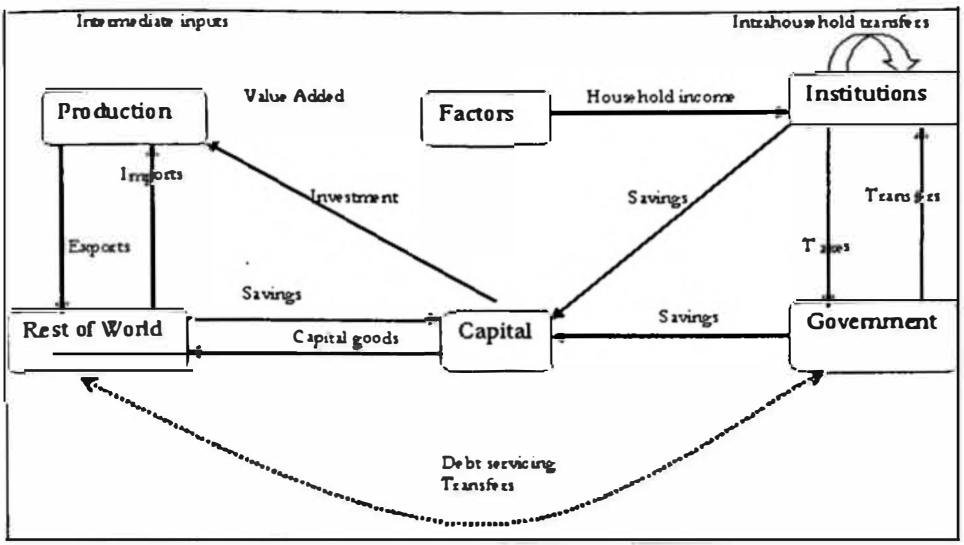
This study uses multiplier analysis in a Social Accounting Matrix (SAM) framework to establish the effect of economic growth on income distribution in Kenya. The basic methodology involves use of the multiplier analysis to carry out growth simulations by identifying sectoral growth options, and consequently assessing the impact of these options on income distribution among institutions (enterprises and households).

A SAM is a useful tool for analysing employment, growth options and income distribution. Thus, it is possible to analyse the redistribution effects of growth in a SAM framework. Income distribution in the SAM framework is in the form of distribution of value added between the different factors of production (capital–mainly in enterprises, and labour–provided by households). The analysis involves further decomposition of factor incomes across different categories of households, and also decomposition of surplus across enterprises and different categories of households.

Generally, the Social Accounting Matrix has two main purposes: organising of information about the economic and social structure of a country or city or region in a particular year; and, providing statistical basis on which a credible model can be created (Pyatt and Round, 1985). 'The principle of SAM is really nothing more than that of double entry bookkeeping in accounting. A SAM is a series of accounts in each of which income and expenditure must balance' (Pyatt and Round, 1985). The SAM brings the aggregate national accounts of a country together and breaks them down into production sectors, production factors, earning households expenditure categories, government, and the rest of the world; the whole within a consistent and statistically closed matrix (Cohen, 2002).

At the core of the SAM framework are the households and household groups. It shows the circular flow of income, including transactions between different institutions (including different households groups), production activities, and in particular recording the interactions between these sets of agents via the factor and product markets. The direction of the arrows in Figure 4.1 shows the direction of transaction' or payment. At the production level, intermediate outputs are combined with factors of production to produce commodities. At the production level, where growth in the economy is generated, the factors of

Figure 4.1: Flow of income and transactions



Source: Wanjala and Kiringai (2007)

production, namely labour and capital are employed. These receive transfers from the production account in the form of factor incomes and use the SAM to estimate the different growth strategies suitable for the economy. It is also possible to observe the effect of these strategies on factor incomes. This allows for the formulation of a growth strategy that ensures equitable distribution of factor incomes.

After the factors of production receive their transfers, they are then transferred to institutions, which are either households or institutions. Institutions have a bi-directional transfer relationship with government in the form of taxes from the institution and transfers from government, such as welfare. Both institutions transfer payments to the capital account, which are savings. The capital account then transfers payments to the rest of the world and the production account in the form of capital goods and investments, respectively. The rest of the world receives transfers from the production account as exports and transfers payment to the production account and capital account as imports and savings, respectively.

