

Southern Africa Labour and Development Research Unit

LABOUR SUPPLY IN THE SOUTH AFRICAN ECONOMY

John Knight

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LABOUR SUPPLY IN THE SOUTH AFRICAN  
ECONOMY AND ITS IMPLICATIONS FOR AGRICULTURE

1. INTRODUCTION

Is South Africa running out of its supplies of relatively unskilled labour? Or is there a growing 'reserve army' of underemployed and unemployed manpower building up in the reserves? The answers to these questions are crucial in attempting to make economic - and indeed social and political - projections for South Africa.

Consider the 'optimistic' view. If employment in the capitalist sector can grow in absolute terms more rapidly than the labour force, the amount of labour in the subsistence sector is reduced.<sup>1/</sup> Eventually all labour is withdrawn from the subsistence sector, shortages even of relatively unskilled labour appear, and real wages are bid up by market forces. The shortage of labour, combined with its greater cost, provides employers and government with a powerful economic incentive to raise the quality of labour through education, training and stabilisation. A process of this sort has occurred in a variety of countries, and it is an integral part of the story of those who make 'reformist' predictions for South Africa.

Consider the alternative possibility, which might be termed the 'pessimistic' view. If the growth of employment in the capitalist sector falls short, in absolute terms, of the growth in the labour force, increased numbers are necessarily absorbed into the subsistence sector. Given the limited land and limited demand for non-farm activities in this sector, underemployment and unemployment are increased and average income is depressed further. If unskilled wages in the capitalist sector are competitively determined, the reduced opportunity cost of labour is likely to depress capitalist sector wages also. However, if capitalist sector wages are raised above market-determined levels through institutional or political pressures, a growing income disparity develops between those who have modern sector jobs and those who do not: poverty is not eliminated and the poor are likely to grow in number over time. In these circumstances a 'reformist' solution to South Africa's problem is more difficult to envisage. If it were in this position, South

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<sup>1/</sup> There is a terminological problem in distinguishing between two parts of the economy. For some of our purposes the clearest distinction is between 'capitalist' (but including government) and 'subsistence' or 'non-capitalist' sectors, for others between 'wage-employment' and 'self-employment'. The economic distinctions between 'modern' and 'traditional' and 'formal' and 'informal' come close to our division, but the geographic distinction between 'White areas' and 'Bantu Homelands' or the sectoral distinction between Homeland agriculture and other sectors may be the best statistic available. Some of these terms may appear value-laden, but that is not my intention. For much of the analysis these distinctions correspond, in the sense that the differences in the dividing lines are unimportant.

Africa would be in company with the many less developed countries which combine rapid growth of population and absolutely small - if not proportionately slow - growth of wage-employment.

It should not be assumed that the net outcome of the growth of employment and the growth of the labour force has consistently either reduced or expanded the manpower surplus, or that current trends are not reversible. It is quite possible that the pre-war and post-war trends were in opposite directions. The common assumption in economic models such as those of Lewis and Ranis and Fei that, with the process of economic growth, developing economies are gradually transformed from conditions of labour-surplus to labour-scarcity, may have been reversed in the South African case.

Within the capitalist sector, agriculture has historically been the largest employer of relatively unskilled labour and has paid the lowest wages. Artificial restrictions on the movement of farm labour have helped to depress farm wages and to divorce them from wages paid in other sectors. The fact that White farmers have traditionally complained of labour shortage indicates simply that an excess demand for farm labour existed at the wage levels which predominated in farming. Nevertheless, at times of general complaints of labour shortage by farmers, it seems that work was available in other sectors offering higher income. There could not have been a large number of unemployed and underemployed workers remaining in the subsistence economy who, faced with a choice of remaining where they were or working on White farms, were so poor that they chose farm employment.

The occupational and geographic restrictions placed by Government on the mobility of Black labour mean that South Africa's labour market is very fragmented. Surplus (or shortage) of unskilled labour in White agriculture, or in parts of White agriculture, is quite consistent with shortage (or surplus) elsewhere. Economic forces operating in the labour market considered as a whole cannot be relied on to operate also in the farm labour market. But it is the contention of this paper that national labour market tendencies are likely to percolate through and have some influence on the conditions of farm labour.

The paper takes the following form. First, I examine the growth of population and labour force during the post-war period, using census and other data. Secondly, non-farm employment and its growth is measured and assessed. The next section deals similarly with farm employment, including the problems of measurement. Fourthly, the estimates are drawn together to derive levels and rates of 'residual labour' on various permutations of assumptions.

An examination of productive employment in Homeland agriculture then permits the measurement of 'underemployment'. Finally, in the light of these results, the extent of competition for labour between White agriculture and other sectors is analysed.

It will become apparent that the data available do not permit clear-cut answers to the important questions. Wisdom, I fear, becomes no more than a greater recognition of our ignorance. I make no apology, therefore, for including a detailed study and assessment of official and other statistics.

## 2. GROWTH OF THE LABOUR FORCE

I propose to concentrate on the African population, given that the non-African population has been more or less fully employed during the post-war period. The first task is to measure the African labour force. I shall initially rely on the census data, and subsequently attempt to modify them.

The concept of the labour force - those above a certain age able and willing to work - is complicated. The appropriate concept depends partly on the reason for measuring it. Our main concern is to investigate whether relatively unskilled incomes will be bid up by market forces. The availability of labour to the capitalist sector therefore seems to be the criterion. This would exclude e.g. women in the Homelands who combine self-employment and household duties and cannot move their families close to wage-employment opportunities. Others engaged in the non-capitalist sector will be available at a certain supply price, depending on e.g. their current income and non-economic factors such as the necessity of separation from their families. Such workers should logically be included in the labour force available to the capitalist sector if the wage rate exceeded their supply price: this would only be the case if the wage rate exceeded the market-determined level. Market-determined wages can be expected to rise as these workers transfer to the capitalist sector because the supply price of those remaining increases e.g. through less under-employment. In practice, non-capitalist sector workers should be regarded as part of the labour force, but it should be recognised that market-determined wages are likely to rise before all of them are absorbed into wage-employment.

TABLE 1: AFRICAN POPULATION AND LABOUR FORCE IN CENSUS YEARS ('000s)

	<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>
Total	7 832	8 560	10 922	15 340
Male	3 997	4 369	5 509	7 543
Female	3 835	4 191	5 413	7 797
Aged 15-64	4 480	4 907	6 043	8 130
Male	2 333	2 556	3 097	3 992
Female	2 146	2 352	2 946	4 138
'Economically active'	2 905	3 110	3 890	5 605
Male	2 351	2 542	3 051	3 716
Female	554	567	839	1 889
Standardised 'economically active'				
Aged 15-64	3 055	3 351	4 109	5 416
Male	2 092	2 294	2 785	3 556
Female	963	1 057	1 324	1 860

Sources: Department of Statistics, Population Census 1970.

Single Ages 1941 to 1970, Report no. 02-05-05, Table D1;

South African Statistics, 1970, Table H-7, 1972, Table A-33.

Table 1 shows, for each of the census years, the African population in total, in the age-group 15-64, and those classified as 'economically active'. The economically active are defined as those aged 15 or over who are employees, employers, self-employed, or unemployed and looking for work.<sup>1/</sup> Those not economically active are in effect housewives, students, pensioners, invalids and those not working are not seeking work. However, there is clearly a subjective element in deciding whether a person is seeking work, particularly in the reserves. How should a miner in the Homelands who is currently unemployed and not seeking work be classified? In the 1970 census his occupation was shown as miner and his status employee.<sup>2/</sup> The coding instructions for the 1960 census called for a distinction 'between unemployed persons who are presumably still, or can be taken up in the open labour market, and

<sup>1/</sup> Department of Statistics, 1970, census form 02, and Standard Industrial Classification of all Economic Activities, Pretoria, p. 91.

<sup>2/</sup> Department of Statistics, Population Section, internal memo no. 16/71.

those who have already retired or are probably no longer in the open labour market'.<sup>1/</sup>

In the 1951 and 1960 censuses a male aged 16 or over in the Homelands was classified as 'peasant farmer' unless another occupation was specified; a female in the same position was classified as 'housewife'.<sup>2/</sup> In the 1970 census the Homeland wives of household heads were classified as 'housewives' and thus 'not economically active', but other females aged 16 or over were classified as 'peasant farmers'.<sup>3/</sup> Hence half of the recorded increase of over a million in economically active female Africans between 1960 and 1970 is the result of a change in definition. As the notes to the 1946 census state, nearly all women in the reserves are engaged in some agricultural work, and this may account for a quarter of their working time.<sup>4/</sup>

Changes in definitions from one census to another render inter-census comparisons of the 'economically active' worthless. A crude but better indication of the growth of labour supply is given by numbers in the age-group 15-64. The table reveals that this age-group is generally more numerous than the 'economically active' population (except in the case of men in 1946). The precise relationship - in the form of age-specific activity rates - is shown for 1970 in Table 2.

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- 1/ Department of Statistics, Population Census 1960, instructions for coding, p. iv.
  - 2/ Information received through interviews in the Department of Statistics.
  - 3/ Information received through interviews in Department of Statistics.
  - 4/ Department of Statistics, Population Census 1946, Vol. 5, Occupations and Industries, p. v.

TABLE 2: AGRICAN AGE-SPECIFIC ACTIVITY RATES 1970

Age	Activity rate (%)	
	Men	Women
15-19	62,3	49,2
20-24	92,9	59,9
25-29	96,5	49,2
30-34	97,3	44,1
35-39	97,7	41,5
40-44	97,3	39,9
45-49	97,4	37,6
50-54	96,9	34,6
55-59	96,1	30,9
60-64	76,1	13,6
65-69	64,2	8,7
70-74	46,9	5,2
All ages	87,2	43,2

Note: The activity rate is defined as the economically active as a percentage of the total in each age-group.

Source: J.A. Vermaak, Die Vraag na en Aanbod van Mannekrag in die Republiek van Suid Afrika: Deel 1, Human Sciences Research Council, 1974, Table 3.9; calculated from unpublished 1970 census data.

The constancy of activity rates over time is implausible and their prediction hazardous. The problem is partly definitional and partly substantive. Thus the fall in the rate for African males aged 60-64, from 93 per cent in 1960 to 76 per cent in 1970, may be the result of a change in definition: in 1970 an African aged 60 or over who did not give an occupation was classified as 'pensioner' and thus 'not economically active'.<sup>1/</sup> If it is the case that a growing shortage of jobs means that people wait longer periods between employment contracts or retire earlier from wage-employment, it is not clear whether they will continue to be recorded as economically active. On the 1970 census definitions, the activity rates for African women are higher in the urban than in the rural areas - being 61 per cent in the White urban areas and 32 per cent in the African rural homelands.<sup>2/</sup>

<sup>1/</sup> Department of Statistics, Population Section, Internal memo no. 16/1971.

<sup>2/</sup> Department of Statistics, Population Census 1970, Report no. 02-02-02, Tables 1 and 3.

Activity rates may thus depend on government policies with regard to the settlement of African women in or near White urban areas.

The 1970 census definitions of economic activity correspond reasonably to our required concept. Therefore, to avoid the problem of changing definitions, the 1970 age-specific activity rates are applied to the populations of other census years. However, this method simply begs the question of substantive changes in activity rates. The results are shown as the standardised economically active population in Table 1.

The results in Table 1 are not adjusted for under-enumeration of the African population. This is particularly important in the Bantu homelands and among Africans illegally resident in the White urban areas. Attempts have been made to check the accuracy of census figures in rural Bantu homelands, using aerial photography to count hut-groups and sampling to count numbers per hut-group. Serious under-enumeration has been found, particularly in areas inaccessible to enumerators through the hilliness of the terrain and lack of roads. Smit found that in the Sibasa area of the Northern Transvaal his aerial count for 1960 exceeded the census figure by 41%.<sup>1/</sup> Schulze estimated that the population of the inaccessible Tugela Location in Natal in 1964 exceeded the 1960 census estimate - projected to 1964 by extrapolation - by 113%.<sup>2/</sup> Hattingh used aerial photographs taken at various times to check census estimates in the Modjadji location in the Northern Transvaal. He found that the population exceeded the census counts by 142% of the census figure in 1951, by 59% in 1960, and by 6% in 1970.<sup>3/</sup> The 1970 census was far more reliable than its predecessors because it was based on hut-group to hut-group counts and not on gatherings of people or on the word of headmen. Note that the degree of under-recording in the inaccessible rural areas referred to above would clearly not apply on a national scale.

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- 1/ P. Smit, "'n Vergelykende geografiese studie van grondgebruik in die Bantoegebiede van Noord-Transvaal", unpublished thesis, University of South Africa, 1965.
  - 2/ R.E. Schulze, "A comparison between official population data and an aerial photograph population survey in the Tugela Location", South African Geographical Journal, 1969, Table 3.
  - 3/ P.S. Hattingh, "An analysis of population counts and estimates in a Bantu rural area with the aid of a sample survey and an airphoto analysis", South African Geographical Journal, 1973.

In attempting to improve on the census data I shall rely on the work of J.L. Sadie. Sadie applied a variety of demographic techniques to the South African born African population to correct for example the under-reporting of males in relation to females and the under-reporting of children aged 0-4.<sup>1/</sup> Sadie carried out revisions in the light of the 1970 census results, in order to make projections beyond 1970.<sup>2/</sup> His estimates of the African population for the census years and his projections to 1980 are shown in Table 3. They imply under-reporting of about 10% in the censuses prior to 1970 and of 3.9% (6.9% in the cases of males but negligible in the case of females) in 1970. Also shown is the economically active population aged 15-64, first standardised according to the 1970 age-specific activity rates and then, in addition, adjusted for census under-reporting. The implied census under-reporting of the labour force is even greater than that of population, being 10.6% (420 000 people) in the case of African males in 1970.

The projections are made on the assumption that the foreign-born African population remains at the levels and activity rates of 1970. They imply a growth rate of 2.8% in the first half of the 1970's, rising to 2.9% in the second half, the corresponding growth in the labour force is being 3.0% in both cases. The projections mean an absolute increase (measured in thousands) in the South African-born African labour force as follows:

	<u>Male</u>	<u>Female</u>	<u>Total</u>
1970	111	64	175
1975	132	71	203
1980	153	83	236

The official projections of the African population and labour force are also given in Table 3. These cover the period 1973-1979 and are taken from the current economic development programme document.<sup>3/</sup> The official estimates are extrapolated to the years 1970 and 1980, and these estimates are shown

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1/ J.L. Sadie, "An evaluation of demographic data pertaining to the non-white population of South Africa", South African Journal of Economics, June 1970.

2/ J.L. Sadie, Projections of the South African Population 1970-2020, Industrial Development Corporation, 1972. Unpublished official projections correspond closely with Sadie's projections.

