

Southern Africa Labour and Development Research Unit

THE STRUCTURE OF LABOUR SUPPLY IN THE
WESTERN CAPE :
SOME EXPECTATIONS OF THE LABOUR SITUATION
IN THE YEAR 1990 AND THE YEAR 2000

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THE STRUCTURE OF LABOUR SUPPLY IN THE WESTERN CAPE : SOME EXPECTATIONS
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Introduction

The scope of this study may be delimited in two ways at the outset:

(a) it concerns itself with the region consisting of 19 magisterial districts in 1980: Bellville, Ceres, Goodwood, Hopefield, Cape Town, Kuils River, Malmesbury, Montagu, Paarl, Piketberg, Simonstown, Somerset West; Stellenbosch, Strand, Tulbagh, Vredenburg, Wellington, Worcester and Wynberg. Throughout the analysis the region will be treated as a unit;

(b) it will take into consideration five variables: race (inevitably in South Africa), sex, age, educational level and economic activity status. Five-year age cohorts are used while six educational levels are distinguished: nil, special and primary, Std. 6, Std. 7, Std. 8, Std. 9, Std. 10 or higher. The focus here, then, is on secondary education; the justification for this is that the median educational level of both the male and female labour supply is estimated or projected to fall in the secondary range in 1980, 1990 and 2000. In view of the current interest in the high level manpower question, consideration of tertiary education is also of importance but this would require rather different methods from those used here and therefore has not been attempted. Two economic activity statuses are distinguished: active (which refers to people who are working or seeking work i.e. the employed plus the unemployed) and inactive (school children, housewives, the retired, the disabled etc.).

An early caveat is also necessary: while it is one of the achievements of economic theory to have effected a sharp conceptual distinction between supply and demand, regional projections of labour supply over the next twenty years ought to take demand conditions into account. This is for three main reasons:

- (a) migration into any region will depend on the demand for labour there or, more accurately, the demand there relative to that in the rest of the country. So one really needs both national and regional demand projections (and for that matter national supply projections) to make properly informed migration and hence regional population projections;
- (b) when making educational projections, one needs to have as a control an idea of the evolution of the occupational (hence educational) structure of demand. Supply all the educational services you will, people (other than a small minority who regard education as a consumption rather than a predominantly investment good) cannot be expected to use them unless they expect their prospects in the labour market to be enhanced by doing so. The indications are at present that certainly at the tertiary level and to some extent at the secondary level (though less here than ten years ago) the pressure of demand is such as to keep the rate of return on educational investment high, but this is not a condition that can simply be assumed to persist for the next two decades;
- (c) while supply and demand are distinct concepts, the economist is in the habit of bringing them into some relation. This need not, in my opinion, be such that there is no unemployment, for instance, but if there is unemployment of a substantial kind, the effect of that on activity rates needs to be considered. In other words, if an initial set of activity rates leads to high estimates of unemployment, there may be a case for revising those rates downward. This is an example of what in general must be considered a fully adequate procedure for supply projections: start out with a series of conjectures about the factors which influence both supply and demand and see what the outcomes are. If there are serious mis-matches adjust the conjectures until these are eliminated. Projection is thus to be conceived of as an iterative technique.

It is therefore also a lengthy one. Given the state of the art and the time available to me for this study, I have not been able to tackle the demand side of the problem at all. The estimate presented must therefore be considered merely as an initial supply conjecture.

The rest of the study will be divided into four parts:

- (a) demographic projections for the region;
- (b) educational outputs over the period 1970-2000; the educational levels of people over 20 in 1970 will be taken from the 1970 Population Census;
- (c) economic activity rate projections;
- (d) a consideration of the interaction between economic activity rates and education, leading to projections of the economically active population by educational level.

Demographic Projections

The starting points here are the 1970 Population Census, the preliminary reports of the 1980 Population Census and Professor Sadie's Projections of the South African Population (Johannesburg, IDC, 1973). All our censuses have under-enumerated the population to some extent; throughout this study Sadie's estimates for the period 1970-2000 will be accepted as the correct account at the national level. By comparing the 1970 Census figures with Sadie's 1970 figures a set of race, sex and age specific census correction multipliers can be obtained. These are then applied to regional census figures to obtain the composition of the Western Cape population in 1970. Age distributions from the 1980 Census have not yet been published, so in this case the best one can do is obtain race and sex specific multipliers at the national level from comparisons of the two relevant sources and apply these to region race-sex

totals.¹ Assuming that Sadie's national fertility and mortality rates apply to the region it is possible to project the 1970 regional population estimates forward to 1980; the difference between these projected estimates and the figures obtained by adjusting 1980 census results represents net emigration (1970-1980) if positive and net immigration if negative. It was found that there was a small white immigration (8% of the 1980 total for men, 6% for women) a smaller emigration of Coloured people (2% for men, 1% for women), and an immigration of Asians which is larger in percentage terms but very small in numbers because Asians form such a small part of the Western Cape population while the largest immigration both in percentage and numerical terms has been of Africans (27 000 men or 22%, 31 000 women or 51%) in spite of an official policy of discouragement.

