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An Analysis of Employment and Wage Behavior in South Africa

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EXECUTIVE SUMMARY

South Africa faces a growing labor market crisis. In the early 1960s, over 80 percent of new labor market entrants were absorbed into wage employment. Over recent years, this proportion has fallen below 10 percent. Despite ongoing employment growth in the many forms of government within South Africa, overall employment growth has deteriorated consistently since 1970. There has been accompanied by a compositional shift in employment away from agriculture towards other sectors of the economy. Labor supply growth has, however, changed little over the past three decades, although lower net immigration has reduced growth in white labor supply. Consequently, there has been a growing imbalance over the past twenty years between the level of black labor supply and the ability of the economy to provide employment in the formal sector. The decline of the apartheid system has permitted valuable growth in the informal sector, but this has been insufficient to close the gap between black labor supply and formal employment. Unemployment has thus grown rapidly among blacks. In contrast, full employment was maintained among the white labor force up to 1985. Since then, however, white unemployment has grown significantly. It is estimated that the unemployment rate has rocketed upwards to over 20 percent of the total labor force, and has reached a much higher level among Africans. Unemployment rates of this magnitude represent a considerable waste of South Africa's resources, and are a major source of existing social unrest. To counter this, employment generation must remain very high on the policy agenda for many years to come.

There seem to be four basic reasons why South Africa has experienced ever-slower wage employment growth over the past three decades. First, despite a growing labor surplus among blacks, the prolonged collapse of apartheid and other factors such as reduced discrimination and increased bargaining power have led to continued upward pressure on black wages. This, in turn, has acted as a brake upon growth in black employment. Second, there have been other forces at work pushing the economy towards a more capital-intensive structure. While these are not explicitly identified, it is plausible that they include an emphasis on capital-intensive strategic investments in, for example, iron and steel, and petrochemicals. Third, as strong labor market discrimination accompanied by enabling legislation effectively reserved middle and upper-level jobs for whites, the supply of whites may have acted as an effective constraint on the productive capacity of the economy. Declining growth in white labor supply during the 1970s and early 1980s may then have had the effect of reducing both economic growth in general and the growth in employment of other racial groups. A fourth development arises from the increasingly severe recession experienced in South Africa since the early 1980s. While there is little evidence that South Africa is operating unusually far below its productive capacity, it seems that the recession has inhibited investment and employment growth.

Of these four factors underlying slow employment growth, only the last, i.e. the recessionary forces, may perhaps be quickly removed. South Africa will, however, remain hampered by its capital-intensive structure, and may continue to face upward wage pressure. Once the expansionary effects arising from the alleviation of the present recession are exhausted, these other inhibitory factors are likely to further slow formal employment growth. While it is true that an alleviation of the present recession followed by a restoration of capital stock growth to a higher level is likely to reduce black unemployment, the past performance of the South African economy would suggest that, unless additional measures are taken, this fall in the black unemployment rate will be rather slow.

Although the results presented in this paper lend support to the idea that black employment growth has been hampered by rising real wages, they do not accord with the

view that slow employment growth has heavily been caused by the maintenance of an artificially low real user cost of capital through low interest rates and an overvalued foreign exchange rate. There are three principal justifications for this last conclusion. First, as a lower real user cost of capital encourages both increased investment and greater capital-intensity, it will have conflicting effects upon the demand for labor. Second, while there appears to be significant substitutability in aggregate between capital and both black and white labor, such substitutability is more limited than sometimes supposed. Third, there appear to have been important structural shifts towards increased capital intensity in the South African economy that are not explained by shifts in relative factor prices. In total, the empirical results indicate that the net effect of a lower real user cost of capital is only very mildly negative in terms of its employment impact. This conclusion does not imply, however, that the maintenance of real interest rates and the avoidance of an overvalued exchange rate are inappropriate policies, but simply that they should be judged on the basis of wider criteria such as, for example, their impact upon domestic saving, resource allocation and international competitivness.

Perhaps the most important conclusion of this paper is that, to maximise productive employment growth, South Africa will need to expand the skills of its black labor force more rapidly than in the past. Otherwise, growth may be stifled by unavailability of necessary skills. This is illustrated through forward-looking scenarios distinguished according to the rate at which black workers are upgraded to white status. The key result is that scenarios under which the skills of black workers are more rapidly upgraded than in the past suggest both higher growth rates in employment and GDP and better macroeconomic sustainability than those under which no such upgrading takes place. Nevertheless, as the elimination of unemployment will take some time under even the most optimistic scenario, it would be advisable to further encourage employment growth in both the formal and informal sectors.

In the short-to-medium term, it is likely that additional employment will be generated through the implementation of special employment programs. One concern is that such programs may simply involve a redistribution of resources from other sectors of the economy. While, multiplier effects generated by such programs must be limited, given relatively little spare capacity in the economy, and increased imports are likely to stimulated, there is little evidence to believe that significant crowding-out effects would occur in the market for unskilled labor. It is nevertheless important that such schemes be located in areas where there are substantial concentrations of surplus labor. Otherwise local wage rates may be bid up to the detriment of employment outside the schemes. Care should also be taken in implementing such programs, that labor-intensive techniques be used, and that the burden on public expenditure be eased by paying wages below prevailing levels. As unskilled labor is in excess supply in South Africa, it is appropriate that such labor be valued at its shadow price. The informal sector wage may be taken as a rough guide, although a higher wage than this may be a better estimate of the shadow price of labor, as informal sector activities tend to employ many workers on a part-time basis. The special employment scheme introduced in South Africa during 1985-86, paid much lower wages than prevailing rates, and yet, there was a strong demand for places on the scheme. Success has also been achieved in implementing such schemes in other developing countries, especially when they are closely related to infrastructural developments in neglected regions.

It should be carefully investigated whether distortionary influences exist that are biased towards capital-intensive industries. The most obvious historical example is the redirection of investment in both the 1970s and 1980s towards strategic industries such as iron and steel, and petrochemicals. This process may be continuing. Past strategic investments could not to be justified under rational cost-benefit methodology, and there is no reason to believe that this does not apply to such existing investments. It also needs to be established whether the relative absence of small-scale production units in numerous sectors is also the result of policy distortion, as such small-scale units are usually more labor intensive. One mistake that should be avoided is to follow the route of discouraging the informal sector. It has been commonplace in other Southern African countries to discourage such activities through over-zealous application of municipal regulations and by denial of access to public utilities. Historically, the apartheid system discouraged the informal sector, but fortunately, this position has been abandoned. There is clear evidence from studies carried out in South Africa that the informal sector is increasingly providing a sustainable source of income to a substantial proportion of its labor force. As even the most optimistic scenario presented in this paper indicates that formal sector will mop up unemployment quite slowly, informal sector growth provides the only plausible route to fill the gap for many years to come.

Over the long haul, great priority is likely to be attached to improving the skills of disadvantaged groups. This should prove consistent with the objective of redistributing income. It should not be assumed, however, that this will automatically lead to a major improvement in the employment prospects of such groups, as there is little evidence that unemployment declines sharply by education among black school-leavers below diploma or degree level. This doubtless reflects both the inferior quality of the education received by blacks when compared to that of whites and the persistence of labor market discrimination. In the immediate future, encouraging the acquisition of job-related skills by blacks could be of more immediate benefit, while a closing of interracial educational standards would be beneficial over the longer term.

Employment subsidies are a natural choice of policy instrument when wages are higher than workers' supply prices. Such subsidies can be difficult to administer as employers have a clear incentive to report exaggerate employment levels. In countries such as South Africa in which many formal sector employees do not pay income tax or file income tax returns and in which registration for unemployment insurance is non-compulsory, it could become very costly to assess the employment levels of individual firms by means of direct inspection. This would be much easier if a each employee were issued with a social security number, and this along with other details were computerized. At present, however, South Africa has no such system. As our results suggest that, across the economy taken as a whole, employment is not highly responsive to changes in real wages, it would be more realistic if employment subsidies were targeted towards sectors with a relatively high elasticity of labor demand, where they would have more impact. This type of measure cannot be evaluated, however, only in the context of employment creation, but would also have to be assessed in terms of its budgetary impact.

AN ANALYSIS OF EMPLOYMENT AND WAGE BEHAVIOR IN SOUTH AFRICA

Introduction and Summary

South Africa1/ faces a growing labor market crisis. In the early 1960s, over 80 percent of new labor market entrants were absorbed into wage employment. Over recent years, this proportion has fallen below 10 percent. Despite substantial growth in the informal sector, the unemployment rate has rocketed upwards to over 20 percent of the total labor force, and has reached a much higher level among Africans2/. Unemployment rates of this magnitude represent a considerable waste of South Africa's resources, and are a major source of existing social unrest. To counter this, employment generation must remain very high on the policy agenda for many years to come3/.

Policy initiatives will also inevitably be aimed at narrowing income differentials between whites and blacks. At present, on a per-capita basis, white household incomes are about 10 times greater than those of Africans, and 3 to 4 times higher than those of Coloreds and Asians. The substantial wage differentials that currently prevail between whites and other groups are an important source of these income differences. In addition, racial income dispersion is increased by a higher incidence of unemployment among blacks than among whites. Future policies are unlikely therefore to be confined only to employment generation *per se*, but are likely to be especially aimed at increasing employment levels among blacks and narrowing interracial wage differentials.

The main objectives of this paper are to provide an analysis of aggregate wage and employment behavior over the past three decades, and to assess both future prospects and the efficacy of possible policy instruments. A central conclusion is that, while the final removal of apartheid accompanied by a full reintegration of South Africa into the international economy may offer some respite from existing labor-market pressures, this benefit may be short-lived unless appropriate measures are taken. The basic argument is that, while existing recessionary pressures may be relieved and thus give rise to a temporary spurt in employment growth, other causes of weak employment growth will remain. This conclusion draws upon an analysis of historical labor-market trends. To understand this further, it is necessary to examine the sources of the wage employment slowdown.

There are four basic reasons why South Africa has experienced ever-slower wage employment growth over the past three decades. First, despite a growing labor surplus among blacks, the prolonged collapse of apartheid and other factors described later in this paper have led to continued upward pressure on black wages. This, in turn, has acted as a brake upon the growth in black employment. Second, there have been other forces at work pushing the economy towards a more capital-intensive structure. While these are not explicitly identified it is plausible that they include an emphasis on capital-intensive strategic

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1/ For the purposes of this paper, South Africa is taken to include Transkei, Bophutatswana, Venda, and Ciskei (TBVC). Wherever possible, all data are presented on this basis.

2/ This paper follows a similar terminology for racial groups as adopted by the Institute for Race Relations. The four groups are referred to as Africans, Asians, Coloreds and whites. The term "blacks" refers jointly to all groups other than whites.

3/ The importance of employment generation has clearly been recognized by the present government. Special state-funded employment creation programs have been launched over recent years. A further scheme aimed at creating 50,000 additional jobs was announced in August, 1991.

investments in, for example, iron and steel, and petrochemicals. Third, as strong labor market discrimination accompanied by enabling legislation effectively reserved middle and upper-level jobs for whites, the supply of whites may have acted as an effective constraint on the productive capacity of the economy. Declining growth in white labor supply during the 1970s and early 1980s may then have had the effect of reducing both economic growth in general and the growth in employment of other racial groups. A fourth development arises from the increasingly severe recession experienced in South Africa since the early 1980s. While there is little evidence that South Africa is operating unusually far below its productive capacity, it seems that the recession has inhibited investment and employment growth. For the first time since the Second World War, the country now experiences significant unemployment among its white labor force.

Of these four factors underlying slow employment growth, only the last, i.e. the recessionary forces, may perhaps be quickly removed. South Africa will, however, remain hampered by its capital-intensive structure, and may continue to face upward wage pressure. Once the expansionary effects arising from the alleviation of the present recession are exhausted, these other inhibitory factors are likely to further slow formal employment growth unless past biases towards capital-intensive investments are eliminated and the skill base broadened. While it is true that an alleviation of the present recession followed by a restoration of capital stock growth to a higher level is likely to reduce black unemployment, the most optimistic scenario suggests that this fall in the black unemployment rate will be rather slow. Much more optimistic employment prospects arise under scenarios in which a small fraction of the black labor force is upgraded annually to white status, as this alleviates skill constraints and encourages both output and employment growth. What remains unclear, however, is the extent to which this would require additional job-related training of black workers as opposed to improved allocation of workers to jobs given a change in employer perceptions.

The paper suggests a number of additional directions for future policy. There would seem to be scope for employment generation schemes in South Africa provided that wages are set at levels consistent with the supply prices of unskilled workers. In addition, small business development could be a priority given its greater labor intensity, while status-based capital-intensive state investments should be avoided. In other countries in Southern Africa, policies have often been deliberately aimed at discouraging the urban informal sector. This too should be carefully avoided in South Africa, as the informal sector offers, and will continue to offer, a valuable buffer between formal wage employment and unemployment. Black skill development is certain to be a future policy priority given social demands and the potential for income redistribution. However, the quality of black education will need to be improved, and there is no guarantee, as labor market discrimination will take time to disappear, that improved educational levels alone will quickly improve black job access. The acquisition of greater job-related skills by blacks may be have a more immediate impact. Pressures are also likely to arise for a future government to introduce both a high national minimum wage and restrictive job security regulations. However, both the empirical analysis presented in this paper and international experience suggest that such policies would discourage employment growth. Employment subsidies may, however, play a constructive role as a temporary measure.

The rest of the paper is divided into four sections. Section I gives a brief historical overview of the operation and structure of the labor market. This is important both as a basis for establishing a conceptual framework, and because observed historic wage and employment behavior are likely to be influenced by relevant institutional and policy change over the period. Section II describes major employment trends and presents some crude indicators of labor supply/demand imbalance. Section III examines both wage trends and the

behavior of racial differentials over time. This section also reviews available evidence regarding the determinants of such differentials. Section IV presents the central conclusions of an aggregate time-series econometric model of the non-government South African labor market. Section V uses the model to evaluate future prospects and suggests some directions for future policy. The technical specification of the model and the estimated equations are discussed at length in the Appendix.

Section I. The Labor Market in South Africa

At first glance, the evolution of the South African labor market seems remarkably similar to that assumed in much of the development literature -- an expanding modern sector drawing upon a large pool of mostly unskilled labor from surrounding areas. What makes the history of the South African labor market very different from this is that, whereas the traditional view assumes that labor could move freely to urban areas in response to labor market signals and that employers were free to make hiring decisions, a major objective of the policy regime over much of the 20th century, and particularly since the early 1950s, has been to hinder such labor inflows and, if necessary, to directly restrict the access of the majority of the labor force to modern sector jobs. As explained below, the post-1948 apartheid system cannot be treated as a single fixed entity, but rather as a system of which both the structure and its effects changed substantially over time.

The system of apartheid had as its vision a society in which different racial groups would develop separately in different geographical areas. The degree of physical separation was most tightly prescribed for Africans vis-a-vis other groups, and it was towards Africans that the most sweeping and restrictive apartheid legislation and regulations applied. From a purely labor market perspective, apartheid legislation and associated regulations can, for convenience, be separated into two groups: a) those that defined the geographical areas in which different racial groups could live, and which attempted to tightly regulate labor flows from one area to another; and b) those that attempted to restrict the hiring of blacks, and in particular, Africans, into selected industries, establishments, and occupations. The implementation of apartheid had other profound effects relevant to labor-market analysis. These are discussed further below.

Labor Supply Controls

Controls on the urban influx of Africans have a long history in South Africa. The main features of the policies introduced after 1948 were: a) the introduction of systematic racial classification under the Population Registration Act; b) the merging of the existing 260 Native Lands into 10 mini-states known as 'homelands' or Bantustans covering 13 percent of the country's land area; c) the introduction of a number of amendments to the Black Urban Areas Consolidation Act (1923) establishing qualifications for the urban residence rights of Africans (Section 10 rights); d) a stiffening of existing pass laws under the Abolition of Passes and Coordination of Documents Act (1952); and e) the designation of geographical zones within major urban areas by race under the Group Areas Act (1948). The development of African communities was to take place in the homelands, and, theoretically, only economically active Africans with Section 10 rights were an eligible component of urban labor supply. Coloreds and Asians were not covered by the influx control laws, but were racially segregated by area of residence under provisions of the Group Areas Act.

Influx controls had surprisingly little effect upon the availability of male African labor for wage employment, although they did impose effective constraints on the supply of female labor. In fact, there seems to be no evidence of any sustained shortages of unskilled labor during the period of strict application of influx controls. There were a number of

reasons for this. First, influx controls as such did nothing to limit the numbers of Africans available to work in white-owned agriculture or on the mines. The mining sector in particular, has made heavy use of expatriate black labor recruited from surrounding countries in addition to indigenous Africans, while the agricultural labor supply has been bolstered by illegal black immigrants. Second, the Labor Bureaus, (the agencies that administered the pass laws in urban areas), had the power to issue temporary passes of one year's duration. Urban-based employers could thus hire African workers on a temporary basis, and the local Labor Bureau would issue the necessary passes. This practice was commonplace in the construction sector. Third, there can be little doubt that the ability of the authorities to enforce these measures declined substantially after the late 1970s, while evidence exists that evasion of the law was widespread. The outcome of two court cases heard in 1980 and 1981 had the effect of extending substantially the number of Africans with urban residential rights.