The basic methodology involves use of multiplier analysis to carry out growth simulations by identifying sectoral growth options, and consequently assessing the impact of these options on income

distribution among institutions (enterprises and households). The theory behind the SAM is that it records the transactions between the accounts in the cells of the matrix (T_{ij}). This means that any payment from the *j*th account to the *i*th account will be shown in cell T_{ij} according to standard accounting convention and, although not crucial, the rows are always ordered in the same way as the columns.

The SAM is not a model and, for this reason, column coefficients are computed from the matrix itself in order to calculate the matrix multipliers, which are analogous to the input-output model. For the multiplier computation to be possible, one or more of the accounts has to be designated as exogenous or the matrix will not be invertible. It has been routine to consider transactions in the government account, capital account (consisting) of savings and investment) and the rest of the world as an exogenous account (Round, 2003).

These accounts have been assumed to be exogenous because of various reasons. First, government expenditure is generally determined by policy. Second, the external sector or rest of the world is outside domestic control and, finally, lack of dynamic features in the model mean investment is exogenously determined. Simply put, expenditure is set independently of income. This being so, the endogenous accounts are commonly the production accounts, that is, activities and commodities, factors of production and households, which consist of private institutions, and are the accounts where changes in income lead to changes in level of expenditure.

In order to derive the SAM multiplier, we begin by aggregating the exogenous accounts to a single account, which will record an aggregate set of injections and leakages in the system. The endogenous transactions will then be represented by the summary matrix T, which will then be used to define a matrix A of column shares (coefficients) by dividing the elements in each column of T by the columns total.

$$T=Ay \quad \text{.....(i)}$$

The component sub-matrices of A (endogenous transactions) resemble the submatrices of the macro SAM depicted in Table 4.1 where for example A_{62} is the matrix of taxes generated by activities and A_{53} is the share of factor incomes distributed across households. It is notable that several submatrices do not reflect any transactions in the SAM and these are recorded as zeros. Additionally, the exogenous injections in the SAM below can be depicted as vector x and the account totals as

vector y, where x_1 is the vector of all purchases of final goods less households and y_1 is total demand for products. The endogenous row accounts can be written as a series of linear identities and the system can be solved to give:

$$y = Ay + x \quad \text{.....(ii)}$$

where A is the coefficient, y is intermediate demand and x is final demand.

$$y - Ay = x \quad \text{.....(iii)}$$

$$(1 - A)y = x \quad \text{.....(iv)}$$

$$y = (1 - A)^{-1}x \quad \text{.....(v)}$$

In equation (v), $(1 - A)^{-1}$ is the SAM multiplier matrix or the matrix of accounting multipliers. If A represents the pattern of expenditures, for example, government or distribution coefficients, and these are assumed to be fixed, then $(1 - A)^{-1}$ will be fixed as well, which means equation (v) will determine total outputs and incomes y using any set of injections x.

To give an example of the application of the multiplier, we observe the effect of a reduction in government expenditure, inclusive of wages and salaries. As government expenditure is one of the exogenous accounts, if we assume the same endogenous patterns of expenditure and income payments in other part of the economy, then equation (v) will generate the multiplier effects (which in this case will be negative because it is a reduction in expenditure being experienced) on the outputs of activities of production and household incomes.

4.1 Aggregate SAM for Kenya 2003

The aggregate SAM is divided into five sectors. First is the agricultural sector, which registered a total gross output of Ksh 278,733 million in 2003. Second is the industrial sector, whose total gross output in 2003 totalled Ksh 799,922 million. This is followed by the private sector, whose total gross output for 2003 totalled Ksh 699,101 million, then public service and utilities sectors whose gross output totalled Ksh 232,974 million and Ksh 36,723 million, respectively in 2003.