Net emigration and immigration totals can (and certainly do in the case of Africans) conceal migration in different directions among people in different age-cohorts. For Whites, Coloureds and Asians where total net movement has been quite small I shall assume that this has not been the case. This makes it possible to generate estimates of the actual 1980 age distributions for people of these races and either sex by prorating² the projected 1980 distribution. In the case of Africans the best one can do is prorate the 1970 distribution which, of course, is a compound of the fairly normal demographic profile of the settled urban population and the people of working age resident in the region either on a contract worker basis or illegally. Instead of the latter group growing older in the Western Cape without migration, older members migrate away and younger replacements immigrate.

In order to project the population forward to 1990 and 2000, the following assumptions were made:

- (a) Whites. National fertility and mortality rates were used to project the population to 1990, 5% was added across the board to the 1990 estimates to

allow for white immigration over the period 1980-1990 and the resultant age-sex distribution was projected to 2000. No immigration adjustment was made to the figures for 2000.

- (b) Coloureds and Asians. 1980 estimates were projected forward to 1990 and 2000 with no allowance for migration in any cohort.
- (c) Africans. Here a different procedure was used. The total male population was projected to 1990 and 2000 assuming the growth rate during 1980-1990 and 1990-2000 will be the same as from 1970 to 1980. The age distribution was obtained by prorating the 1970 distribution in either case. The total female population was obtained by assuming that there would be 135 males for every 100 females in 1990 and 2000 (the ratios were 248 in 1970 and 158 in 1980). The age distribution was obtained by the same procedure as used for males. These assumptions amount to assuming that controls on African influx into the region will continue to apply over the next twenty years but not with the severity that drove the masculinity ratio for Africans to the very high level of 1970. The assumed masculinity ratio for 1990 and 2000 is close to that for Africans in all urban areas (outside the homelands) in South Africa in 1980. It is open to question whether influx control in its present form can be maintained for the next twenty years (indeed, I hope it cannot); if it cannot a greater growth of the African population in the region must be expected, though it will not be possible to answer the question 'how much greater?' until the rules of the new game are known.

The estimates of the size of the population by race, sex and age in 1980, 1990 and 2000 are reported in Table I.

TABLE I :

Population of the Western Cape, 1980, 1990 and 2000

	Whites			Coloureds			Asians			Africans		
	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000
MALES												
0-4	36311	36565	41178	107088	133701	162120	1112	1176	1243	10677	13794	178
5-9	35285	36855	38103	94461	118767	146224	940	1163	1179	8729	11277	14
10-14	27248	37960	36452	76997	104805	131568	766	1105	1172	7401	9561	12
15-19	25940	36827	36693	69177	93330	117605	786	935	1159	9778	12632	16
20-24	25668	28254	37593	57256	75365	102905	899	760	1099	15209	19648	25
25-29	24995	26721	36218	47958	66681	90376	874	776	925	17320	22375	28
30-34	26215	26391	27722	40799	54512	72166	685	883	749	17453	22547	29
35-39	22205	25577	26113	31938	45095	63096	553	850	757	17073	22056	28
40-44	18786	26481	25488	27260	37512	50525	430	652	844	16139	20849	26
45-49	15549	21952	24217	22340	28365	40465	405	510	788	11694	15107	19
50-54	14505	17971	24318	16875	23092	32198	307	377	577	7404	9565	12
55-59	13520	14448	19283	12350	17863	23006	271	331	422	3642	4705	60
60-64	10686	12303	14725	8749	12522	17411	164	228	285	2909	3758	48
65+	22938	26047	27810	13516	17732	25390	227	344	468	1952	2521	32
Total	319851	374352	415913	626764	829342	1075055	8419	10090	11667	147380	190395	2459
FEMALES												
0-4	35131	35957	40558	109739	133598	162150	1077	1163	1231	14721	22231	287
5-9	34204	36308	37556	94826	118618	146124	912	1152	1169	12773	19288	249
10-14	25754	36788	35899	78023	107550	131572	761	1072	1160	11654	17598	227
15-19	24427	35838	36261	71105	94050	117860	760	909	1150	8851	13366	172
20-24	24307	26945	36692	59288	77181	106638	792	756	1069	8286	12513	161
25-29	25082	25505	35677	50195	69922	92841	868	754	905	6796	10263	132
30-34	25310	25356	26781	41983	57915	75798	567	784	750	6211	9379	121
35-39	21469	26089	25289	29839	48665	68261	405	857	747	5876	8873	114
40-44	18209	26184	25047	29635	40250	56031	382	555	773	5388	8136	105
45-49	15956	22025	25595	24593	28174	46490	365	392	839	4347	6564	84
50-54	15794	18426	25396	18813	27422	37781	302	363	535	3136	4736	61
55-59	14689	15813	20974	14032	22152	25811	239	331	363	1931	2916	37
60-64	13176	15162	17032	11063	16213	24143	151	250	307	1618	2443	31
65+	35620	41911	45134	19893	27939	42932	172	333	540	1807	2728	35
Total	329128	388307	433891	653027	869657	1134432	7753	9671	11538	93395	141034	182