3/ Office of the Economic Adviser to the Prime Minister, Economic Development Programme for the Republic of South Africa 1974-1979, Table 5.1.

in the table. They imply an allowance for an under-recording of population in 1970 of 3.6%, and a growth in African population of 2.74% and in economically active Africans of 2.9% per annum. The planners use the 1970 census definition of "economic activity" and they extrapolate the economically active by means of age-specific activity rates.<sup>1/</sup> Trend adjustments are made in the activity rates, involving a slight fall for African men and a slight rise for African women over the period 1970-1980. Whereas my own estimates of the labour force exclude persons aged over 64, the official projections include the ages 65-74 on the basis of their census activity rates. These different assumptions account for the minor differences between my own and the official labour force projections, to be seen in the table.

### 3. GROWTH OF NON-FARM EMPLOYMENT

There are two sources of data on employment: the census data, collected from individuals, and the "employment statistics", collected from employers. Both are subject to bias. In the case of census data, there is likely to be under-enumeration, not only in the Bantu homelands as already discussed, but also among workers who are illegally employed or resident in the urban areas. That census under-reporting of workers occurs on a significant scale is suggested by the masculinity ratio among South African-born Africans in the age-group 15-34, recorded as 85.0% in the 1970 census.<sup>2/</sup> In the case of statistics provided by employers, there may be an incentive for firms employing workers illegally (i.e. without having gone through the necessary administrative procedures) to under-report.

The divergence between the two sources of employment statistics are shown in Table 4. Data for Whites are also shown because they are likely to indicate how far the percentage discrepancies are due to differences in coverage or sectoral definitions. In the case of manufacturing, since the two figures for Whites tally, the excess in recorded African employment over the census figures - by some 105 000 - is probably due to census under-reporting. The under-recording, in relation to the census, of African employment in some of the service sectors is mainly but not entirely due to incomplete coverage of these sectors. Domestic servants are not included in the employment statistics, although an estimate for 1970 can be made from a sample survey of

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1/ Ibid., p.56.

2/ Population Census 1970, Report 02-02-02, Table 1.

Table 3

Adjusted Estimates and Projections of the African Population and Labour Force

	<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
<u>Population (000)</u>						
Census estimates						
Male	3997(1.8)	4369(2.6)	5509(3.2)	7543		
Female	3835(1.8)	4191(2.9)	5413(3.7)	7797		
Total	7832(1.8)	8560(2.7)	10922(3.5)	15340		
Adjusted estimates and projections						
Male	4514(2.2)	5024(2.5)	6266(2.6)	8103(2.7)	9241(2.8)	10606
Female	4120(2.2)	4600(2.8)	5897(2.9)	7857(2.9)	9074(3.0)	10525
Total	8634(2.2)	9624(2.6)	12163(2.8)	15960(2.8)	18315(2.9)	21131
Implied census under-reporting (%)						
Male	11.5	13.0	12.1	6.9		
Female	6.9	8.9	8.2	0.8		
Total	9.3	11.1	10.2	3.9		
<u>Economically Active Population 15-64 (000)</u>						
Standardised census estimates						
Male	2092(1.9)	2294(2.2)	2785(2.5)	3556		
Female	963(1.9)	1057(2.5)	1324(3.5)	1860		
Total	3055(1.9)	3351(2.3)	4109(2.8)	5416		
Standardised and adjusted estimates and projections						
Male	2490(1.9)	2731(1.8)	3219(2.1)	3976(2.8)	4566(2.9)	5269
Female	1086(2.1)	1205(2.1)	1459(2.6)	1879(3.4)	2226(3.2)	2611
Total	3576(1.9)	3936(1.9)	4678(2.3)	5855(3.0)	6792(3.0)	7880
Implied census under-reporting (%)						
Male	16.0	16.0	13.5	10.6		
Female	12.3	12.3	9.3	1.0		
Total	14.6	14.9	12.1	7.5		
<u>Official Projections (000)</u>						
Population				15916(2.7)	18219(2.7)	20852
Economically active population aged 15 and over				5975(2.9)	6909(2.9)	7989

Sources: Department of Statistics, Population Census, various reports, Economic Development Programme 1974-1979, J.L. Sadie, Projections of the South African Population 1970-2020, and working table supplied by the author, J.A. Vermaak, op.cit.

Note: The figures in brackets are the annual average percentage increases between the flanking years.

households blown up according to the number of White households in 1970.<sup>1/</sup> The estimate using this method is 754 000, which is very close to the census figure of 748 000. Excluding domestic service, the ratio of the employment is actually higher (at 86%) for Africans than for Whites (83%). This suggests that under-recording of African workers is greater in the census than in the employment statistics. More important, the sectoral discrepancies are sufficiently large to throw doubt on both sets of statistics.

There is no satisfactory way of taking account of census under-reporting of African employees. Even age-specific employment data by industry would not be enough, because to assume no sectoral bias in under-representation would be to beg the question. However, on the assumption that all economically active Africans enumerated in the 1970 census were employed in the non-farm sector, African non-farm employment would be 429 000 (13%) higher than the census figure of 3 307 000. The assumption is extreme, and its result merely indicates that we cannot be at all confident about the true level of African non-farm employment. Yet, in comparing employment with the labour force, a failure to adjust for census under-reporting would make nonsense of the adjustments to the labour force data.

Table 5 sets out estimates of African non-farm employment in the census years and in the 1970s, from three sources: the censuses, the employment statistics, and the economic development programme document. The census data - although deficient for the reasons explained above - reflect most accurately the past trends in employment. The employment statistics coverage of the largest sector - services - was negligible in the table years before 1970, and remains deficient. In particular, aggregate estimates of domestic servants are not made. For prediction purposes, however, the employment statistics may have the edge on the census data in all but the services sector. This is because they are collected together with - and are therefore more consistent with - data on production and earnings, which are likely to figure as independent variables in equations attempting to predict employment behaviour.

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<sup>1/</sup> Department of Statistics, Statistics of Houses and Domestic Servants 1970, Report No. 11-03-06.

Table 4

Comparison of Two Sets of Non-Farm Employment Statistics, 1970

	<u>Employment ('000s)</u>				<u>Ratio (%)</u>	
	<u>African</u>		<u>White</u>		<u>Employment statistics ÷ census</u>	
	<u>Census</u>	<u>Employment Statistics</u>	<u>Census</u>	<u>Employment Statistics</u>	<u>African</u>	<u>White</u>
Mining and quarrying	605.2	587.3	62.7	62.6	97	100
Manufacturing	511.5	616.5	281.6	272.2	121	98
Electricity, gas and water	32.2	25.6	14.2	14.2	79	100
Construction	264.2	248.3	98.0	59.8	94	61
Commerce, catering and accommodation	314.4	259.1	270.1	243.2	82	90
Transport, storage and communication	139.6	108.9	164.9	147.9	78	90
Financing, insurance and real estate	34.8	9.9	143.7	73.0	29	51
Community, social and personal services	316.7	341.9	324.2	246.6	108	76
Domestic service	747.5	-	1.0	-	-	-
Industry not adequately defined	340.5	-	-	-	-	-
Total non-farm employment	3307	2198	1360	1125	78	83
Total non-farm employment excluding domestic service	2259	2198	1359	1125	86	83

Sources: Department of Statistics, Population Census 1970, Reports No. 02-02-02, 02-05-04; South African Statistics 1974.

The table shows an annual growth rate of African non-farm employment between 1960 of 3.4% according to the census and of 3.6% in those non-farm sectors equally covered in employment statistics in the two years. It also shows "adjusted" census data, estimated on the assumption that all the labour force participants unrecorded in the censuses were employed in non-farm activities. On this extreme assumption - clearly wrong for the censuses prior to 1970 - employment growth between 1960 and 1970 is reduced by 1% per annum.

It is beyond the scope of this paper to make independent projections of African non-farm employment given various rates of growth of production. However, this has been done officially for the economic development programme. The projections for 1979, given an assumed GDP growth rate of 6.3% per annum, are shown in Table 5. They are projected from a 1973 base year estimate of employment which is "hard" in the case of mining and industry but, in the case of services, implies an unlikely annual growth in African employment of 6.1% per annum between 1970 and 1973. In services the base year estimate of employment was adjusted upwards in some way for under-reporting in the 1970 census.<sup>1/</sup>

For projection purposes it is better to operate with total than with African employment: because of African skill acquisition the relation between production and total employment is likely to be less unstable than that between production and African employment. African employment can then be estimated as a residual by subtracting growth in the non-African labour force from the growth of employment. Indeed, that is the method used by the economic development programmers.<sup>2/</sup>

Table 6 shows the annual average percentage growth of non-farm production, labour productivity (both African and total) and employment (both African and total). Labour productivity growth simply indicates the rate of decline of labour input per unit of output and says nothing about the efficiency of labour. The fact that African labour productivity rose, and is projected

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1/ Economic Development Programme, 1974-1979, p.17.

2/ It does not indicate how the growth of non-African employment is distributed among industries, e.g. between the agricultural and non-agricultural sectors. Here the programmers estimate relationships between production and racial composition (ibid., p.65).

Table 5

African Non-Farm Employment

	<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>	<u>1973</u>	<u>1979</u>
<u>Census</u>						
Male	1071(3.5)	1272(2.5)	1583(2.9)	2113		
Female	429(1.7)	467(1.6)	540(4.7)	853		
Total	1500(3.0)	1739(2.2)	2123(3.4)	2966		
<u>of which: mining</u>	441(0.4)	449(2.2)	548(1.0)	605		
industry	246(8.9)	376(3.1)	496(5.0)	808		
services	813(2.4)	914(1.9)	1079(3.7)	1553		
<u>Adjusted Census</u>						
Male	1469(3.1)	1709(2.8)	2017(2.3)	2533		
Female	522(2.2)	615(1.6)	675(2.6)	872		
Total	2021(2.8)	2324(2.5)	2692(2.4)	3405		
<u>Employment Statistics</u>						
Total	654(4.8)	826	1255	2190(2.2)	2335	
<u>of which: mining</u>	412(1.0)	434(2.6)	548(0.7)	587(1.0)	625	
industry	242(10.1)	392(1.5)	449(5.9)	878(4.0)	987	
services	-	-	-	725(0.8)	743	
<u>of which: government</u>	-	-	259(2.4)	329(-1.6)	313	
other	-	-	-	396(2.8)	430	
<u>E.D.P. Projections</u>						
Total					3481(4.5)	4537
<u>of which: mining</u>					606(2.6)	705
industry					1018(5.1)	1375
services					1857(4.8)	2457

Sources: Department of Statistics, Census of Population, various reports, South African Statistics 1974, Economic Development Programme, 1974-1979.

Note: Figures in brackets are the annual average percentage increases between the flanking years. They are shown only where data are comparable.

Table 6

Growth in Non-Farm Production, Productivity and Employment

	<u>Production</u>	<u>Labour productivity</u>	<u>African labour productivity</u>	<u>Employment</u>	<u>African employment</u>
<u>1960/2-1970/2</u>					
Mining	3.9	3.7	3.6	0.2	0.3
Industry	7.9	1.5	1.0	6.4	6.9
Services	5.4	1.8	1.7	3.6	3.7
Total non-farm	6.0	2.1	2.2	3.9	3.8
<u>1973-1979</u>					
Mining	4.4	1.9	1.8	2.5	2.6
Industry	6.9	2.5	1.8	4.4	5.1
Services	6.6	2.6	2.2	4.0	4.8
Total non-farm	6.4	2.5	1.9	3.9	4.5

Sources: Department of Statistics, South African Statistics 1974, Bulletin of Statistics; Economic Development Programme 1974-1979.

Notes: The percentage employment growth is less rapid (and thus productivity growth more rapid) for African than for total employment in the case of the non-farm sector as a whole during the 1960s despite the fact that the reverse is the case for each of the component sectors. This is to be explained by the high weight of the slowest growing sector, mining, in African employment.

to rise, less rapidly than total labour productivity in each of the sectors simply indicates a more rapid increase in African than in total employment. This may be partly because the sectoral composition of growth or the nature of technical progress encourages the use of unskilled and semi-skilled labour. It also reflects the upgrading of Africans into more skilled jobs.

The results are sensitive to the choice of base- and end-years (hence the averaging of each over three years in the table). However, they indicate a percentage growth of African non-farm employment (3.8% experienced in the 1960s and 4.5% projected for the current programming period) significantly in excess of the corresponding percentage growth rates in the African labour force.

#### 4. GROWTH OF FARM EMPLOYMENT

Population census data on employment in agriculture are unsatisfactory because they fail to distinguish clearly between employment on farms in the White areas and farming activities - generally self-employment and family labour - in the African reserves. Moreover, they suffer severely from changing definitions of female economic activity in the Bantu homelands. The available census information is gathered in Table 7, together with official estimates and projections made for the economic development programme.

Owing to the inadequacies of the published census data, these are adjusted in the table in two ways. To take account of the changing definitions, the female activity rates of 1970 are applied to earlier years. This is done on the assumption that the differences represent women in the reserves who should have been classified as economically active in farming. Under-enumeration in the censuses is allowed for on the assumption that all those economically active but unrecorded were engaged in farming. This is an extreme assumption, clearly inconsistent with the earlier extreme assumption (Table 5) that they were all engaged in non-farm activities! However, it helps to show that the possible margins of error are large. The adjusted census figure of 2 605 000 is 590 000 higher than the recorded African employment in "agriculture, forestry and fishing" in 1970.

The economic development programme document makes an implicit adjustment of 626 000 to the 1970 census figure of economically active Africans. It implicitly divides African employment which is unrecorded or not classifiable between farming (546 000) and non-farming (80 000).<sup>1/</sup> Having revised the 1970 figures of African agricultural employment, the programmers project forward on a crude and question-begging basis: on the assumption that the undercounts in the 1951 and 1960 censuses were the same, the average recorded growth between these years (1.4% per annum) is taken to apply after 1970.<sup>2/</sup>

These programming projections fail to distinguish between employment in White agriculture and in African agriculture. Yet the number of persons engaged in African agriculture is the difference which emerges between the labour force and wage employment provided in the capitalist sector including White agriculture. Influx control and government restrictions on urban self-employment activities limit the amount of urban unemployment and under-employment among Africans. The reserves therefore act as the sponge which absorbs the residual people, and it is reserve agriculture which bears the brunt. Even though the numbers engaged in African agriculture may increase, the hours worked need not alter if the land is already fully worked. In that case the extent of under-employment among African farmers increases. It is therefore necessary to examine employment trends in the capitalist and subsistence agriculture separately.

