

Welfare and Economic Growth in Kenya, 1914-76

ARNE BIGSTEN*
University of Gothenburg, Sweden

Summary. — In this paper we present estimates of per capita income, income distribution, and poverty in Kenya for the period between 1914 and 1976. The estimates indicate that per capita incomes mostly increased up to 1974; inequality increased most of the time until 1950, then fell and increased again until 1971 and then finally fell; poverty declined until 1964 but has since then increased slightly. A decomposition analysis shows that modern sector enrichment contributed more to growth than modern sector enlargement, and that traditional sector enrichment was of greater importance to the poor than modern sector enlargement.

1. INTRODUCTION

An intricate issue in the analysis of the process of development is how to evaluate its effect on economic welfare. This paper attempts to make such an analysis of the long-term change in Kenya. In order to be able to draw conclusions about the change in economic welfare, most people would agree that growth, equity and poverty aspects need to be considered, although there may be different views of their relative importance. The purpose of this paper is to measure and analyze the changes in income, income distribution, and poverty in Kenya between 1914 and 1976. The data problems are notorious, however, and the reader should be aware that the estimates are approximate and that the margin of error increases as we go backwards in time.

In Section 2 we discuss the welfare effects of growth in a dual economy, while Section 3 is devoted to a short discussion of data and definitions. Our results are presented in Sections 4 and 5, and in Section 6 we draw some conclusions from the analysis.

2. WELFARE EFFECTS OF GROWTH IN A DUAL ECONOMY

The economic structure of Kenya has changed drastically during this century. From having been a traditional agrarian economy, now more than two-thirds of the output originates in the modern sector which employs at least a fifth of the labor force. Two major economic sectors have co-existed during this period of structural change in the Kenyan economy — the traditional sector

and the modern sector. An economy with such a structure may be labeled a dual economy, although there has been a continuum of economic units from completely subsistence oriented units to fully commercialized ones. Particularly in recent years it has been practically impossible to find a smallholder who produces for subsistence only (see e.g. Bigsten, 1985b). Thus, the word traditional is here not taken to be equivalent to subsistence, but is assumed to cover agricultural production within the framework of the smallholder and nomadic economy. The modern sector includes large-scale agriculture together with industry and services.

The evaluation of the welfare effects of growth is an intricate affair when dealing with a dual economy (see Fields, 1979), and it is particularly problematic when attempts are made to evaluate the effects on welfare when there is a transfer of people from a backward to an expanding, advanced sector as is the case in Kenya. Different welfare criteria may give contradictory results. Let us consider Fields' illustration of this point.

A simplified dual economy may be described as follows. Assume that the total labor force is L . Total income Y then is equal to the sum of

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modern sector income Y^m and traditional sector income Y^t , which can be written as:

$$Y = Y^m + Y^t = \bar{Y}^m \cdot f^m \cdot L + \bar{Y}^t \cdot f^t \cdot L \quad (1)$$

where f^m and f^t are the labor force shares of the two sectors and a bar over a variable indicates that it is in per capita terms. By dividing through by L this can be rewritten as

$$\bar{Y} = \bar{Y}^m \cdot f^m + \bar{Y}^t \cdot f^t \quad (2)$$

which shows how per capita income¹ is equal to the weighted sum of the average incomes in the two sectors.

The growth of a dual economy is equal to the weighted sum of the growth of its two sectors. The growth of sectoral output in turn is due to two effects:

- (a) an enlargement (or contraction) effect which reflects the percentage change in the labor force within the sector;
- (b) an enrichment effect, due to a change in the income level within the sector.

A typical pattern of change in the dual economy is growth of the modern sector share of the labor force (f^m) combined with increasing income levels (\bar{Y}^m , \bar{Y}^t) in both sectors.

To evaluate how different groups benefit from growth one may take the first difference of (2) and decompose the change in total income as follows:

$$\Delta \bar{Y} = (\bar{Y}_2^m - \bar{Y}_1^m)(f_2^m - f_1^m) + (\bar{Y}_2^m - \bar{Y}_1^m)f_1^m + (\bar{Y}_2^t - \bar{Y}_1^t)f_2^t + (\bar{Y}_2^t - \bar{Y}_1^t)f_1^t \quad (3)$$

modern sector enlargement effect α	modern sector enrichment effect β
interaction between modern sector enlargement and enrichment effects γ	traditional sector enrichment effect δ

The effects in (3) obviously need not be positive. Note that we calculate the effects net of the growth required to absorb the growing population at the initial income levels and labor allocation.²

Per capita income growth may thus, for example, be due to either the modern sector enlargement effect or enrichment effects. The welfare evaluation of growth will be affected by the relative valuation of the different types of effects.