The following summary statistics can be extracted from Table I:

- (a) The total population of the region is estimated at 2,17 million in 1980, 2,81 million in 1990 and 3,51 million in 2000. These figures imply an average annual compound growth rate of 2,64% during 1980-1990 and 2,24% during 1990-2000 (as compared with 2,71% during 1970-1980). The projected drop in the population growth rate is the result of projected declining fertility and a projected end to white immigration during 1990-2000; these factors are partially offset by African immigration and if this is much greater than projected the decline in the growth rate could be reversed.
- (b) Whites are estimated to form 29% of the regional population in 1980 and 24% in 2000. The share of Coloured people is projected to rise from 59% to 63% and that of Africans from 11% to 12%. Asians make up just under 1% throughout.

Educational Projections

The next (and most difficult) task is to distribute the race-sex-age cohorts between the six educational levels already distinguished. This distribution will be carried out only for the ten cohorts between the ages of 15 and 64 and several assumptions will be needed to get to that point. Assumption 1 is that people get all the primary and secondary schooling they are going to get by the age of 20. This, of course, is not quite true given the existence of correspondence colleges and the like and there are some people (especially Africans) still at school in their early twenties, but there is no reason to suppose that either of these factors will lead to serious error.

Assumption 2 is that mortality does not vary with educational level within a specific cohort so that, for instance, a 20-24 age cohort is assumed to have the same distribution of educational levels within it now as it will have 20 years later (now aged 40-44) although the total size of the cohort will have

diminished slightly. The assumption is less likely to be true the closer to 60-64 the cohort gets; those with lower education will have had a physically harder life with less access to and knowledge about health care etc. But, with the possible exception of the two top age categories, this assumption is not expected to introduce substantial error.

Assumption 3 concerns the equality of national and regional distribution of educational levels. The major reason I can see for supposing that school education might be better or worse in the Western Cape than elsewhere is a departure of the rural-urban distribution from the national average. According to the 1980 census preliminary figures the proportion of whites living in rural areas in the region was 5,4%, of Coloured people 16,1% and of Asians 0,6% - these figures are a little lower than the respective national averages and to that extent one might expect school education here to be a little better than I am going to assume. The position for Africans is quite different, of course; the proportions who live in rural areas here is only 12,9%, much lower than the national average. A better reference group would be urban Africans only and this will be used in the rather rough and ready African projections.

Assumptions 1, 2 and 3 mean that one can take the distribution of educational levels for all cohorts aged 20 and over in 1970 from the 1970 Population Census adjusting total cohort size in accordance with the regional population estimates of Table I. For all the other cohorts one will have to consider the output of the educational system between 1970 and 2000. How is this to be done?

The approach used is as follows: consider the progress over a five year period of cohorts aged 5-9, 10-14 and 15-19 at the beginning of the period. (The cohort aged 0-4 will still be entering school throughout the period and so is ignored). The following things can happen in each of the cohorts:

(a) 5-9

Some children may never get to school, or have to go to a special school (for the physically or mentally handicapped) or drop out of primary school. Denote the proportion in these categories by P_N^1 ; the remainder P_S^1 remain in conventional schools at the end of five years.

(b) 10-14

Of the children who are at school at the outset some may drop out at the primary school level (proportion P_N^2) or during or at the end of Stds. 6, 7, 8 and 9 (proportions $P_6^2, P_7^2, P_8^2, P_9^2$) or leave during or at the end of Std. 10 (P_{10}^2) or remain in school (P_S^2) at the end of the period.

(c) 15-19

Of the children who are at school at the outset some may drop out at the primary school level (proportion P_N^3) or during or at the end of Stds. 6, 7, 8 and 9 (proportions $P_6^3, P_7^3, P_8^3, P_9^3$) or leave during or at the end of Std. 10 (P_{10}^3). By assumption 1 there will be none left in school at the end of the period.

Consider a cohort aged 5-9 passing through 15 years where the proportions are as indicated above. Then the proportions of people finally ending up with the various educational levels will be

$$T_N = P_N^1 P_S^1 + (P_N^2 + P_S^2 P_N^3)$$

$$T_i = P_S^1 (P_i^2 + P_S^2 P_i^3) \quad \text{for } i = 6, 7, 8, 9, 10$$

and since the P's with the same superscript add up to one, it follows that the T's will also do so.

It remains to find a procedure for estimating the P's. Assumption 3 enables us to use national figures for our regional projections; for Whites, Coloureds and Asians these are obtained from the educational reports of the Department of Statistics for 1970-75 which crosstabulate enrolments in various classes with

age of pupils. In conjunction with Sadie's population figures the distribution of enrolments in each age cohort in each year and the proportions not at school can be found. Now comes the trick: project a distribution a year forward assuming everyone at school (except, of course, Std. 10s who leave) moved up a year, making an allowance for mortality (which consists by Assumption 2 of multiplying all figures by a constant equal to the fifth root of the survival ratio) and compare it with the actual distribution of the next year. Subtract the projected vector from the actual one; in years after school entry has ceased there will be a positive entry under 'not in school' and a combination of positive and negative entries elsewhere reflecting the combination of drop out and failure patterns. The sum of these entries will be negative and equal in magnitude to the positive 'not at school' entry; since this is an increment it represents the number of drop outs plus Std. 10 exits. Unfortunately no information is given to enable us to distinguish failures from drop outs, so I have distributed the latter proportionately among the negative entries in the difference vector remembering, of course, that a failure to appear in Std. 8, say, represents a drop out from Std. 7. Drop outs and Std. 10 exits comprise the output of the educational system and can be summed over five year periods. These sums yield the information we need.