It is also worth noting that influx controls were applied unevenly over time and the enabling legislation was often disobeyed. The number of prosecutions under laws restricting the movement of Africans4/ rose from 749 per day in 1960 to a peak of 1900 in 1966-67, then fell more-or-less steadily to 470 in 1980-81, and subsequently remained roughly constant relative to the number of African workers until the time of the abolition of the influx control legislation in 1985. Although further draconian measures were proposed in the Orderly Movement and Settlement of Black Persons Bill (1982), this was never legislated.

At their height, however, the influx controls did limit African urban population growth. One net effect was to break up many families, with breadwinners in the towns and cities, and other family members back in the homelands. This situation has changed considerably in the last decade. Although hard macro-quantitative evidence is lacking, there is no doubt that African urbanization has mushroomed, particularly in the township areas, but also in other urban areas. Given its dissatisfaction with the results of the 1985 Population Census, the Central Statistical Service (CSS) re-investigated its estimate of the African population. Subsequently, it revised upwards its estimates of population by racial group according to undercount rates of: Whites - -5.5%; Coloreds - -3.5%; Asians - -6.5%; and Africans - -20.4%. The undercount rate for blacks was further decomposed into -24.3% and -16.2% among males and females respectively. Such high undercount ratios among the African population may be attributed to two main causes: the presence in urban areas of those without Section 10 rights; and the unstructured nature of much of the township areas resulting from rapid in-migration. One clear effect of influx regulations that still remains, however, is that, as non-white Group Areas were usually located quite far from urban centers, African, Asian and Colored workers often have an arduous journey to and from work. Many Africans still commute daily from homeland areas.

It is plausible that these measures had some effect upon African wage rates. To obtain Section 10 rights to urban residence, Africans were required to have either 10 years continuous employment with one employer, or 15 years employment with multiple employers. Informal sector activity was thus effectively prohibited. This absence of realistic alternative earnings opportunities for African workers could be expected to reduce the wages paid by employers, and limit their voluntary turnover rates.

4/ Handbook of Labor and Social Statistics, Vol. 5, (1986), Southern Africa Labor and Development Unit (SALDRU), University of Capetown. The series was first published in Annual Reports of the Commissioner of Police (1980-85).

Labor Demand Controls (Job Reservation)

A plethora of instruments was used to protect the jobs of the white minority. In addition, in some areas, e.g. Cape Town, preference was declared in favor of colored workers over Africans. The main instruments used were that: a) stated types of work could be reserved for persons of specified racial groups under Section 77 of the Industrial Conciliation Act as amended in 1959, ; b) the government had wide powers to control the increase in the number of African employees in factories located in white areas under the Physical Planning and Utilization of Resources Act (1967); and c) white jobs were protected under separate job reservation legislation for the mining sector. Other regulations requiring that separate facilities be provided for black and white employees may have increased the costs to employers of appointing blacks to more senior jobs. In addition to job reservation measures, African self-employment was limited by the application of numerous sanctions to the legal operation of African shops and African self-employed traders through various amendments to the Black Urban Areas Consolidation Act.

The main era of job reservation was between 1967 and 1974. The number of reservations increased markedly between 1967 and 1970, and were scrapped progressively between 1974 and 1979. Virtually all forms of job reservation had disappeared by 1984. Although controls of this kind never affected more than about 2 percent of wage employees, it has been argued that, even in establishments in which reservations were not applied, the perception of the legislation among employers was that administrative and supervisory positions were reserved for whites. The dismantling of job reservation and other regulations helped open up access of qualified blacks to higher level jobs.

Other Labor Market Effects of Apartheid5/

There were four other important labor market effects. First, the purely discriminatory component in racial wage differentials, (i.e. that part of observed differentials that cannot be attributed to differences in economically-relevant characteristics such as training, experience and education), is believed to be larger than in other countries6/. In a society in which discriminatory racial policies are adopted by the state, it is highly plausible that discriminatory attitudes on the part of economic agents will be reinforced. Second, as illustrated later in this paper, separate provision of education to racial groups, and limitations on the provision of training to Africans, created very large gaps in racial skill levels. This form of 'before-the-market' discrimination greatly widened wage differentials between the races. Third, prior to 1979, white trade unions had full legal status, but not black trade unions. White workers thus had possible gains from collective bargaining -- an advantage that was denied to blacks. Fourth, as noted above, Africans were heavily restricted in terms of access to informal sector activities such as trading. This meant that, an important source of labor absorption in many developing countries was largely closed-off in South Africa. The alternatives to urban wage employment thus depended heavily on development initiatives in the homelands, and on employment in South Africa's highly mechanized agricultural sector.

It is important to note that the factors noted above have changed markedly over the last decade. This has partly attributable to the chronic breakdown of the operation of the

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5/ Here the discussion abstracts from many of the profound social effects of apartheid.

6/ The usual argument that discriminatory employers would be driven out of the market by less-discriminatory employers, as the latter would face lower costs, is unconvincing in South Africa, as the industrial structure is very oligopolistic and discriminatory practices have been reinforced on occasions by legislation and legally-empowered regulations.

apartheid system, and, in some cases, to legislative change. The relevance of some of these effects for wage determination are surveyed in Section II.

Section II. Employment, Unemployment and the Informal Sector

This section summarizes the main developments in both employment and labor market imbalance since 1960. Despite ongoing employment growth in the many forms of government within South Africa, overall employment growth has deteriorated consistently since 1970. There has been accompanied by a compositional shift in employment away from agriculture towards other sectors of the economy. Labor supply growth has, however, changed little over the past three decades, although lower net immigration has reduced growth in white labor supply. Consequently, there has been a growing imbalance over the past twenty years between the level of black labor supply and the ability of the economy to provide employment in the formal sector. The decline of the apartheid system has permitted valuable growth in the informal sector, but this has been insufficient to close the gap between black labor supply and formal employment. Unemployment has thus grown rapidly among blacks. In contrast, full employment was maintained among the white labor force up to 1985. Since then, however, white unemployment has grown significantly, but still remains at a relatively low level by international standards

Before moving to a discussion of employment growth, it is first useful to get a feel for the existing sectoral distribution of employees by racial group. Table 1 gives this information for 1990. These data are based on the standardized employment series as produced by the Central Statistical Service (CSS). These series include the TBVC states and the estimated number of domestic servants.

Table 1. Wage Employment ('000s of Workers) by Sector in 1990

	White	%	Color	%	Asian	%	Afric	%	Total	%
Agriculture	70	3.8	107	11.4	4	1.5	580	11.9	761.0	9.6
Mining	78	4.2	8	0.9	1	0.4	627	12.8	714.0	9.0
Manufacturing	322	17.3	276	29.4	93	35.1	825	16.9	1516.0	19.1
Elec., gas, water	33	1.8	7	0.7	1	0.4	50	1.0	91.0	1.1
Construction	53	2.8	59	6.3	8	3.0	348	7.1	468.0	5.9
Trade, Catering	335	18.0	122	13.0	69	26.0	492	10.1	1018.0	12.8
Transport	162	8.7	45	4.8	18	6.8	214	4.4	439.0	5.5
Financial Serv.	286	15.4	35	3.7	22	8.3	104	2.1	447.0	5.6
Non-gov. Serv.	154	8.3	24	2.6	12	4.5	129	2.6	319.0	4.0
Gov. Serv.	366	19.7	159	17.0	35	13.2	758	15.5	1318.0	16.6
Domestic Serv.	2	0.1	96	10.2	2	0.8	762	15.6	862.0	10.8
Total	1861	100.0	938	100.0	265	100.0	4889	100.0	7953.0	100.0

Source: South African Labour Statistics (1991).

The importance of the industrial sector is highlighted by the fact that it employs over 26 percent of all employees, of which over 19 percent are engaged in manufacturing. Agriculture employs nearly 10 percent of all employees, -- almost double its contribution to GDP, while government services (central, provincial, self-governing territories, TBVC and local) accounts for 16.6 percent. There are also important differences in racial employment distributions across sectors. Whites are disproportionately employed in the skill-intensive sectors, financial services providing the most striking example. African employees are disproportionately under-represented in manufacturing and over-represented in agriculture and mining. This is consistent with both the discussion above regarding influx controls and job reservation, and the presumption that Africans are disproportionately employed in low-skill

sectors. As the most urbanized racial group in South Africa, Asians are heavily over-represented in manufacturing and trading activities. It is interesting to note that government employs all racial groups in roughly similar proportions.

The distribution of employment across sectors of the economy has changed markedly since 1960. This is illustrated in Table 2. Among both black and white workers there has been a pronounced shift away from the primary-producing sectors of the economy in favor of other sectors. This is clearest in the case of agriculture. In 1990, agriculture accounted for substantially less than one half of its corresponding share of total employment as compared with 1960. This represents a major employment shift away from one of the most labor-intensive sector in the economy. Government in its various forms has become a more important source of wage employment since 1960. This is particularly true for black employment and reflects increased employment in the governments of the TBVC states and the self-governing territories.

Table 2. Percentage Distribution of White and Black Employees by Sector, 1960-90

	WHITES			BLACKS		
	1960	1980	1990	1960	1980	1990
Agric. etc.	10.8	4.8	3.8	25.7	14.6	11.3
Mining	6.1	4.5	4.2	15.0	12.0	10.4
Manuf.	16.3	18.2	17.3	13.1	20.0	19.6
Elec. etc.	1.1	1.4	1.8	0.6	1.0	1.0
Constr.	2.5	2.9	2.8	2.7	6.1	6.8
Trade etc.	20.0	19.5	18.0	8.3	10.6	11.2
Transport etc.	14.1	11.2	8.7	4.6	5.4	4.5
Finance etc.	8.2	12.1	15.4	0.9	1.4	2.6
Non-gov serv.	5.7	7.2	8.3	2.0	2.4	2.7
Gov. serv.	15.2	18.2	19.7	7.8	11.6	15.6
Domestic serv.	0.2	0.1	0.1	19.4	14.9	14.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Source: South African Labour Statistics (1991)

The annual average growth rates in employment, as presented in Table 3, reveal a close relationship between employment growth and growth in the economy. As shown in Table 3, total employment growth peaked among all racial groups in the 1960s, and has declined consistently ever since. The only exception to this is that employment among Coloreds and Asians has grown more quickly during the latter half of the 1980s than during the preceding five years. Among Coloreds, this can largely traced to increased employment within government. Increased Asian employment growth during the 1986-90 period remains, however, unexplained, although, as shown later, Asians have enjoyed the most rapid increase in measured skill levels of all racial groups over recent years. White and African employment growth have both shown a steady decline in all three sectors since 1960.

Table 3. Average Annual Percentage Employment Growth Rates

		1951-60	1961-70	1971-80	1981-85	1986-90
Primary						
	White	-0.17	-1.03	-0.20	-0.61	-1.26
	Colored	1.25	0.00	0.34	-1.33	-2.41
	Asian	1.99	-3.40	-3.23	-3.16	2.11
	African	0.91	0.88	-0.35	-0.67	-2.49
Secondary						
	White	0.84	4.49	1.65	1.35	-0.47
	Colored	2.70	7.65	2.52	1.60	1.17
	Asian	3.99	8.71	3.50	-0.34	0.57
	African	3.11	6.27	3.50	0.87	0.55
Tertiary						
	White	2.89	3.14	2.43	1.13	1.11
	Colored	3.40	3.10	3.37	1.23	3.44
	Asian	3.33	3.80	4.09	2.61	4.17
	African	2.95	2.87	2.37	1.70	1.42
Total						
	White	1.88	2.83	1.98	1.03	0.55
	Colored	2.56	3.68	2.50	0.97	1.80
	Asian	3.38	5.11	3.56	1.19	2.67
	African	2.03	2.66	1.72	0.81	0.17
	Total	2.07	2.86	1.91	0.89	0.53
Of Which						
Gov. Serv.						
	White	3.29	3.79	2.90	1.70	1.76
	Colored	4.68	5.92	5.83	2.75	5.30
	Asian	1.90	6.05	5.73	5.46	4.33
	African	6.87	2.92	5.25	3.41	4.97
	Total	5.14	3.57	4.49	2.84	4.04

Source: South African Labour Statistics (1991).

Note: The sectors are defined as follows:
Primary: Agriculture and Mining.
Secondary: Manufacturing; Electricity, Gas, Water; and Construction
Tertiary: Remaining sectors.

Employment growth rates show a wide disparity across sectors. Employment levels in the primary sectors have generally declined since 1970. While employment has continued to grow throughout the entire period in the secondary and tertiary sectors, the rate of employment growth has fallen markedly in the secondary sectors after a boom period during 1961-70. The period since 1985 has been particularly disappointing, although this has been partially compensated by substantial growth in employment in government services. In fact, total employment growth would have been negative over the period, 1986-90, if there had been no growth in government employment.

There is a startling imbalance over recent years between the employment growth rates given in Table 2, and existing estimates of labor supply growth7/. For the purposes of this paper, estimates of labor force growth in South Africa inclusive of the TBVC states are taken from Sadie (1991). These estimates indicate that the African labor force growth increased from about 2.5 percent per year in the early 1960s to about 2.8 percent a year in the 1980s. Annual labor force growth among Asians and Coloreds declined from 2.8 percent in the 1960s to 2.6 percent in the 1980s, while white labor force growth declined from 2.8 percent to about 1.6 percent over the same two periods. The imbalances between labor supply and demand, expressed as proportions of labor supply not engaged in wage employment are given in Table 4 for selected years.

Table 4. Estimated Proportions of Labor Force Not in Wage Employment

	1960	1970	1980	1985	1990
Africans	0.28	0.27	0.37	0.43	0.50
Asians/Coloreds	0.29	0.21	0.18	0.29	0.30
Whites	0.15	0.15	0.16	0.18	0.19

Sources: Sadie(1991) and author's calculations.

It must be emphasized that the proportions given in Table 4 are not estimates of unemployment rates *per se*, as formal self-employment, unmeasured formal wage employment8/, and informal sector employment are implicitly included. These estimates, nevertheless, show a huge rise in the proportion of the African labor force not engaged in measured wage employment between 1960 and 1990. There is also a noticeable jump in the "not-wage-employed" ratio among whites in the 1980s, particularly after 1985. This ratio varies less among Asians/Coloreds than among Africans. It is plausible, however, that among Africans at least, these estimates indicate a sharp rise in excess labor supply during the 1980s.

The broad picture thus illustrates a stark contrast between the degree of labor market imbalance between Africans and whites. Africans have basically been an outsider group in excess supply providing predominately unskilled labor to the formal wage economy. During the 1960s when employment growth was at its peak, the proportionate level of excess supply among Africans remained roughly constant, but has increased quite rapidly since then given high growth in labor supply and ever-slower employment growth. Whites, on the other hand, have been much more of an insider group supplying mostly skilled labor with the patronage of the apartheid regime. It is very noticeable that the "not-wage-employed" ratio for whites remained virtually static over the period, 1960-85. There is strong reason to believe that this corresponds with a maintenance of near full employment, as census estimates of white unemployment over the same period do not suggest any marked change in the white unemployment rate, while strident complaints were sometimes heard from employers during the 1970s to the effect that job reservations were worsening a shortage of skilled labor. White preference within the civil service and major parastatals was also used as an instrument

7/ Labor force growth estimates are amongst the most controversial statistics produced in South Africa. A number of different and inconsistent estimates exist for individual time periods, Meth (1989).

8/ The employment series produced by the CSS exclude a number of minor formal-sector activities. These include employees of restaurants and bars not on hotel premises and taxi-drivers employed by companies.

to depress white unemployment. Since 1985, however, the economy has entered an increasingly recessionary phase, and for the first time in many years South Africa has an unemployment problem among its white population.

These conclusions are supported by evidence from other sources. There are two main sources of unemployment data in South Africa: the Population Censuses and the Current Population Survey. Both of these identify unemployed individuals as being both without remunerative activity and actively seeking work. Discouraged jobseekers, i.e. those not actively seeking work but available for work if offered, are therefore excluded. As this 'hidden' category of unemployment may grow disproportionately with excess labor supply, these sources may tend to seriously underestimate unemployment among groups with a high unemployment incidence. Changes in unemployment rates for South Africa exclusive of the TBVC states, as measured in the Population Censuses of 1980, 1985 and 1991, and shown in Table 5, are not inconsistent with the movements in the 'not-wage-employed' proportions given in Table 4. Some unofficial estimates of the level of unemployment among Africans are higher than those in the Censuses. For example, recent surveys have found African unemployment rates closer to 40 percent in some townships.

There is also evidence from the censuses of wide disparity in African unemployment rates across different regions of the country. This is illustrated in Table 5. As the homeland areas are virtually exclusively African, their total unemployment rates make good comparators for the African unemployment rate in the country as a whole. Preliminary results from the 1991 Census indicate that the unemployment rate among Africans in South Africa exclusive of TBVC was 24.5 percent. African unemployment seems much higher in the TBVC countries where the unemployment rate consistently greater than 30 percent. In all of the homelands, both TBVC and self-governing territories, the unemployment rate has risen consistently, and in most cases sharply, over the past decade.