We can now define a simple general welfare function as

$$W = W(\bar{Y}, I, P) \quad (4)$$

which says that welfare is some function of per capita income \bar{Y} , relative inequality I , and absolute poverty P .

This general welfare function is affected in the following way by the effects described in (3).

$$\frac{\partial W}{\partial \alpha} > 0 \quad (5)$$

$$\frac{\partial W}{\partial \beta} \leq 0 \quad (6)$$

$$\frac{\partial W}{\partial \delta} > 0 \quad (7)$$

The ambiguous sign of (6) is due to the combination of higher incomes and higher inequality. Some kind of weighting procedure is required, if one is to reach a definite conclusion about the overall welfare effect.

It is obvious that inequality, as measured by, say, the Gini-coefficient (G), would follow an inverted U-pattern over time in an economic setting where originally everybody is in the traditional sector and all eventually end up in the modern sector (for the time being assuming away intra-sectoral inequality). When $f^m = 0$, also $G = 0$, and then when $f^m = 1$, we once again have $G = 0$. Between these two extreme points $G > 0$ if $\bar{Y}^m \neq \bar{Y}^t$. This effect was pointed out by Kuznets in 1955, although he also assumed intra-group inequality.

When evaluating modern sector enlargement growth, different criteria yield different results. Some kind of trade-off between growth, distribution and poverty is necessary.

It should here be stressed that W does not include non-economic variables such as political freedom or absence of racial persecution. This does not mean that we are unaware of their fundamental importance to overall welfare. It is, however, beyond the scope of this paper to include also this kind of factors.

3. DATA, DEFINITIONS, AND METHOD

The data base is briefly described in the Appendix, which also provides a listing of the sources.

The income which we distribute is the net national product at factor cost less public sector operating surplus, which cannot be allocated. Income is divided among the members of the labor force, including the self-employed, businessmen, and subsistence farmers; we also distinguish between Africans, Europeans, and Asians since racial income gaps were and still are

very large. We thus disaggregate by the 13 categories shown in Table 1. We first estimate total income for 14 years between 1914 and 1976. The years before World War II (1914, 1921, 1927, 1936) have been chosen mainly on the basis of data availability, but they should capture the trends reasonably well, even if, for example, the economic downturn around 1930 is omitted. The year 1946 is the first year in many of the data series used, while 1950, 1955, and 1960 are just five-year intervals. The year 1964 is Kenya's first year of independence, while the remaining years (1967, 1969, 1971, 1974, 1978) represent years with good data availability. However, which years were chosen for this period is not so important since the pattern of development is fairly stable, at least until 1973. Then there was a setback in 1974 due to the oil price shock, and then the coffee boom started in 1976. The last two years are therefore somewhat atypical. In conclusion, we would still argue that the number of years is sufficient to pick up the major trends, even if some short-term fluctuations are either omitted or exaggerated.

However, we do not have complete information for any of the years chosen. Various procedures have therefore been used to fill in the "white spots." The national income estimates for the period between 1964 and 1976 are good by African standards, and our estimates for this period are the best of those used. Although built on official estimates of national income, our accounts for 1946-60 are more uncertain.

However, no national accounts have been published for the earlier years. We have therefore derived the relevant parts of those mainly from piecemeal information about employment and wages (see Appendix). The data for this period are therefore highly uncertain, but we believe that they still indicate reasonable orders of magnitude.

We then break down the estimate of aggregate income to our 13 income categories and measure the size of those according to the best information available (see Appendix). We assume that income in each category is lognormally distributed and estimate empirically the variance of log incomes for as many categories and years as possible and impute the rest.³ All the actual estimates, except one, relate to the post-war period, so the values used for the pre-war period have to be extrapolated from these. Since we do not have any substantial income distribution information for this period, we have introduced little change in those variance estimates. This means that we cannot say very much about the long-term change in inequality within different groups. What the analysis focuses on instead are the consequences of a changing composition of the labor force.