This gives us a set of P's for 1970-75. If one can project the P_N 's and P_S 's (which I have assumed constant or slightly falling in the case of the P_N 's and constant or slightly rising in the case of the P_S 's) one can use expectations about secondary school survival rates to obtain all the remaining P's. Starting with white projections, I have assumed that Asians will be in 2000 where whites will be in 1985 and that Coloureds will be in 2000 where whites were in 1970. I have also assumed that half (or all, in the case of whites) the gap between males and females found in 1970 will have closed by the year 2000. Table II details the survival rate assumptions.

TABLE II : Secondary School Survival Rate Assumptions in 1995-2000 Compared with Actual Rates, 1970-75

	Whites				Coloureds				Asians			
	M	F	M	F	M	F	M	F				
	1970-1975	1995-2000	1970-1975	1995-2000	1970-1975	1995-2000	1970-1975	1995-2000	1970-1975	1995-2000	1970-1975	1995-2000
Std.6	1000	1000	1000	1000	1000	1000	1000	not explicitly calculated	1000	1000	not explicitly calculated	not explicitly calculated
Std.7	990	995	969	985	685	895	669		875	991		
Std.8	923	950	891	950	459	820	485		742	940		
Std.9	730	833	654	822	256	615	134		500	832		
Std.10	594	750	520	750	132	490	78		338	720		

Having found the educational distribution for Whites, Coloureds and Asians and for the older African cohorts (from urban African data in the 1970 Population Census), it was assumed that African female education in the Western Cape will have reached the level of Coloured female education in 2000 while the level of African male education will lag about ten years behind its Coloured counterpart.³

The results of these projections are set out in Table III. Since our ultimate objective is to estimate the distribution of educational levels among the labour supply, Table III, as an intermediate result, will not be commented on.

Projections of Economic Activity

Activity rate projections are difficult to make since the propensity of people to work as incomes rise over time is notoriously unpredictable. In general I shall assume constant activity rates except for the 15-19 age group where they will certainly drop with a rising proportion of the cohort staying

TABLE III : Distribution of Educational Levels among the Population aged 15-64 and not Still at School, of the Western Cape, 1980, 1990 and 2000

	MALES							FEMALES						
	N	6	7	8	9	10+	T	N	6	7	8	9	10+	T
a) WHITES														
1980	5484	23156	14564	39426	15353	87678	185481	5834	22576	15745	50075	14447	78785	1876
%	3,0	12,5	7,9	21,1	8,3	47,2	100,0	3,1	12,0	8,4	26,7	7,7	42,1	
1990	5842	22756	14767	41846	19847	113321	218379	5865	19204	16117	52181	18258	109050	22067
%	2,7	10,4	6,8	19,2	9,1	51,8	100,0	2,7	8,7	7,3	23,6	8,3	49,4	
2000	6248	23516	14211	41171	23132	144946	253224	5977	17622	15148	50108	21379	147053	25728
%	2,5	9,3	5,6	16,3	9,1	57,2	100,0	2,3	6,8	5,9	19,5	8,3	57,2	
b) COLOURED														
1980	178723	51706	27892	24199	10785	18222	311527	195819	55854	23713	35574	5084	12940	32898
%	57,3	16,6	9,0	7,8	3,5	5,8	100,0	59,6	17,0	7,2	10,8	1,5	3,9	100,0
1990	200224	64283	39371	41730	21828	50572	417958	218785	73606	35549	66657	11726	42346	44860
%	47,9	15,4	9,4	10,0	5,2	12,1	100,0	48,8	16,4	7,9	14,9	2,6	9,4	100,0
2000	207398	72801	48322	69328	39089	120951	557889	225173	85052	45894	110762	24726	110805	60321
%	37,2	13,0	8,7	12,4	7,0	21,7	100,0	37,3	14,2	7,6	18,4	4,1	18,4	100,0
c) ASIANS														
1980	1439	1052	453	735	413	942	5034	2392	693	309	506	206	493	459
%	28,6	20,9	9,0	14,6	8,2	18,7	100,0	52,0	15,1	6,7	11,0	4,5	10,7	100,0
1990	1247	946	549	927	587	1608	5864	2288	772	433	726	334	1040	559
%	21,3	16,1	9,4	15,8	10,0	27,4	100,0	40,9	13,8	7,7	13,0	6,0	18,6	100,0
2000	1125	720	601	1054	765	2754	7019	2073	749	532	928	502	2100	688
%	16,0	10,3	8,6	15,0	10,9	39,2	100,0	30,1	10,9	7,7	13,5	7,3	30,5	100,0
d) AFRICANS														
1980	88181	13768	4049	4899	2356	2922	116175	30571	8299	3212	4964	1181	1586	4981
%	75,9	11,9	3,5	4,2	2,0	2,5	100,0	61,3	16,7	6,4	10,0	2,4	3,2	100,0
1990	101448	19217	7258	8681	4633	8208	149445	37028	12430	5632	10686	2342	6342	7446
%	67,8	12,9	4,9	5,8	3,1	5,5	100,0	49,7	16,7	7,6	14,4	3,1	8,5	100,0
2000	110451	25400	12016	15478	8749	19930	192024	35799	13994	7210	17439	4115	16647	9520
%	57,4	13,2	6,3	8,1	4,6	10,4	100,0	37,6	14,7	7,6	18,3	4,3	17,5	100,0