Table 4.1: Kenya's Macro SAM 2003

	Activities	Commodities	Factors	Enterprises	Households	Taxes	Govt	Investment	Rest of the World	Total
Activities		1,783,049			95,043					1,878,092
Commodities	867,692	117,117			772,972		202,913	196,723	281,387	2,438,804
Factors	1,010,400									1,010,400
Enterprises			544,860				41,297		4,909	591,066
Households			461,261	335,194			17,898		91,014	905,367
Taxes		131,756		37,053	33,603					202,412
Government			4,279	7,332	6,298	202,412			5,677	225,998
Savings				204,248	-2,549		-36,286	17,498	31,310	214,221
Rest of the World		406,882		7,239			176			414,297
Total	1,878,092	2,438,804	1,010,400	591,066	905,367	202,412	225,998	214,221	414,297	

5. Empirical Findings

5.1 Structure of the Kenyan Economy: A SAM Perspective

The Kenya 2003 disaggregated SAM focuses on 13 sectors in the economy, which have been identified in Table 5.1 below. The largest contributor of gross output in the economy is the manufacturing sector, which accounts for 21.3 per cent of total gross output at market prices, followed by the agricultural sector, which contributes 18.1 per cent of total gross output in the economy. Transport and communication, building and construction, and trade account for 12.6 per cent, 8.9 per cent and 8.6 per cent, respectively.

Output can be measured either as value added or gross output. Value added does not include the intermediate inputs that are utilized in the production process, such as materials, energy and services. The latter includes all these inputs; the former is also defined as Gross Domestic Product.

Exports consist of all final goods and services produced for overseas consumption, while imports consist of foreign supplies of goods and services consumed in the domestic market. The manufacturing sector accounted for the largest share of Kenya's exports in 2003, with 43.7 per cent, followed by the agricultural and transport and communication sectors, which contributed 35.9 per cent and 16.3 per cent, respectively. Imports are deducted from the equation so as to distinguish foreign

Table 5.1: Structure of the Kenyan economy, 2003 (%)

	Gross Output	Exports	Imports	Investment	Household Consumption
Agriculture, fishing & forestry	18.1	35.9	7.0	2.1	16.9
Mining & quarrying	0.4	3.0	0.2	-0.1	0.0
Manufacturing	21.3	43.7	75.0	20.1	35.0
Electricity and water	2.0	0.0	0.0	0.0	1.3
Building and construction	8.9	0.0	0.0	77.8	0.0
Trade	8.6	0.0	0.0	0.0	1.1
Hotels and restaurants	4.9	0.5	1.5	0.0	9.3
Transport & communication	12.6	16.3	12.3	0.0	18.2
Financial services	5.2	0.5	1.8	0.0	4.3
Other services	5.7	0.0	0.1	0.0	7.6
Education	2.2	0.0	0.0	0.0	3.3
Health	5.5	0.0	0.0	0.0	3.0
Public administration	4.7	0.0	2.0	0.0	0.1
Total	100	100	100	100	100

Source: Own computation from 2003 SAM

products from domestic supply. The manufacturing sector also dominated the countries' imports, accounting for a massive 75 per cent of imports, while the transport and communication and agricultural sectors contributed only 12.3 per cent and 7.0 per cent, respectively.

The investment component in gross output is specifically non-financial purchase goods, meaning that if money is converted into goods or services, without any charges for reimbursement, then it is an investment. Kenya's building and construction sector recorded investment levels of 77.8 per cent of entire investment in the economy, while the manufacturing sector recorded 20 per cent followed by agriculture with 2.1 per cent of investment. Consumption in the SAM framework includes both personal consumption at the household level and consumption at the enterprise level. The manufacturing sector accounted for 35 per cent of consumption in the economy, followed by the transport and communication sector (18.2%), and the agricultural sector (16.9%).

As per the 2003 Kenya macro SAM in Table 5.1, total value added amounted to Ksh 1,010,400 million. Of this total, 26.4 per cent was attributed to agriculture, 12.9 per cent to the manufacturing sector and 10.2 per cent to the transport and communication sector (Table 5.2). By further separating the three variables, we are able to observe that of the

Table 5.2: Distribution of value added, 2003 (%)

Sector	Value Added	Labour	Capital	Land
Agriculture, fishing & forestry	26.4	25.9	22.9	100.0
Mining & quarrying	0.4	0.4	0.4	0.0
Manufacturing	12.9	8.5	17.1	0.0
Electricity and water	2.7	1.6	3.8	0.0
Building and construction	5.3	3.6	6.8	0.0
Trade	7.2	8.9	6.3	0.0
Hotels and restaurants	6.0	3.2	8.5	0.0
Transport & communication	10.2	9.1	11.5	0.0
Financial services	6.6	5.7	7.6	0.0
Other services	7.3	5.7	8.9	0.0
Education	3.0	3.9	2.4	0.0
Health	7.6	17.0	0.5	0.0
Public administration	4.6	6.5	3.3	0.0
Total	100.0	100.0	100.0	100.0

Source: Own computation from 2003, SAM

total labour earnings distributed in the economy, 25.9 per cent was earned in the agricultural sector, 17.0 per cent in the health sector and 9.1 per cent and 8.9 per cent in the transport and communication and trade sectors, respectively.