Once we have calculated the log variance of a group, we can use this information together with our information about the arithmetic mean to compute the log mean. We can then derive the distribution of income receivers over the income spectrum (see Aitchison and Brown, 1957). We can also estimate the Gini-coefficient for any group or aggregation of groups.

As pointed out in Section 2 it may be misleading to use the Gini-index to measure inequality in a dual economy. We will therefore also compute the gap between the traditional and the modern sector average incomes denoted GAP,(TM). We define a poverty line, which makes it possible to estimate Sen's poverty index.

In this application we have thus abstained from distributing individual incomes by families, due to the paucity of data, although some measure of family income would be of greater interest from a welfare point of view. Income distribution by income earners should still give an indication about changes in interfamily distribution. The

Table 1. *Income categories*

	African	Asian	European
Traditional smallholders	1. Smallholders		
Self-employment	2. Businessmen Farmers	6. Businessmen	10. Businessmen Farmers
Private modern agriculture	3. Squatters Agr. workers	7. Agr. workers	11. Agr. workers
Other private employees	4. Private employees	8. Private employees	12. Private employees
Public employees	5. Public employees	9. Public employees	13. Public employees

dependency ratios have changed over time. Before World War II Africans had a larger dependency ratio than Europeans and Asians, but after the war Asians showed a higher dependency ratio. In the 1960s Europeans also showed a higher ratio. This is due to the fact that African women form an important part of the agricultural labor force, and that an increasing fraction of the Africans is over 15 years of age. This means that Africans have tended to reduce the gap in per capita incomes more than the gap in income per labor force member.

4. CHANGES IN INCOMES, INEQUALITY AND POVERTY, 1914-76

In this section we present the conclusions that can be drawn about Kenyan economic development between 1914 and 1976 on the basis of our data set. We consider income distribution, per capita incomes, and poverty in our welfare evaluation.

The major results of our computations are shown in Tables 2, 3 and 4. We first compare Tables 2 and 3, and note that there is a strong correlation between a change in the Gini-coefficient and a change in the urban-rural income gap. When the gap declines, the Gini-coefficient also declines. What happens to the urban-rural gap will therefore strongly influence

what happens to overall inequality as measured by the Gini-coefficient. Thus, we may conclude that the Gini-coefficient is often a usable indicator of inequality in a dual economy as well. We can also draw the policy conclusion that if we wish to promote equity, we should choose measures that decrease the urban-rural income gap (see Bigsten 1983 for further evidence about this).

Looking at Table 4 we see that there are only a few years about which we can directly say that welfare has either increased or decreased. Welfare declined unambiguously between 1914 and 1921 and between 1955 and 1960, and increased between 1950 and 1955, between 1960 and 1964 and between 1971 and 1974, when we measure its change by change in our three factors. When the changes have different signs we must weigh the factors against each other and then consider the left hand part of Table 4. Let us now briefly describe the Kenyan pattern of development and go through the results for all the periods systematically.

Before the colonial period the degree of economic differentiation in Kenya may be assumed to have been relatively limited. At the beginning of the century the English established themselves in Kenya and started to build the railway to Lake Victoria. The work was done by coolies from India, many of whom remained in Kenya after the work was finished. Most of those set up small stores, and some took up clerical positions in industry and the public sector. The number of Europeans and Asians increased rapidly, but by 1914 the share of non-Africans in the labor force was still under 1%. Already then, about 15% of African males are estimated to have been in wage employment. Most worked in white settler agriculture, but some were engaged in other unskilled or clerical work. Now a small group of African traders and businessmen was also emerging. The relative racial income levels for Africans:Asians:Europeans are here estimated to have been 1:26:144 in 1914. This means that although the share of non-Africans in the population was small, their share in income was over 20%.