at school. In general, too, I shall assume a slight decline in the activity rate for the oldest age group. Notes on estimates for specific races follow:

(a) Whites

1970 activity rates are taken at 8% below 1970 Population Census levels. This reduction is necessary; without it white unemployment rates during the 1970s becomes implausibly high. 25-44 age group rates are taken as constant to 2000; the others decline slightly.

(b) Coloureds

1970 activity rates are taken from the Theron Commission's report. 1980 male rates are lower in the 15-19, 20-24 and 60-64 cohorts, reflecting an average rate reported by the Current Population Survey slightly lower than that based on the 1970 Population Census. Female rates are appreciably higher according to the Current Population Survey than they were in 1970. This is corroborated by the Theron Commission report prediction of a shortage of female Coloured labour on the assumption of the old rates. Female rates are therefore increased across the board for 1980; thereafter rates in the 15-24 cohorts are assumed to decline.

(c) Asian

1970 male Asian rates are reduced for the same reason that white rates were. They are reduced to white levels in the 25-64 cohorts, and left alone in the 15-24 cohorts. Because the 15-19 rate in 1970 was so low it was not reduced further but the 20-24 and 45-64 cohorts are assumed to display slightly declining activity from 1970. Activity rates for Asian females were very low in 1970 and these are assumed to rise somewhat in the period 1970-2000.

(d) Africans

Here activity rates for metropolitan Africans taken from the Current Population Survey (March 1980) are used. A slight decline for males 15-24 and females 20-24 is projected for 1990 and 2000.

The rates used are shown in Table IV. These are national rates but they will be used in the regional projections. Economically active persons outside the 15-64 age range are ignored.

Principal features of Table V are:

(a) Total economically active population is projected to rise from 826 000 in 1980 to 1 042 000 in 1990 (an average annual, compound growth rate of 2,35%) and to 1 305 000 in 2000 (implying a growth rate of 2,27% p.a. between 1990 and 2000).

(b) Throughout the period 1980-2000 men are expected to constitute two-thirds of labour supply.

(c) As in the case of population as a whole the proportion of whites in labour supply is expected to drop and those of Coloured people and Asians is expected to rise. Whites, Coloureds and Asians are a slightly smaller proportion of labour supply than of population; the reverse, of course, is true for Africans.

Interaction Between Activity Rates and Education

The final aim of this study is to produce an analysis of labour supply in terms of educational level. One way of arriving at estimates would be to assume that the distribution of educational levels is the same in the labour supply as in the population as a whole for each race-sex-age cohort, but this would be to assume that there is no interaction between activity rates and educational level which may well not be true.

TABLE IV : Activity Rates by Race, Sex and Age Group 1980, 1990 and 2000 (percent)

	Whites			Coloureds			Asians			Africans		
	1980	1990	2000	1980	1990	2000	1980	1990	2000	1980	1990	2000
MALES												
15-19	31,9	28,4	25,0	61,3	48,3	35,3	8,5	8,5	8,5	37,0	36,5	35,3
20-24	81,4	80,7	80,0	89,0	85,5	82,1	84,4	82,9	81,4	} 89,1	} 85,6	} 82,1
25-29	} 90,5	} 90,5	} 90,5	94,7	94,7	94,7	} 90,5	} 90,5	} 90,5			
30-34				94,7	94,7	94,7				} 95,1	} 95,1	} 95,1
35-39	} 91,0	} 91,0	} 91,0	94,4	94,4	94,4	} 91,0	} 91,0	} 91,0			
40-44				94,2	94,2	94,2						
45-49	} 85,8	} 85,4	} 85,0	92,0	92,0	92,0	} 85,8	} 85,4	} 85,0	} 88,8	} 88,8	} 88,8
50-54				91,2	91,2	91,2						
55-59	} 85,8	} 85,8	} 85,8	85,8	85,8	85,8	} 72,4	} 72,4	} 72,4			
60-64				66,8	63,4	60,0						
FEMALES												
15-19	28,5	26,7	25,0	55,0	42,5	30,0	5,9	6,8	7,6	16,0	16,0	16,0
20-24	53,2	53,2	53,2	60,0	55,0	50,0	29,8	32,4	35,0	} 66,7	} 62,8	} 62,0
25-29	} 33,9	} 33,9	} 33,9	55,0	55,0	55,0	} 20,8	} 22,9	} 25,0			
30-34				50,0	50,0	50,0				} 76,8	} 76,8	} 76,8
35-39	} 34,6	} 34,6	} 34,6	50,0	50,0	50,0	} 16,4	} 18,2	} 20,0			
40-44				45,0	45,0	45,0						
45-49	} 27,5	} 26,3	} 25,0	45,0	45,0	45,0	} 9,7	} 9,9	} 10,0	} 57,6	} 57,6	} 57,6
50-54				35,0	35,0	35,0						
55-59	} 28,2	} 28,2	} 28,2	28,2	28,2	28,2	} 37,6	} 37,6	} 37,6			
60-64				16,4	16,4	16,4						