A somewhat different picture emerges from the Current Population Survey (CPS) conducted monthly by the CSS. The CPS indicates a rise in the unemployment rate among Coloreds and Asians over the first half of the 1980s, followed by a significant drop since 1985. This is not necessarily contradicted by the estimates in Table 4, as it is believed that these groups are disproportionately involved in informal activities. However, the CPS also showed a significant drop in the African unemployment rate between 1985 and 1989. This measured drop in unemployment need not be taken seriously, however, as the CSS discontinued the collection of data on Africans under the CPS in mid-1989, given the implausibility of this series. The methodology employed in the CPS is based upon a revolving panel for each racial group within South Africa exclusive of TBVC, and it has been commonly argued that these panels are inadequately updated. It has been noticeable in the past that the CPS unemployment estimates always jumped upwards whenever a new panel was introduced. In its last peak estimate in 1987, the CPS gave a reasonably plausible estimate of 18.2 percent for the unemployment rate among Africans as defined under its expanded definition of unemployment.2/

2/ The definitions of unemployment employed in the CPS are explained below in the text.

Table 5. Census Unemployment Rates (percentage) by Race and Areas of South Africa

		1980	1985	1991
South Africa (exclusive of TBVC)	Africans	10.9	14.9	24.5
	Asians	4.5	12.3	12.8
	Coloreds	7.7	11.7	16.6
	Whites	1.3	2.7	4.0
	TOTAL	8.4	12.0	19.0
Independent States				
	Transkei	13.9	24.5	30.1
	Bophutatswana	14.7	25.8	33.1
	Venda	17.1	31.1	34.8
	Ciskei	24.4	24.9	30.6
Self-Governing Territories				
	Gazankulu	17.2	18.8	20.4
	Kangwane	4.2	16.4	17.8
	Kwandebele	18.2	23.5	25.6
	Kwazulu	20.4	24.8	27.7
	Lebowa	15.3	20.0	21.7
	Qwaqwa	19.5	18.9	20.6

Source: South African Labour Statistics (1991) and Development Bank of Southern Africa (DBSA) (1991).

Note: Figures given for unemployment in TBVC and the self-governing territories are DBSA estimates.

Although the CPS is perhaps an unreliable guide to trends in unemployment, it provides much useful information on the composition of the unemployed and the relative amount of underemployment. Some of the major features of the unemployment situation in South Africa as indicated by the CPS are discussed below. For brevity, the discussion is mostly restricted to Africans, although qualitatively, the comments made also apply to other black groups. The CPS employs two definitions of unemployment: a) the strict definition under which an individual must have taken active steps to secure employment during the previous 7 days; and b) the expanded definition which also includes those available for work but not actively seeking it. Detailed breakdowns of the unemployed by their characteristics are only given according to the strict definition, and this is reflected in the discussion below. January, 1988 is taken as an arbitrary, but convenient, date for CPS estimates. On this date, the CPS estimated unemployment among Africans at 14.4 percent and 17.1 percent according to its strict and expanded definitions respectively.

Females experience higher unemployment rates than males. For example, on the date in question, the female unemployment rate (strict definition) was estimated at 24.6 percent as compared to 12.6 percent among males. A differential of this magnitude is not

wildly out of line with the experience in other developing countries, and this usually relates to the fact that less-educated women face a narrower range of earnings opportunities, and are more restricted by ties to the household. The CPS does not differentiate between women according to number of children, however, it is probably safe to assume that women with young children experience greater difficulty in seeking work outside a limited distance from the household.

A second, and important observation, is that unemployment is much higher among younger members of the labor force. By the strict definition of unemployment, the estimated unemployment rate among Africans aged from 15 to 24 years was 27.5 percent -- almost twice the overall estimated African unemployment rate of 14.4 percent. This pattern is similar for both males and females. It is to be expected that unemployment would be disproportionately concentrated among younger groups, as recent labor market entrants are usually the first to be affected whenever labor force growth outstrips that of employment. While the CPS does not give estimates by age according to its expanded definition, it seems reasonable to suppose that, on this basis, unemployment among younger members of the African labor force must be in excess of 30 percent.

A third point is that unemployment is by no means an exclusively urban phenomenon in South Africa. In fact, the rural unemployment rate is not vastly below that in urban areas. For example, by the strict unemployment definition, the unemployment rate among rural Africans was estimated in the CPS to be 12.1 percent as compared with a corresponding estimate for urban areas of 16.3 percent. In most less-developed countries the rural-urban differential in unemployment rates is much larger, basically because in rural areas, subsistence agriculture tends to soak up excess labor supply. In South Africa, however, unemployment seems to be much more of an all-economy phenomenon, presumably because so much of the rural areas was reserved for white commercial farming leaving relatively little for traditional subsistence agriculture.

Finally, perhaps the most important conclusion is that unemployment is not confined to the least educated. As Table 6 shows, among both Africans and Asians/Coloreds the unemployment rates among those with no education are below average for the racial groups taken as a whole. Among Africans, the unemployment rate rises fairly steadily from an estimated 14.9 percent among Africans with Standard 3 or less10/ to a peak of 21.7 percent among those with Standard 7, and then falls back to 11.9 percent among those who have completed Standard 10. Among Asians/Coloreds the peak unemployment rate occurs amongst those who have completed Standard 5. Measured unemployment is, however, negligible among those with diplomas and degrees. Unemployment is thus a fairly widespread phenomenon among those with secondary education or less, and only those with tertiary education are fully spared. Tertiary education aside, there seems to be little evidence that educational expansion *per se* would reduce unemployment among blacks. Although comparable evidence is unavailable for whites, it is almost certainly the case that their unemployment rates have been much lower at various educational levels than among blacks. It is unclear to what extent this reflects the lower quality of black education as opposed to labor market discrimination.

10/ Under the education system in South Africa, pupils complete two years before embarking on Standards. Each Standard lasts for one year and must be passed by written examinations. Failure results in retention at the same Standard for a further year. A pupil who had passed successive Standards up to and including Standard 7 without failure for example, would have completed 9 years of education. The education system has been strictly separated on racial grounds in the past, and there have been considerable differences in quality both in terms of teaching and examination.

TABLE 6. PERCENTAGE UNEMPLOYMENT RATES BY EDUCATION (January, 1988)

	Africans	Asians/Coloreds	Total
No Education or Unspecified	8.9	7.5	8.7
Std. 3 and less	14.9	13.0	14.7
Std. 4	17.9	12.1	16.7
Std. 5	18.7	14.6	17.8
Std. 6	15.9	8.8	13.6
Std. 7	21.7	11.6	19.0
Std. 8	13.1	8.9	12.1
Std. 9	14.2	12.3	13.7
Std. 10	11.9	8.5	10.9
Diploma and Degree	0	0	0
Total	14.4	10.9	13.7

Source: ***Current Population Survey (1988).***

Note: The unemployment rates in this table are calculated according to the strict definition of unemployment adopted in the CPS. The overall unemployment rate of 13.7 percent compares with a corresponding value under the expanded definition of 17.1 percent.

In addition to unemployment, there is substantial underemployment among Africans. In the CPS a person is defined as underemployed if he or she is seeking full-time work, and involuntarily worked less than 35 hours during the reference week. Treating the standard working week as being 47 hours in length, it is possible to redefine hours of underemployment in terms of their unemployment equivalent. Thus, for example, a person working only for one half of a standard working week would be treated as equivalent to one half of a fully unemployed individual. Applying this methodology converts measured underemployment among Africans as equivalent to a further 12.8 percent being fully unemployed among the African labor force. Adding this to the estimated African unemployment rate of 17.1 percent under the expanded definition, thus gives an overall "underutilization" rate among the African labor force of almost 30 percent.

The "not-wage-employment" proportions in Table 4 are much higher than measured unemployment rates because workers also participate in the agricultural subsistence sector and the informal sector. The agricultural subsistence sector is relatively small in South Africa given legally-empowered land acquisition by whites and the limited agricultural potential of much of the homelands. The 1985 Population Census and similar censuses for TBVC indicate that this sector accounts for only around 7 percent of the black labor force. The main "missing link" is thus the informal sector. For present purposes, the informal sector is defined in terms of unmeasured economic activities. Unfortunately, little is known quantitatively about the rate of expansion of employment in the informal sector. It is widely

believed that informal sector growth was closely linked to the breakdown of the apartheid system. The CSS have estimated that, in 1989, such unmeasured activities contributed a further 8 percent to GDP in that year. Noting that such activities usually have a substantially higher labor/output ratio than formal sector activities, it is plausible that a significant shift towards informal self employment has occurred among groups other than whites during the past decade. The CSS estimated that 19.9 percent of the black labor force were involved in the informal sector. Of these, 12.3 percent were involved on a full-time basis. Average income from informal sector activities is estimated at about 37 percent of the formal sector wage. These results are very consistent with those presented in a synthesis of 44 localized studies of the informal sector11/. Here it was estimated that in 1985, some 1.72 million individuals or, 28 percent of the black labor force were employed in informal sector activities. This figure is unsurprisingly higher than the CSS estimate as part-timers and moonlighters from the formal wage sector are implicitly included. It was further estimated that the informal sector contributed an additional 6.5 percent to measured GDP in 1985 -- a very consistent estimate with the 8 percent estimated by the CSS for 1989.

The informal sector seems to have been heavily based upon trading activities in the past. According to Kirsten's synthesis study, only 23 percent of blacks participating in the informal sector in 1985 worked in production or construction activities, while 71 percent were engaged in trading, and only 16 percent in services. Illegitimate activities such as prostitution seemed to be confined to squatter areas.12/, and accounted for only 6 percent of informal participation. While incomes earned in the informal sector are lower than formal sector wages, the distribution within this sector of both income and hours worked seem to be quite wide. A particularly striking development in the informal sector has been the growth in black taxi services. This activity grew rapidly during the 1980s, and it has been estimated that employment in this sector was equal to 60 percent of that in the gold mining industry13/ by the end of the decade.

It is now possible to give a crude estimate for the disposition of measured African excess supply between unemployment and informal sector participation. The tentative census-based estimate of 24.5 percent given above for the African unemployment rate in 1991 seems consistent with peak estimates from the CPS. Subtracting this from the estimated 49 percent of the African labor force outside formal wage employment given in Table 4, gives an identical estimate of 24.5 percent for Africans participating either in the agricultural subsistence sector or in the informal sector. This is reasonably consistent with the estimates of subsistence and informal sector participation given above.

11/ See the paper by Kirsten (1988).

12/ A survey carried out in 1978 of a squatter area in Durban found higher informal sector participation among females than among males. However, only a small minority of females were engaged in prostitution. See Maasdorp (ed.) (1983).

13/ See, for example, Khosa (1990).

Section III. Wage Differentials And Real Wage Growth

Despite growing unemployment among black workers, their average real wages have, until quite recently, continued to rise. This section examines some alternative explanations that try to account for this behavior. The main conclusion is that a mixture of different forces have been at work. While there is little doubt that earnings-related characteristics of blacks such as educational and occupational attainment have improved over time, there is also evidence that other factors have combined to push up black wages. These may include: reduced discrimination, including positive effects stemming from the abolition of job reservation practices; the abolition of influx controls; and the pressures of growing African trade unionism.

There are two striking features of real wage behavior over the past thirty years. As Table 7 shows, wage differentials have in general narrowed over time between whites and other groups of workers, while real wage growth has slowed markedly among all racial groups, and, in some cases, became negative during 1986-90. This illustrated more clearly in Figure A for the manufacturing sector. This slowdown is broadly in line with the behavior of real GDP per capita. Wage data for mining, manufacturing and construction are shown separately for comparative purposes14/.

There are marked differences in real wage movements both over different time periods and across sectors. Among whites, the pattern is clear as white real wage growth has declined progressively in almost every instance across sectors over successive time periods. This is fully consistent with the observed slowdown in economic growth in the economy since the late 1960s. The pattern is much less transparent, however, among black groups, although there are clear signs that real wage growth progressively declined after 1980. There are special historical factors that strongly affected the timing of black real wage growth in mining, and these are discussed further below. As suggested earlier, there is little evidence of growth in excess labor supply among black groups during the 1960s, and this was indeed a period of real wage growth among blacks in both manufacturing and construction. However, whereas black real wage growth further increased in manufacturing during the 1970s, the exact reverse was true of construction. Movements in real wage behavior become more consistent across these two sectors during the 1980s, although construction wages have clearly been much more adversely affected by the deepening recession after 1985. By the end of the 1980s, the average wage in manufacturing across all racial groups stood at about 2.7 times South Africa's GDP per capita. This value is in the broad range observed for this ratio among countries at a similar stage of development although higher than in fast-growing economies such as South Korea and Thailand, but rather lower than in most other sub-Saharan African countries. (See for example ILO(1991)).

The mining sector presents a rather different pattern from the non-primary sectors of the economy. This reflects two factors. First, mining is a disproportionately large employer of migrant workers from surrounding economies. This seems to have insulated the mining industry from labor market pressures during the 1960s. Second, the Chamber of Mines has a near-monopsony of labor within the industry. Historical evidence15/ indicates during the 1950s and 1960s, wages were so low on the mines, that a significant outflow

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14/ There is no single aggregate wage series available for South Africa. Data on agricultural wages are collected less frequently and with a less consistent methodology than other sectoral series. There are also difficulties in interpreting government wage series over time, given some reclassification between governmental and parastatal activities, and the granting independence to the TBVC states.

15/ See, for example, Nattrass (1990).

developed among African workers in favor of manufacturing and construction. However, the Chamber, alarmed by the political risk of overdependence on migrant mineworkers from abroad, subsequently reversed its low-wage policy, and granted a series of large wage increase to African mineworkers during the first half of the 1970s that largely closed the gap between wages in mining and manufacturing. Dependence on foreign labor was then substantially reduced over the following years, and the proportion of South African blacks working on the mines rose substantially. It has been argued that this exerted upward pressure on agricultural wages but not on wages in urban areas16/.

Table 7. Wage Ratios and Rates of Growth in Real Wages by Race

Ratios to White Wage

	1960	1970	1980	1985	1990
Mining					
Africans	0.06	0.05	0.17	0.19	na
Asians	0.29	0.26	0.42	0.52	na
Coloreds	0.21	0.20	0.31	0.34	na
Manufact.					
Africans	0.19	0.17	0.23	0.25	0.29
Asians	0.31	0.25	0.32	0.36	0.42
Coloreds	0.29	0.24	0.27	0.29	0.31
Construct.					
Africans	0.18	0.15	0.19	0.21	0.22
Asians	0.39	0.43	0.50	0.58	0.51
Coloreds	0.37	0.34	0.30	0.34	0.32

Real Wage Growth Rates

	1961/70	1971/80	1981/85	1986/90
Mining				
Africans	0.72	13.18	-0.14	na
Asians	1.88	5.61	0.33	na
Coloreds	2.18	5.06	-0.83	na
Whites	3.02	0.53	-1.77	na
Manufact.				
Africans	2.69	4.61	0.81	0.64
Asians	1.41	3.68	1.38	0.68
Coloreds	1.31	2.88	0.58	-0.07
Whites	3.52	1.40	0.04	-0.76
Construct.				
Africans	2.96	2.83	1.15	-1.45
Asians	5.27	2.40	1.50	-2.84
Coloreds	3.38	-0.28	1.02	-2.02
Whites	4.40	0.87	-0.16	-1.59
GDP per cap	3.05	1.81	-0.14	-1.31

Sources: South African Labour Statistics (1991) and SALDRU (1988).

16/ See the study on post-war movements in black wages by Hofmeyr (1990(a)).

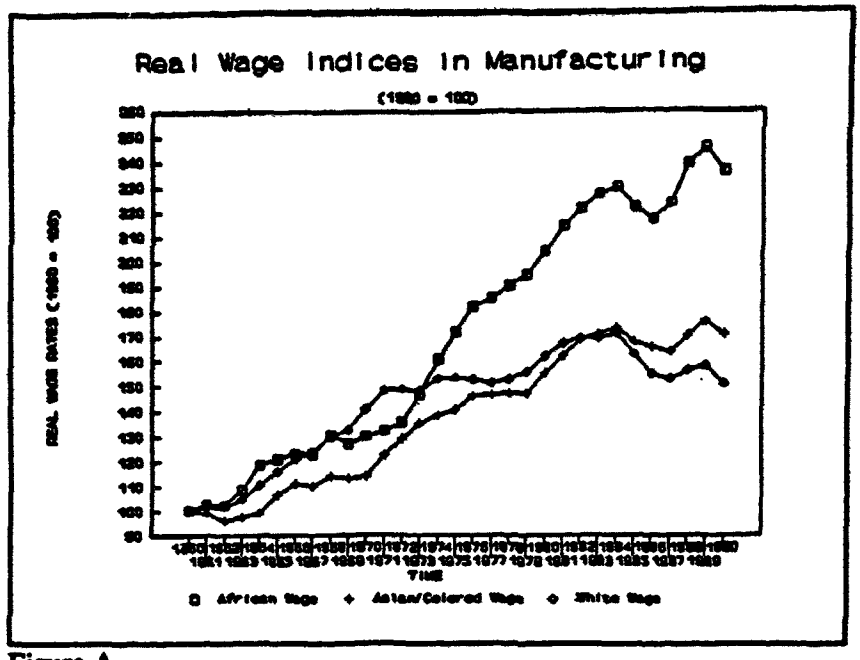

Figure A

A first reaction in seeking an explanation for wage movements in any given less developed country is to examine the role played by official wage-setting bodies. However, there is little evidence that these have played an important role in South Africa. Statutory minimum wages are set by the Wage Board. This body essentially makes recommendations regarding minimum rates to be paid in industries without industry-wide collective agreements17/. While it is believed that the Board may have played a positive role in pushing up black wages immediately after the Second World War, this is unlikely to have been true over more recent years. For example, the real value of minimum wages fell substantially between 1978 and 1988. Actual wages paid increasingly differ from minimum rates as set by the Board, as union membership has grown in industries covered by the Board, and plant-level agreements setting wage levels well above minimum rates are increasingly common. The Industrial Councils are the other main wage-setting institutions. These, however, are bipartite bodies consisting of both union and employer representatives. As such, they are thus essentially forums for collective bargaining. Upward pressure on wages as reflected in Industrial Council agreements are likely therefore to provide evidence of trade union effects rather than of positive wage pressures emanating from the Councils themselves. It is interesting to note that in 1978, the Wage Board rates were on average, 89 percent of the average Industrial Council rate, but that by 1988, this proportion had fallen to 56 percent18/. This cannot of itself, however, be taken as evidence of union wage pressure, since as explained above, Wage Board rates are often well below actual wages paid.