Pass laws were introduced before World War I. Racial segregation was thus established quite early. For several decades to come it was the white landowners who dominated politics, and maximization of their land rent may be regarded as the major policy objective. The settlers took the best land and restricted the Africans to poorer land. This tended to reduce their reservation wage, which reduced costs for the settlers. They reduced the supply price of labor even further by means of hut and poll taxes. The

Table 2. *Per capita income, inequality and poverty in Kenya, 1914-76*

	\bar{Y} Per capita* income	I Inequality* (Gini)	P Poverty† (Sen's index)
1914	296	0.50	0.57
1921	214	0.57	0.75
1927	402	0.58	0.56
1936	609	0.63	0.46
1946	629	0.64	0.48
1950	862	0.70	0.43
1955	1177	0.63	0.23
1960	1165	0.68	0.31
1964	1365	0.63	0.21
1967	1451	0.66	0.23
1969	1568	0.68	0.24
1971	1636	0.70	0.25
1974	1665	0.69	0.25
1976	1618	0.68	0.25

*Net National Product at factor cost less public sector operating surplus income is here divided by the whole population.

†The per worker poverty line is 1,000 Kshs per year in the price of 1976.

Table 3. *Traditional-modern income gap*

	Traditional sector income	Subsistence income (1)
	Modern sector income	Private modern income (African) (4)
1914	0.174	0.244
1921	0.148	0.299
1927	0.175	0.367
1936	0.152	0.360
1946	0.169	0.376
1950	0.123	0.318
1955	0.250	0.425
1960	0.169	0.268
1964	0.198	0.277
1967	0.185	0.230
1969	0.153	0.169
1971	0.141	0.172
1974	0.155	0.185
1976	0.156	0.199

Table 4. *Welfare change, 1914-76*

	Percentage annual change of			Impact on welfare			Change in welfare
	Per capita income	Gini-coeff. of inequality	Sen's poverty index	Change in <i>Y</i>	Change in <i>I</i>	Change in <i>P</i>	
1914-21	-4.6	1.9	4.0	-	-	-	-
1921-27	11.2	0.3	-4.8	+	-	+	? (+)
1927-36	4.8	0.9	-2.2	+	-	+	? (+)
1936-46	0.3	0.2	0.4	+	-	-	? (0)
1946-50	8.3	2.3	-2.7	+	-	+	? (+)
1950-55	6.7	-2.1	-11.8	+	+	+	+
1955-60	-0.2	1.5	6.2	-	-	-	-
1960-64	4.2	-1.9	-9.3	+	+	+	+
1964-67	2.1	1.6	3.1	+	-	-	?
1967-69	4.1	1.5	2.2	+	-	-	?
1969-71	2.2	1.5	2.1	+	-	-	?
1971-74	0.6	-0.5	0	+	+	0	+
1974-76	-1.4	-0.7	0	-	+	0	?

incomes of the African smallholders were also held down by regulations, which ruled that Africans could not grow a number of cash crops. The Europeans also protected their positions *vis-à-vis* the Asians through administrative regulations which, for example, forbade them to own land. By the mid-1920s a racially segregated society had been firmly established with the whites controlling export crop production and professional jobs, and with the Asians controlling trade and working in middle-level administrative positions. Africans were confined to smallholder farming, unskilled wage employment, petty trade and lower-level clerical jobs.

1914-21: In this period per capita incomes fell and inequality and poverty increased. The decline in per capita incomes was due to the war, and this decline also explains why poverty increased. The increase in inequality during this period was due to the increasing differences within the modern sector. It was thus the increasing economic differentiation, which caused the Gini-coefficient to increase. The gap between the traditional and modern sectors increased considerably. This may be considered a period of falling welfare.

1921-36: The policy of segregation continued and racial inequality remained large. Still, the

economy expanded rapidly, except for the depression years. The incomes of the Africans in the modern sector increased with the general growth in these sectors. At the same time there was some expansion of African cash crop production in this period, mainly directed to the expanding domestic food market, although crops such as cotton were also grown. The economic expansion of estates and urban areas created a demand for African labor, which tended to increase the wage level. With the growth in per capita incomes poverty also decreased. Inequality increased due to increased inequality within the modern sector. With incomes increasing and poverty decreasing one should probably consider this a period of increasing *W*, in spite of the increase in inequality.

1936-46: Inequality among smallholders increased. Those who had large areas of land, or land where cash crops could be grown, improved their income position considerably. More Africans became traders, and could as such earn better incomes. In spite of this, African inequality increased little in this period. This was a period with a small increase in per capita incomes against small increases in inequality and poverty. One could say that *W* changed little.