Table V presents the estimates of the economically active population by race, sex and age which results from the application of Table IV to Table I.

TABLE V :

Estimates of the Economically Active Population in the Western Cape, 1980, 1990 and 2000

	1980					1990					2000				
	Whites	Col.	Asian	African	Total	Whites	Col.	Asian	African	Total	Whites	Col.	Asian	African	Total
MALES															
15-19	8275	42406	67	3618	54366	10459	45078	79	4611	60227	9173	41515	99	5761	56548
20-24	20894	50958	759	13551	86162	21716	64437	630	16819	103602	30074	84485	895	20839	136293
25-29	22620	45416	791	15432	84259	24183	63147	702	19153	107185	32777	85586	837	23732	142932
30-34	23725	38637	620	16598	79580	23884	51623	799	21442	97748	25088	68341	678	27701	121808
35-39	20207	30149	503	16236	67095	23275	42570	774	20975	87594	23763	59563	689	27097	111112
40-44	17095	25679	391	15025	58190	24098	35336	593	19410	79437	23194	47595	768	25076	96633
45-49	13341	20553	347	10887	45128	18747	26096	436	14065	59344	20584	37228	670	18169	76651
50-54	12445	15390	263	6575	34673	15347	21060	322	7920	44649	20670	29365	490	10973	61498
55-59	11600	10596	233	3234	25663	12339	15326	283	4178	32126	16391	19739	359	5397	41886
60-64	9169	5844	141	2106	17260	10507	7939	195	2721	21362	12516	10447	242	3515	26720
Total	159371	285628	4115	103262	552376	184555	372612	4813	131294	693274	214230	483864	5727	168260	872081
FEEMALES															
15-19	6962	39108	45	1416	47531	9569	39971	62	2139	51741	9065	35358	87	2763	47273
20-24	12931	35573	236	5527	54267	14335	42454	245	7858	64892	19520	53319	374	10022	83235
25-29	8503	27607	181	4533	40824	8646	38457	173	6445	53721	12095	51063	226	8220	71604
30-34	8580	20992	118	4770	34460	8596	28958	180	7203	44937	9079	37899	188	9305	56471
35-39	7428	14920	66	4513	26927	9027	24333	156	6814	40330	8750	34131	149	8804	51834
40-44	6300	13336	63	3836	23535	9060	18113	101	5793	33067	8666	25214	155	7484	41519
45-49	4388	11067	35	3095	18585	5793	12678	39	4674	23184	6399	20921	84	6038	33442
50-54	4343	6585	29	1806	12763	4846	9598	36	2728	17208	6349	13223	53	3524	23149
55-59	4039	3957	23	1112	9131	4159	6247	33	1680	12119	5244	7279	36	2170	14729
60-64	3623	1814	15	608	6060	3988	2659	25	919	7591	4258	3959	31	1187	9435
Total	67097	174959	811	31216	274083	78019	223468	1050	46253	348790	89425	282366	1383	59517	432691
Total M & F	226468	460587	4926	134478	826459	262574	596080	5863	177547	1042064	303655	766230	7110	227777	1304772
% M	70	62	84	77	67	70	63	82	74	67	71	63	81	74	67
% F	27	38	16	23	33	30	37	18	26	33	29	37	19	26	33

In order to test for such an interaction the relevant five-way tables from the 1970 Population Census were considered (national urban and rural for whites, Coloureds and Asians, national urban for African). Four age groups (25-34, 35-44, 45-54 and 55-64) were considered, the assumption being that all secondary and virtually all tertiary education is complete by age 25. Each race and either sex were considered separately so eight three-way tables were analysed, the three dimensions being age (A-4 levels), economic status (P-2 levels active/inactive) and education (E-6 levels). Multidimensional contingency table analysis was applied in the same way to each of these tables by fitting the model A, PE i.e. by getting the best fit to the original table employing the unsaturated log-linear model

$$\ln F_{ape} = \theta + \lambda_a + \lambda_p + \lambda_e + \lambda_{pe}$$

(where F_{ape} is the frequency in cell ape),

which allows for main effects and an interaction between education and participation. The non-interaction hypothesis is that $\lambda_{pe} = 0$ for all levels