Considerable controversy surrounds the factors underlying real wage behavior in South Africa. Most research has tried to explain the observed narrowing in racial wage

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17/ Some sectors are explicitly excluded from Wage Board determinations. These include: agriculture, domestic servants, state institutions, universities and public schools, charitable institutions and institutions for the blind.

18/ Detailed evidence on minimum rates set by the Wage Board is presented in SALDRU (1988).

differences, and a number of different explanations have been advanced. Studies in this area have focused upon the determinants of earnings differences between individuals, and upon shifts in such determinants between two points in time. As microeconomically-based studies, they do not, however, seek to relate these shifts to developments in the wider labor market context. The main explanations examined in these studies relate to: a) reduced labor market discrimination; b) an improvement in the skills of blacks relative to those of whites; and c) the growth of African trade unionism.

Skill Improvement and Wage Discrimination

As the measurement of wage discrimination19/ and the contribution of earnings-related characteristics to inter-racial wage differences are closely linked, the evidence on both is reviewed jointly. Most studies have investigated wage discrimination by estimating detailed earnings functions based on cross-section data on individual workers collected during labor market surveys. The basic method is to estimate wage differences attributable to race after standardizing for other relevant earnings-related characteristics20/. The conclusions of these studies include the following: a) wage discrimination fell significantly during the 1970s and first half of the 1980s; b) wage discrimination decreases with occupational level; and c) that at the highest occupational levels, wage discrimination had virtually been eliminated by 1985. All studies nevertheless indicate that wage discrimination between racial groups remained a significant factor at lower occupational levels in the mid-1980s.

In a recent study, Knight and McGrath (1987) estimated detailed earnings functions based on cross-section data on individual workers collected during labor market surveys in 1976 and 1985. The surveys were conducted by Peronmes, a market research organization. The Peronmes approach is to classify workers into some 19 grades defined according to the requirements of the job in question, while information on education, experience etc. is not collected. Knight and McG[illegible]th found, that after standardizing for the sex and assigned grade of individual workers, Africans, Asians and Coloreds received respectively 42.9, 33.0 and 37.8 percent less pay than whites. In 1985, the corresponding figures were 21.8, 12.7 and 21.2 percent respectively. Thus by this measure, discrimination against Africans vis-a-vis whites had halved over the period. Other interesting conclusions were that discrimination declines with the grade level, and that, at the highest grades, discrimination had been virtually eliminated by 1985.

There are two problems in interpreting these results. The first is that Knight and McGrath measure discrimination more narrowly than is common in labor market analysis. Basically, discrimination may be decomposed into: a) 'before the market' discrimination -- discrimination faced in obtaining relevant earnings-related characteristics such as education

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19/ Wage discrimination is defined as the payment of different wage rates to individuals possessing identical economically-relevant characteristics. Normally, it is measured as the proportionate wage differential between two or more groups that remains after other characteristics such as education, occupation, experience, geographical location and access to collectively-bargained wages have been taken into account. This methodology has been applied in a number of studies on South African wages. In some studies, wage discrimination is decomposed into two parts: that due to reduced access to better-paying jobs of disfavored groups whose economically-relevant characteristics are equal or superior to those of existing job incumbents (job discrimination); and that due to different wages being made to identical individuals doing the same job.

20/ For examples of such studies see Knight and McGrath (1967, 1977), Hofmeyr (1990(b)), and Moll (1992).

and training; b) 'after the market' discrimination -- discrimination in the payment of individuals with identical characteristics. The latter may be further subdivided into: b1) discrimination in obtaining a given job grade given one's qualifications (job discrimination); and b2) discrimination in the level of wages paid to workers in the same grade ('pure' wage discrimination. Most studies measure b) as a whole. However, given the limitations of the Peronmes surveys, Knight and McGrath are only able to measure b2). The other problem is that the observed decline in discrimination may be due to changes in other variables excluded from the estimating equations. The authors themselves, for example, recognize the potential importance of increased union membership among blacks.

The question of the relative contributions of job and 'pure' wage discrimination have been investigated by Moll (1992). His study is confined to an examination of wage differentials between Colored and white workers over the period, 1970 to 1980. This study standardizes much more widely for the effects of education, experience and occupation. Like Knight and McGrath, he finds a reduction in overall discrimination, but of much more modest proportions. His central conclusion is that "pure" wage discrimination is much larger than job discrimination, although the latter fell sharply among younger workers. This result is consistent with the phasing out of job reservation over the same period.

Reduced wage discrimination may well have been prompted by other developments. In particular, multinational corporations operating in South Africa during the 1970s came under increased pressure to abandon discriminatory practices. Such pressure was intensified in the late-1970s with the publication of both the Sullivan Code in the U.S.A., and a similar code drawn up by the European Economic Community.

There can be no question that skill and education levels have narrowed over the past 20 years between the various racial groups. Table 8 gives the proportion of employees in administrative, professional and clerical occupations for selected years over the period, 1960-85. These data show clearly that, as measured by this indicator, the skill levels of Asians and Coloreds grew more quickly than those of other groups. The growth in white skills was the slowest of all. However, virtually all growth in occupational attainment has occurred since 1970. While the indicator shown is a very crude one, other indicators available on a less comprehensive basis suggest a similar picture. For example, as shown later, a comparison of the 1970 and 1985 Population Censuses reveals faster improvement in educational qualifications within the black labor force than within that of the whites. Similarly, the National Manpower Commission has estimated that blacks as a percentage of high level manpower21/ has increased from 25.5 percent in 1965 to 35.6 percent in 1989.

21/ See National Manpower Commission (1990). High level manpower is defined as workers with two years or more of training and an educational attainment of at least Standard 10.

Table 8. Skill Levels By Race

Percentage of employees in Administrative, Professional and Clerical Occupations

	1960	1970	1980	1985
Africans	5.0	4.7	7.2	8.8
Asians	19.1	22.8	33.4	37.4
Coloreds	9.9	10.5	16.6	18.9
Whites	49.5	48.1	56.4	56.9

Source: Manpower Survey, CSS (various issues).

The role of education and occupation has also been examined in analyses of cross-sectional wage data. A recent study by Hofmeyr (1990b), using survey data collected by the Bureau of Market Research (BMR) in 1975, 1980 and 1985, concentrates entirely upon the determinants of African wages, and strongly indicates that improved educational and occupational attainment by African workers fully explain the increase in the African wage between 1975 and 1985. The most striking finding is that the real wages of males with the lowest educational and occupational attainment fell by more than 3 percent per year between 1975 and 1985. Among groups with much higher educational and occupational attainment, wage differentials increased over the period relative to those of unskilled Africans.

Some questions nevertheless remain. Hofmeyr finds that the majority of the 1.32 percent annual average increase in the African wage indicated by the BMR data sets is explained by improvement in occupational attainment. A closer inspection of his summary data reveals that the occupational distribution of Africans actually deteriorated between 1975 and 1980, and then took a startling jump upwards between 1980 and 1985. There is therefore an obvious concern that this sudden increase may have resulted from decreased discrimination resulting from the abolition of job reservation and increased black union pressure to remove unfair job grading practices. A more reliable guide may be to concentrate upon the effects of improved educational attainment.

There has indeed been a substantial improvement in black educational attainment. As Table 9 shows, the proportions of blacks in the labor force with little or no education have fallen markedly over the period, 1970-85, while the proportions with, for example, Standard 7 or above have increased. Among Africans, however, penetration is still very limited at diploma and degree level. It is possible to use this information to get a measure of the potential input from each racial group adjusted for educational level. The basic method is to weight individuals of a given educational level by the ratio of their wage to that of a person with no education22/. Persons with no education are thus given a weight of unity. Labor input thus calculated per worker rose among Africans from 1.23 in 1970 to 1.39 in 1985 -- an average annual growth rate of 1.3 percent. This is well below the average growth rates in the African real wage observed in Table 7. It is of course possible that growth in educational

22/ To be more precise, potential labor input for each group, I, is defined as

$$I = \Sigma(w_i/w_0)L_i,$$

where L_i is the labor force in the ith educational category, w_i is the wage, and w_0 is the wage of persons with no education. The relative wages, (w_i/w_0), used are those for whites in 1980 as taken from the Population Census. These should be less distorted by the effects of discrimination than those for other racial groups.

qualifications was higher among formal sector employees than in the labor force as a whole. The BMR data used by Hofmeyr provides a partial check on this as these data are restricted to wage employees. Applying the same method to the BMR data indicates that, when adjusted for education, labor input per African worker rose from 1.531 in 1975 to 1.581 in 1985 -- an annual percentage increase of 0.3 percent. This would suggest that improved education explains about one quarter of the observed wage increase, a finding not inconsistent with Hofmeyr's own results.

TABLE 9. ECONOMICALLY ACTIVE POPULATION BY EDUCATION AND RACE

	1970				1985			
	Africans	Asians	Coloreds	Whites	Africans	Asians	Coloreds	Whites
No Educ.	49.70	7.94	21.50	0.60	25.59	3.46	12.15	1.48
< Std. 4	22.90	13.17	21.73	0.63	23.82	5.22	16.80	0.00
Std. 4	7.25	9.51	10.76	0.75	9.10	3.98	9.20	0.00
Std. 5	6.51	13.38	13.29	1.38	10.36	7.03	13.07	1.03
Std. 6	7.91	26.76	16.34	13.52	11.63	18.43	16.72	4.63
Std. 7	1.78	6.88	6.19	8.88	5.48	7.84	9.43	3.76
Std. 8	1.97	10.13	5.62	24.72	6.87	16.75	10.14	19.98
Std. 9	0.95	3.35	1.12	6.27	2.06	7.84	2.88	5.93
Std. 10	0.39	5.06	1.43	28.10	3.51	18.35	4.90	31.06
Diploma	0.61	2.59	1.89	9.68	1.41	7.58	4.22	22.06
Degree	0.02	1.23	0.14	5.47	0.16	3.51	0.49	10.02
Total	100	100	100	100	100	100	100	100
Labor Force (000s)	5419	210.6	807.4	1674	8501	341	1208	2232
Labor Input	6675	329	1143	3131	11837	597	1852	4613
Labor Input per Worker	1.23	1.56	1.42	1.87	1.39	1.75	1.53	2.07

Sources: Republic of South Africa Population Censuses 1970 and 1985.

African Trade Union Growth

The rights of African workers to organize in trade unions were progressively restricted between 1953 and 1959. Under an amendment to the Industrial Conciliation Act passed in 1959, unions comprising African workers were unable to register, while no African could be appointed as a worker representative on an industrial council or at proceedings of a conciliation board. Africans were also excluded from membership of racially-mixed registered unions. The situation changed substantially following the report of the Wiehahn Commission in 1979, and registered African unions were re-legalized under the Industrial

Conciliation Amendment Act of the same year. The effect on registered African membership has been staggering. In 1980, only about 1.2 percent of African employees were registered union members, but by 1990, this ratio had risen to over 30 percent23/. This has been accompanied by a massive rise in both the number of strikes involving Africans and in the number of mandays lost through strike action.

It is particularly difficult to assess the impact of this increase in African unionization on wages. Basically, one would expect this effect to be very unevenly spread across both different industries and within industries themselves. In South Africa at the present time, collective bargaining takes place at three levels; at industry level through the Industrial Councils both on a regional and national basis; at plant level; and, more recently through direct bargaining with the management of major conglomerates. In addition, a special arrangement prevails across most of the mining sector, under which unions bargain directly with the Chamber of Mines. Prior to the reorganization of the trade union movement in 1985 and the formation of the Confederation of South African Trade Unions (COSATU), most trade unions bargained extensively at plant level. However, as unions grew rapidly and took on more of a regional and even national character, African unions sought a more centralized bargaining forum through the Industrial Councils. As statutory agreements arrived at through the Councils set minimum rates for different categories of workers, there is then substantial latitude for higher rates to be negotiated at plant level. In plants in which unions have strong bargaining power, local wage settlements may be substantially above Council rates, while in others, wage rates at or close to Council rates may prevail. Hard evidence on the size of such 'wage drift' seems, however, to be lacking. In addition, it is clear that collective bargains are being struck in industries not covered by Councils, as many union members work in industries lacking Council agreements. For example, some 515,00 workers were covered by agreements in 1990. But the total membership of both registered and unregistered trade unions was estimated by the Department of Manpower at 2.81 million as of end-October24/. These figures may be partially reconciled by the fact that the mines account for a further 713,000 workers, while the iron and steel agreement covering 300,000 workers was not in force, however, this still leaves some 1.3 million union members unaccounted for.

So far, research on the impact of African trade union growth on real wages has been very limited. A recent study using household survey data25/ for 1985 estimates the overall African union/non-union wage differential as 21 percent. Applying this estimate to the African union membership figures above would imply that union growth has at most increased real African wages by 7.0 percent (or by 0.68 percent a year) over the past decade. The growth of African unionization is thus a potentially important source of real wage growth over the 1980s. This result cannot, of course, explain the pattern of real wage growth during the 1970s, as during the latter period, the differential in real wage growth between black and white workers was much larger than during the 1980s, yet African unions were heavily restricted in legal terms.

Union activity may have a greater effect than indicated by increased wages. South African employers often claim that industrial relations difficulties are a more general

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23/ An exact figure cannot be given for the proportion of Africans unionized, as some registered trade union members are not classified by race, while no racial breakdown is available for unregistered trade union members.

24/ Department of Manpower (1990).

25/ See Moll (1992b).

impediment to future expansion. One recent study26/, based upon a survey of employers in the manufacturing sector, found that 'labor problems' defined very generally were cited as the most common cause of greater capital intensity. One possible interpretation of this is that industrial conflict has widened the margin between the perceived cost of employing an African worker and the wage paid.

Section IV. Explaining Past Wage and Employment Behavior

A coherent empirical framework is needed to understand the central working of South African labor markets. This is attempted in the empirical model described in the Appendix. The model is used in three different ways: a) to explain the wage and employment behavior over the past thirty years; b) to uncover some important parameters that govern key quantitative relationships, such as that between employment levels and real wages; and c) to examine future employment prospects. Given existing data constraints, the model treats employment by racial group as synonymous with a skill classification of the workforce27/. To be specific, employment groups are treated as follows: African as unskilled; Asian/Colored as semi-skilled; and whites as skilled. While this approach is less than ideal, given different amounts of skill-upgrading among the racial groups, it nevertheless means that the model directly evaluates how changes in key variables impinge upon the disadvantaged majority. However, as it is certain that both present and future policy initiatives will obscure existing linkages between race and skill, the model is used only to evaluate future prospects over the short-to-medium term.

Leaving the mathematics to one side, the basic structure of the model can be described quite briefly. The central idea is that very different conditions underlie the respective labor markets for blacks and whites. Blacks are essentially viewed as a "reserve army" of largely unskilled workers who supply themselves to wage employment in the formal sector. Those who cannot find such employment are either absorbed into the informal sector or become unemployed. However, black wages cannot fall sufficiently to provide full employment as it is assumed that employers are unwilling to reduce wages below some minimum level (the efficiency wage), while trade unions may have an additional wage-raising effect. The level of the efficiency wage is not, however, treated as a fixed value and may itself fall given growing unemployment. The important point, however, is that such adjustment in the black wage is insufficient to reach full employment. The growth in black employment then depends upon the behavior of the black wage, the growth in the productive capacity of the economy, and any other changes in the level of economic activity. The labor market for whites is seen very differently. Here, drawing on the discussion above, it is assumed that white workers enjoy employment levels at, or close to, those consistent with full employment. The white wage is then assumed to adjust accordingly. Although, some unemployment among whites may result, as in very recent years, if the economy is sufficiently depressed, the main effects of a recession will work through a reduction in the white wage. Similarly, an economic upturn or a renewal of investment, will drive white real wages upwards. Faster economic growth in South Africa is thus primarily seen as being good for black employment and white wages, while slower growth will have the opposite effects.

There are two central questions that need to be answered about historical aggregate labor market behavior in South Africa. These are: a) why have African real wages

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26/ See the study by Welcher(1991).

27/ The Manpower Surveys published by the Central Statistical Services gives racial employment data broken down by occupation. While it is possible to derive time series for employment by skill levels from this source, there are no comparable wage series.

continued to rise despite growing unemployment? and b) why has employment growth slowed down so much? The answer to the first question obviously relates to that of the second.