1946-50: The economy grew quite rapidly after the war, but inequality increased in all sectors and races. It was mainly the modern sector which grew, while the traditional sector was restrained by the restrictions or neglect of the government. In spite of the considerably increased inequality, poverty was reduced due to the rapid growth of the economy. It could thus be argued that *W* increased.

1950-55: This is the period of the Mau Mau struggle, but the economy boomed, because of the Korean War. Particularly the agricultural sector (including traditional agriculture) grew, and this reduced inequality considerably in spite of the fact that inequality within traditional agriculture increased.

Demand for labor increased rapidly due to higher prices and increased production. The gap between modern and traditional sectors was at its all time low in 1955. The modern sector grew in relative size and the traditional sector was enriched, and this reduced the Gini-coefficient. *W* increased.

1955-60: One consequence of Mau Mau was that the government had to change its policy towards the African smallholders, and during the second half of the decade smallholders were allowed to grow coffee and received more support. In spite of this, the incomes of smallholders fell due to the poorer market situation. It should also be noted that the government from

now on pushed up minimum wages, which contributed to the increased urban-rural gap. This policy of support for poorly paid African workers increased inequality. The falling smallholder incomes increased the incidence of poverty. *W* declined.

1960-64: Estates began to break up with the coming of independence in 1963, which reduced the demand for wage labor. Incomes went up, and inequality and poverty declined. *W* increased.

1964-71: Since independence Kenya has pursued a capitalist strategy. Industrial development has been supported by an import substitution policy. There was some land redistribution during the 1960s, but essentially the policy was aimed at supporting smallholders within the existing structure of land ownership. The public sector expanded rapidly and government intervention increased.

Independence implied a change of the inter-racial distribution of income and political power. Even if the economic structure changed little, there was a change in the racial distribution of positions and incomes. The degree of overlap among African, European and Asian distributions increased. Independence thus contributed to intra-African inequality by opening up opportunities, that were earlier not available.

The public sector wages were raised drastically to recruit people; this increase was later met by the private sector which also pushed up wages. Minimum wages continued to increase until the late 1960s. There was a high demand for skilled African labor at this time, and their incomes increased rapidly.

Agricultural sector per capita incomes had increased until 1964, but have since then been stagnant. There are, however, large differences in the smallholder group. There is a hard core of poor peasants, which has not benefited from the opportunities, namely those with little and poor land, people with small incomes on the side and people who do not innovate for one reason or another. The landless and the pastoralists are also in a difficult situation.

For this period we must weigh improved per capita incomes against increases in both inequality and poverty. The change in *W* is ambiguous.

1971-74: The economy expanded quite rapidly until the first oil price shock, although African real wages tended to stagnate or decline. Nevertheless, in this period per capita income increased, inequality declined and poverty was unchanged. Our *W* increased.

1974-76: This period first saw the impact of a negative shock, the oil price increase, and then

the beginning of a positive shock, the coffee boom. It was thus a turbulent period, in which some gained while others lost. Per capita incomes fell, but inequality declined while poverty remained constant. The change in W is ambiguous.

With regard to racial inequality it should be noted that the share of Europeans and Asians in income peaked in 1950, when it amounted to 51%. Their share of the population was then about 2.5%. Since then their share of income gradually fell to 22% in 1976, when their share of the population was about 1%. Inequality has, over time, increasingly been an intra-racial affair, although the gap in income levels between Africans and non-Africans in 1976 still was in the neighborhood of 1:30.

Our tentative analysis of economic welfare suggests that it declined between 1914 and 1921, improved 1921–55, declined 1955–60, improved between 1960 and 1964, while it is more difficult to clearly state what has happened to economic welfare since then. The period between 1971 and 1974 can be rated as a period of improvement, while we would get different results for the other periods depending on how the different components are weighted. First, per capita income grows while inequality and poverty increase. Then finally we have the reverse situation that per capita incomes fall, while inequality decreases (and poverty remains constant).

We may thus note that there was a considerable growth in per capita incomes during the post-independence period until 1974, but that poverty has increased in spite of this. One reason

for this is, of course, the fact that inequality showed an increasing trend until 1971.