Three sources of data are available on farm employees: the fairly regular agricultural census, available in 1969 and 1971, a single survey conducted by the South African Agricultural Union in 1969, and the population census of 1970. Their results are compared in Table 8. The S.A.A.U. survey shows male regular employees on a particular date and casual labour, measured in man-days over the previous year. I have converted these into "full-time equivalent" employees by assuming 250 working days a year. Partly because casual employment is seasonal, the resultant figures are not comparable with the agricultural census estimates of casual employees, which refer to employment on a particular date. The two sources also diverge considerably on the number of regular employees, the S.A.A.U. estimate being higher by no

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<sup>1/</sup> Economic Development Programme 1974-1979. These results are obtained by extrapolating the published data (mostly for 1973) to 1970 and comparing with census data.

<sup>2/</sup> Ibid., pp.18, 65.

Table 7

Census Data on Agricultural Employment of Africans ('000s)

	<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>	<u>1973</u>	<u>1979</u>
<u>Census</u>						
Agriculture, forestry and fishing						
Male	1181(-0.4)	1158(0.8)	1246(0.9)	1359		
Female	87(1.6)	94(8.3)	193(13.0)	655		
Total	1268(-0.3)	1252(1.6)	1439(3.4)	2014		
<u>of which: agriculture</u>						
Male	1166(-0.4)	1141(0.7)	1211(0.8)	1317		
Female	86(1.6)	93(8.2)	189(13.0)	642		
Total	1252(-0.3)	1234(1.4)	1400(3.4)	1959		
<u>Adjusted Census</u>						
Agriculture, forestry and fishing						
Male	1698(1.3)	1813(1.1)	2003(-0.4)	1919		
Female	781(4.9)	993(1.8)	1162(-5.1)	686		
Total	2479(2.5)	2806(1.3)	3162(-1.9)	2605		
<u>E.D.P.</u>						
Agriculture, forestry and fishing						
Published				2650(1.43)	2672(1.4)	2909
Adjusted				2014(1.43)	2102(1.4)	2289

Sources: Department of Statistics, Population Census, various reports; Economic Development Programme 1974-1979.

Notes: 1. The figures in brackets are the annual average percentage rates of change between the flanking numbers.

2. The census data are adjusted on the basis of the standardised economic activity rates for females (Table 1) and the extent of under-enumeration (Table 3).

less than 278 000 (53%). It is possible that the difference represents under-reporting and poor coverage in the agricultural census: since the census is undertaken by the police force, farmers may have an incentive not to report labour employed illegally. The S.A.A.U. survey covered 63% of members, and the estimates were blown up on the basis of economic sub-areas and farm sizes. Combining regular and casual employees, the divergences between the two sources tend to cancel out, and their estimates for African total male employees are similar. This may be a matter of chance, or of the definitions dividing regular and casual employees. The 1970 population census figures of Africans employed in the "White areas", whether in the sector "agriculture, forestry and fishing" or in the occupation "farm and forestry worker", are considerably less than those of the other two sources. The only conclusion to be drawn from these inconsistent estimates is that the statistics on farm employment should be treated with great caution.

The agricultural census provides an indication of employment growth on non-African farms. The available data for selected years are set out in Table 9. In no case does the 1972/3 figure show any increase over that for 1957/8 or 1960/1. Indeed, between 1957/8 and 1972/3 the number of farm employees excluding domestic servants fell on average by 1.1% per annum. But the recorded numbers fluctuate widely from one year to another, e.g. there was no fall between 1957/8 and 1968/9 and a rise averaging 0.4% per annum between 1960/1 and 1968/9. The fluctuations in employment are proportionately no less than, and uncorrelated with, fluctuations in the volume of agricultural production, as can be seen in Figure 1. The unfortunate implication is that the agricultural census employment statistics are unreliable.

A particular difficulty arises in the treatment of casual employees. The number of casual employees varies seasonally and according to the weather. The S.A.A.U. survey shows that in the first quarter of 1969 the man-hours worked by African casual labour were 105% of the annual average, in the second quarter 146%, in the third 83% and in the fourth 65%.<sup>1/</sup> Moreover, the seasonal pattern might vary somewhat from one year to another according to the weather. The agricultural census refers to a date in June up to 1962/3 and in August thereafter. The census estimates of casual employment are therefore suspect.

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1/ Ibid., Appendix Table XVI.

Table 8

Measures of Farm Employees 1969-71 ('000s)

	<u>1969</u>	<u>1970</u>	<u>1971</u>
<u>Agricultural census (June 30)</u>			
Regular employees			
Male	595		-
Female	113		-
Total	708		637
Casual employees			
Male	315		-
Female	335		-
Total	650		650
Total (excluding domestic servants)			
Male	910		-
Female	448		-
Total	1358		1287
<u>S.A.A.U. survey (year ended April)</u>			
Regular employees			
Male	873		
Casual employees (full-time equivalent)			
Male	53		
Female	140		
Total	193		
Total (excluding domestic servants)			
Male	926		
<u>Population census (May 6)</u>			
"Agriculture, forestry & fishing"			
White areas			
Male		792	
Female		244	
Total		1036	
"Farm & forestry worker", White areas			
Male		857	
Female		313	
Total		1170	

Sources: Department of Statistics, Report on Agricultural and Pastoral Production, 1968-69 and 1970-71; Population Census 1970, Reports 02-02-02 and 02-05-06; South African Agricultural Union, "The Farm Population and Labourers of South Africa", 1970 (mimeo).

Table 9

## African Employment in Non-African Agriculture ('000s)

	<u>1953/4</u>	<u>1957/8</u>	<u>1960/1</u>	<u>1964/5</u>	<u>1968/9</u>	<u>1972/3</u>
<u>Regular employees</u>						
Male	609(0.5)	622(-0.4)	614(-1.4)	580(0.6)	595	-
Female	102(-5.6)	81(13.4)	118(2.5)	130(-3.4)	113	-
Total	711(-0.3)	703(-1.4)	732(-0.8)	710(-0.1)	708(-3.3)	619
<u>Casual employees</u>						
Male	-	384(-6.8)	311(0.2)	-	315	-
Female	-	273(0)	273(2.6)	-	335	-
Total	-	659(-3.9)	583(1.4)	-	650(-5.2)	524
<u>Adjusted casual employees</u>						
Total	-	167(-1.5)	-	150(3.8)	174(-3.6)	150
<u>Converted casual employees</u>						
Male	-	65	52	-	53	-
Female	-	114	114	-	140	-
Total	-	179	166	-	193	156
<u>Domestic servants</u>						
Male	15(-7.5)	11(13.3)	16(-5.1)	13(-2.0)	12	-
Female	115(-0.7)	112(-0.3)	111(-2.8)	99(-0.3)	98	-
Total	130(-1.4)	123(1.1)	127(-3.1)	112(-0.4)	110(-3.1)	97
<u>Farm employees excluding domestic servants</u>						
Male	-	1005(-2.8)	924(-0.2)	-	910	-
Female	-	355(3.3)	391(1.7)	-	494	-
Total	-	1360(-1.1)	1315(0.4)	-	1359(-4.2)	1143
<u>Adjusted farm employees excluding domestic servants</u>						
Total	-	878(-0.3)	-	860(0.6)	882(-3.4)	769

Sources: Department of Statistics, Report on Agricultural and Pastoral Production, various years.

- Notes: 1. The figures in brackets show the annual average percentage rates of change between the flanking years:  
 2. The published estimates of casual employees in 1964/5 are not shown because they are clearly in error, revealed e.g. by their implicit average earnings in that year.

One indication that the numbers of casual workers are not equivalent to those of regular employees is given in Table 8, where the number of "full time equivalent" casual workers falls far short of the number recorded as employed on a particular date. Another indication is given by the disparity in averaged earnings. Dividing the total earnings, in cash and kind, of African employees over the previous year by the number employed at a particular date, we find that in 1972/3 the averaged annual earnings of regular employees were R217 and those of casual employees R62, i.e. the earnings ratio was 3.5:1.<sup>1/</sup> This earnings ratio is sensitive to the sexual composition of employment. The same exercise applied to 1958/9 - a year for which earnings are available by sex - reveals that male regular employees averaged R73 and females R36, whereas male casual employees averaged R18 and females R13 per annum, i.e. the earnings ratio is higher for men than for women.<sup>2/</sup>

There are alternative explanations of the earnings disparities which exist between regular and casual employees. One is that farmers report more casual labourers than there is casual labour, i.e. only a fraction of those reported are working on any one day. Another is that casuals have a lower supply price than regular employees. Casual workers may normally be underemployed in the reserves and therefore have a low opportunity cost. In that case, they may be paid a lower daily wage than the implicit daily payment to regular employees. If the former explanation holds but not the latter - so that casuals receive the same daily pay as regular workers, for the limited number of days they work - there is a means of converting casual employment to a regular employment basis. Dividing total annual payments to casuals by the average annual earnings of regular employees, an "adjusted casual employment" series is derived and shown in Table 9. It follows a trend similar to that of the published series but its absolute level is far lower (150 000 in 1972/3 compared with 524 000). It would not be so low if the data were available to adjust for the fact that a higher proportion of casuals than regulars are women (52% compared with 16% in 1968/9) and women receive less pay than men as regular farm workers (49% in 1958/9). With its underlying assumptions untested, the adjusted series cannot be accepted with any greater confidence than the original one.

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1/ Department of Statistics, Report on Agricultural and Pastoral Production 1972-73.

2/ Department of Statistics, Report on Agricultural and Pastoral Production 1958-59.

A second method of converting casual labour to a full-time basis is to assume the ratios between casual man-days worked in 1969 (derived from the S.A.A.U. survey and converted to a man-year basis) and the number of casual workers recorded in the 1969 agricultural census remained constant for each sex over the period. The resulting series, referred to as "converted casual employees" in Table 9, is similar to the alternative series but only a little more justified.

5. UNEMPLOYMENT, UNDEREMPLOYMENT AND HOMELAND AGRICULTURE

There are two main ways of assessing whether the extent of unemployment and underemployment in South Africa is increasing or decreasing, but neither of them is satisfactory. One is to bring together the results of sections 2 - 4 and examine the growth of wage-employment in relation to that of the labour force. The other approach is to examine the Homelands, in which most of the un- and underemployment is concentrated, e.g. measuring trends in population density, income and production levels. Both of these methods will be explored. First, however, in dealing with a couple of dead ends, it will be shown why the most obvious statistic - unemployment recorded in the census - is unhelpful, and why the methods of the economic development programmers are patently misleading.

The census estimates of unemployment are extremely shaky. In the urban areas census evasion is likely to be particularly high among the unemployed. A great deal depends on the precise definition of "unemployment" used. For instance, how are the dividing lines to be drawn in the Homelands between those who are not economically active, migrants who are resting between contracts of wage-employment, self-employed farmers, and the unemployed? Instructions to enumerators suffer from both arbitrariness and the need for interpretation. For instance, the 1960 census report states that some of the unemployed were voluntarily unemployed or "resting", and that "it is not always possible to classify persons correctly as unemployed on the little or inadequate information furnished on the questionnaire".<sup>1/</sup> In 1970 a resting migrant who specified an industry and occupation was not classified as unemployed.<sup>2/</sup> The census definitions, in line with standard international practice, draw a distinction between employment and unemployment without taking account of underemployment. It is likely that the extent of idle manpower in the Homelands is seriously understated for this reason.

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1/ Department of Statistics, Population Census 1960, Sample Tabulation No. 5, p.xi.

2/ Department of Statistics, Population Section, Instruction No. 16/71.

A measure which takes account of the labour time available in Homeland agriculture in relation to the amount of productive work which can be put in is therefore to be preferred.

For what they are worth, the available African unemployment statistics are presented in Table 10. They indicate a rise in unemployment in successive censuses. However, it is only for 1970 that the "unemployed" can be separated from the "unspecified" (the economically active who cannot be classified). In previous censuses the combined group was referred to as "unspecified including presumably unemployed".

Table 10  
Census Unemployment of Africans

	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>"Unemployed and unspecified"</b>			
1946 Number ('000s)	97	37	134
Rate (%)	4.1	6.7	4.6
1951 Number ('000s)	112	6	118
Rate (%)	4.4	1.1	3.8
1960 Number ('000s)	222	106	328
Rate (%)	7.3	12.6	8.4
1970 Number ('000s)	243	381	624
Rate (%)	6.5	20.2	11.1
<b>"Unemployed"</b>			
1970 Number ('000s)	119	165	284
Rate (%)	3.2	8.7	5.1

Source: Department of Statistics, Population Census 1970, Report No. 02-02-02, Tables 4-6, South African Statistics 1970, Table H-7.

Note: The unemployment rate shows unemployment as a percentage of the standardised economically active African population.

The E.D.P. document measures unemployment as the difference between the estimates of the economically active and the demand for labour. Assuming a 6.1% growth rate of GDP, African employment is projected to rise from 366 000 in 1973 to 434 000 in 1979, the percentage unemployed remaining constant at 5.61%. On the 6.4% growth assumption, the number unemployed in 1979 will fall to 314 000, when 4.05% of the African labour force will be unemployed.<sup>1/</sup> However, the estimate of the absolute number of

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<sup>1/</sup> Economic Development Programme for the Republic of South Africa, 1974-1979, Table 5.1 and pp.58-9.

unemployed in the base period is sensitive to the adjustment for under-counting of the labour force and the arbitrary allocation of these workers to sectors. The projected trend in unemployment depends crucially on the assumed growth of employment in agriculture, discussed and criticised above. To exclude from unemployment those Africans who will have to be absorbed into Homeland agriculture is simply to beg the question.

We are now in a position to draw together and compare the estimates of the African labour force and of African employment made in previous sections. Just how hazardous an exercise this is, is revealed in Table 11, which sets out the results from various permutations of assumption.

Two estimates of the labour force are used, one based on census data standardised by means of the 1970 age-specific economic activity rates (row 1), and the other in addition adjusting for under-enumeration in the various censuses (row 2). Two estimates of non-farm employment are used, both based on census sources. Row 3 shows the recorded census data, and row 4 adjusts for census under-estimation of the labour force by assuming that all unrecorded labour was employed in non-farm activities. Employment in Non-African agriculture poses severe data problems. The data for regular employment (row 5a) for the years 1946 and 1951 were obtained by interpolation between 1936-37 and 1954-55, the closest years for which measurements were made. Casual employment (row 5b) fluctuated widely from one year to another, and 1958 was the earliest year in which it was measured. In 1958 the number was 657 000 and in 1969 it was 650 000: a guesstimate of 650 000 was made for 1946 and 1951! casual employees were converted to full-time equivalent numbers (row 5c) using the S.A.A.U. survey on the basis described above.<sup>1/</sup>

It is possible by summation to derive 4 series of "employment excluding Homeland agriculture". Row 6 sums rows 3, 5a and 5b, and row 7 adjusts for under-recording of non-farm employment ( $4 + 5a + 5b$ ). Rows 8 and 9 correspond to 6 and 7 respectively but convert casual employment to a full-time equivalent (rows  $3 + 5a + 5c$  and  $4 + 5a + 5c$  respectively).