The agricultural sector employed 22.9 per cent of the capital employed in the economy, followed by the manufacturing sector (17.1%) and transport and communication sector (11.5%). All land used in the production activities of 2003 was employed in the agricultural sector.

5.2 Economic Growth Simulations and Impact on Income Distribution

Table 5.3 shows the results of applying the multiplier analysis on the 2003 SAM data. By solving $(1 - A)^{-1}$, where A is matrix of input output technical coefficient, it is possible to compute the backward and forward linkages between sectors and level of integration in the economy. Backward linkages refer to where a sector sources its inputs, while forward linkages refer to where the outputs of one sector are used as inputs in another sector. The level of integration demonstrates the change in overall output level that results from one unit injection into any particular sector.

Table 5.3: Level of integration and backward and forward linkages

	Level of integration	Backward linkages (activities)	Forward linkages (activities)
Agriculture, fishing & forestry	1.4502	2.8303	5.2051
Mining & quarrying	1.0019	2.6834	1.0262
Manufacturing	1.5039	2.6772	6.5020
Electricity and water	1.0552	2.5267	1.6823
Building and construction	1.0171	2.5602	1.1418
Trade	1.1893	2.9631	3.4209
Hotels and restaurants	1.1276	2.7175	2.6201
Transport & communication	1.4750	3.0360	4.7327
Financial services	1.1756	2.8361	2.9512
Other services	1.1564	2.6655	2.9611
Education	1.0389	2.8515	1.4332
Health	1.0397	3.0325	1.3915
Public administration	1.0126	2.8219	1.1339

Source: Own computation from 2003, SAM

Beginning with the linkages, agriculture, fishing and forestry have strong forward linkages, which imply they are widely used as inputs in other sectors. The sector also has strong backward linkages, implying they source for inputs from other sectors. Manufacturing also has a strong forward linkage, which is expected as its output is used as input in other sectors. Trade has strong backward linkages because goods and services from other sectors are needed for trade to occur.

Transport and communication have both strong backward and forward linkages as inputs are needed from other sectors to set up and operate the sector, while the outputs are necessary as inputs for other sectors to produce outputs. Other sectors that present strong backward linkages are financial services and education.

The level of integration shown in Table 5.3 represents the overall growth in output in a sector caused by an injection into the same. In the case of agriculture, fishing and forestry, a Ksh 1 million injection into the sector results in a 45 per cent overall growth in output. In the case of the manufacturing sector, a Ksh 1 million injection in the sector will lead to a 50 per cent growth in overall output growth, while injecting Ksh 1 million into transport and communication will yield a 47.5 per cent increase in growth in output.

Growth Policy Simulations

Given Kenya's historical and current economic targets, policy makers need to implement a growth strategy that is not only sustainable but one that ensures an equitable distribution of income. For growth policy targets, actual growth rate in value added/GDP at factor cost in 2004 is used. To get the target growth for 2004, we calculate the target growth rate as:

[(GDP at factor cost 2004/GDP at factor cost 2003)-1].....(i)

[(1,141,752.34/1,010,400.30)-1] = 0.13.....(ii)

Our target growth is therefore 13 per cent, implying that the target GDP growth is 13 per cent of Ksh 1,010,400.30 (GDP at factor cost 2003), which corresponds to an increase of Ksh 131,352.04 million. In order for this target to be met, this growth is distributed across the sectors that have the highest linkages in the multiplier results in Table 4. The sectors are agriculture, fishing and forestry, manufacturing, trade and transport and communication. Three sets of simulations are carried out:

(i) Targeting an injection into agriculture and manufacturing;

(ii) Targeting an injection into agriculture, manufacturing and trade; and,

(iii) Targeting an injection into agriculture, manufacturing, trade and transport and communication.