1. Wage Behavior

The simplified view of the South African labor market outlined above is reflected in the empirical analysis of wage behavior in the manufacturing sector. It does indeed seem that rather different considerations apply when considering the behavior of black and white wages respectively. Within the black category, it is also useful to distinguish between the behavior of African wages, and those of Asians/Coloreds. The central conclusions are that: 1) African wages have largely responded to influences other than market forces that have led to an increase in réal wages despite higher African unemployment; and 2) white wages have adjusted much more strongly to market forces, and have apparently maintained white employment close to its full employment level, although a minor deviation from the latter has arisen over recent years. The wages of Asians/Coloreds seem to have followed a weighted average of those of whites and blacks, although the empirical analysis of the wage behavior of this group can only be described as rather tentative. With this in mind, the discussion below concentrates upon the empirical results for African and white wage behavior.

Both African and white real wages do display a tendency to fall in the face of increased unemployment. The important point, however, is that, given existing labor market conditions in South Africa, the effect of a given *proportionate* fall in the number of workers employed is much stronger for whites. This result is perhaps best explained with the help of a simple example. Suppose, hypothetically, that the wage employment of Africans and whites were each to fall by 1 percent. Since, at the present time, around 50 percent of the African labor force but only 20 percent of the white labor force are outside wage employment, this would increase these "not-wage-employed" ratios by about 0.5 percent and 4 percent among Africans and whites respectively. The empirical results indicate that this would lead to an fall in the African real wage of about 0.43 percent -- a significant effect, however, among whites the effect would be much larger -- a fall of 2.78 percent. White wages are thus much more sensitive to a given proportionate change in white employment than is the case for Africans.

This conclusion suggests that one reason why real white wages have shown a greater tendency to fall in the face of slower economic growth than those of Africans is that they are more responsive to lower growth in labor demand. Another factor, as indicated by the empirical results, is that, while white real wages are positively related to white productivity, the corresponding result does not apply to Africans. As slower economic growth has resulted in a corresponding reduction in growth of white productivity, this has put further downward pressure upon the white real wage.

The picture underlying the behavior of the African real wage is one in which conflicting forces have operated. Increased unemployment among Africans has, as indicated above, acted as a brake upon real wage growth. The results indicate that between 1980 and 1990, the increase in the proportion of the African labor force not having wage jobs may have reduced the African real wage by as much as 8.7 percent below the level that would have otherwise prevailed. This represents a contribution to the average annual increase in the real African wage of -0.91 percent. As shown in Table 5, the surplus of African labor has risen continuously since 1970. However, it is only relatively recently that African wages have started to fall. The explanation for this offered here is that other influences have been at work. As discussed below, three influences were identified in the empirical analysis as having put upward pressure on the African wage. These are: a) increased strike activity; b)

the decline and abolition of influx controls; and c) an ongoing tendency for African real wages to move upwards progressively towards white real wage levels.

Increased union activity, as measured by strikes per African employee, may have raised African real wages by as much as 15 percent between 1979, the year of legalization of African unions, and 1990. This effect is equivalent to an average annual real wage increase of 1.27 percent. This estimate is somewhat higher than the 0.68 percent a year implied by the results obtained by Moll (1992b) discussed earlier. The latter estimate is based, however, upon the impact of changing trade union membership among blacks, while the estimate here is based upon the growth in strike activity which has been even more spectacular. As noted earlier, the unevenness of African trade union development in South Africa makes quantitative assessment of its impact upon wages difficult, and estimates from both time-series and cross-section sources must be treated with caution.

The decline and eventual abolition of the system of influx controls seems to have had a positive effect on African real wage rates. It is estimates that this led to an increase in the real wage of 9.4 percent between 1975 and 1985 -- an average annual increase of 0.9 percent. As noted earlier, the intuitive argument that the relaxation of influx controls would reduce real wages, does not have much force in the historical context, as employers were able to recruit Africans on a temporary basis. Three further explanations may be offered here. The first is that influx controls may have inhibited African entry into urban informal sector activities and reduced mobility between formal sector employers. An increased range of urban earnings opportunities for Africans may therefore have led firms to raise their wages to deter turnover among experienced workers. At first glance, this hypothesis does not seem to fit the facts, as discharges and resignations among Africans in manufacturing declined from 4.3 percent per month in 1975 to 2.5 percent in 1985. However, it must be remembered that the existence of influx controls presumably forced some employers to employ an excessive proportion of temporary workers thus pushing up the measured exit rate, and that this rate would have automatically fallen as the proportion of permanent workers increased. This then leads to a second explanation -- influx controls increased the use of temporary workers who were paid less than permanent workers. A third possible explanation is that the relaxation of influx controls was closely correlated with reduced discrimination and increased fairness in wage-setting. It should be noted, however, that, as discussed below, the empirical model found evidence for this even after the effects of influx controls had been standardized for. Whatever, the case, however, influx controls were abolished in the mid-1980s, and cannot have any further influence on present-day wage movements.

The empirical results also indicate that African real wages have progressively been pulled closer to the level of the real white wage. This may reflect a number of factors such as reduced discrimination, increased pressure on employers to reduce inter-racial wage differentials, and some convergence in skill levels between Africans and whites. As noted earlier, it is difficult to separate the quantitative importance of these different effects. In total however, their joint influence is estimated as having raised the African real wage at an annual rate of around 2.5 percent over the 1970s, when white real wages were rising, but as having had a negligible effect during the 1980s, when white real wages were in a decline. The obvious interpretation of this is that while reduced discrimination etc. has lead to a sustained closing-the-gap effect, there is an additional influence on the African real wage arising from movements in the real wage of whites. While this suggests an additional mechanism through which African wages may have adjusted to changing economic conditions, it seems to have been relatively unimportant.

2. Employment Behavior

As employment generation among blacks is likely to be a major policy priority in the future, it is very important to understand why employment has been growing so slowly over recent years. As employment by government in its various forms is itself a policy instrument, the empirical analysis concentrates upon the determinants of total employment in other sectors of the economy. The main conclusion of the analysis are that, while movements in factor prices, and, in particular, upward movement in the African real wage, rate, have had a depressing effect on employment growth, much of the employment slowdown seems to arise from other sources.

As the analysis is a heavily technical one, the discussion here concentrates on a few of its broad features and some central conclusions. One feature of the analysis is that there does seem to be evidence that increased capital-intensity in the non-government sector in South Africa has partly arisen because the cost of using capital has fallen relative to the cost of employing workers. This is shown in Figure B below which plots the ratio of the capital stock to black employment in the non-government sector against the corresponding ratio of the real user cost of capital28/ to the black wage. It is readily seen that the trends in the two series move in opposite directions, particularly from 1960 through 1980. There is also a slowing in the rate of growth of capital intensity after 1984, that may reflect a lagged response to a cessation in the downward trend in the factor price ratio after 1981. A broadly similar relationship not shown here is also observed between the ratio of an aggregate of capital and black labor to employment of whites and the ratio of the cost of this combination to the white wage.

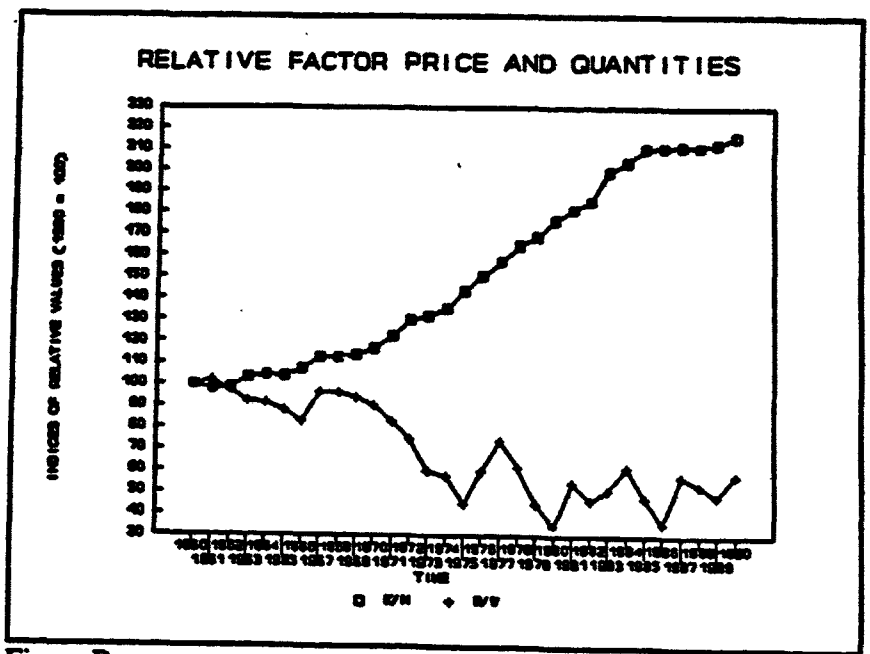

Figure B

Notes: K/N – Ratio of non-government capital stock to non-government employment of blacks.
R/W – Ratio of real user cost of capital to black wage.

28/ This is basically a measure of the opportunity cost incurred by holding wealth in the form of durable assets such as capital equipment and buildings. Its derivation is described in the Appendix. The real interest rate is an important component in this measure.

While the econometric analysis confirms the statistical validity of these relationships, it also indicates that unidentified forces other than movements in factor prices have raised the capital intensity of the economy over the past three decades. Although the decline in the non-gold external terms of trade offers a very tempting statistical explanation for the remaining increase in capital intensity, one cannot rule out the possibility that this merely represents a spurious relationship, and that a quite different set of variables have been responsible. Nevertheless, the decline in the terms of trade may serve as a useful proxy for policy response via increased strategic investment to the growing opprobrium of the international community, and may also have contributed to the relative decline of labor-intensive sectors such as agriculture. The empirical analysis also suggests that the decline in the terms of trade was a significant factor in reducing white employment below its full employment level.

White labor supply is another variable that seems to have influenced the level of black employment. The historical predominance of severe labor market discrimination meant that middle and higher-level jobs were virtually the sole preserve of whites. As noted above the exclusion of other groups from such jobs was reinforced by job reservation and other measures. Until quite recently, full employment was maintained among whites , this thus suggests that the growth in white labor supply may have acted as a constraint both upon economic growth in general and the employment growth of blacks. This proposition crudely fits the facts as white labor force growth has declined over the 19702 and 1980s given lower net immigration. However, this effect has presumably become less important over recent years as the occupational attainment of blacks has improved, and white unemployment has started to rise.

How important have been changes in factor prices in explaining South Africa's disappointing employment performance? To answer this question one first need to note that if the ratio of capital to black workers had remained at its 1960 value, black employment in 1990 would have been about 3.66 times its level in 1960 -- an increase of 266 percent. The estimated model predicts that, given observed change in relative factor prices and the change in the external terms of trade, black employment in 1990 would have only registered an increase of 78.3 percent. This compares reasonably closely with the actual increase of about 70 percent. The total impact of changing factor prices and other changes is then a reduction in the order of (266 - 78) or 188 percent of the 1960 level. If relative factor prices alone had changed, it is estimated that black employment in 1990 would have increased by 197 percent. The impact of the reduction in black employment due to changes in relative factor prices taken alone is then only (266 - 197) or 79 percent of the 1960 level. This estimate thus suggests that only (79/188) or 42 percent of the shortfall in black employment attributable to the change in the capital-to-black-labor ratio between 1960 and 1990 arose from changing factor prices. It seems then that other factors as discussed above account for the bulk of the shortfall.

These results nevertheless suggest that changes in factor prices have had an important effect on black employment. The empirical results indicate that this can overwhelmingly be traced to upward movements in black wages. The alternative view that employment growth has been retarded by a falling real user cost of capital carries much less weight, despite the fact, that, during the period, 1974 to 1986, the real user cost of capital was at around 60 percent of its typical value during the 1960s and early 1970s29/. The reason behind this is that while a lower real user capital cost induced substitution of capital for black labor, it also had the contrary effect of making both capital and black labor more

29/ During this period, monetary policy had the effect of stabilizing the interest rate at a level below that of the rate of inflation.

attractive as compared with employing whites30/. There was thus both a substitution effect that worked against black employment and an expansion effect, reflected in increased investment, which worked in the opposite direction. The results actually indicate that the net effect of a lower user cost of capital was only trivially negative with respect to black employment. This then leaves the rise in black wages as the critical factor price. As argued above, real wages have been propelled upwards by important institutional and socioeconomic changes, even in the face of a growing labor surplus. The results described in the Appendix suggest that the elasticity of black employment with respect to the real wage is of the order of -0.25. This estimate is similar for both Africans and Asians/Coloreds. While this estimates may not seem very high, it is fairly typical of values obtained elsewhere for industrial countries.

As noted earlier, there was near full employment among whites up to the mid-1980s. Demand for white employees was thus driven by white labor supply. Since 1985, white employment has increasingly deviated from full employment as the recession intensified. However, this effect has so far been relatively minor, and the observation that white wages adjust to keep whites close to full employment still approximately holds.

The results of this section obviously do not accord with the view that slow employment and GDP growth have heavily been caused by the maintenance of an artificially low real user cost of capital through low interest rates and an overvalued foreign exchange rate31/. There are three principal justifications for this conclusion. First, as noted above, a lower real user cost of capital encourages both increased investment (a positive influence on black employment) and increased substitution of capital for labor (obviously a negative influence on black employment) and therefore has conflicting effects. Second, while there appears to be significant substitutability in aggregate between capital and both black and white labor, such substitutability is more limited than sometimes supposed. The lower the level of substitutability then the weaker is the impact of a change in factor prices on factor quantities. Third, there appear to have been important structural shifts towards increased capital intensity in the South African economy that are not explained by shifts in relative factor prices. These results do not imply, however, that the maintenance of real interest rates and the avoidance of an overvalued exchange rate are misjudged policies, but simply that they should be judged on the basis of wider criteria such as, for example, their impact upon domestic saving, resource allocation and international competitivness.

3. Some Scenarios

The model can be used to provide answers to two further questions: a) what employment gains can South Africa achieve if the economy moved back to a level of economic activity consistent with full capacity? and b) what would subsequently happen if

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30/ To take an extreme example, suppose that capital and unskilled labor are used in fixed proportions, so that direct substitution between them is impossible. A fall in the real user cost of capital would then raise employment of both capital and unskilled labor relative to that of skilled labor.

31/ This argument is made by Lombard and van den Heever (1990). Their empirical analysis does not distinguish the potentially different roles of white and black labor, and employs an aggregate Cobb-Douglas production in which, by definition, the elasticity of substitution between labor and capital is set equal to unity. As the authors rightly note, their assumed form of production function strongly conditions their results. An additional and very important difference between their work and the present analysis is that whereas they take the level of investment and hence growth in capital stock to be determined by the total of domestic and foreign savings, and hence to be uninfluenced by the real user cost of capital, the present analysis allows the capital stock to be itself determined by the real user cost of capital and other variables.

investment and hence the growth in the capital stock were maintained at a much higher level than at present? The answer to the first question is not terribly optimistic as the economy does not seem to be much below its full capacity at present (see Appendix, section F). There is obviously a range of possible answers to the second question depending on the extent of an investment revival, but in general, prospects for employment growth are much brighter

A scenario concerning a return to full capacity was constructed using assumptions listed in the Appendix. Under this scenario, it would be possible to achieve an average annual growth rate in non-government black employment of 3.3 percent over a five year period. Assuming that government employment of blacks continues to grow at about 3.8 percent as over the past decade, this would imply an annual average growth in total black employment of around 3.4 percent. As the labor supply of Africans and Asians/Coloreds are both projected to grow at 2.8 percent per annum over the next decade, this suggests that the proportion of blacks not holding formal wage employment would fall slightly over the period. White employment grows more quickly than white labor supply at a rate of 3.1 percent per year, as the scenario assumes that white unemployment would quickly revert to a level close to full employment. Black and white wages would rise in real terms under this scenario by 2.7 and 3.1 percent a year respectively. However, once the effects of returning the economy to full capacity had worked themselves fully out, a scenario of this kind is of little interest, as it is implicit in its assumptions as the economy moves back on to its slow growth path. During the revival, non-government capital stock grows at about 3.5 percent a year. However, once the revival is exhausted, this growth rate falls back to about 2.2 percent. Consequently, growth in black employment would fall below that of black labor supply growth to about 2.5 percent per year. This implies that unless other influences increase capital stock growth, then once the South African economy returned to a "business-as-usual" position, its historical inability to supply sufficient jobs to the most impoverished groups would once again reassert itself.

Over recent years, capital stock has grown very slowly, and employment performance would be much more satisfactory if capital stock growth returned to earlier historical levels and the job attainments of blacks could be improved more quickly to those of whites. The scenarios presented in Table 10 show some predicted growth rates as calculated from the empirical model under alternative assumptions regarding rates of sustained rates of capital stock growth32/ and the proportion of the black labor force upgraded annually to white status. The estimates shown are of expected growth rates in key variables over a five year period immediately following the point at which the economy reached full capacity. These scenarios thus represent a kind of "follow-on" to the one discussed above under which consistently higher capital stock growth rates are imposed. Even the least optimistic scenario, under which non-government capital stock grows at 4 percent per year and no black workers are upgraded, suggests that total black employment (non-government, government, and domestic servants) could grow at 3.0 percent -- not greatly above assumed labor supply growth. Black wages, even among those not upgraded, grows faster than those of whites under all scenarios, given a tightening of the black labor market through reduced unemployment and a continued "catching up" effect between black and white wages.