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<sup>1/</sup> See p,22.

Table 11

African Labour Force, Employment, and Residual Labour ('000s)

<u>Row</u>		<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>
	<u>Labour Force</u>				
1	Standardised census				
	Male	2092	2294	2785	3556
	Female	963	1057	1324	1860
	Total	3055	3351	4109	5416
2	Standardised and adjusted census				
	Male	2490	2731	3219	3976
	Female	1086	1205	1459	1879
	Total	3576	3936	4678	5855
	<u>Employment</u>				
3	Census non-farm employment				
	Male	1071	1272	1583	2113
	Female	429	467	540	853
	Total	1500	1739	2123	2966
4	Adjusted census non-farm employment				
	Male	1469	1709	2017	2533
	Female	552	615	675	872
	Total	2021	2324	2692	3405
5	Employment in non-African agriculture				
5a	Regular				
	Male	460	505	543	595
	Female	180	185	95	113
	Total	640	690	638	708
5b	Casual				
	Male	377	377	243	315
	Female	273	273	255	335
	Total	650	650	498	650
5c	Converted casual				
	Male	63	63	41	53
	Female	114	114	107	140
	Total	177	177	148	193
6	Employment excluding homeland agriculture ( rows 3+5a+5b)				
	Male	1908	2154	2369	3023
	Female	882	925	890	1301
	Total	2790	3079	3259	4324
7	Adjusted employment excluding homeland agriculture (rows 4+5a+5b)				
	Male	2306	2591	2803	3443
	Female	1005	1073	1025	1320
	Total	3311	3664	3828	4763
8	Converted employment excluding homeland agriculture (rows 3+5a+5c)				
	Male	1594	1840	2167	2761
	Female	723	766	742	1106
	Total	2317	2606	2909	3867

<u>Row</u>		<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>
9	Converted and adjusted employment excluding homeland agriculture (rows 4+5a+5c)				
	Male	1992	2277	2601	3181
	Female	845	914	877	1125
	Total	2837	3191	3478	4306
	<u>Residual Male Labour</u>				
10a	row 1 minus 6 (= 2 minus 7)	184	140	416	533
11a	row 1 minus 8 (= 2 minus 9)	498	454	618	795
12a	row 2 minus 6	582	577	850	953
13a	row 2 minus 8	895	891	1052	1215
	<u>Residual Male Labour as a Proportion of the Male Labour Force (%)</u>				
10a		9	6	15	15
11a		24	20	22	22
12a		23	21	26	24
13a		36	33	33	31
	<u>Residual Female Labour</u>				
10b	row 1 minus 6 (= 2 minus 7)	81	132	434	559
11b	row 1 minus 8 (= 2 minus 9)	240	291	582	754
12b	row 2 minus 6	204	280	569	578
13b	row 2 minus 8	363	439	717	773
	<u>Residual Female Labour as a Proportion of the Female Labour Force (%)</u>				
10b		8	12	33	30
11b		25	28	44	41
12b		19	23	39	31
13b		33	36	49	41
	<u>Residual Labour</u>				
10c		265	272	850	1092
11c		738	745	1200	1549
12c		786	857	1419	1531
13c		1258	1330	1769	1988
	<u>Residual Labour as a Proportion of the Labour Force (%)</u>				
10c		9	9	21	20
11c		24	22	29	29
12c		22	22	30	26
13c		35	34	38	34

Sources: Tables 3, 5 and 9, and their sources.

The difference between the labour force and employment excluding Homeland agriculture is referred to as "residual labour". It combines Homeland agricultural employment and African unemployment, much of it in the Homelands and disguised within Homeland agriculture. Four different estimates of residual labour are shown. Rows 10 and 11 use unadjusted labour force data, but whereas 10 measures casual employment in Non-African agriculture as

reported, row 11 converts it to a full-time basis. Conversion of casual labour also explains the difference between rows 12 and 13; the latter has the converted series. Rows 12 and 13 use the adjusted labour force data. The data are shown for males (10a to 13a), females (10b to 13b), and males and females (10c to 13c), both in thousands and as a percentage of the corresponding labour force.

If the labour force is adjusted for under-recording, some adjustment should also be made for under-recording of employment. Rows 12 and 13 assume that none of the unrecorded labour was employed outside Homeland agriculture. The alternative extreme assumption is to place all unrecorded labour in employment outside Homeland agriculture. Since the unrecorded people are added both to the labour force and to employment, the resultant residual labour estimates are identical to those in rows 10 and 11. The percentage rates differ because the adjusted labour force is larger, but the difference is insignificant. Rows 10 and 11 therefore serve as proxies for rows 2 minus 7 and 2 minus 9 respectively.

On all definitions, and for males, females and the sexes combined, there is an absolute increase in residual labour between 1951 and 1960 and again between 1960 and 1970. This is not generally true of the corresponding percentage rates. However, comparing 1951 and 1970, there is a marked increase in all 4 female rates and an increase in 3 of the male rates. Female residual labour rates, but not absolute numbers, are higher than male on all definitions except in 1951 (but here the 1970 census definition of economic activity is important).

Consider in more detail the differences in the 4 estimates of total residual labour. The conversion of casual farm employment increases the estimate of residual labour by 350 000 - 500 000. The adjustment of the labour force for under-recording increases residual labour by 400 000 - 600 000, and the placing of this unrecorded labour affects residual labour by identical amounts. Thus residual labour in 1970 is 439 000 lower if all instead of none of it is assumed to be employed outside Homeland agriculture. No doubt the truth lies in between. Because of the improved census coverage in remote areas and the more stringent influx controls, the proportion of unrecorded labour which was in the Homelands may have been lower in 1970 than in previous censuses; in that case residual labour may have fallen after all. Ignoring the errors introduced through amendment of the data, it is logically correct to adjust the labour force and to convert casual

employment. This implies that rows 11 and 13 are most appropriate: the remaining difference represents the placement of unrecorded labour.

To summarise the results: the available information does not permit an accurate measurement of the level of, and trends in, the residual labour force. The residual labour series, being the difference between two series which have both had to be doctored and are still prone to error, is intrinsically shaky. The estimate is sensitive to the various permutations of assumptions which can plausibly be made. However, we can tentatively conclude that there appears to have been a significant growth in absolute numbers of residual labour since 1951. When residual labour is expressed as a proportion of the corresponding labour force, the evidence is ambiguous: much depends on the proportion of those economically active but not recorded in the censuses who were employed outside Homeland agriculture.

The Homelands deserve study both in order to provide independent estimates of "residual labour" and to divide the residual labour force between productive employment in Homeland agriculture and un- and underemployment. A crude method of doing this is by measuring the de facto labour force within the Homeland over time. Again we are hampered by data deficiencies. The only aggregative data available (and even these are not published) show total African population, with only a male/female and an urban/rural split, in the Bantu Homelands defined on the basis of the 1970 area boundaries. The results are presented in Table 12. They reveal a considerable increase in the population density of the reserves, particularly between 1960 and 1970. However, the masculinity ratio remained constant over the post-war period.

There is no satisfactory way of adjusting for the census under-reporting which is thought to have occurred, particularly before 1970. An extreme assumption would be that all under-reporting in each census occurred in the Homelands and none in the "White" areas: its implications are shown in the final three rows of Table 12. Homeland population still grew but the rate of growth after 1951, and particularly after 1960, was diminished as a result of the adjustment. However, it is possible that non-reporting occurred mainly in the Homelands in the years prior to 1970 and in the "White" areas in the 1970 census. In that case even these rates of growth would be over-stated.

Table 12  
African Population of the Bantu Homelands ('000s)

	1946	1951	1960	1970
<u>Urban</u>				
Male	7(7.4)	10(6.1)	17(33.2)	299
Female	6(5.9)	8(8.0)	16(33.8)	294
Total	13(6.7)	18(7.0)	33(33.5)	593
<u>Rural</u>				
Male	1362(0.1)	1368(2.6)	1722(4.6)	2690
Female	1868(0.5)	1915(2.3)	2356(4.7)	3719
Total	3230(0.3)	3283(2.4)	4078(4.6)	6410
<u>All areas</u>				
Male	1369(0.1)	1379(2.6)	1739(5.6)	2989
Female	1883(0.4)	1922(2.4)	2372(5.4)	4013
Total	3252(0.3)	3302(2.5)	4112(5.5)	7003
Masculinity ratio	73	72	73	74
<u>Adjusted census data</u>				
Male	1885(1.5)	2034(2.3)	2495(3.6)	3549
Female	2168(1.5)	2332(2.3)	2855(3.6)	4073
Total	4053(1.5)	4366(2.3)	5350(3.6)	7622
Masculinity ratio	87	87	87	87

Source: Derived from unpublished material in the Department of Statistics.

- Notes:
1. Although the Bantu Homelands are defined on the basis of the 1970 area boundaries, the urban/rural split is on the basis of the division in each census.
  2. The figures in brackets indicate the annual percentage rates of change between flanking years.
  3. The masculinity ratio shows the ratio of males to females expressed as a percentage.

Data for the Homelands as a whole are not available for the labour force or by age-group prior to 1970. Yet it is important to disaggregate in this way. For instance, the rising population of the Homelands may increasingly represent women, children and pensioners outside the labour force, or a growing shortage of young, physically fit male recruits to the wage-economy may occur together with a growing labour surplus of women or older men who do not possess the characteristics required by employers. Information on age in the census years prior to 1970 is available only by magisterial district and not according to residence in a Homeland. However, a comparison

can be made between 1951 and 1960, on the following indirect basis. Those magisterial districts in 1960 for which more than two-thirds of the African population were actually in a Homeland can be isolated and aggregated, and their African male population by age-group can be compared with that in 1951 (Table 13). Numbers are seen to increase somewhat over that period. The de facto African male population of the Homelands is also shown, for each age-group, as a proportion of the African male population of South Africa. The percentage falls slightly between 1951 and 1960 in every case.

To counter the problem of under-reporting in the Homelands, both absolute under-reporting and in one census relative to another, the table also shows numbers of African males in the Homelands by age-group expressed as a proportion of the total Homeland African population, and as a proportion of the Homeland African female population of the same age-group. It is possible to extend these two comparisons to 1970. From 1951 to 1960 there was no significant change in the proportions. In 1970, however, adult males constituted a smaller proportion of the total, and the masculinity ratio was also lower in all age-groups over the age of 30. This suggests that during the second decade the pool of adult male labour in the Homelands was diminished relative to the rest of the Homeland population, as a result either of economic forces or of more stringent influx controls on women and children.

A further piece of indirect evidence on the extent to which Homeland labour has been absorbed into the capitalist economy is provided by the work of J. Nattrass. She estimated the number of African male "temporary" migrants from the rural areas of South Africa, both absolute numbers and as a proportion of the sum of African adult males in rural areas plus migrants.<sup>1/</sup> The method was to estimate the standard adult female population of the rural areas by applying the standard ratio of women to children to the number of rural children, and to estimate the standard adult male population by applying standard masculinity ratios to this number of women; migrants were then

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1/ Jill Nattrass, "The migrant labour system and South Africa's economic development", South African Journal of Economics, March 1976, Table 4.

estimated as the difference between standard and recorded numbers in the rural areas:

	<u>1946</u>	<u>1960</u>	<u>1970</u>
Numbers ('000s)	635	788	1357
Rate (%)	22	29	34

The increasing rate suggests that a growing proportion of men based in rural areas (and probably also in the rural Homelands) work in urban areas. Although the absolute number of men in the Homelands at any point in time appears from our other evidence to have increased, Homeland-based men may well spend an increasing proportion of their working lives as migrant wage-earners.

One method of assessing the growth of productive agricultural employment in the Homelands is to measure the growth of production. The growth of productive labour inputs is unlikely to exceed the growth of production: the latter therefore provides an upper limit to the former. Unfortunately the data are too sparse and unreliable to trace Homeland agricultural production over the post-war period. One difficulty is illustrated by the work of the Tomlinson Commission, which estimated African incomes from the Homelands in 1950/1 as R33.4 million using "conventional" national income methods but adjusted this to R93.7 million by valuing or revaluing imputed items not specified.<sup>1/</sup> Tomlinson reported that the real income produced in the reserves had remained almost unchanged since 1936 and per capita real income had fallen.<sup>2/</sup> There were 5.5 million "large stock units" in the reserves in 1930, 5.2 million in 1953, and 4.7 million in 1973.<sup>3/</sup> Tomlinson estimated that in 1953 the number of stock in the reserves was 50% more than the optimum in relation to the carrying capacity of the land.<sup>4/</sup>

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1/ Summary of the Report of the Commission for the Socio-Economic Economic Development of the Bantu Areas within the Union of South Africa, 1955, p.99.

2/ Ibid., p.99.

3/ Ibid., p.79 and South Africa 1974. Official Yearbook of The Republic of South Africa, p.295.

4/ Ibid., p.114.

Table 13  
African Adult Male Population in the Homelands

	20-29	30-39	40-49	50-59	20-59
<u>Numbers ('000s)</u>					
1951	111	99	92	65	367
1960	134	105	102	79	420
<u>As Proportion of Total Male Population (%)</u>					
1951	14.5	15.8	22.1	28.5	18.0
1960	14.4	14.7	19.0	26.6	16.9
<u>As Proportion of Total Homeland Population (%)</u>					
1951	4.2	3.7	3.5	2.4	13.8
1960	4.3	3.3	3.2	2.5	13.3
1970	3.8	2.8	2.5	2.0	11.1
<u>Masculinity Ratio (%)</u>					
1951	45	50	66	71	54
1960	46	49	62	74	54
1970	45	45	54	61	49

Sources: Department of Statistics, Census of Population, 1951, 1960, 1970, various reports; P.J. van der Merwe, "Die Bantoe in die Suid-Afrikaanse ekonomiese stelsel. Deel VIII: Die Bantoetuislande" (mimeo).

The Official Yearbook permits a comparison of farm production in the years 1960 and 1970.<sup>1/</sup> Homeland GDP arising in "agriculture, forestry and fishing" increased by 33% over that period. On the other hand, the "producer price of all agricultural products" increased by 23%.<sup>2/</sup> The implied real increase is therefore less than 1% per annum. This is to be compared with a corresponding growth of population in the rural part of the Homelands of 4.6% per annum if the census data are not adjusted for under-reporting, or of 3.0% per annum if adjustment is made as in Table 14. The implication is that the absorption of population by the rural Homelands for outstripped the growth of agricultural production.

1/ Op.cit., pp.292-3.

2/ Department of Agriculture, 1975 Abstract of Agricultural Statistics, Table 89.