For the first simulation and according to their value added shares in the 2003 SAM, 67 per cent of this growth is distributed to agriculture, fishing and forestry and the remaining 33 per cent to the manufacturing sector. Therefore, while Ksh 131,352.04 million is targeted for growth, the agriculture, fishing and forestry sectors need Ksh 88,190.04 million and the manufacturing sector Ksh 43,162.00 million to grow. Following from $X=(1-A)^{-1} F^d$, where F^d represents exogenous injections, then:

$$\begin{bmatrix} 88{,}190.04 \\ 43{,}162.00 \end{bmatrix} = \begin{bmatrix} 1.4502 & 0.3602 \\ 0.3928 & 1.5039 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \end{bmatrix}$$

Solving the values I_1 and I_2, results in I_1 = Ksh 57,405.25 million and I_2 = Ksh 13,706.30 million. This means that for the two chosen sectors to meet the target set, injections of the amounts represented by I_1 and I_2 will have to be invested in the agriculture, fishing and forestry and manufacturing sectors, respectively.

To run the second simulation and according to their share in the 2003 value added, 57 per cent of the growth goes to agriculture, fishing and forestry, 28 per cent to manufacturing and the remaining 15 per cent to the trade sector. This implies that for output to grow by Ksh 131,352.04 million, agriculture, fishing and forestry need to grow by Ksh 74,473.45 million, the manufacturing sector by Ksh 36,448.83 million, and trade by Ksh 20,429.77 million. Thus:

$$\begin{bmatrix} 74{,}473.45 \\ 36{,}448.83 \\ 20{,}429.77 \end{bmatrix} = \begin{bmatrix} 1.4502 & 0.3602 & 0.3101 \\ 0.3928 & 1.5039 & 0.4153 \\ 0.1652 & 0.1990 & 1.1892 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \end{bmatrix}$$

Solving for I_1, I_2 and I_3 yields that I_1 = Ksh 47,069.80 million, I_2 = Ksh 9,440.63 million and I_3 = Ksh 9,057 million will have to be injected in the agricultural, manufacturing and trade sectors, respectively, for the growth target to be achieved.

In the third simulation, growth is distributed as follows: 46 per cent to agriculture, 23 per cent to manufacture, 13 per cent to trade and 18 per cent to the transport and communication sector. In order for the growth target to be met, agriculture will need to grow by Ksh 61,113.52 million, manufacturing (Ksh 29,910.20), trade (Ksh 16,764.83) and transport and communication by Ksh 23,563.48 million. Thus;

$$\begin{bmatrix} 61{,}113.52 \\ 29{,}910.20 \\ 16{,}764.83 \\ 23{,}563.48 \end{bmatrix} = \begin{bmatrix} 1.4502 & 0.3602 & 0.3101 & 0.2983 \\ 0.3928 & 1.5039 & 0.4153 & 0.3746 \\ 0.1652 & 0.1990 & 1.1892 & 0.2351 \\ 0.2757 & 0.2001 & 0.3643 & 1.4750 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \\ I_4 \end{bmatrix}$$

Solving for I will give I_1 = Ksh 37,789.33 million, I_2 = Ksh 6,634.72 million, I_3 = 6,466.63 million, I_4 = 6,413.45 million, implying injections of these amounts in the respective sectors is what is needed for the growth target to be achieved.

The three simulations all lead to differing levels of growth in the economy resulting from the multiplier effect throughout the sectors. The first simulation will result in the growth of the economy, which include both activities and commodities, by Ksh 363,513.67 million, while the second and third simulations will affect growth by Ksh 338,836.18 million and Ksh 298,823.56 million, respectively. These values are deviations, which means the economy grows by those amounts over and above the targeted Ksh 131,352.04 million. Other sectors recorded substantial improvement in their output as a result of the injections.

In the activities category, the first simulation resulted in Ksh 12,215.39 growth in trade activities, and growth in transport and communication and other services by Ksh 18,571.56 million and Ksh 11,245.68 million, respectively. The second simulation led to growth in these same sectors by Ksh 20,429.77 million, Ksh 18,167.67 million and 10,374.63 million, while the third simulation generated growth by Ksh 16,764.83 million, Ksh 23,563.48 million and Ksh 9,705.60 million in the trade, transport and communication and other sectors.