32/ While it is true that the empirical model predicts non-government capital stock growth rates, and that the imposition of higher value for such rates is in a sense stepping beyond the bounds of the model, it should also be remembered that the empirical results suggest that important shifts in the factor demand equation have occurred that seem to have been associated with South Africa's increasing isolation from the international community. The approach adopted here may be reconciled with the formal model if the real user cost of capital is perceived to decrease by investors given greater international acceptance of South Africa and a more stable domestic environment.

In the scenarios under which no upgrading of blacks takes place (group A), the proportion of blacks without wage jobs would still remain high for a long time to come even under the most optimistic case. If the non-government capital stock grew at 6 percent a year -- about the growth rate during South Africa's fastest post-war growth epoch during the 1960s -- annual black employment growth would exceed that of labor supply by about 1 percent. If this result were applied to the African labor force, it would take much longer than a decade for the proportion of Africans without wage employment to fall from 50 to 40 percent. While this would in itself constitute a remarkable improvement, it would imply that unless the informal sector grew very rapidly so as to fill the void, South Africa would still face unemployment rates among its black labor force of 15 percent and higher for a considerable number of years to come.

Table 10

Employment and Wage Scenarios

Scenarios	Annual Average Growth Rates (%)					%
	Black Employment	Black Real Wage (Non-transferees)	Black Real Wage (All)	White Real Wage	GDP	Invest-ment to to GDP Ratio
	A (no upgrading)					
Annual Rate of Growth of non-Government Capital Stock:						
= 4%	3.0	3.1	3.1	2.5	3.9	24.6
= 5%	3.6	4.2	4.2	3.0	4.2	26.9
= 6%	4.1	5.2	5.2	3.4	4.4	29.6
	B (upgrading rate = 1/2% black labor force)					
= 4%	3.9	1.7	3.0	0.7	4.8	22.9
= 5%	4.4	3.0	4.1	1.4	5.4	24.8
= 6%	4.9	4.4	5.2	2.1	5.9	26.9
	C (upgrading rate = 1% black labor force)					
= 4%	4.6	0.5	2.1	-1.1	5.1	22.1
= 5%	5.1	2.0	3.3	-0.2	5.7	23.8
= 6%	5.6	3.6	4.5	0.11	6.4	25.6

Source: Author's Calculations

Notes: (1) The scenario differ according to: the assumed rates of growth in non-government capital stock as indicated; and an assumption regarding the progressive upgrading of black workers via improved skills and reduced discrimination to levels enjoyed by:
Group A - no upgrading of blacks from their 1990 status.
Group B - 1/2 a percent of the black labor force is transferred annually to white worker status.
Group C - 1 percent of the black labor force is similarly transferred.
(2) The growth rates for black employment and the black real wage refer to all blacks, i.e., both upgraded and otherwise.
(3) Growth rates and ratios are five-year averages.

It is possible to take a more optimistic view if the observed historical linkage between economic growth and growth in white labor supply were to break down more rapidly.33/ In the past, white workers have been closely mapped into a range of mangerial and supervisory jobs, and this seems to have acted as a constraint upon the economy. A further opening-up of these jobs to blacks should ease this constraint, thus permitting higher rates of growth in black employment and in real GDP, with lower real wage growth among whites. This is illustrated in Table 10 by the group B and C scenarios under which 1/2 percent and 1 percent respectively of the black labor force are assumed to be upgraded annually to white status. The group C scenarios suggest, for example, that such upgrading would raise the overall annual growth in black employment by between 1.4 and 1.6 percentage points above those indicated when no upgrading takes place. Under the most optimistic of these scenarios, unemployment among blacks could be eliminated within 15 years if informal sector employment grew at the same pace as black labor supply. However, the urgency of the unemployment crisis in South Africa is such that other vehicles for black employment creation may be needed. Some implications of this are discussed in the next section.

A more optimistic view of black employment growth could also be taken, if real wage growth were slower than predicted -- for a rough benchmark, a 4 percent black real wage growth rate (excluding upgrades) results in 1 percent less annual growth in black employment. Under the group B and C scenarios, real wage growth among blacks who are not upgraded is lower than in the scenarios with no upgrading, as lower white real wage growth, associated with faster creation of skilled manpower, stimulates less black wage growth through the "catching up" effect. This is a further partial reason why black employment growth is higher in the group B and C scenarios.

Rapid employment growth may well be unsustainable unless significant upgrading of the black labor force takes place. If one assumes that both the stocks of residential and government capital continue to grow at around 2.4 percent a year (their combined annual average growth rate between 1985 and 1990), then the no-upgrading scenarios described in Table 10 imply that the ratio of gross fixed investment to GDP would increase from its 1990 value of 20.3 percent to 24.6, 26.9 and 29.6 percent respectively. The most ambitious of these scenarios (non-government capital stock growth equals 6 percent) would imply that, if the national savings ratio remained constant, then the external current account balance expressed as a proportion of GDP would move from an existing surplus of about 2.2 percent to a deficit of around 7.1 percent. While this latter figure could be trimmed through an increase in the domestic savings rate, it would nevertheless seem to be beyond the limits of medium-term sustainability. In this context, scenarios assuming a lower rate of capital stock growth would seem more reasonable, although, even here, only the lowest case (non-government capital stock growth equals 4 percent) seems sustainable. This concern becomes more serious if, as seems plausible, there were increased growth in housing and government investment, or, if as happened during 1991, the national savings ratio were pushed below its normal historical level by increased dissaving on the part of the government.

Macroeconomic sustainablity is much better, however, under the upgrading scenarios. Even in the most optimistic case under group C, the investment-to-GDP ratio would only rise to about 25.6 percent, thus, on the basis of the same reasoning as above, suggesting an external current account deficit of 3.1 percent of GDP. Given GDP growth of 6.4 percent a year, this scenario could be sustainable and would yield a very healthy annual rate of growth in black employment of 5.6 percent. Similarly, although the group B scenarios are less encouraging, sustainability could still be achieved with an annual average growth in non-government capital stock of 5 percent giving black employment growth of 5.1 percent a year.

33/ A similar conclusion was also drawn by Iyengar and Porter (1990) using a disaggregated simulation model.

These upgrading scenarios represent only a crude representation of the alternative facing South Africa. It remains unclear, for example, to what extent such upgrading would require additional training of black workers or simply a changed perception on the part of employers. Insofar as more training would be needed, such increased training levels would obviously impose additional costs on either workers or firms. What is assumed here is that a pact exists between unions and major firms under which employers agree to bear additional training costs in return for greater discipline among their workforces. The deterrent to employing more black workers through increased training requirements is then assumed to be counterbalanced by reduced industrial relations costs. The need for diversion of skilled workers to training activities and additional investment in training facilities would probably be relatively minor. Clearly, more work is needed on these issues. What is established in the analysis above, however, is that South Africa's future growth prospects cannot be viewed simply in terms of the historical linkage between capital stock and output, but are likely to depend crucially upon the rate of expansion of the skill base.

Section V. Some Further Implications

As a starting point for the design of an employment it should first be noted that much of the evidence above points firmly to the conclusion that the labor market in South Africa is not performing its allocative function very efficiently. Leaving to one side the depressant effect of the present recession, a major problem is that wages paid in the formal sector are well above the wages that jobseekers are prepared to accept. This is illustrated by the substantial gap in labor incomes between those in the formal and informal sectors, and it is highly plausible that this applies well up the educational spectrum. It is suggested in the Appendix, that this problem arises because employers find it against their own interests to pay below some minimum wage (the efficiency wage). although the rise of African unionism may have been another important factor. However, whatever the reason why black wages are above workers' supply prices, this means that employers will consistently perceive the cost of black labor as above its true social cost. The result will of course be sub-optimal employment levels. This effect has presumably been further exacerbated to an unknown extent in the past by publicly-supported strategic investments. These considerations would thus support the argument that government should price unskilled labor at below prevailing wage rates in making future investment decisions, encourage wage restraint in the economy in general, and seek means of encouraging higher employment in the private and parastatal sectors. While there are of course other pressing reasons for expanding black employment, including various political, social and poverty-alleviation dimensions, these simply reinforce the basic argument.

There are four obvious mechanisms through which additional employment creation could be achieved: i) public employment creation schemes; ii) encouragement of small businesses/informal sector activities; iii) improvement of the skills of the black labor force; and iv) the introduction of employment subsidies. Each of these is discussed further below.

In the short-to-medium term, it is likely that additional employment will be generated through the implementation of special employment programs. One concern is that such programs may simply involve a redistribution of resources from other sectors of the economy34/ While, multiplier effects generated by such programs must be limited, given relatively little spare capacity in the economy, and increased imports are likely to stimulated, there is little evidence to believe that significant crowding-out effects would occur in the market for unskilled labor. It is nevertheless important that such schemes be located in areas where there are substantial concentrations of surplus labor, otherwise local wage rates may be bid up to the detriment of employment outside the schemes. Care should also be taken in implementing such programs: that labor-intensive techniques be used; and that the burden on public expenditure be eased by paying wages below prevailing levels. As unskilled labor is in excess supply in

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34/ See, for example, Roux (1991). He raises this point alongside other considerations.

South Africa, it is appropriate that such labor be valued at its social opportunity cost (the shadow wage). The informal sector wage may be taken as a rough guide, although a higher wage than this may be a better estimate of the shadow price of labor as informal sector activities tend to employ many workers on a part-time basis. The special employment scheme introduced in South Africa35/ during 1985-86, paid much lower wages than prevailing rates, and yet, there was a strong demand for places on the scheme. Success has also been achieved in implementing such schemes in other developing countries36/.

It should be carefully investigated whether distortionary influences exist that are biased towards capital-intensive industries. The most obvious historical example is the redirection of investment in both the 1970s and 1980s towards strategic industries such as iron and steel, and petrochemicals. This process may be continuing. Past strategic investments could not to be justified under rational cost-benefit methodology, and there is no reason to believe that this does not apply to such existing investments. It also needs to be established whether the relative absence of small-scale production units in numerous sectors is also the result of policy distortion, as such small-scale units are usually more labor intensive. One mistake that should be avoided is to follow the route of discouraging the informal sector. It has been commonplace in other Southern African countries to discourage such activities though over-zealous application of municipal regulations and by denial of access to public utilities. Historically, the apartheid system discouraged the informal sector, but fortunately, this position has been abandoned. There is clear evidence from studies carried out in South Africa that the informal sector is increasingly providing a sustainable source of income to a substantial proportion of its labor force. As even the most optimistic scenario presented in this paper indicates that formal sector will mop up unemployment quite slowly, informal sector growth provides the only plausible route to fill the gap for many years to come.

Over the long haul, great priority is likely to be attached to improving the skills of disadvantaged groups. This should prove consistent with the objective of redistributing income. It should not be assumed, however, that this will automatically lead to a major improvement in the employment prospects of such groups, as there is little evidence that unemployment declines sharply by education among black school-leavers below diploma or degree level. This doubtless reflects both the inferior quality of the education received by blacks when compared to that of whites and the persistence of labor market discrimination. In the immediate future, encouraging the acquisition of job-related skills by blacks could be of more immediate benefit, while a closing of interracial educational standards would be beneficial over the longer term.

Employment subsidies are a natural choice of policy instrument when wages are higher than workers' supply prices. In principle, there are two types of employment subsidy -- average and marginal37/. The difference between the two is that whereas an average subsidy is paid for every worker employed by a firm, a marginal subsidy is only paid for additional workers hired. Both types of subsidy can be difficult to administer as employers have a clear incentive to report exaggerate employment levels. Large multi-enterprise firms would have the additional advantage that they could benefit from a marginal employment subsidy by moving workers between enterprises. In countries such as South Africa in which many formal sector employees do not pay income tax or file income tax returns and in which registration for unemployment insurance is non-compulsory, it could become very costly to

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35/ See Nattrass and Roux (1991).

36/ See, for example, the discussion of public employment schemes in the World Development Report (1990).

37/ A marginal subsidy has the obvious advantage that it costs less at the same subsidy rate. In general, however, an average subsidy will have more impact on employment. Formal analysis of the theoretical effects of the two types of subsidy is quite complex. For a discussion and further references, see Layard, Jackman and Nickell (1991).

assess the employment levels of individual firms by means of direct inspection. This would be much easier if a each employee were issued with a social security number, and this along with other details were computerized. At present, however, South Africa has no such system. If employment subsidies were introduced, it would be more realistic if they were targeted towards sectors with a relatively elastic demand for unskilled labor. In a reasonably open economy, these are normally the more labor-intensive segments of the tradeable goods sectors, and in the context of South Africa, where the potential for further import substitution seems limited, one would expect to find these among sectors with export potential. This type of measure cannot be evaluated, however, only in the context of employment creation, but would also have to be assessed in terms of its budgetary impact. Such subsidies should also be regarded as a temporary measure aimed at easing adjustment towards a more labor-absorbing economic structure.

There are two forms of labor market intervention that should be avoided, given the prevailing labor market circumstances in South Africa. These are: a) aggressive national minimum wage policies; and b) job security regulations.

While it is true that, given the relative inelasticity of demand for unskilled labor in South Africa, an aggressive minimum wage policy could redistribute income towards the lower-paid by raising their real wages, this could operate only at the expense of an absolute fall in the real incomes of other groups. In other words, this is an inefficient method of achieving an income redistribution as it lowers the growth rate of GDP. It is also true that difficulties have been encountered with this approach in other countries.

There is thus a potential conflict between efficiency and equity objectives. An advocate of efficiency objectives would argue that, given heavy excess supply of unskilled labor, the real wages of unskilled workers should be encouraged to fall during an economic revival so as to maximize employment and output growth. In contrast, an advocate of equity objectives, while noting that this approach would raise the total income accruing to unskilled groups, would be concerned that their share of labor income would fall, while skilled white workers would benefit most from such a revival.

After achieving independence, many sub-Saharan African countries either introduced minimum wages or raised existing minimum rates to levels above prevailing market rates. Usually, the aim of this policy was to provide employers with a more stable work-force and to counteract perceived exploitation of indigenous workers by colonial administrations. Yet, in virtually every case, such aggressive policies were subsequently moderated over time, and minimum rates allowed to fall steadily given domestic inflation. The principal difficulty that arises with an aggressive minimum wage policy is that it significantly reduces employment in labor-intensive tradeable goods sectors. In addition, the enforcement of minimum wage regulations has proved difficult in a number of countries. The most recent example is provided by Zimbabwe, where minimum rates were increased significantly in real terms between 1980 and 1982. However, the Government found evidence that this was encouraging lower employment growth, particularly in agriculture, and allowed minimum wages to fall gradually in real terms. Subsequently, controls on the level of wage increases were introduced in the mid-1980s, which favored lower-paid employees. These have, however, been difficult to enforce in the private sector.

A number of countries have also introduced tight job security regulations (JSR). While the exact format of such regulations differs widely, the common feature is that employers have to obtain government permission before retrenching employees or closing down factories and offices. The theory behind JSR is that employment levels would be higher than otherwise, given fewer retrenchments. In fact, available empirical evidence suggests that the imposition of JSR actually reduces employment as employers become more reluctant to hire additional workers38/.

38/ See Fallon and Lucas (1991) for a study of the impact of JSR in India and Zimbabwe. This study also finds that JSR have no impact on wage rates.

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APPENDIX

A. Model of Wage and Employment Behavior

The model attempts to explain the behavior of wage rates and factor (i.e. labor and capital) employment levels over the period 1960 to 1990. Throughout the analysis, employment levels among both government employees and domestic servants are treated as given, and are excluded from the employment categories described below. As explained in the text, the model uses the four racially-based employment groupings as identified in South African wage and employment data as the basis of the empirical analysis. Two groups, Asians and Coloreds, are combined to form a single group. A central assumption is that, given substantial disparity between skill levels across races, racial employment categories are a useful proxy for more general skill categories. The notation used in describing the model and subsequent empirical results reflects this assumption. The three labor types identified are: U -- unskilled labor as measured by African employment; SS -- semi-skilled as measured by Asian/Colored employment; and, S -- skilled labor as measured among whites. The corresponding money wage rates are defined as W_U, W_{SS}, and W_S, respectively.

To simplify further, U and SS are further aggregated to form a single constant elasticity of substitution (CES) category, N (non-skilled). This is defined as:

$$N = (\alpha U^{\theta 1} + (1 - \alpha)SS^{\theta 1})^{1/\theta 1}.$$

The parameters of this aggregate are estimated from the relative marginal productivity relationship:

$$\log(U/SS) = \sigma_1 \log(\alpha/(1 - \alpha)) - \sigma_1 \log(W_U/W_{SS}) \qquad (1)$$

where, the elasticity of substitution, $\sigma_1 = 1/(1 - \theta 1)$. The wage rate corresponding to N may be written as:

$$W_N = (W_U + W_{SS})/N.$$

To model further the factor demand side of the economy, one must specify the underlying production relationship. Estimation of labor demand equations derived from a Cobb-Douglas production function yielded implausible, though statistically-significant, values for relevant parameters. This approach was therefore abandoned. The most general function, the translog, proved unattractive in the present context, as it is difficult to handle dynamic processes within this framework. Experiments were therefore tried with alternative Two-Level CES production functions. Given three factors, Z_1, Z_2, and Z_3, this function may be written as:

$$Y = A(\gamma(\beta Z_1^{\theta 2} + (1 - \beta)Z_2^{\theta 2})^{\theta 3/\theta 2} + (1 - \gamma)Z_3^{\theta 3})^{1/\theta 3};$$

where Y is GDP net of government, and A is an efficiency parameter. In this example, Z_1 and Z_2 are contained in single CES aggregate that is in turn nested within a further CES function. There are three possible specifications depending upon whether Z_1 (as above), Z_2, or Z_3 is the "odd man out". Initial experimentation with the relevant factor demand equations indicated that the most promising specification in the South African context was:

$$Y = A(\gamma(\beta K^{\theta 2} + (1 - \beta)N^{\theta 2})^{\theta 3/\theta 2} + \gamma S^{\theta 3})^{1/\theta 3};$$

where, K is capital stock exclusive of government and residential property.