The statistical picture is confirmed by qualitative evidence. As early as in 1932, the Native Economic Commission found a steadily growing impoverishment of the reserves, a growing shortage of land, and some landlessness.<sup>1/</sup> The Social and Economic Planning Council concludes in 1946 that "given the primitive method of agricultural and animal husbandry still practised by the majority of Natives, many, if not most, of the Reserves are overpopulated".<sup>2/</sup> The Tomlinson Commission envisaged that, after the full implementation of the 1936 Land Act, 357 000 families could be supported in full-time farming in the reserves, with a gross annual income of R140 in the prices of 1951/2.<sup>3/</sup> This would amount to only 2 142 000 people, to be contrasted with a de facto population in 1951 of 3 633 000.<sup>4/</sup>

The most direct way of gauging the extent of, and trends in, unemployment and underemployment in the reserves is by means of specifically designed, detailed sample surveys. I am aware of only one such survey in recent years.<sup>5/</sup> In their study of 4 districts in the Ciskei and Transkei in 1965 and 1968, Maree and de Vos distinguished between the "employed" and the "underemployed" within their sample which referred to those resident in the districts plus migrant labourers from those districts but not resident at the time. The "employed" were those actually working plus migrant labourers on leave and intending to return to their jobs plus those not working but who had been working within the last 4 months. The "underemployed" were not working at the time of the survey nor had they been working in the previous 4 months. They "owned no land, had no right of land use anywhere, did not work as farm assistants, nor did they fulfill household tasks (in the case of women)".<sup>6/</sup> The "underemployed" were therefore wholly unemployed at the time of the survey, and had been employed for at most 8 months of the previous year. Note that the definition excludes from underemployment those permanent farmers with insufficient land to keep themselves fully occupied. On this basis the rates of underemployment

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1/ Report of the Native Economic Commission 1930-32, (UG 22-1932), pp.174-83.

2/ Social and Economic Planning Council, Report No. 9. The Native Reserves and their Place in the Economy of the Union of South Africa, 1946, p.56.

3/ Op.cit., pp.113-4.

4/ Op.cit., pp.53, 114.

5/ Johann Maree and P.J. de Vos, Underemployment, poverty and migrant labour in the Transkei and Ciskei, South African Institute of Race Relations, May 1975.

6/ Ibid., p.10.

of the African labour force<sup>1/</sup>were as follows:

	<u>Transkei</u>	<u>Ciskei</u>
Male	22.3	10.2
Female	22.7	9.1
Total	22.5	9.6

Given the restrictive definition used, these represent a high incidence of idle manpower. It is dangerous to extrapolate from this single micro-study to the national situation, and the need for further such studies is clear.

The nature and form of unemployment and underemployment in the Homelands also deserves further study. Are un- and underemployment confined to a distinct group or are they shared out among the Homeland labour force on a continuous or revolving basis? It was the opinion of Tomlinson and of previous reports that all able-bodied men spend part of their lives in wage-employment outside the reserves. The Tomlinson Commission conducted a survey of African workers and concluded that the average migrant worker in secondary and tertiary industry spent 62% of his working life in wage-employment, and 38% in unpaid work or inactivity.<sup>2/</sup> An average cycle comprised 26 months spent in a "White" area, 23.5 of which were spent in wage-employment, followed by 6 months in the reserve. The unevenness of age-specific male migration rates (reaching a peak in the age-group 20-29 and falling off sharply after the age of 44)<sup>3/</sup> suggests that underemployment is disproportionately experienced by the older age-groups.

The implications of these findings are that un- and underemployment may be widely shared, and that increased or decreased rates of un- and underemployment will partly take the forms of longer or shorter periods of rest between spells of wage-employment and earlier or later retirement from wage-employment.

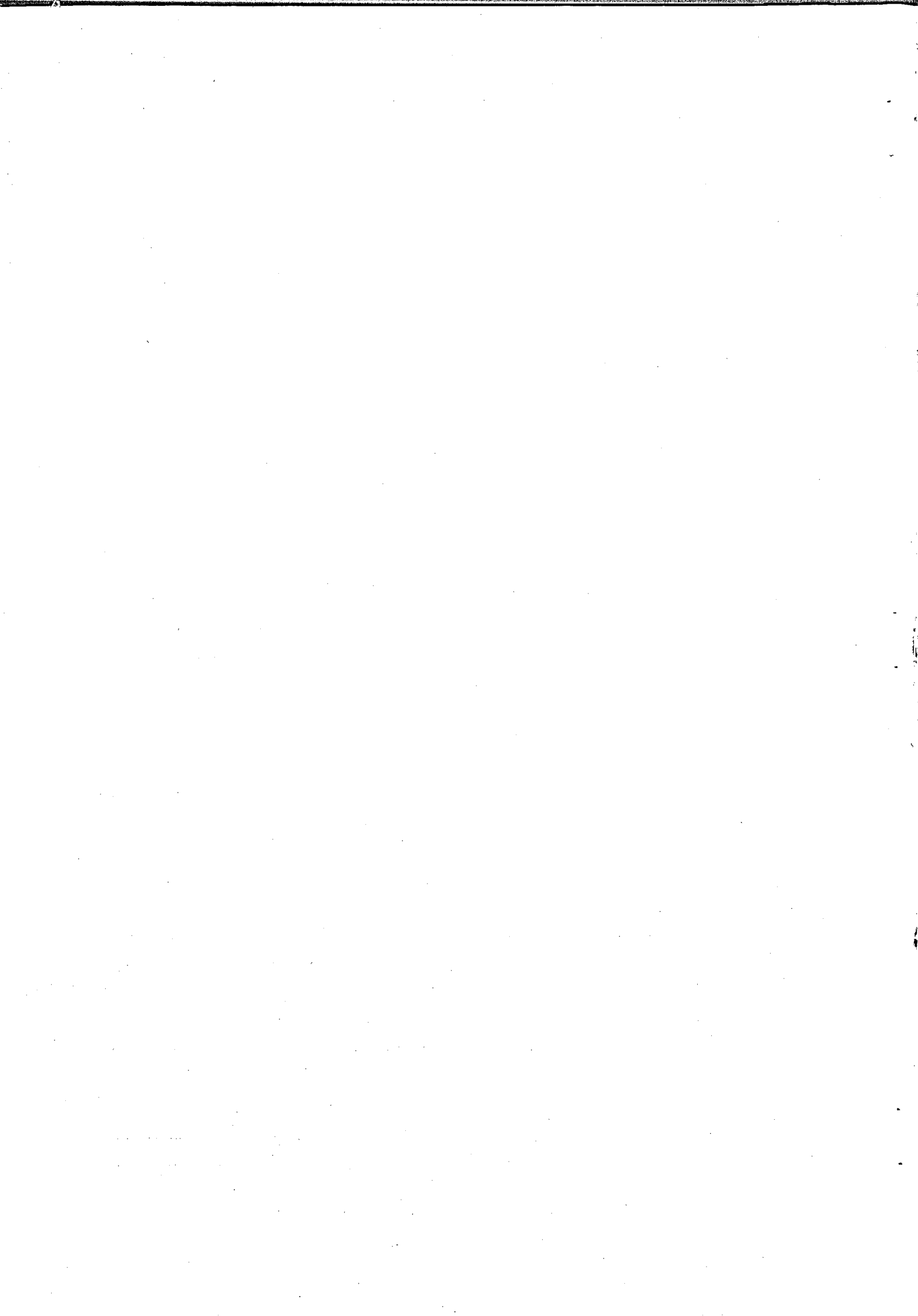
The evidence, such as it is, is consistent with the view that the amount of productive employment in Homeland agriculture has not significantly increased over the post-war period. It suggests that the marginal product of labour is zero or near zero, and has been so throughout the period. Using

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<sup>1/</sup> Those aged 16 and over including housewives (classified as employed) but excluding scholars, students, old-age and disability pensioners.

<sup>2/</sup> Op.cit., p.96. Only averages are given.

<sup>3/</sup> J. Nattrass, op.cit., Table 7. The data refer to migrants from the rural areas of 4 Homelands in 1970.



Tomlinson's own estimate of the "carrying capacity" of the reserves, we can convert the 2.14 million people who could be wholly dependent on agriculture into units of fully-employed labour. Neither the current economic activity rate in the rural Homelands (23% in 1970) nor that for Africans in the country as a whole (37%) is appropriate for this conversion. We assume that either one or two of the members of the postulated six-member farming family are economically active. In that case the number of labour-years put into reserve agriculture is 357 000 or 714 000 respectively. More important than the absolute number is our assumption that this number - representing the amount of productive employment in agriculture - has remained constant.

It is now possible to subtract productive employment in Homeland agriculture from "residual labour" to derive a measure of unemployment among Africans:

Table 14  
Underemployment among Africans

	<u>1946</u>	<u>1951</u>	<u>1960</u>	<u>1970</u>
<u>If One Full-time Farmer per Family:</u>				
<u>Man-years ('000s)</u>				
10c	-92	-85	493	735
11c	381	388	843	1192
12c	429	500	1062	1174
13c	901	973	1412	1631
<u>Man-years as a Proportion of the</u>				
<u>Labour Force (%)</u>				
10c	- 3	- 3	12	14
11c	12	12	21	22
12c	12	13	23	20
13c	25	25	30	28
<u>If Two Full-time Farmers per Family:</u>				
<u>Man-years ('000s)</u>				
10c	-449	-442	136	378
11c	24	31	486	835
12c	72	143	705	817
13c	544	585	1055	1274
<u>Man-years as a Proportion of the</u>				
<u>Labour Force (%)</u>				
10c	- 15	- 13	3	7
11c	1	1	12	15
12c	2	4	15	14
13c	15	15	23	22

Source: Table 11, and its sources.

Since unemployment may be widely shared and probably takes the form of so many months spent in the reserves for each period of wage-employment and

insufficient productive activities for those engaged in peasant agriculture, it is more appropriately referred to as underemployment. Underemployment is measured on various assumptions in Table 14, combining the 4 estimates of residual labour with the 2 estimates of productive employment in Homeland agriculture. These are based on the assumption of either one or two full-time farmers for each of Tomlinson's farming families, i.e. 357 000 or 714 000 productive labour-years in Homeland agriculture throughout the period.

The estimates which show negative or low values of underemployment in the early years (rows 10 and 11) are inconsistent with the Tomlinson finding of substantially excessive population engaged in peasant agriculture. Whatever the absolute level of underemployment, the table indicates a consistently rising trend in unemployed labour-years over time. This applies also to the percentage rate as between 1951 and 1970, although the estimates are divided on the movement of the rate from 1960 to 1970. Our conclusions are the same as, but even less firm than, those drawn for "residual labour".<sup>1/</sup> The evidence suggests a significant growth in the extent of African underemployment over the post-war period.

As a final exercise, an attempt is made to project African residual labour and underemployment over the 1970s. All but the least plausible assumptions of the economic development programmers are accepted, i.e. the E.D.P. projections of labour force and non-agricultural employment are used but employment in agriculture is projected on a different basis.

The problems of projecting African employment in non-African agriculture are clear from Figure 1. The figure shows three series: the volume of agricultural production<sup>2/</sup> and two measures of African farm employment (casual plus regular, and "converted casual" plus regular employees).<sup>3/</sup> Each series is shown as an index with 1958/9-1960/1 as 100. The employment data are not available for all years and are particularly suspect for two years, 1963/4 and 1964/5, as revealed by the implied leap in average earnings

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<sup>1/</sup> See above p.27.

<sup>2/</sup> Department of Agriculture, 1975 Abstract of Agricultural Statistics, Table 80.

<sup>3/</sup> Department of Statistics, Agricultural Census, various reports. The method of converting casual employment to full-time equivalents is described on p.22.

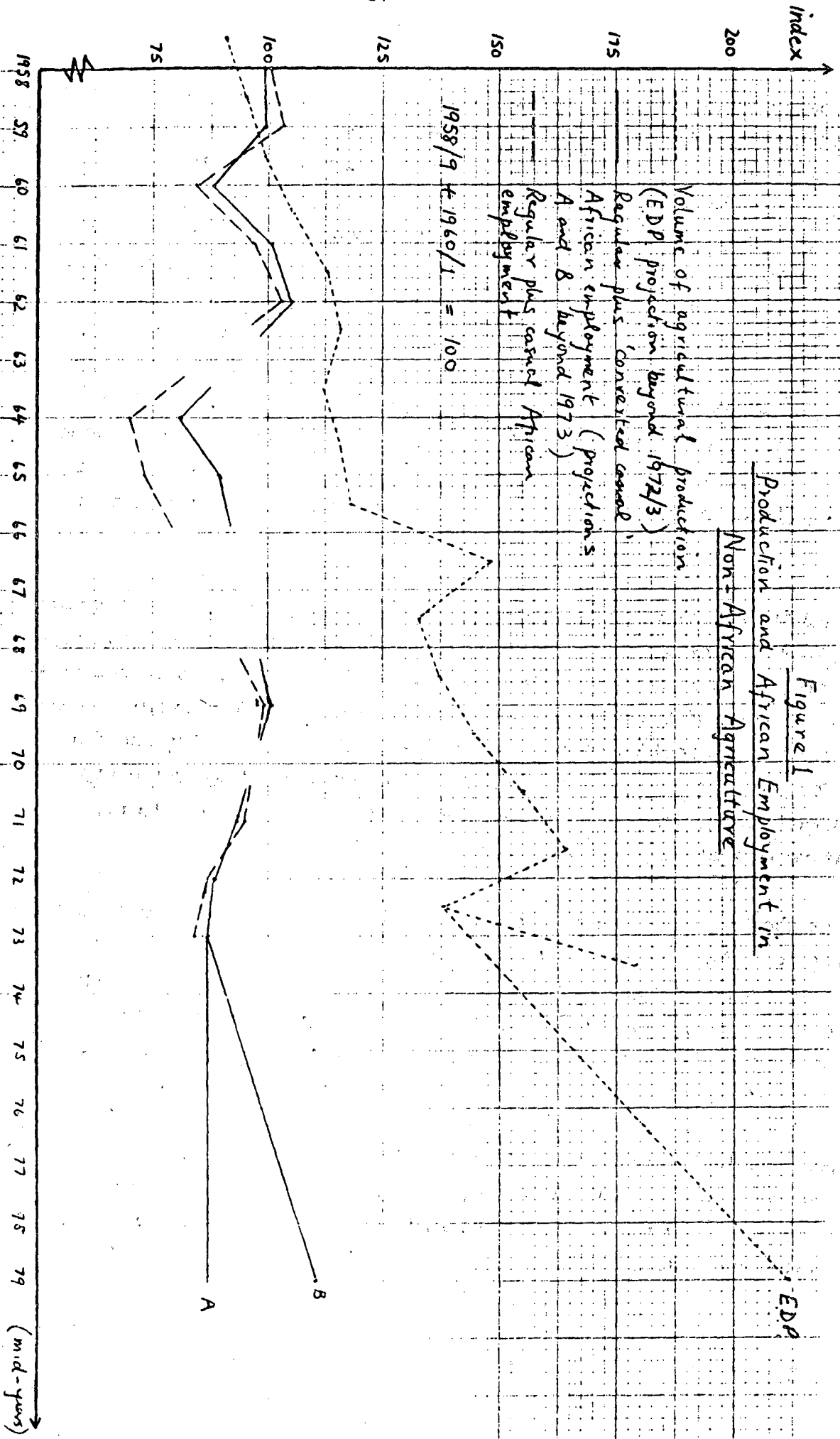


Figure 1  
Production and African Employment in  
Non-African Agriculture

Volume of agricultural production  
(EDP projection beyond 1972/3)  
Regular plus 'converted casual'  
African employment (projections  
A and B beyond 1973)  
Regular plus carried African  
employment

1958/9 + 1960/1 = 100

EDP

A

B

(mid-years)

of casual employees in these years. No amount of sophisticated econometric curve-fitting can help to project employment beyond 1973, even if the E.D.P. projection of agricultural production is accepted. Employment was lower in the last year of the series than it was in the first; there is really no more plausible assumption than that employment will remain constant. Using the "converted casual" plus regular employment series, this assumption is shown as projection A in Figure 1. To gauge the sensitivity of the results to levels of farm employment, an optimistic forecast (projection B) is also shown in the figure. It implies employment growth of 4% per annum and productivity growth of African labour of almost 2% per annum. These are two assumptions chosen for non-African agriculture. With regard to African agriculture, constant productive employment is once more assumed, again on the assumption of one or two full-time farm-workers per farming family.