Besides the growth experience by activities and commodities, the injections will also have an effect on the distribution of factor incomes. Looking at labour, the growth mostly benefits workers engaged in medium skill labour, while male workers benefit from higher increases in income than their female counterparts. The first simulation resulted

Table 5.4: Impact of injection on growth in the economy

Economy wide impact of injections	Total effect		
	Simulation 1	Simulation 2	Simulation 3
Agriculture, fishing & forestry	88,190.04	74,473.45	61,113.52
Mining & quarrying	172.41	145.60	119.48
Manufacturing	43,162.00	36,448.83	29,910.20
Electricity and water	3,621.77	3,276.40	2,952.76
Building and construction	1,368.34	1,170.41	965.39
Trade	12,215.39	20,429.77	16,764.83
Hotels and restaurants	7,170.99	6,699.62	5,926.37
Transport & communication	18,571.56	18,167.67	23,563.48
Financial services	8,142.39	9,251.45	8,072.99
Other services	11,245.68	10,374.63	9,705.60
Education	2,559.98	2,350.38	2,043.44
Health	2,418.61	2,211.99	1,917.68
Public administration	331.54	335.21	295.85
ACTIVITIES TOTAL	199,170.70	185,335.40	163,351.60
Agriculture, fishing & forestry	24,243.46	21,428.49	18,156.69
Mining & quarrying	218.30	184.36	151.29
Manufacturing	66,423.99	60,931.24	52,516.18
Electricity and water	3,634.41	3,287.84	2,963.07
Building and construction	1,368.34	1,170.41	965.39
Trade	12,283.24	11,435.61	10,355.41
Hotels and restaurants	8,014.29	7,487.50	6,623.31
Transport & communication	22,742.56	22,247.96	21,001.77
Financial services	8,798.76	9,997.22	8,723.77
Other services	11,274.10	10,400.85	9,730.12
Education	2,559.98	2,350.38	2,043.44
Health	2,418.61	2,211.99	1,917.68
Public administration	362.91	366.93	323.85
COMMODITIES TOTAL	164,342.97	153,500.78	135,471.96
GROWTH TOTAL	363,513.67	338,836.18	298,823.56

Source: Own computation from 2003, SAM

in these incomes increasing by Ksh 15,378.62 million and Ksh 12,413.15 million for medium and high skilled male labour, respectively. An increase of Ksh 13,627.15 million and Ksh 12,367.03 million was experienced in the second simulation and Ksh 11,761.21 million and Ksh 11,317.82 million in the third simulation. Incomes for females in medium skilled labour also increased by Ksh 9,162.42 million as a result of the first simulation and Ksh 8,280.27 million and Ksh 6,882.23 million in the second and third simulations, respectively.

Table 5.5: Impact of growth on factor incomes in the economy (%)

		Baseline	Simulation 1	Simulation 2	Simulation 3
Value added	Male low-skill labour	1.65	2.84	2.69	2.56
	Male medium-skill labour	9.90	12.63	12.21	12.11
	Male high-skill labour	16.93	10.19	11.08	11.65
	Female low-skill labour	1.08	1.93	1.86	1.76
	Female medium-skill labour	4.76	7.52	7.42	7.09
	Female high-skill labour	8.52	4.73	5.02	4.96
	Capital	54.35	54.11	54.14	54.62
	Land	2.81	6.05	5.58	5.26
	Total value added	100	100	100	100
Institutions	Enterprises	54.15	41.29	41.31	41.59
	Rural households	18.41	24.81	24.39	23.98
	Urban households	27.43	33.90	34.30	34.43
	Total	100	100	100	100

Source: Own computation from 2003, SAM

In Table 5.5, the baseline percentage for value added is calculated from values of the 2003 disaggregated SAM. From the results of the simulation, we are able to observe the distributive effects on the different labour skill sets. All three simulations result in an increase in the percentage of income to males in low and medium-skilled labour. For example, income for males in low-skilled labour in the second simulation increased by slightly over one percentage point from 1.65 per cent to 2.69 per cent. Males in high-skilled labour, on the other hand, experience a decline in the percentage of income they earn, from 16.93 per cent to 10.19 per cent.