One must be cautious in comparing our Gini-estimates with those of other countries derived by other methods. For example, our estimate of 0.68 in 1976 is reduced to 0.53 when intra-group inequality is assumed away. This means that it is fairly close to the estimate for Kenya by Crawford and Thorbecke (1978) which is 0.48. With an approach similar to ours, with intra-group inequality, Anker and Knowles (1983) estimate the Kenyan Gini at 0.67, while our estimate is 0.68. One should nevertheless be cautious about conclusions about the level of the Gini-coefficient. The main point here is that we have applied a consistent method throughout, which we believe will capture the direction of change in the Gini-coefficient.

5. DECOMPOSITION OF ECONOMIC GROWTH 1914–76

In this section we report the results of the decomposition of per capita income growth described in Section 2. The results of the decomposition according to formula (3) are reported in Table 5. The poor can benefit from growth either by being drawn into the modern sector (α) or by income increases in the traditional sector (δ).

Note that modern sector enlargement was most important in the periods 1914–27, 1936–46,

Table 5. *Sector decomposition of growth*

	Modern sector enlargement α	Modern sector enrichment β	Interaction γ	Traditional sector enrichment δ
1914–21	46.37	-94.95	-16.14	-184.85
1921–27	96.88	122.72	50.54	186.87
1927–36	8.09	288.70	5.03	139.54
1936–46	218.04	-150.62	-44.71	-42.64
1946–50	-8.47	485.87	-5.34	52.72
1950–55	578.66	-168.31	-79.42	377.91
1955–60	-161.80	359.55	-42.90	-173.53
1960–64	-0.14	151.44	-0.01	308.21
1964–67	-163.29	384.19	-39.13	-8.70
1967–69	-49.95	371.69	-10.38	-38.85
1969–71	51.11	138.14	3.34	-36.33
1971–74	172.00	-146.48	-10.86	43.08
1974–76	-118.00	-0.85	0.04	5.77
1914–76	421.96	690.77	1068.48	668.57

1950–55, and 1969–74. Modern sector enrichment was important 1921–36, 1946–50, and 1955–71. The incomes in the traditional sector increased 1921–36, 1946–55, 1960–64, and 1971–76.

Looking at the growth of the modern sector, we see that over the whole period modern sector environment is more important than modern sector enlargement when explaining the per capita income increase. We also see that traditional sector enrichment is more important than modern sector enlargement.

When we compare different periods, we find that the best periods for the poor according to this analysis were 1936–46, 1950–55, and 1971–74. In most periods, however, modern sector enrichment dominates, e.g. 1964–71. Note, however, that in the last period between 1974 and 1976 it is the traditional sector enrichment effect that dominates, but this is to a large extent due to the temporary coffee boom.

It should be noted that inequality increases in the years when modern sector enrichment growth dominates (cf. Table 4). We may also note that when traditional sector enrichment is positive, poverty decreases. The policy conclusions are thus obvious and hardly surprising. Positive α and δ influence W positively, while the β -factor is ambiguous, since it contributes to both increased per capita incomes and higher inequality. To reduce inequality and poverty, growth should increase the size of the modern sector and the level of traditional sector incomes.

6. CONCLUSION

We have argued that in order to analyze changes in economic welfare, one should take changes in per capita incomes, inequality and poverty into account. If there are improvements in all these three indicators, we can unambiguously talk about improvements in economic welfare; if they all deteriorate, we may talk about a welfare decline; if some improve while some deteriorate, we have to weigh the effects against each other. As the basis for our welfare analysis we have therefore computed the levels of per capita income, inequality and poverty for 14 years between 1914 and 1976. Our estimates have shown that per capita income increased most of the time up until 1974; inequality as measured by the Gini-coefficient increased until 1950, then fell, increased again until 1971, and finally fell again; poverty decreased until 1964 and then

increased slightly again. Economic welfare, which we define as a composite of the three above-mentioned factors, increased more often than it decreased, but its change since Independence has been ambiguous.

The decomposition analysis showed that productivity increases within the two sectors mattered more to the growth of per capita incomes than the increase in the share of the modern sector. Both sectors have thus shown a positive long-run development pattern, but real agricultural income levels would probably have shown a poorer long-run trend if outmigration to the modern sector, which has reduced land pressure, had been impossible. Moreover, access to wage employment in the modern sector has made it possible for smallholder families to receive cash to finance innovations which have raised rural incomes. On the other hand, urban growth has to some extent been precipitated by government policies, such as the import substitution policy, which have discriminated against agriculture. Thus we may conclude that the growth in total productivity was mainly due to the growing productivity in the two major parts of the economy, but that structural change played a part in this increase. A development pattern of modern sector enlargement and traditional sector enrichment was found to reduce both poverty and inequality.