The results of this forecasting exercise are shown in Table 15. If African employment remains constant (assumption A) residual labour and underemployment are seen to increase over the current E.D.P. period, but when expressed as a percentage of the labour force, they are seen generally to fall slightly. On assumption B, residual labour and underemployment are roughly constant over the programming period but rise over the decade, and the percentage rates fall more sharply and in every case. The forecasts are clearly sensitive to what happens to farm employment.

Some of the E.D.P. assumptions accepted in this exercise may prove to be optimistic. For instance, with services accounting for more than half of African non-farm employment, the employment projections are also sensitive to the growth rate of African employment in services: the programmers assumed a high figure of 4.8% per annum. Moreover, the target GDP growth rate for 1974-79 of 6.4% per annum now seems to be too high. The results in Table 15 probably paint too rosy a picture of current and future labour absorption into the capitalist sector. Although economic growth at the rate achieved in the 1960s may produce some fall in the percentage rate, it is very unlikely to prevent a rise in the absolute level of African underemployment in the 1970s.

Table 15

Projections of African Residual Labour and Underemployment ('000s)

	1970	1973	1979	1980	Increase 1973-79	Increase 1970-80
E.D.P. labour force	5975	6519	7760	7989	1241	2014
E.D.P. non-farm employment	3181	3481	4537	4743	1056	1562
Farm employment:						
Assumption A	865	774	774	774	0	-91
Assumption B	865	774	979	1019	205	154
Employment outside Homeland agriculture:						
Assumption A	4045	4255	5311	5517	1056	1472
Assumption B	4045	4255	5516	5762	1261	1717
<u>Residual Labour:</u>						
Assumption A	1930	2264	2449	2472	185	542
Assumption B	1930	2264	2244	2227	-20	297
<u>Underemployment</u> if one full-time farmer per farming family:						
Assumption A	1573	1907	2092	2115	185	542
Assumption B	1573	1907	1887	1870	-20	297
if two full-time farmers per farming family:						
Assumption A	1216	1550	1735	1758	185	542
Assumption B	1216	1550	1530	1513	-20	297
<u>As a proportion of the labour force (%)</u>						
<u>Residual labour:</u>						
Assumption A	32	35	32	31	- 3	- 1
Assumption B	32	35	29	28	- 6	- 4
<u>Underemployment</u> if one full-time farmer per farming family:						
Assumption A	26	29	27	26	- 2	0
Assumption B	26	29	24	23	- 5	- 3
if two full-time farmers per farming family:						
Assumption A	20	24	22	22	- 2	2
Assumption B	20	24	20	19	- 4	- 1

Sources: Economic Development Programme for the Republic of South Africa 1974-1979; Figure 1 above.

Note: The E.D.P. estimates of labour force and non-farm employment are extrapolated backwards to 1970 using the rates of change in the periods 1973-79 and 1971-73 respectively, and forwards to 1980 using the rates of change in the period 1973-79 (Tables 2.3 and 5.1).

6. COMPETITION FOR LABOUR?

The variety of statistical results obtained indicates that no firm conclusions can be drawn from the census data. The proof of the pudding is in the eating: it is worth investigating whether labour shortages in sectors of the economy have actually been experienced and how they can be explained. Since wages are basic to any economic analysis of sectoral labour shortage or surplus, the first task is to analyse and explain wage behaviour in the main sectors.

Figure 2 shows annual figures of average real earnings of African employees in mining and manufacturing,<sup>1/</sup> and - in the years for which data are available - average real earnings of African regular farmworkers.<sup>2/</sup> Earnings are all converted to the prices of 1975 by means of the urban White consumer price index. This price index is inappropriate for Africans and particularly so for migrant mineworkers or remote farmworkers, but regrettably it is the least inappropriate measure available for this period.

In 1951 average earnings in manufacturing were double those in mining, having been roughly equal before the war. Real earnings in manufacturing were constant in the decade before 1958, but rose significantly in the period 1958-61. There was another spurt in the period 1964-66 and a sustained and substantial rise after 1970. The 1958-61 increase has been attributed to a new policy and initiative on the part of the Wage Board, associated with the African unrest and political disturbances of the time, and the 1964-66 increase to a new round of Wage Board determinations.<sup>3/</sup> The increase after 1970, and particularly after the African strikes of 1973, can be explained in terms of government policy and the initiative of employers. A contributory factor to the increase in average real earnings in manufacturing was gradual skill-acquisition, accelerated after 1970, by which increasing numbers of Africans moved from unskilled to semi-skilled and other jobs. It is unlikely that shortages of African labour were a significant cause of the increases in earnings. With exceptions at particular places and times, the effect of urban influx control was probably to equate the supply of labour to industry with the demand and prevent urban unemployment.

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1/ Department of Statistics, Bulletin of Statistics and South African Statistics (various issues).

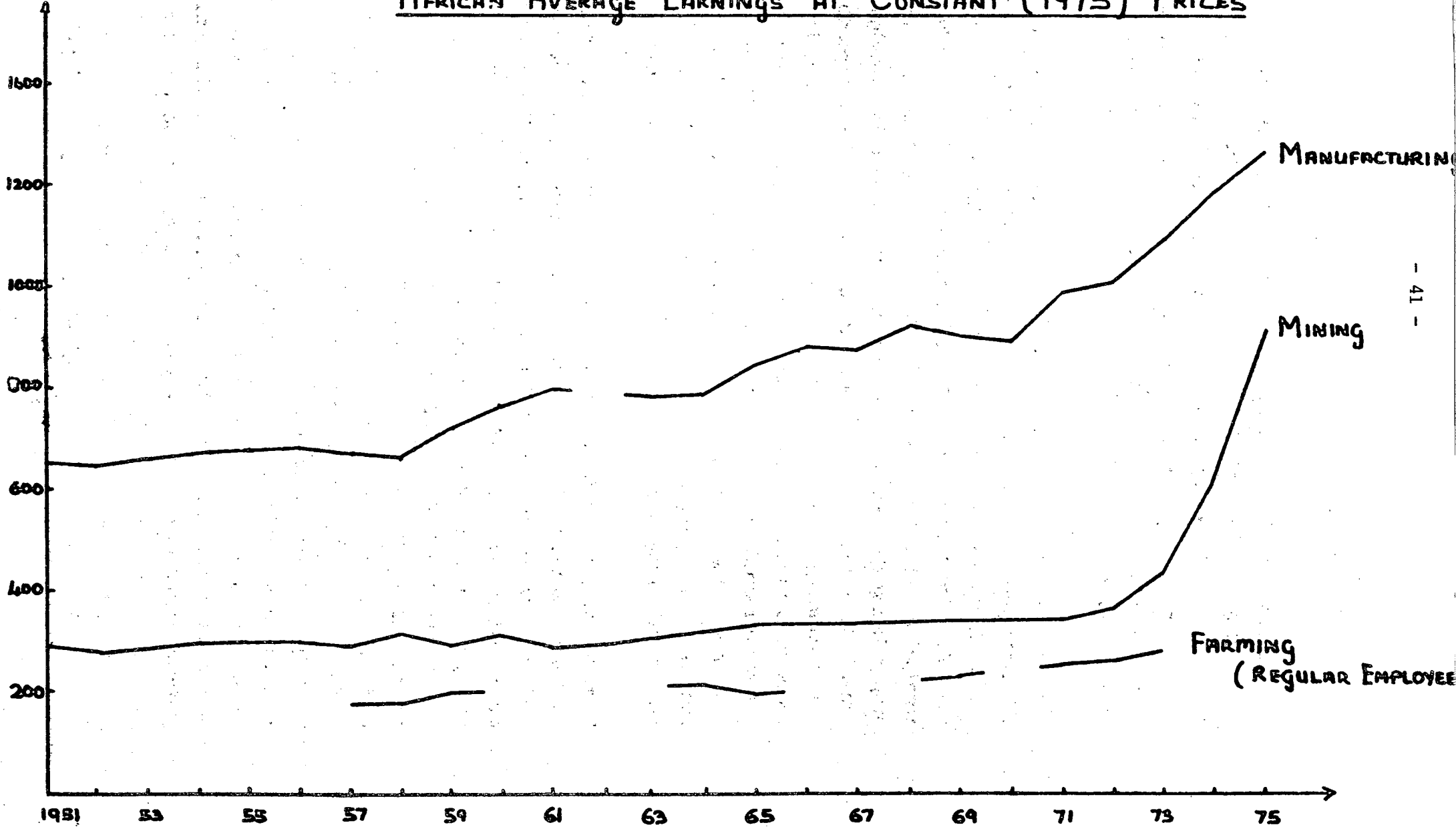
2/ Department of Statistics, Report on Agricultural and Pastoral Production, (various issues).

3/ Donald E. Pursell, 'Bantu real wages and employment opportunities in South Africa', South African Journal of Economics, June 1968.

FIGURE 2

AFRICAN AVERAGE EARNINGS AT CONSTANT (1975) PRICES

Rands P.A.



Real earnings in mining remained roughly constant from 1951 to 1971, as indeed they had since 1911.<sup>1/</sup> The use of migrant labour, the industry's efficient recruiting organisation and its monopsonistic behaviour to prevent competition among mines at times of labour shortage no doubt help to explain the relatively low level and stability, until recently, of real wages in mining.

Francis Wilson argued that the gold mining industry has passed through alternate phases of shortage and abundance of African labour.<sup>2/</sup> During the war African labour supply was adequate, but between 1946 and 1958, it was well below 'complement'. It became abundant in the late 1950s and remained so until the early 1970s. The most important means of increasing supply during the post-war period has been the expansion of foreign recruitment. Given the fixed gold price between 1949 and 1969, monopsonistic collusion among mines in not competing for labour, and a belief in the backward-sloping supply curve, real wage increases were resisted and instead a recruitment drive undertaken for foreign labour at the prevailing real wage. The steady decline of South African nationals, in both absolute numbers and as a proportion of the total, is shown in Table 16. The proportion fell from over half before the war to 22.4% at its lowest, in 1972.

There was very little difference in African earnings as between mining and manufacturing before the war. However, the substantial post-war gap meant that industry was the first preference of South African Blacks and that mining had to take the residual. A spell in mining may often be regarded merely as a stepping stone to a better job in industry. The same choice is not available to foreign Africans, to whom industry is closed. Insofar as South African Blacks can find industrial employment, their opportunity cost and thus their supply price to the mining industry is higher than that of foreigners. However, the poverty of the reserves means that this is probably not the case for Africans unable to find employment in industry. If underemployment in the reserves has been increasing then - it might be argued - the mining industry should have been able to recruit more South African nationals. The fact that their recruitment has fallen during the post-war period is taken by some people in the mining industry as a sign that the pool of suitable male labour is drying up.

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1/ Francis Wilson, Labour in the South African Gold Mines 1911-1969, 1972, Table 5, p.46.

2/ Ibid., pp.86-8.

Table 16

African Employment in Gold Mining

<u>Numbers ('000s)</u>	<u>1936</u>	<u>1946</u>	<u>1956</u>	<u>1966</u>	<u>1970</u>	<u>1972</u>	<u>1974</u>
South African labour	166	126	116	130	112	85	91
Foreign labour	152	179	218	233	265	296	302
Total employment	318	305	334	362	379	381	393
<u>Percentage of total (%)</u>							
South African labour	52.2	41.3	34.7	35.8	29.5	22.4	23.2
Foreign labour	47.8	58.7	65.3	64.2	70.5	77.6	76.8

Sources: Francis Wilson, *op.cit.*, Table 8 (1936-56);  
 Mine Labour Organisations (N.R.C.) Ltd., Reports and  
 Financial Statements (1966-).

The remarkable increase in mining wages which began in 1971 was not initially a matter of current shortage: significant shortage appeared only in 1874. A variety of factors appear to have been at work. Whereas in 1972 half the gold mines were state-assisted, none was assisted in 1975. The increased price of gold, beginning in earnest in 1972, was important in permitting the wage increases but it cannot be regarded as the cause. The initial increases, originating in the Anglo American Corporation, may have been helped by concern about reputation and an enlightened view of company interests. Probably most important was a growing concern about the increasing dependence on foreign labour. In 1972 Malawi and Mozambique together accounted for no less than 53% of African employment in the gold mines. Political events made this dependence increasingly risky. The Malawian decision to permit no further recruiting for the mines came in 1974, and the coup in Portugal later in 1974 gave the industry another fright.