I do not propose to report directly on the levels of λ_{pe} , but to compare two quantities: the supply of labour with the measured interaction present and the supply of labour assuming no interaction. Let S_e denote the first, S_e' the second for each educational level, let P_{ae} denote the number of people in age-group a with education e and let w denote economically active and x economically inactive. Then

$$\begin{aligned} S_e &= \sum_a P_{ae} \frac{F_{awe}}{F_{awe} + F_{axe}} \\ &= \sum_a P_{ae} \frac{e^{\theta + \lambda_a + \lambda_w + \lambda_e + \lambda_{we}}}{e^{\theta + \lambda_a + \lambda_w + \lambda_e + \lambda_{we}} + e^{\theta + \lambda_a + \lambda_x + \lambda_e + \lambda_{xe}}} \end{aligned}$$

From the standard restrictions on the λ 's in the loglinear model

$$\lambda_w + \lambda_x = 0 \quad \lambda_{we} + \lambda_{xe} = 0 \quad \text{for all } e, \text{ so}$$

$$S_e = \frac{1}{1 + e^{-2(\lambda_w + \lambda_{we})}} \cdot \sum_a P_{ae}$$

and by the same token

$$S'_e = \frac{1}{1+e^{-2\lambda_w}} \cdot \sum_a P_{ae}$$

so that
$$\frac{S_e}{S'_e} = \frac{1+e^{-2\lambda_w}}{1+e^{-2(\lambda_w + \lambda_{we})}}$$

This ratio is the ratio of the labour supply at education level e compared with what it would have been had there been no interaction. These multipliers can then be applied to the educational distribution given by the initial simple procedure to get a more accurate picture; in general, application of the multipliers will not preserve totals exactly, so that these are re-introduced by prorating.

Table VI sets out the multipliers (to be applied to the 25-64 age cohorts).

TABLE VI : Multipliers reflecting the impact of Education on Labour Supply,

1970

	N	6	7	8	9	10+
White males	.9063	.9865	.9984	1.0127	1.0190	1.0159
White females	.6218	.7006	.9685	1.2027	1.2697	1.3837
Coloured males	.9741	1.0002	1.0009	1.0034	1.0077	1.0052
Coloured females	.6485	.7807	.8840	1.0576	1.0834	1.4665
Asian males	.9601	1.0016	1.0020	1.0112	1.0113	.9989
Asian females	.4405	.5883	.8330	1.1436	1.2289	2.2261
African males	.9976	1.0041	1.0035	1.0004	1.0016	.9900
African females	.8019	.9463	.9451	1.0060	1.0351	1.1894

Table VI shows the multipliers to be close to one for males of all races and all educational levels, which is not surprising since nearly all men between 25 and 64 are economically active so that the distribution of education among the economically active could hardly be much different from

that among the population as a whole. The multipliers for women, however, are very far from one in most cases. Among all races they are much less than one for the least educated and increase steadily as education increases. The female labour supply therefore is considerably better educated than the female population as a whole.

Assuming the educational composition of the 15-19 labour supply cohort is the same as that part of the relevant population which has left school and assuming the 20-24 labour supply cohort has the same composition as the appropriate population, one may then arrive at the desired analysis of the labour force. This is presented in Table VII.

The following conclusions can be drawn from Table VII:

(a) in 1980 the median educational level of the male labour supply was 7,4 years (halfway through Std. 6) in 1990 it is projected to be 7,8 years and in 2000 8,7 years. The corresponding figures for females are 7,6 years, 8.5 years and 9,4 years, so that although female populations are worse educated than their male counterparts, the female labour supply as a whole is slightly better educated than the male labour supply, a consequence of the interaction just discussed.

(b) The proportion of the male supply with Std. 10 or better will have increased 60% between 1980 and 2000 (from 17,4% to 28,1%), the absolute number increasing by 150%. The proportion of the female labour supply will have doubled over the same period, the absolute number increasing by over 210%. Perhaps this reflects assumptions which imply slightly too rapid an improvement of female education in relation to male.

TABLE VII : Economically Active Population by Education in the Western Cape 1980, 1990
and 2000

	Males							Females						
	N	6	7	8	9	10+	T	N	6	7	8	9	10+	T
1980														
W	4624	19287	12546	34095	13275	75904	159371	1337	5055	4687	17533	5718	32767	67097
C	162274	47972	25934	22510	10034	16904	285628	90692	30844	14727	24593	3562	10541	174959
A	1178	905	358	594	326	754	4115	252	106	67	131	57	198	811
Af	78378	12562	3598	4216	2079	2519	103262	18286	5609	2068	3272	886	1095	31216
T	246094	80726	42346	61415	25714	96081	552376	110567	41614	21549	45529	10223	44601	274083
%	44,5	14,6	7,7	11,1	4,7	17,4		40,3	15,2	7,9	16,6	3,7	16,3	
1990														
W	4439	18500	12484	35708	17027	96397	184555	1372	4535	4491	17015	6775	43831	78019
C	176935	57951	35703	37614	19866	44543	372612	88537	35698	19481	41887	7473	30392	223468
A	998	815	452	777	486	1285	4813	208	101	81	175	88	397	1050
Af	89605	16888	6179	7516	4039	7067	131294	21369	8270	3727	7282	1637	3968	46253
T	271977	94154	54818	81615	41418	149292	693274	111486	48604	27780	66359	15973	78588	348790
%	39,2	13,6	7,9	11,8	6,0	21,5		32,0	13,9	8,0	19,0	4,6	22,5	
2000														
W	4756	19138	11981	35103	19961	123291	214230	1376	4236	4000	15538	7391	56884	89425
C	178903	64326	43038	60598	34768	102231	483864	77402	35725	21580	61162	13952	72545	282366
A	879	623	502	893	637	2193	5727	189	70	85	186	112	741	1383
Af	97559	22323	10374	13413	7627	16964	168260	19960	9136	4769	11843	2772	11037	59517
T	282097	106410	65895	10007	62993	244679	872081	98927	49167	30434	88729	24227	141207	432691
%	32,3	12,2	7,6	12,6	7,2	28,1		22,9	11,4	7,0	20,5	5,6	32,6	