The same effects can be observed where female labour is concerned, with the increase in percentage of income for low and medium-income labour, such as increase in simulation two of females in medium skilled labour from 4.67 per cent to 7.42 per cent. Incomes of females in high-income labour decreased in all simulations.

We also observe that there is very little change in the percentage of capital employed, and that all the simulations lead to an increase in land use.

The injection into these sectors also has an impact on the exogenous factors in the economy, namely taxes, government, savings and the rest of the world. The first simulation resulted in growth by Ksh 30,463.32

million in the rest of the world account and Ksh 22,308.85 million in the capital account. The second simulation resulted in growth by Ksh 28,251.81 million and 20,457.42 million and the third simulation led to growth by Ksh 24,669.69 million and Ksh 17,966.93 million, respectively (Table 5.6).

Table 5.6: Impact of injections (Ksh millions)

	Simulation 1	Simulation 2	Simulation 3
Commodity taxes	8,165.49	7,515.39	6,504.18
Direct taxes	7,318.57	6,731.29	5,895.21
Import taxes	1,530.82	1,397.39	1,201.75
Government	1,324.50	1,214.45	1,066.38
Savings	22,308.85	20,457.42	17,966.93
Rest of the world	30,463.32	28,251.81	24,669.69
	71,111.56	65,567.77	57,304.14

Source: Own computation from 2003, SAM

6. Conclusion and Policy Recommendations

6.1 Conclusion

The use of the multiplier analysis on all sectors of the economy enables us to draw several important conclusions that will guide the simulations we will run for the growth options. First, the level of integration, which indicates the overall growth in output per sector will produce based on the injection in it, allows us to conclude that the sectors that will experience the highest percentage growth following injections are the agricultural, manufacturing and transport and communication sectors. The analysis concludes that with an injection of Ksh 1 million into each sector, sectoral growth would be 45 per cent in agriculture, 50 per cent in manufacturing and 47.5 per cent in transport and communication.

The backward and forward linkages that emerge from the analysis also enable the identification of the sectors that will produce inputs for other sectors or require inputs from other sectors. Investment in the sectors with high linkages will result in higher levels of growth due to their far-reaching nature.

The growth simulations on the three different combinations of high linkage sectors in the SAM resulted in economic growth totalling Ksh 363,513 million when injections were to the agricultural and manufacturing sectors only, Ksh 338,836 million with injections into the agricultural, manufacturing and trade sectors, and Ksh 298,823 million with injections into the agricultural, manufacturing, trade and transport and communication sectors.

These simulations also led to increases in overall incomes to Ksh 280,137 million with injections in agricultural and manufacturing sectors, Ksh 256,717 million with injections in agricultural, manufacturing and trade sectors, and Ksh 223,704 million with injections in agricultural, manufacturing, trade and transport and communication sectors.

6.2 Policy Recommendations

The results of the simulations in this study allow us to recommend more that one policy, each with a different focus. The first recommendation of this study is for the Government to implement a growth policy based

on injections into the agricultural, manufacturing, trade and transport and communication sectors, simultaneously. This growth will be sustainable as it is initiated by four different sectors with strong linkages as opposed to the reliance of one sector for the entire growth of the economy, which would probably not be prolonged. This would result in positive change in the distribution of factor incomes both at the skill level and between the rural and urban areas. This policy would lower the high incomes earned by both male and female high-skilled labour, while at the same time increasing incomes of both male and female in low and medium-skilled labour, effectively narrowing the wide factor income gap being experienced in the economy.

The second recommendation is a policy geared towards the empowerment of women through distribution of incomes in their favour by investing in a strategy that benefits them most. A policy that will focus on injections into the agricultural and manufacturing sectors alone will result in the highest share increase of females in low-skill labour, while at the same time affecting the largest share decrease of males in high-skill labour. As investment into these sectors also results in the improvement of incomes for women in low-skill groups, it should be accompanied by social policy to ensure the sustainability of this income share, such as vocation training.

The final recommendation as a result of this study is the injection into both the agricultural and manufacturing sectors in order to achieve the highest increase in the share of incomes for rural households, and in doing so effectively bridge the gap between rural and urban households to its narrowest level. This investment strategy would assist in discouraging rural-urban migration to areas that are unable to sustain growing numbers of rural immigrants.

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