The increase in mine wages since 1971 must be seen primarily as an attempt to recruit more South African nationals. Some evidence that such a policy could succeed was provided by an attitude-survey carried out a couple of years ago to discover the reasons for the loss of South African workers from the mining industry.<sup>1/</sup> The attitude towards gold mining of some 240 Africans not employed in the mines, many of whom had previously been gold miners, were investigated. The most frequently mentioned source of satisfaction from employment was 'earning a living' and the main source of

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1/ M.M. Masipa, 'Attitudes towards gold mining of ex-miners in other occupations', Chamber of Mines, Human Sciences Laboratory, (mimeo, n.d.).

dissatisfaction (mentioned by 84%) was 'rate of pay'.<sup>1/</sup> The reasons cited for dissatisfaction with gold mining in particular were low wages in relation to secondary industry and the hazardous and strenuous nature of the job.<sup>2/</sup> The most frequently cited condition (mentioned by 52%) which might influence ex-miners to return to gold mining was improved pay.<sup>3/</sup>

It is a commonly held view in the mining industry that there is no significant pool of suitable, involuntarily unemployed male labour remaining in the Homelands. It was therefore felt necessary to attract workers from other wage-employment through better pay and conditions. Since work in industry was relatively congenial and the pay very high relative to mining, the prime target for recruitment became White agriculture. The recruitment of African labour by labour agents is restricted by the government to certain areas of the country, and many of the White farming areas have traditionally been excluded. After the Malawian embargo on recruitment for the mines, the government gave the mines permission to recruit in a number of White rural areas which were formerly closed to them. In the heady times of record gold price in 1974 and 1975, the projections made in the mining industry indicated rapid expansion of gold production and of African employment, well in excess of the E.D.P. projections. Even in 1975, as Figure 2 reveals, African wages in manufacturing were significantly above those in mining. These considerations reinforced the expectations held by important sections of the mining industry of a growing competition and conflict with White agriculture over Black labour supplies.

Mining's conventional wisdom of a small and diminishing labour pool, based on the decline in the number of South African miners, runs counter to our own evidence of 'residual labour' and 'underemployment' both large and increasing in absolute numbers. Can the two be reconciled? One possibility is that it is a particular sort of labour - physically fit males aged no less than 18 but less than 40<sup>4/</sup> who are not put off by the claustrophobic,

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1/ Ibid., Table 13.

2/ Ibid., Table 13.

3/ Ibid., Table 15.

4/ Recent figures indicate that 25% of Black workers in the gold mines were aged below 22.6 years and 25% above 35.7 years. See R.P. Plewman, 'Minerals and Manpower', Journal of the South African Institute of Mining and Metallurgy, October 1974, p.61.

hot, arduous and dangerous nature of underground work - which has become scarce. The 1970 census shows the number of African males by age-groups who were in the Homelands on census night.<sup>1/</sup> There were some 466 000 African males aged 20-39, of which 367 000 were in the rural areas. Not all of these would have been economically active. It is inappropriate to apply the available national age-specific economic activity rates to the Homeland population. However, since economic activity rates are likely to be lower in the Homelands than elsewhere, these rates are applied and the results are shown as probable over-estimates of the labour force:

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>20-39</u>	<u>40-64</u>	<u>15-64</u>
Total Homelands ( '000s)	204	141	112	101	93	447	365	1016
Rural Homelands ( '000s)	184	115	85	78	73	351	321	856

There would thus at the most some 447 000 economically active African males aged 20-39 in the Homelands, of which 351 000 were in the rural areas. Not all of these would have been available for wage employment. Some 363 000 males in the Homelands were allocated to a specific sector other than agriculture, of whom 48 000 were allocated to mining (the numbers aged 20-39 cannot be separated). The corresponding figure for the rural Homelands was 235 000, of whom 40 000 were in mining. It is likely that some of the people so classified were involuntarily unemployed.<sup>2/</sup> However, on the assumptions that all those assigned to sectors other than agriculture were either employed or choosing to rest between contracts, and that those engaged in farming could be attracted out, then the numbers aged 15-64 who remained in the labour pool were 653 000 in the Homelands as a whole and 621 000 in the rural Homelands.

One further complication should be taken into account: the minimum rest period for a man leading the unnatural life of an oscillating migrant. Natrass's estimate of migration from the Homeland indicates that 1 030 000 African males were temporarily absent from the rural Homelands in 1970,<sup>3/</sup> to be compared with the 856 000 economically active males in the rural Homelands. If we make the strong assumption that employment and unemployment is

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1/ Department of Statistics, Population Census 1970, Report No. 02-02-02.

2/ See above, pp.6-7.

3/ Jill Natrass, op.cit., Table 1.

shared equally by all Homeland men and unemployment takes the form of rest periods between contracts of employment, then the proportion of time spent resting averaged 45%, i.e. nearly 10 months off work after every 12 months on. The age-specific average proportions are as follows:

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-64</u>	<u>15-64</u>	
Percentage rate:	61	37	31	32	39	35	56	45

After the age of 29 the proportion of men resting increases systematically with age. The proportion of time spent resting by the age-group suitable for mining (age 20-39) is 35%, i.e. 6 months spent resting after every 12 months of wage-employment.

By making the further assumption that, say, 1 month, or 3 months, of rest is regarded as the very minimum after a year away from the family, an estimate can be made of the remaining male labour pool in the rural Homelands in 1970, measured in thousands:

	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-64</u>	<u>20-39</u>	<u>15-64</u>
1 month of rest:	174	99	69	64	64	299	296	769
3 months of rest:	155	67	37	36	45	257	185	597

The results are sensitive to the minimum length of rest period assumed, particularly in the age-groups suitable for employment in mining. For instance, if a minimum rest period is 3 months, the male labour force aged 20-39 available for wage employment becomes 185 000 instead of 351 000. Nevertheless, a considerable pool remains.

It is too simple to assume that unemployment is shared equally among the Homeland population. There is likely to be a wide dispersion of lengths of rest period around the mean, depending on individual circumstances. For instance, the rest period may increase with the extent of access to land and the level of income from peasant farming, with the number of working members in a household, with the extent of leisure preference, and with the distance from wage-employment. It may decrease with the number of household dependants, the ease of weekend visiting, and the relative advantage of returning to the same employer. A study was made in 1971/2 of Tswana work-seekers at labour bureaux, 200 in a 'White' town near the Homeland and 200 in a rural part of the Homeland.<sup>1/</sup> Four factors influencing the

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1/ H.J. Redelinghuys, Gesindheid van Manlike Tswana-Werksiekers in die Rustenberg - Area ten Opsigte van Soort Werk, Toesig en Werksgebied, Human Sciences Research Council, 1974, pp.20-24.

period of unemployment were listed: the customary rest period which, if circumstances permitted, was normally 3 months' duration; help from the family (the length of unemployment increased with the number of working household members); family income from farming and remittances (but no statistical relation was found); and the availability of work. The relationship between an individual's wage level and his period of unemployment deserves study. Francis Wilson has argued that the mining wage may have been so low that men preferred to remain in the reserves: a worker would not 'earn sufficient to make much difference to the level at which he and his family were living'.<sup>1/</sup> On the other hand, there is still an influential body of opinion in South Africa which accepts that migrant workers from the Homelands have backward-sloping individual supply curves to the modern sector, whether for cultural reasons or for reasons associated with enforced migrancy.

One means of helping to reconcile the diminished supply of nationals to the mines with growing underemployment in the reserves is to be found in the probabilistic theories of migration behaviour which have been applied to the phenomenon of urban unemployment in less developed countries.<sup>2/</sup> The argument can be stated quite simply: given a gap between the urban wage and rural income, rural-urban migration occurs and urban unemployment increases until the 'expected value' of an urban job equals rural income. Expected value depends positively on the urban wage which is received if employment is found, and negatively on the probability of remaining unemployed. The theory requires considerable adaptation to the South African case. Urban unemployment is largely prevented by the influx control measures, but these merely transfer unemployment to the Homelands. Insofar as Homeland men see a choice between employment in mining and the chance of employment in industry, then the greater the difference in wages, the more people are prepared, and the longer they are prepared, to wait in the Homelands for a job in manufacturing before accepting a contract of employment in mining. During the period 1958-1971, in which the wage disparity between manufacturing and mining increased, the fall in the number of indigenous African miners need not be inconsistent with increasing Homeland underemployment.

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- 1/ Francis Wilson, 'Unresolved issues in the South African economy: labour', South African Journal of Economics, December 1975, p.528.
- 2/ See, for instance, Michael P. Todaro, 'A model of labour migration and urban unemployment in less developed countries', American Economic Review, March 1969. A concise statement of the theory is made in J.B. Knight, 'Wages and employment in developed and underdeveloped economies', Oxford Economic Papers, March 1971, pp.52-4.

Figure 2 indicates that, up to 1972/3, the real wage of African regular farm employees had risen slowly but steadily. Comparing 1956/7 and 1972/3 (the earliest and the latest years for which data are available) the increase in their mean real earnings averaged 2.8% per annum. However, the inappropriateness of the national consumer price index and the difficulty and arbitrariness of imputing money values to benefits-in-kind<sup>1/</sup> mean that it can only tentatively be concluded that a real increase occurred.

The average earnings (including benefits-in-kind) of regular farm workers were consistently lower not only than those of manufacturing workers but lower also than those of miners (which excluded benefits-in-kind). It is probable, but more difficult to establish, that real earnings were also lower. Poverty datum line studies of farm labour are non-existent or rare, but a cursory study by the Natal Agricultural Union claims that the cash requirement of an African farm family in order to reach the P.D.L. might be under half that of an urban family.<sup>2/</sup> The choice between remaining in employment on the farm or taking employment in the town depends on many more factors than real income e.g. security, ability to live with one's family, access to education, the nature of the job, and work relationships. Nevertheless, it is implausible that real incomes have not been sufficiently different to attract a considerable flow of African farm labour to the towns in search of industrial employment. That such a flow has not occurred on a greater scale must be due to the operation of the pass laws.

It is impossible to quantify the extent to which the pass laws have succeeded in keeping Black labour on the White farms. Van der Merwe, from his study of the Labour Bureau system, considers that many rural workers are attracted to the urban areas by high wages, obtain illegal employment and manage to evade discovery.<sup>3/</sup> Some channels are open to farm workers wishing to leave.

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1/ For instance, estimates of benefits in kind for regular employees begin in 1964/5. The 1964/5 ratio of total income to cash income (1.375) is applied to earlier years. The real increase in average cash earnings averaged 3.1% per annum. The Marais commission produced a table showing an entirely different ratio of total income to cash income for regular farm labourers: no less than 3.45 in 1966/7. (Second Report of the Commission of Enquiry into Agriculture, RP84/1970, Table 10.5).

2/ Natal Agricultural Union, 'Service Conditions of Bantu on Farms in Natal' (Mimeo), 1973.

3/ P.J. van der Merwe, 'The economic influence of the Bantu Labour Bureau System on the Bantu labour market', South African Journal of Economics, 1969.

There is little to prevent a farmworker from moving to a Homeland and then taking contract employment, although there is the question of whether the previous occupation, revealed in his documents, impedes his taking non-farm employment. A farm worker can get legal entry to the urban areas with his family by obtaining state employment, but this channel is restricted for most farm workers by their lack of education. The recent extension of permitted recruitment by labour agents in the 'White' rural areas means that more able-bodied men can be contracted for mine employment, although this may pose a threat to the security of tenure of their families left on the White farms.

The pass laws have not prevented persistent shortages of farm labour. For instance, the S.A.A.U. survey of 1969 revealed that an additional 141 000 (12.4%) regular male Non-White farm workers were needed in 1969 'to have the farm work done satisfactorily,<sup>1/</sup> of which 105 000 were to be Africans.<sup>2/</sup> The highest provincial percentages were in the Cape (16.1%) and Transvaal (15.1%), and the areas of highest percentage shortage were the Western Cape and the western parts of the Transvaal and O.F.S.<sup>3/</sup> The shortfall of 105 000 African men far exceeded the reported surpluses of 7 000 African male, 11 500 female and 25 000 child workers; representing 0.8%, 1.6% and 1.6% of their respective totals.<sup>4/</sup>

Shortage implies a wage lower than the equilibrium wage but, in the absence of perfectly competitive labour markets, theory cannot predict whether wages in the labour-short regions are likely to be higher or lower than average. The regional relationship between shortage and wage levels was examined using the S.A.A.U. estimates of percentage shortage by region in 1969 and the agricultural census estimates of African average regular earnings in cash and kind for the same 34 regions in 1969. A weak positive regression relationship was found. However, this was due to the severe shortages and high wages of the Western Cape; when the Western Cape regions were excluded, the relationship became weakly negative, largely owing to relatively low wages in the labour-short western regions of the Transvaal and the O.F.S. Average earnings were highest in the Witwatersrand area although the reported shortage was not higher than average.

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1/ Op.cit., p.25.

2/ Ibid., Table 9.

3/ Ibid., Table 10.

4/ Ibid., Table 11, p.29, and Appendix Table 8.

We may hypothesise that wages are lowest where the opportunity cost of farm labour is lowest, i.e. the greater the immobility of labour in a region the lower are regional earnings. Wages should be low in areas still closed to mine recruiting, or where foreign labour is able to come across the border. Where farmers have to rely on migrant workers from the Homelands, as in the Western Cape or the sugar-growing area of Natal, then insofar as the migrants' geographical or industrial mobility is greater, wages should be more responsive to the forces of competition.

Competition for labour in the wake of the dramatic increase in mining wages since 1971 was clearly felt by the sugar growers. The Natal sugar industry relies heavily on Pondo migrant labour for cane-cutting: for cultural or other reasons cane-cutting is not a job which Zulu men will accept. However, the Pondo men also have an opportunity to migrate to the mines. In the 1969/70 season the basic wage of a cane-cutter in the industry (excluding bonus and payments in kind) was about 34 cents a day; in the 1975/6 season it was R1.75 a day. The policy is to pay more than the mines.

In a statement on African labour policy in 1974, the South African Agricultural Union envisaged that, as 'surplus' labour is moved from the White areas to the Homelands in line with government policy, 'the farmer will have to make use to an increasing extent of agreement labour'.<sup>1/</sup> An implication is that an increasing proportion of farm labour will, like the Pondo migrants, have more choice of employment as between sectors.

The discussion of wage policy in the S.A.A.U. document was muted, with reference to capacity to pay, the need for 'continuing to pay ... a competitive wage', and the conflict between the national need to create more employment for the growing African labour force and the necessity 'from time to time to pay higher wages' which could adversely affect employment.<sup>2/</sup> In 1975 the author gained the impression that the S.A.A.U. was far less convinced of a diminishing labour pool and therefore less concerned about future competition for labour between mining and farming than was the mining industry. For instance, the Union was opposed to the organised recruitment of foreign workers in agriculture, and it had made no protest against the

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1/ South African Agricultural Union, 'Bantu Labour Policy' (mimeo), October 1974, p.3.

2/ Ibid., pp. 1, 5, 8.

extension of mine recruiting in the White rural areas. A somewhat different view of the impending degree of competition in the labour market was that taken by the Natal Agricultural Union in a statement on labour policy in 1973. It saw the need for a choice between policies to ensure the maintenance of a contented labour force on the farms or policies 'to strengthen the legislative dyke which at present restricts so many Bantu to the rural areas'.<sup>1/</sup> The N.A.U. opted for the former: members were recommended to raise their minimum cash wages to about double the level found in a survey of Natal farms in 1971/2.<sup>2/</sup>

Part of the explanation for the difference in mining and farming attitudes to what is an empirical question may be that farming can draw on supplies of labour unsuited or unavailable to mining. There are no women miners but roughly a third of African farm-workers are women. Casual farm-workers may be the dependants of regular farm-workers, or may choose to divide their year between their Homeland farms and limited employment in White agriculture. Women who run households in the reserves may have no other possibilities of wage-employment. For these reasons the South African-born labour supply to farming is somewhat less restricted than to mining.