(c) The proportion of the labour force which has no secondary education is, of course, projected to drop but in 2000 still nearly a third of economically active men and nearly a quarter of the women will be in this position.

Conclusion

If one approximates the increase in years of education per child implied by the educational projections by the increase in average years of education of the 15-19 cohort in 2000 over that of 1980 and if one approximates the increase in number of children by the increase in the population as a whole, then it is possible to conclude that without quality increases the educational system for whites must expand by 1,5% p.a. in real terms over the next twenty years, that for Coloureds by 4,3% p.a., that for Asians by 2,4% p.a. and that for Africans by 4,2% p.a. These rates could be increased but not by very much in the case of Coloureds and Africans especially given that quality increases are also desirable; one may start running into problems of teacher supply and it is doubtful that educational expenditures could increase faster than real gross national product over the long term. The picture which then emerges from this study is that the present situation of a rapidly growing but poorly educated labour supply will be alleviated but only slowly by a small decline in its growth rate and a somewhat larger improvement in its educational composition. Appropriate policy may improve the situation further but only within rather narrow limits.

NOTES

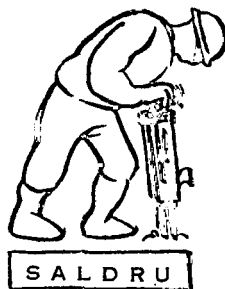
1. The multipliers for Coloured people were rather high, reflecting the possibility that fertility rates as estimated by Sadie are too great. Accordingly the multipliers actually used were half the distance from one of the originally calculated figures. Naturally, too, given the absence of 1980 census figures for Transkei, Bophuthatswana and Venda these had to be estimated assuming these areas accounted for the same proportion of homeland population in 1980 as they did in 1970.
2. Prorating is a procedure whereby a row of figures is made to add up to a total different from its original by multiplying each figure by a factor (new total divided by old total). This preserves the ratios between each figure in the row.
3. This completes the account of the principles of the method. The census-derived educational proportions mesh fairly well but not perfectly with the education statistics proportions, though there are some discontinuities where they meet. The only one I have felt obliged to adjust is the proportion of whites in category N - the figures from education statistics are implausibly high. This is because population projections and education statistics do not mesh as they should, a phenomenon perhaps having to do with the oddities of the education of young immigrants to South Africa.

SOUTHERN AFRICA LABOUR & DEVELOPMENT RESEARCH UNIT

To anybody interested in what is happening in Southern Africa at the present time, it is clear that an understanding of changes taking place in the field of labour is crucial. The whole debate about the political implications of economic growth, for example, revolves very largely around different assessments of the role of black workers in the mines and factories of the Republic. Many of the questions with which people involved in Southern Africa are now concerned relate, in one way or another, to the field generally set aside for labour economists to cultivate. The impact of trade unions; the causes of unemployment; the economic consequences of different educational policies; the determination of wage structures; the economics of discrimination; all these and more are matters with which labour economists have been wrestling over the years in various parts of the world.

At the same time there are many who would argue that these issues are far wider than can be contained within the narrow context of 'labour economics'. These issues, it is pointed out, go to the heart of the whole nature of development. In recent studies, commissioned by the International Labour Office, of development problems in Columbia, Sri Lanka, and Kenya, for example, leading scholars have identified the three crucial issues facing these countries as being poverty, unemployment, and the distribution of income. Thus the distinction between labour and development studies is becoming more blurred as economists come face to face with problems of real life in the Third World.

It is here too that an increasing number of people are coming to see that study of the political economy of South Africa must not be done on the assumption that the problems there are absolutely different from those facing other parts of the world. Indeed it can be argued that far from being an isolated, special case, South Africa is a model of the whole world containing within it all the divisions and tensions (black/white; rich/poor; migrant/nonmigrant; capitalist west/third-world; etc.) that may be seen in global perspective. Be that as it may, the fact remains that the economy of Southern Africa (for the political and economic boundaries are singularly out of line with each other) is one of the most fascinating in the world. It is one on which far more research work needs to be done, and about which further understanding of the forces at work is urgently required. It is in order to attempt to contribute to such an understanding that SALDRU is issuing these working papers.



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