Our computations show that the type of change in economic structure which Kenya has experienced gives a higher Gini-coefficient even when the coefficient within the groups does not change. If a poor economy, such as the Kenyan one, wishes to achieve a structural change which increases the size of the modern, high-paying sector, an increase in the Gini-coefficient is more or less inevitable. Sensitivity analyses of our results show that if we assume the relative incomes of our 13 groups to remain constant over the period, the results come out very much the same. There is a large increase in the Gini-coefficient over the period studied, with a small decline during the 1970s. We also note that although the modern-traditional income gap has changed very little in the long run, the Gini-coefficient has increased.

One may, however, try to pursue policies which make the increase less pronounced, and it is well known that the growth in per capita incomes explains only a limited part of the increase in the Gini-coefficient. Our analysis nevertheless suggests that over the very long run the "inequalizing" force of growth and structural change in a dual economy is strong.

NOTES

1. The analysis is restricted to the distribution of income within the labor force, so per capita here really means per labor force member.
2. This is not clear in Fields (1979, p. 329), whose formula (9) says $Y = W^m f^m + W^l f^l$, where the W 's are wage rates and the f 's fractions. Y must obviously be per capita income and not total income as stated by Fields.
3. We have estimated the variance in 58 different sets of data for the postwar period. For a detailed presentation of sources, see Bigsten (1985a).

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APPENDIX: THE DATA BASE

Due to space limitations it is not possible to present the data used to compute incomes in full. We have to confine ourselves to presenting a list of the data collected, with a few brief comments and the sources used. The data base, definitions and methods of computation are discussed in detail in Bigsten (1985a). The interested reader may obtain the data from the author.

For each of the years 1914, 1921, 1927, 1936, 1946, 1950, 1955, 1960, 1964, 1967, 1969, 1971, 1974, 1976 the variables listed below have been estimated:

Population by race
 Number of households by race
 Household size by income group
 Labor force by race
 Employment by income group
 Gross domestic product
 Gross national product
 Net national product
 Public sector operating surplus
 Smallholder agricultural income
 Wages and salaries by income group
 Operating surplus by income group
 Average annual income by income group
 GDP deflator
 Variance of incomes.

The national income estimates for the postwar period are based on national accounts, although adjustments have had to be made to make definitions consistent over time. For the period before World War II, though, we start from estimates of labor incomes which may be done reasonably well on the basis of fairly rich data. We then assume that the share of wages in GDP before

World War II was 30%, slightly lower than that of the postwar period, and derive GDP from this. This means that if the wage share increased, we overestimate GDP growth before 1936. The growth estimate for this period is thus highly tentative. For the same period we then divide the remaining 70% of GDP between smallholder income and operating surplus on the basis of general information about the pattern of change. This is also highly tentative. Our estimates of income and income distribution before World War II are thus very crude, and should be considered a first preliminary attempt to provide some figures on the pattern of economic change in this period.

Employment figures for Europeans and Asians for 1946 and later are taken from actual employment and earnings surveys, self-employment for Asians is then residually determined from our labor force estimate. For the Europeans we have assumed that the number of settlers peaked in 1955, while the number of self-employed in industry is assumed to have peaked in 1964. The employment population ratio is allowed to vary after 1946 for Europeans.

For these two categories we have estimated employment population ratios for 1921 and 1948 and interpolated intervening years. The ratios for 1914 are assumed to be the same as those of 1921. For the earlier period the ratios between employment and population for Asians and Europeans are considerably higher than after World War II. This is reasonable, since many men with no families came in as labor at the time.

The average age of the African population has increased during the period studied and an increasing fraction has thus come to be of working age. This

means that the fraction of Africans who are in the labor force has also increased. The official figures for African wage employment have been revised upwards, since we know that these grossly underestimate the extent of wage labor in the rural areas and in the urban informal sector. The extent of African self-employment is estimated for 1976, and its size relative to African employment is assumed to have increased over time. Smallholder employment comes out residually as the difference between the size of the labor force and the number engaged in other work.

The data have been derived from the following sources:

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