In 1963 an interdepartmental investigation was made by the Froneman committee into the employment of foreign Africans in South Africa.<sup>3/</sup> The committee saw the use of foreign labour as an economic advantage which had to be weighed against the social and political disadvantages of a larger African population. Except in mining, it was difficult to prevent foreigners from entering other jobs illegally and settling permanently. The committee did not stress the economic advantage because it felt that the supply of indigenous Africans was sufficient. Indeed, it argued that economic growth, even if it continued at the high rate of 5% per annum, would not be sufficient to absorb the increase in the indigenous labour force. The replacement of foreign Africans was therefore seen as a means of solving the problem of growing unemployment.

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1/ Natal Agricultural Union, op.cit., p.2

2/ Ibid., pp.7, 17.

3/ Its report was not published but it has been summarised by Ken Owen, Summary of the Report of the Findings of the Froneman Committee, South African Institute of Race Relations, 1963.

As government restrictions on foreigners were tightened over the post-war period, so the incentive not to be recorded at all in the census or not to indicate foreign origin increased. The number of foreign Africans recorded in the 1960 and 1970 censuses may well be understated. The committee estimated that in 1960 there were 836 000 foreign Africans (rather than the census figure of 586 000), of which 650 000 were employed, 270 000 in agriculture. The committee recommended the systematic complete replacement of foreign African labour by indigenous labour within a period of 5 years. It recognised that a serious replacement problem might arise in agriculture and mining because of the low wages and hard physical work. Employers would have to offer higher pay 'unless compulsory measures were used'.<sup>1/</sup>

The 1970 census recorded 490 000 foreign Africans, of whom 453 000 were economically active and 38 000 employed on White farms. However, given the great problems of enumeration, this does not necessarily mean a significant fall in foreign farm labour since 1960. We know that the number of foreign Africans in mining increased. It appears that the recommendations of the Froneman committee were not seriously implemented. An important reason is to be found in the precarious financial position of the gold mining industry before the price of gold began to rise in the early 1970s.

Reconsideration may now be due. Is it time for government to accelerate further the replacement of foreign Africans with South African nationals? Political considerations may well predominate in any decision, e.g. the disastrous effects on the Lesotho economy would have political repercussions, and the wages of Mozambique workers give South Africa a small hold on their government. Yet the policy of replacement is one which the South African government, should it espouse a path of self-interested reformism to give Blacks a better deal, may well choose to implement.

Table 17 sets out the 1970 census information available for gauging the effects on the labour market of a phasing out of the employment of foreign Africans. Unfortunately the sensitivity to different assumptions of our estimates of

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<sup>1/</sup> Ibid., p.49.

Table 17

Employment of Foreigners in Relation to the Supply  
of Nationals, 1970 ('000s)

	<u>Male</u>	<u>Female</u>	<u>Total</u>
<u>Economically active foreigners</u>			
Total	434	19	453
<u>of which:</u> in mining	352	0	352
in agriculture	40	5	45
<u>Residual Labour</u>			
10	533	559	1092
11	795	754	1549
12	953	578	1531
13	1215	773	1988
<u>Underemployment</u>			
With one full-time farmer per family:			
10	-	-	735
11	-	-	1192
12	-	-	1174
13	-	-	1631
With two full-time farmers per family:			
10	-	-	378
11	-	-	835
12	-	-	817
13	-	-	1274
<u>Labour pool in rural Homelands</u>			
Economically active	856	-	-
Economically active aged 20-39	351	-	-
Economically active less non-farm employment	621	-	-
If one-month minimum rest-period :			
Economically active	769	-	-
Economically active aged 20-39	296	-	-
If three-month minimum rest-period :			
Economically active	597	-	-
Economically active aged 20-39	185	-	-

Sources: Foreign employment: Census of Population 1970, Report No. 02-02-02; Residual labour: Table 11 above; Under-employment: Table 14 above; Labour pool in rural Homelands: pp.

'residual labour' and 'unemployment' (rows 10-13 of Tables 11 and 14) is too great to draw firm conclusions, but it seems that the replacement of all foreigners would not nearly exhaust the total amount of underemployment. The exhaustion is far more complete in the case of male labour, and particularly in the case of males aged 20-39, as can be seen from the size of the labour pool in the rural Homelands in relation to the employment of foreigners in mining. While there would of course be temporary adjustment effects in all

markets, the tentative conclusion on the permanent effects must be that the replacement would cause shortage of physically fit young men but not in the African labour force as a whole.

It is a defect of the discussion so far that it has concentrated on the relationship between the wage rate and the supply of labour. The response of employers in a number of sectors to the wage increases of the 1970s is the subject of a study by the author, and would require a separate paper. In the present context it is worth examining the possible effects of wage increases on levels of employment in two sectors, mining and agriculture.

How did the mines respond to the wage increases, the shortages of labour and the risk of further shortages? The following is based on the experience of a particular mining group. Mechanisation on the gold mines of the group has not proceeded very far, both for technical reasons and because the cost and quality of available labour rendered mechanisation unprofitable. The peculiar technical problems found in South African gold mines - hard abrasive rock and deep, narrow, undulating seams - mean that machines developed for conditions elsewhere are inappropriate and require adaptation. Until the recent abrupt changes, very little research and development has been conducted into an appropriate technology. Therefore, the immediate response to the new situation could only be to take up "technological slack", and to tighten up on supervision and quality of work. For instance, in the ore-winning process, various minor technological innovations (e.g. mechanical scoops, moving barricades and airdriven sweepers) were made a decade ago, but only recently have they become widely used in the mines of the group. In mid-1975 the supply of African labour to the mines was said to be 10% down on the level twelve months before, but they were able to maintain their production.

Taking a longer-run view, there is scope for mechanisation in some spheres. In materials handling underground, men can be replaced by vehicles. The company has recently conducted tunnelling experiments with boring machinery instead of traditional blasting and drilling, and the feasibility of this method has now been proved although it is still somewhat more expensive. The replacement of blasting by rockcutters or other mechanical methods at the face is the subject of investigation, but it is expected to involve years of research and development. In response to the new situation, the company has stepped up its programme of research and development into mechanisation, and the Chamber of Mines has recently decided to spend R150 million over the next decade with this objective.

Coal mining does not face the difficult technical conditions of gold mining. The same mining group operates a number of coal mines which use a wide range of techniques depending partly on the age of the mine. For instance, the group operates a small, old mine employing labour-intensive hand-loading techniques, capable of only 70 tonnes per man a month. But it is also developing an enormous, capital-intensive open-cast mine, capable of producing 1 000 tonnes per man per month. Most of its mines use conventional mechanised equipment and produce about 250 tonnes per man a month. Other methods of underground mining are possible, e.g. continuous mining or the conventional British practice of longwalling, but they have not been introduced by the company for technical reasons or because they require a more knowledgeable labour force than is at present available.

Techniques are changing. None of the new collieries uses hand-loading methods, and open-cast methods are chosen wherever they are technically feasible. Some hand-loading collieries are being mechanised, but it is generally not profitable to introduce a major method change in established collieries with a brief remaining life-span. Considering the South African coal-mining industry as a whole, the labour-intensive hand-loading methods have declined from accounting for about 95% of total production in 1955, to 60% in 1965, to 40% in 1975. Conventional mechanised mining is now the most important method, and open-cast mining accounts for a small but growing proportion. The reasons for the long-run trend towards greater mechanisation are mainly technical. African wage levels probably did not play a major part until the rapid increases which occurred in the 1970s. Unskilled wages rose closely in line with wages in gold mining, with which the smaller coal industry competes for labour. However, the increased risk involved in relying on foreign labour was no less responsible than the increased wages for the recent greater emphasis on mechanisation.

There are two potential non-technical impediments to extensive mechanisation in the mining of both gold and coal. The more mechanised are mining methods, the fewer unskilled and the more semi-skilled and skilled workers are required. This creates the danger that new jobs will be closed to Africans by the powerful White miners' union if it fears that the jobs or safety of members are threatened. However, in the new open-cast coal mines nearly all drivers of earth-moving equipment are Black and the simpler parts of artisan

jobs have been Africanised. The blasting certificate is monopolised by Whites, but the more mechanical coalmining methods involve less blasting. The other impediment is the Government policy of limiting the permanent settlement of African miners and their families near the mines, the official maximum being 3% of African employment. Mechanisation means that greater stabilisation of labour is needed if training and skill acquisition are not to be wasted. For instance, unskilled and semi-skilled production labour - traditionally the main occupation of migrants - accounts for some 70% of employees in unmechanised mines but for less than 20% of employees in capital-intensive, surface mines.<sup>1/</sup> The mining industry has an incentive to press for the permanent settlement of a higher proportion of South African miners, and to pay these workers enough to support their families in township conditions. Thus wage increases can both cause and be caused by mechanisation.

Certain types of agriculture provide considerable scope for a choice of techniques which is sensitive to wage levels. Consider the sugar-growing industry, in which the recent behaviour of wages has provided the incentive to mechanise. Until recently the harvesting of sugar cane has been a labour-intensive operation involving cane cutters, stackers and loaders. However, mechanisation has been rapidly introduced, and the process is continuing. The first operation to be mechanised extensively was loading, by means of mechanical "grab-loaders". The stacking operation can also be mechanised through the use of "push-pilers", provided that the land is sufficiently flat and free of rocks. A push-piler stacks some 90 times more than a labourer does in a day. The most difficult and least profitable operation to mechanise is cutting. All three operations can be done simultaneously by one machine, the "chopper harvester" which is used in Australia. At the 1975 wage levels this method remained unprofitable for the South African industry. However, there are intermediate degrees of mechanisation. Indigenous and imported machines have recently been developed, which cut the cane, or cut and stack. These are not as capital- or skill-intensive as the chopper harvester, and can be operated by a tractor driver. They are also more versatile in that they operate on greater slopes and do not require as great a minimum scale of production. Provided that this machinery can be adapted to the hilly terrain of the sugar belt, the prospects

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1/ R.P. Plewman, "Minerals and manpower", Journal of the South African Institute of Mining and Metallurgy, October 1974, pp.57-8.

of its general acceptance by the large producers are good. Planting and transloading operations also provide scope for varying degrees of mechanisation.

On a large sugar estate in 1972 the single operation using most labour was weeding. In 1975 labour inputs in weeding were down to 44% of the 1972 level. This reduction was achieved by using chemicals. Chemical weeding was made more profitable than manual weeding by a combination of improved chemicals and higher wages. The same estate, although its slopes made it less amenable to mechanisation than most, was able to reduce its African employment by a quarter between the 1970/71 and 1974/5 seasons while maintaining production.

The timber industry is another which offers great scope for mechanisation. Consider the methods of timber extraction on the estates of a large timber company. This involves a series of operations: the timber is felled, sawn, debarked, carried to the roadside, loaded onto lorries, offloaded, and loaded onto railway trucks. In 1965 all these operations were manual except offloading which was done mechanically. Up to 1972 the only change was that 40% of felling and sawing was done with chain saws. By 1975 all felling and sawing was done with chain saws, and 40% of loading onto lorries and 80% of loading onto railway trucks was mechanised. There is great scope for further mechanisation along the lines used in developed countries. The most automated machine is the mechanical harvester which clips the trees off, debranches them, slices them into log lengths, and debarks them, all automatically. But there are intermediate possibilities. For instance, the company is experimenting with a mobile debarking machine which could have important implications for employment. Debarking is very labour-intensive and accounts for a quarter of the African labour force. Considering the machinery recently introduced: the crane loader (loading onto lorries) replaces 5 workers by 1, the front-end loader (loading onto railway trucks) replaces 48 workers by 1, and the replacement of cross-saws by chain-saws means that 2 people do the work of 12.

In 1973 African wages on the company estates were doubled, and this provided the stimulus for accelerating mechanisation and making other economies in the use of labour. For instance, at the doubled wages mechanised loading became cheaper than hand loading. The company was able to reduce African employment by about 40% in response to the wage increases. In addition to

the mechanisation of felling, sawing and loading, this was done by getting more work out of those remaining. The company had allowed the allotted daily "tasks" to be reduced to compensate for an increasing dislike of arduous unskilled work among Africans and the growing opportunities for industrial employment in the area. After the increase in wages the size of tasks was increased by between 20 and 30%. The mechanisation occurring in the timber industry has meant a big change in the sort of labour required. Much less unskilled labour is used and there is an expanded need for Africans trained in the operation and maintenance of machines.

The scope for mechanisation in South African agriculture suggested by the examples taken from the sugar and timber industries is confirmed in the Marais report of 1970.<sup>1/</sup> There has been some mechanisation in the post-war period, e.g. the number of tractors increased from 48 000 in 1950 to 210 000 in 1969. However, mechanisation caused an increase in production but not an absolute decrease in employment. For instance, the tractor replaced oxen rather than labour. It made possible the ploughing of larger areas and enabled planting at the right time and improved fertilisation. This increased production and hence increased the employment of harvesting labour. The partial introduction of combine harvesters in maize production reduced the need for casual labour during the harvesting season. However, mechanical harvesting, although feasible for a number of crops, is not in general use in South Africa. The commission considered that many farmers could, with proper application of cultivation methods and mechanisation, undoubtedly manage with considerably less labour.<sup>2/</sup> It is partly a matter of changing attitudes and improving management so that labour is not wastefully used. It is also partly a matter of training labour to handle mechanical equipment; here farmers may hold back for fear that trained labour is more able and anxious to leave agriculture. Despite these and other obstacles, in dealing with the summer rainfall cropping region the commission could conclude that, with the possibility of future labour shortages and higher wages, '... agriculture has now arrived at the eve (sic) of important new developments in the field of agricultural mechanisation and labour'.<sup>3/</sup>

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1/ Republic of South Africa, Second Report of the Commission of Inquiry into Agriculture, R.P.84/1970, Ch.10.

2/ Ibid., p.161.

3/ Ibid., p.168.

One conclusion of these case studies of managerial responses to wage increases makes it difficult to obtain satisfactory econometric estimates of the elasticity of demand for unskilled labour. More important for the theme of this paper: it seems that the scope for economising on relatively unskilled labour in gold mining is limited in the short run and greater but unpredictable in the long run. On the other hand, there is evidence of a large employment response in sugar and timber, where wages have risen recently, and probably there is considerable scope for economising on labour in most types of White agriculture should farm wages rise rapidly and relatively unskilled labour become scarcer. Whether it will become generally scarcer - the key question of the paper - cannot be answered conclusively. The evidence gathered is consistent with specific shortages but continuing general surplus.