The factor demand equations can now be constructed in stages. The relative demand for K and N is given by:

$$\log(K/N) = \sigma_2\log(\beta/(1 - \beta)) - \sigma_2\log(R/W_N) \qquad (2)$$

where: the elasticity of substitution between K and N, $\sigma_2 = 1/(1 - \theta 2)$; and R is the real user cost of capital. The CES aggregate of K and N may is constructed as:

$$Q = (\beta K^{\theta 2} + (1 - \beta)N^{\theta 2})^{1/\theta 2};$$

The corresponding rental price of Q is given by:

$$R_Q = (RK + (W_N/P)N)/Q,$$

where P is the non-government GDP deflator. W_N/P is thus the real product wage of N.

The next factor demand equation may be constructed analogously. The relative demand equation for Q and S is

$$\log(Q/S) = \sigma_3\log(\gamma/(1 - \gamma)) - \sigma_3\log(R_Q/W_s). \qquad (3)$$

This can be used in the construction of the Two-Level CES production function described above. The function exclusive of the efficiency parameter is

$$YE = (\gamma(\beta K^{\theta 2} + (1 - \beta)N^{\theta 2})^{\theta 3/\theta 2}) + (1 - \gamma)S^{\theta 3})^{1/\theta 3};$$

and the efficiency parameter can be estimated as,

$$A = Y/YE.$$

Equations (1) through (3) deal only with ratios of factor demands. To complete the factor demand side of the model we must specify an additional equation that determines the absolute value of a factor. The obvious route through the standard marginal productivity framework would be to estimate the equation,

$$\log(Y/S) = (1 - \theta)\log(\theta/\alpha) + ((1 - \theta)/\theta)\log(\backslash + (1/(1 - \theta)\log(W_s/P),$$

simultaneously with (3) above while imposing the appropriate cross-equation constraints on the parameters. The influence of macroeconomic disturbances could then be investigated via their influence on Y. This approach is, however, unattractive for two reasons. First, as noted in the text, employment among whites has remained close to full employment levels over most of the period studied. The dominant causality, interpreted in terms of the above equation, has run from Y/S to W_s/P, rather than the other way around as suggested by the equation. Second, if strictly interpreted, the equation implies profit-maximizing behavior in the context of competitive product markets -- dubious assumptions in the South African context given the oligopolistic structure in many sectors and the historical importance of parastatals. The basic problem in the equation is that the product price, P, is taken as the relevant denominator for the real wage. If firms try to maximize profits in a non-competitive environment, then P should be replaced by a measure of marginal revenue. If the behavior of firms is not characterized by

such maximization objectives, then P should be replaced by marginal cost. In either case, the relation between P and the appropriate variable may change systematically over time. The relative factor demand equations (1) through (3) above are less sensitive to this problem as they rely only upon an assumption of cost-minimizing behavior.

The approach followed is more direct than that outlined above, and is broadly consistent with the Keynesian tradition. Let NWS be the proportion of the white labor force outside of wage employment. As noted in the text, this proportion fluctuated relatively little during 1960-85, but has risen sharply since then. The central argument is then that there is a direct link between macroeconomic demand variables and NWS, i.e.

$$NWS = NWS(Z_{NWS}). \qquad (4)$$

where Z_{NWS} is the relevant vector of macro-variables. The empirical specification of (4) is described in a later section of this Appendix. As S is identically defined by

$$S = (1 - NWS)S_{SUP},$$

where S_{SUP} is the supply of S, equation (4) allows a direct link between macroeconomic disturbances and S.

Turning now to the wage equations, different consideration apply in each case. The conventional assumption regarding unskilled labor in most less developed countries is that of a reserve army generating a more-or-less perfectly elastic supply to formal wage employment. Here, the emphasis is placed more upon employer wage-setting behavior, where it is assumed that efficiency wage considerations apply, or, in other words, that it is against employers interests to pay a wage below a certain minimum value (the efficiency wage39/), and that this minimum value is above the labor supply price. In this framework, wages can nevertheless be driven above efficiency levels by trade union pressure, while the level of the efficiency wage will be influenced by changes in alternatives open to unskilled workers. The discussion in the text indicates that three influences may have been particularly relevant to the South African context: the rise and fall of influx control measures insofar as they limited the access of Africans to urban informal sector activities; the growth in overall excess labor supply of Africans; and the rise of African trade union power. These influences are reflected in the variables included in the empirical estimating equation. However, to postpone further discussion to the empirical section, the unskilled (African) real wage equation is written as

$$W_U/CP = W_U(Z_{WU}), \qquad (5)$$

where: CP is the consumption price deflator; W_U/CP is thus the real unskilled consumption wage; and, Z_{WU} is the vector of relevant variables.

The wage of skilled labor (whites) is set in a union-bargaining framework. The main consideration is that, in setting wages, unions take into account the reaction of employers in terms of employment levels, and the quality of the alternatives open to union members if they lose their jobs. The real consumption wage is then taken as a function of labor demand variables, as proxied by observed

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39/ There are several distinct versions of the efficiency wage theory. Each of these notes that, while employers face lower wage costs when the wage is lowered, there may be other adverse consequences for profit levels. For example, at a lower wage: a) worker effort may fall; b) turnover may increase; and c) the average quality of job applicants may deteriorate.

productivity of S, and the level of excess labor supply among whites. The relevant equation is, for the moment, written as

$$W_s/CP = W_s(Z_{ws}). \qquad (6)$$

The final wage equation is that of semi-skilled labor. Here, it is assumed that the relevant considerations are a mixture of those reflected in (5) and (6). The equation is thus written as

$$W_{ss}/CP = W_{ss}(Z_{ss}) \qquad (7)$$

In this model, employers react to factor prices deflated by the product price, while the wage equations determine real wages as deflated by the consumer price. The linkage between P and CP constitutes the final equation to be estimated, i. e.

$$\log(P/CP) = P(Z_p). \qquad (8)$$

As explained later in this Appendix, numerous identities must be specified to close fully the model.

B. Data

Employment and wage data are taken from two sources. Data for recent years are from the CSS annual publication, 'South African Labour Statistics' (1991), and their subsequent Statistical News Releases. Data prior to 1985 are from the Southern Africa Labour Development Research Unit (SALDRU). The standardized employment series as published by the CSS and used in this study were compiled by Roukens de Lange and van Eeghen (1990). There are no all-economy, non-government wage series on South Africa. Wage rates in manufacturing are used in the analysis below. These series behave similarly to the series on wage rates in the non-primary sectors as compiled over recent years by the CSS. The same two sources are the basis for data on strikes and prosecutions under African mobility control laws. All data based upon national accounts variables, capital stock, and price deflators are either taken or calculated from the data base compiled by the Reserve Bank of South Africa. The historical series on the fiscal deficit, as measured by the deficit under the Exchequer account was compiled via a backward search through issues of the Reserve Bank's Quarterly Bulletin. The series on the user cost of capital was calculated by Kahn, Senhadji and Walton (1992). This variable was calculated as

$$R = IPR(i - \Delta P/P + \delta - ((1 - \delta)(\Delta IPR/IPR)),$$

where IPR is the ratio of the investment deflator (excluding government) to P, i is the nominal lending interest rate, and δ is the depreciation rate as estimated by Lombard and van den Heever (1990). Kahn *et al* is also the source the series on the trade-weighted real exchange rate. All deflated series are calculated at 1985 prices.

C. Empirical Results and Model Simulation

All equations, with the exception of the empirical counterparts to equations (4) and (8), are estimated by two stage least squares (2SLS). It will become clear from an inspection of the equations below that the model contains a large number of potential instruments when lagged variables are taken into account. Given the limited number of observations, it was desirable to replace the list of eligible instruments by a reduced set of their principal components. Using the criterion that the set of such

components should contain at least 95 percent of the variance of the set of eligible instruments, it was possible to reduce the instrument set to five principal components. The latter are used in all instrumented equations.

In the presentation of the estimated equations below, t statistics are given in parentheses, ρ is the estimated autocorrelation coefficient, and DW is the Durbin-Watson statistic. The estimated form of equation (1) is

Method=2SLS. Autocorrelation adjustment = Second Order

$$\log(U/SS)_t = \underset{(2.67)}{1.30 - 0.451\log(W_U/W_{SS})_t} \qquad (1')$$

$$\rho_1 = \underset{(5.98)}{1.61}, \rho_2 = \underset{(2.60)}{-0.6}, DW = 2.78, R^2 = 0.96.$$

The equation indicates an elasticity of substitution of 0.45 between unskilled and semi-skilled labor. This estimate is somewhat lower than most comparable cross-section estimates for the USA (e.g. Dougherty (1972)). As indicated above, this equation is used to form the non-skilled labor aggregate, N.

The next two equations require more explanation. It became clear that equations (2) and (3) needed some further modification before a fully satisfactory empirical fit could be obtained. First, it was noted through tests of structural parameter shifts, that the estimated distribution parameters, β and γ, displayed a clear upward tendency over time, i. e. there was an unexplained tendency towards increased capital-intensity. Assuming that this reflects structural shifts within the economy, such as strategic investment associated with growing economic isolation, and the declining importance of agriculture, it is plausible that this structural shift would be associated with a deterioration of the external terms of trade. The logarithm of: the gold terms of trade (LGTT), (i.e. the price of gold relative to import prices); and the non-gold terms of trade, LTT, (defined equivalently); were experimentally added as explanatory variables. As it also possible that movements in the real exchange rate could alter the mix of tradeable and non-tradeable production in the economy, the log of the real exchange rate (LRER); was also included as a further variable. Of these, LTT proved to be the dominant influence. LRER, while positive and significant in some specifications, was finally discarded, and LGTT was always insignificant. Second, the explanatory variables were included in both their current and lagged values. This is a standard procedure when estimating factor demand equations, particularly where decisions regarding the employment of capital stock are concerned. This procedure is preferable to the alternative of including a lagged dependent variable, given a marked unevenness in the lagged response.

The fitted equation corresponding to (2) above is

Method=2SLS. Autocorrelation adjustment = None

$$\log(K/N)_t = \underset{(3.70)}{4.20} - \underset{(3.49)}{0.12\log(R/W_N)_t} - \underset{(11.75)}{0.111\log(R/W_N)_{t-2}} - 0.96LTT_{t-3} \qquad (2')$$

$$DW = 1.66, R^2 = 0.96.$$

In this equation, the estimated elasticity of substitution between K and N is calculated from the sum the coefficients on the current and lagged values of $\log(R/W_N)$ -- in this case, it is equal to 0.23. The next step is to calculate the estimated series for Q. Given the inclusion of the structural shift variable, LTT_{t-3}, $\log(\beta/(1-\beta))$ is now calculated as

$$\log(\beta/(1-\beta)) = 4.20 - 0.96LTT_{t-3}.$$

The estimate of β, thus calculated, along with that of σ_2 are then used to compute a series for Q as described above.

Moving on to equation (3), the fitted equation is

Method=OLS, Autocorrelation adjustment = None

$$\log(Q/S)_t = \underset{}{1.0} - \underset{(3.53)}{0.12}\log(R_Q/W_S)_{t-1} - \underset{(2.53)}{0.09}\log(R_Q/W_S)_{t-3} - \underset{(10.16)}{0.30}LTT \qquad (3')$$

$$DW = 1.55,\ R^2 = 0.83.$$

Here, the estimated elasticity of substitution between Q and S is 0.21 -- a somewhat lower value than that obtained between K and N, thus indicating that capital is more complementary with skilled labor than with unskilled labor. The estimate of γ rises from 0.5 in 1964 to 0.6 in 1990.

There is a clear common pattern in both (2') and (3'). The results suggest that it takes decision-makers between 2 and 3 years to fully respond via investment behavior to relative factor price and product price stimuli. There is, however, a significant response in both equations within the current period, presumably reflecting the fact that decision-makers can make "last-minute" adjustments to their plans by altering employment levels.

Equation (4) directly links factor demand to the macroeconomic environment. Its empirical counterpart treats the log of NW_s, (LNW_s), as a linear function of: the fiscal deficit relative to non-potential government GDP (FISC); LTT; and a dummy variable (D85) set equal to unity from 1985 onwards. The latter variable is intended to pick up additional recessionary influences arising from financial sanctions and growing social unrest, possibly working through abnormally pessimistic expectations on the part of entrepreneurs. Other candidates for inclusion among the variables were: LRER and LGTT, as defined above; a measure of strike frequency; and a monetary variable defined as the residuals from an ordinary least squares regression of the log of real money supply on the log of non-government potential GDP. None of these additional variables were statistically significant.

The estimated version of equation (4) is

Method=OLS, Autocorrelation adjustment = None

$$LNW_{st} = \underset{}{-0.88} - \underset{(2.88)}{0.020}FISC_t - \underset{(3.71)}{0.19}LTT_t + \underset{(6.63)}{0.17}D85_t \qquad (4')$$

$$DW = 1.56,\ R_2 = 0.86.$$

There is clear evidence that an expansion of the fiscal deficit has stimulated the economy and reduced LNW_s and, by assumption, reduced skilled (white) unemployment. The negative sign on the terms of trade variable is consistent with results presented above. It appears that the deepening recession since 1985 has increased NW_s by 17 percent. This would suggest that the recent recession has increased the "not-wage-employed" ratio, and hence the white unemployment rate by about 2.5 percentage points. While the Durbin-Watson statistic is mildly on the low side, the estimated first-order autocorrelation coefficient proved to be statistically insignificant.

The real consumption wage equation for Africans contains four propositions as interpreted in the context of an efficiency wage model. First, that apartheid influx controls reduced the access of Africans to urban informal sector opportunities. INFLUX is the ratio of prosecutions under internal

mobility control regulations as a ratio to employment of Africans. In an efficiency wage context, the coefficient on this proxy variable is expected to be negative, as employers would have less incentive to use wages as a turnover deterrent if such controls inhibited informal sector alternatives and reduced mobility between employers. Second, that an increase in the proportion of the African labor force outside wage employment, NW_U, would reduce the real consumption wage by decreasing the value of expected alternatives. Third, that increased trade union activity, here proxied by (the log of) strikes involving African workers as a ratio to African employment (LNSTR), could raise wage rates above efficiency levels. Fourth, that, as an extension of the efficiency wage model, employers have felt themselves under increasing pressure to raise African wages towards those enjoyed by white workers. As a proxy for this effect, the log of the real consumption wage of whites multiplied by the time trend squared (LWSTSQ) was included as a fourth variable.

Past experience of fitting wage equations (e.g. Layard, Jackman and Nickell (1991)) indicates that it is important to allow for wage dynamics. The lagged value of the dependent variable is therefore included. The fitted equation for (5) is

Method=2SLS. Autocorrelation adjustment = None

$$\log(W_U/CP)_t = \underset{}{-0.87} + \underset{(4.29)}{0.71}\log(W_U/CP)_{t-1} - \underset{(4.11)}{0.39}INFLUX_{t-1} - \underset{(2.11)}{0.25}\log(NW_U)_t$$

$$+ \underset{(1.86)}{0.018}LNSTR_t + \underset{(2.33)}{0.85E\text{-}07}LWSTSQ_t \qquad (5')$$

$$DW = 1.95,\ R^2 = 0.99.$$

This equation tells a quite complex story that is pursued further in the text. All of the estimated coefficients have the expected signs, and all are significant at conventional statistical levels, with the possible exception of the coefficient on LNSTR.

The equation for the real consumption wage of white workers also takes a log-linear form, and, consistent with the bargaining framework, includes three explanatory variables. First, the log of non-government GDP expressed as a ratio to S (LYS) is taken as the demand-side variable. This is consistent with the adopted two-level CES formulation. Second, we add the log of the proportion of the white labor force outside wage employment $\log(NW_S)$ to control for the expected value of non-wage employment alternatives. Third, the lagged dependent variable is included to allow for adjustment dynamics as before. The fitted equation for (6) is

Method=2SLS. Autocorrelation adjustment = First Order

$$\log(W_S/CP)_t = \underset{}{0.42} + \underset{(5.42)}{0.59}\log(W_S/CP)_{t-1} + \underset{(2.82)}{0.51}LYS_t - \underset{(3.01)}{0.29}\log(NW_S)_t \qquad (6')$$

$$\rho = \underset{(2.95)}{0.49},\ DW = 1.60,\ R^2 = 0.98.$$

As described above, the real consumption wage of semi-skilled workers is assumed to be a function of the real wages of the other two labor groups. In log-linear form, equation (7) is estimated as

Method=2SLS, Autocorrelation adjustment = First Order

$$\log(W_{ss}/CP)_t = \underset{(10.69)}{-0.45 + 0.50\log(W_U/CP)_t} + \underset{(4.20)}{0.49\log(W_s/CP)_t} \qquad (7')$$

$$\rho = \underset{(2.64)}{0.45}, \quad DW = 1.40, \quad R^2 = 0.99.$$

The coefficients of the independent variables add to 0.99. The real consumption wage of semi-skilled labor thus approximates closely to a geometric average of the real consumption wages of the other two labor categories.

The ratio of product to consumer prices is assumed to be a function of the real exchange rate, and the gold and non-gold terms of trade respectively. The estimated equation in log-linear form is

Method=2SLS, Autocorrelation adjustment = First Order

$$\log(P/CP)_t = \underset{(3.50)}{-0.57} + \underset{(9.33)}{0.13LRER_t} + \underset{(8.01)}{0.39LGTT_t} - 0.28LTT_t \qquad (8')$$

$$\rho = \underset{(2.03)}{0.36}, \quad DW = 1.82, \quad R^2 = 0.97.$$

This equation is not based on any strong theoretical prior belief, but rather on the common-sense proposition that the relative proportions of tradeable vs. non-tradeable goods and of exportables vs. importables are likely to differ between the production-price and consumer-price "baskets". The results indicate that the production-price basket is: more-intensive in non-tradeables; less intensive in non-gold exportables; and, unsurprisingly, more intensive in gold; than the consumer-price basket.

The potential range of instruments is very wide. This includes: a) the labor supply of U, SS and S; b) the number of government employees in each of these three categories; c) the number of domestic servants in each category; d) the lagged values of all dependent variables in the model; and e) other exogenous variables explicitly included, i. e. LGTT, LTT, LRER, LNSTR, $INFLUX_{t-1}$, D85, log(R), FISC, and their various lagged values where relevant. As explained above, these were reduced to 5 principal components

D. Historical Simulation

In its entire form, the model is much larger than the 8 fitted equations described above. As the model includes variables in both their absolute and logarithmic forms, these linkages must be specified in further identities. In addition, intermediate variables such as Q, R_Q, N, W_N, NW_U, NW_S, must be specified in both absolute and logarithmic form, along with identities deriving β and γ. In total the model to be solved comprised some 35 equations. The historical fits of the model for employment, real consumption wage rates, and capital stock are given in the following figures.

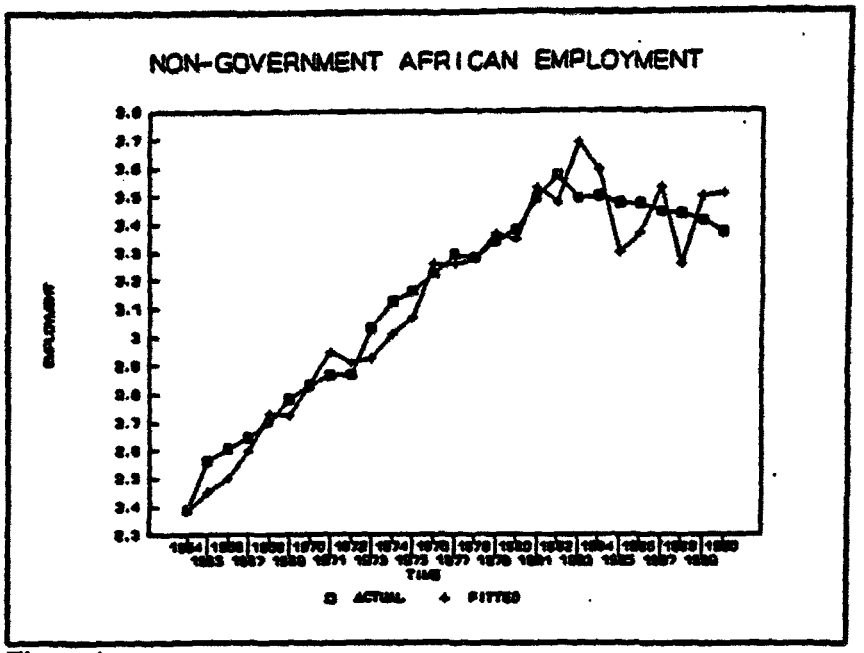

Figure 1

The quality of the fits is broadly reassuring. There is a somewhat jagged appearance to the fit for non-government African and Asian/Colored employment as compared to the actual series. However, there is a smoother fit (not shown) for the labor aggregate, N. This reflects the high degree of serial correlation initially observed in (1'). The fits for the real consumption wage variables are particularly good.

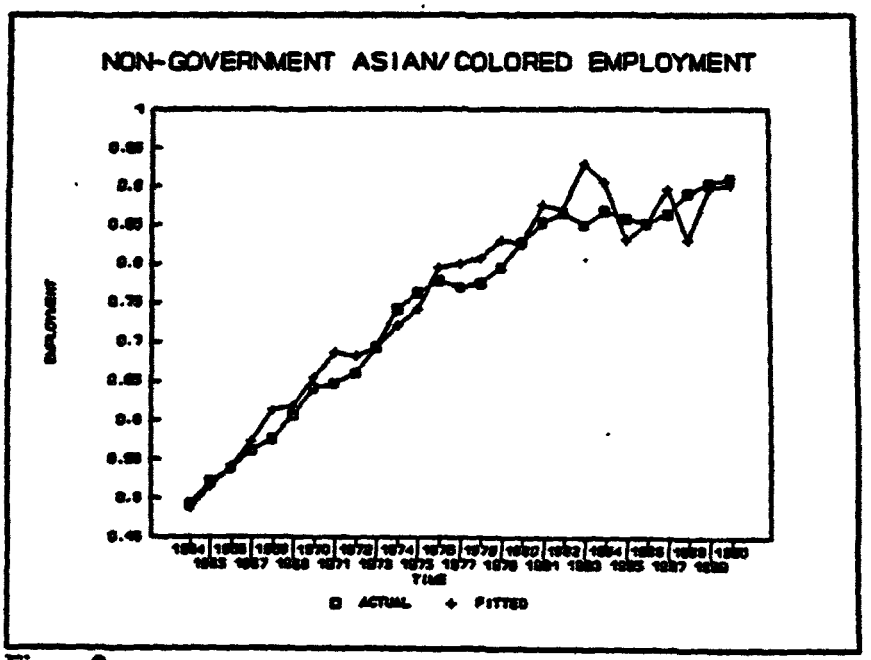

Figure 2

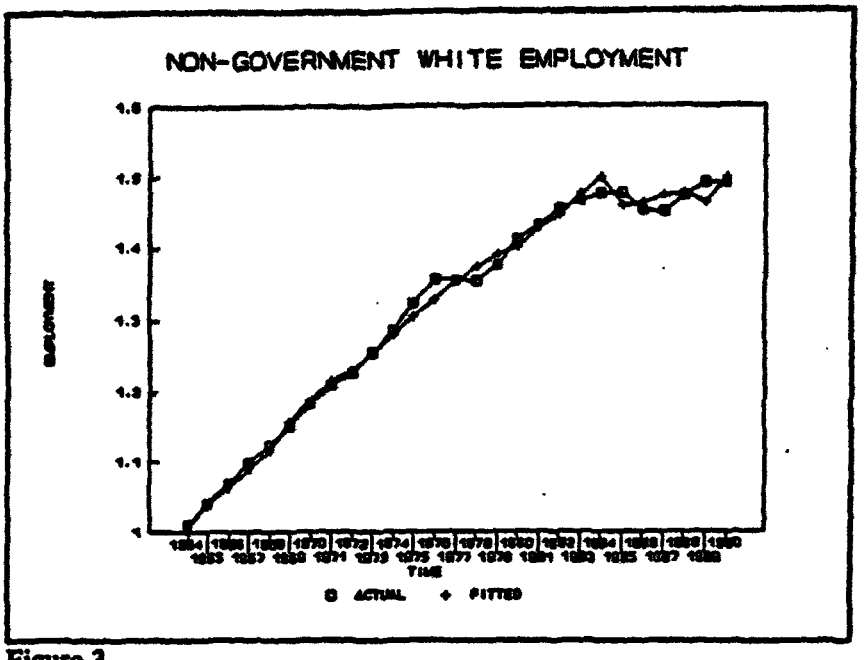

Figure 3

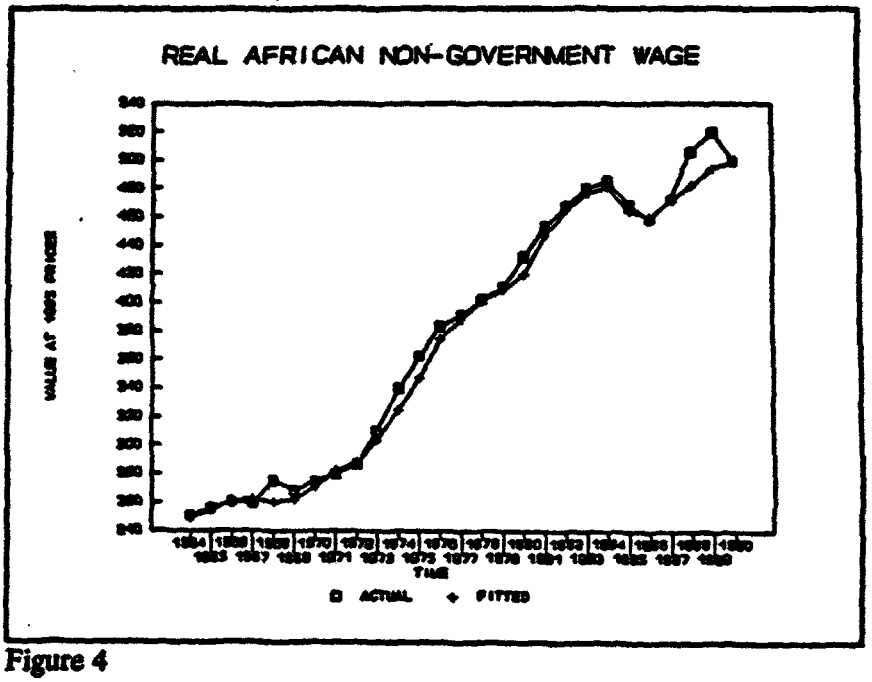

Figure 4

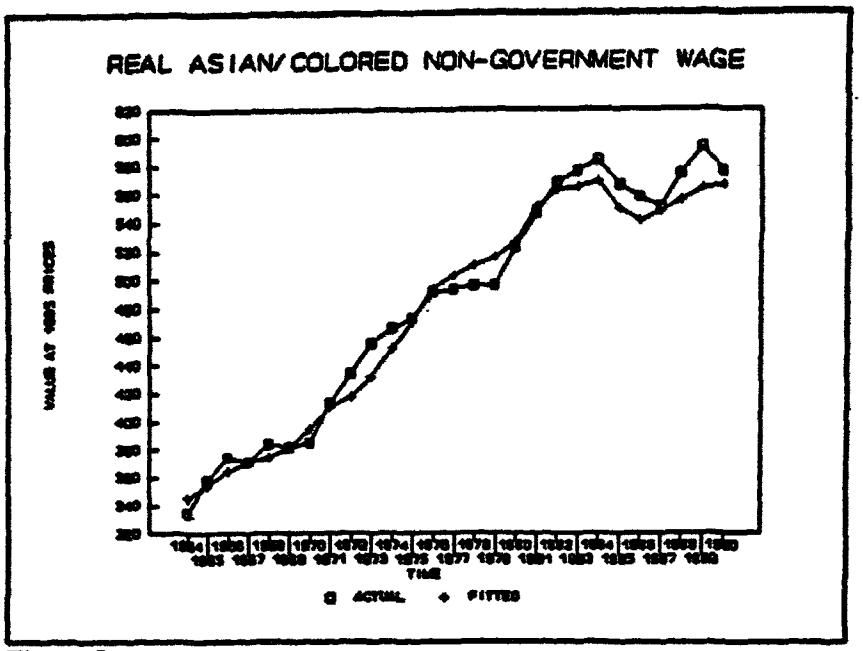

Figure 5

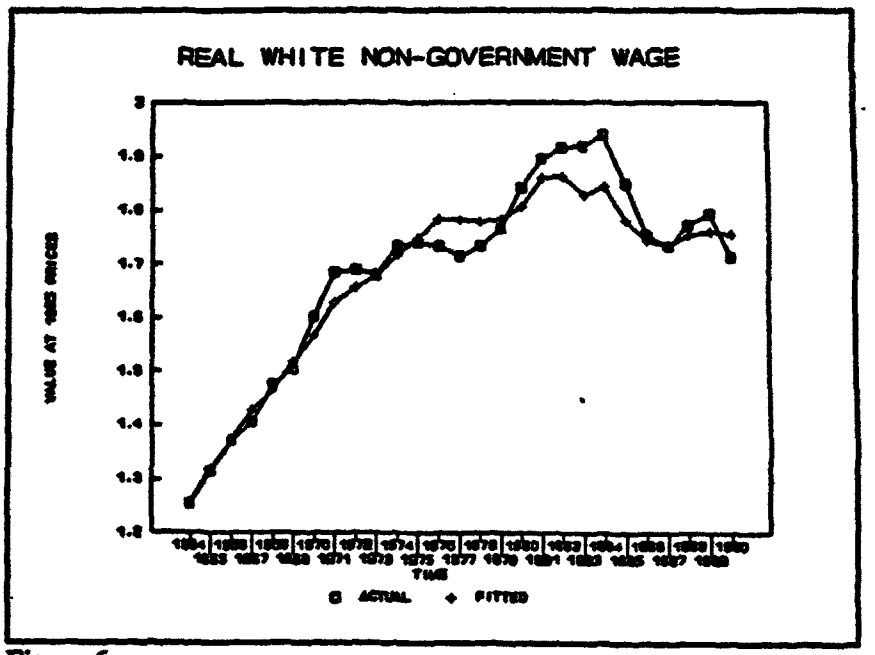

Figure 6

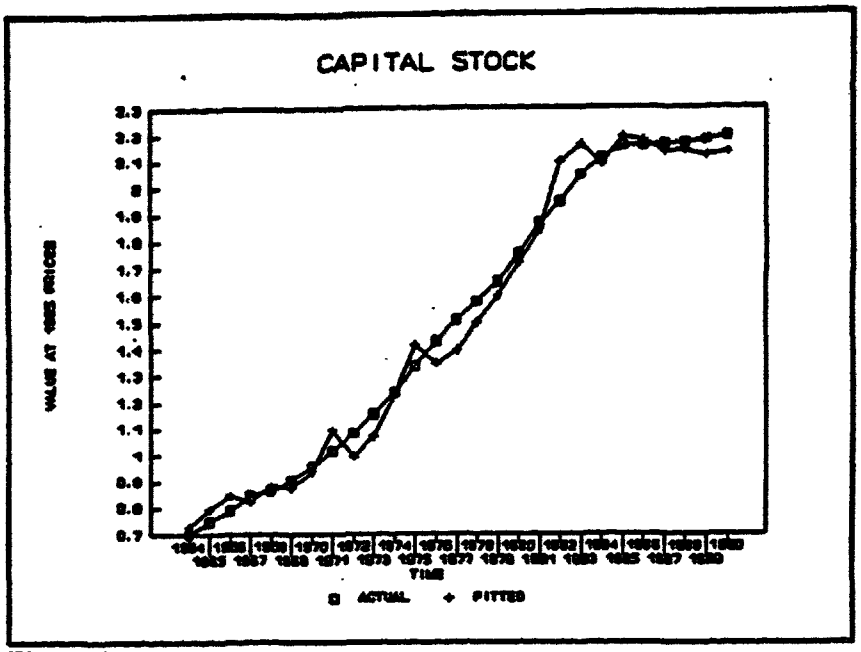

Figure 7

E. Assessing Future Prospects

Given existing uncertainties regarding South Africa's future, there is a very wide range of scenarios that could be examined. The first approach followed here is to judge the impact on employment among blacks of an alleviation of the present recession. The scenario developed here was chosen to assess employment potential as suggested by past experience. The central assumptions are that

a) the fiscal deficit expressed as a proportion of potential GDP rises from 3.45 to 5 percent.

b) the efficiency parameter resumes growth at 1 percent per year.

c) the non-gold terms of trade remain at their 1990 value.

d) the real exchange rate and the real user cost of capital remain at their 1990 value.

e) the number of strikes expressed as a proportion of African labor force remains at the level observed in 1990.

f) labor supply growth rates remain at the levels of the 1980s.

g) numbers of domestic servants remain at 1990 levels.

h) both government employment of all groups and the contribution of government to GDP grow at the same annual average rates as during the period 1980 to 1990.

A further approach is to judge employment and wage growth according to future expansion in the non-government capital stock. Strictly speaking, this approach is inconsistent with the model developed here, as capital stock is treated as an endogenous variable. However, the results strongly indicate that historical movements in capital stock and black employment levels have been significantly determined by variables other than changes in factor prices. Indeed, the terms of trade variable included in some of the factor demand equations can be thought of as a proxy for the net effect of these other variables. It thus seems reasonable when taking a prospective view, to suppose that changes in other unobserved variables such as improved investor optimism could raise capital stock growth above that observed over recent years, while relative factor proportions, such as, for example, the ratio of capital stock to black employment, would continue to be determined by its relevant factor price ratio as before. A further set of scenarios were thus developed under which non-government capital stock was projected forward at a range of historically observed rates i.e. 4, 5 and 6 percent respectively. As explained further in the text, these scenarios were further subdivided according to assumptions regarding future upgrading of black workers to white status. The results are given in Table 10 in the text.

F. Actual and Potential GDP

As a mild digression, it is worth examining what the model tells us about the behavior of real non-government GDP (GDPNG) over the past three decades. The efficiency parameter, A, derived above, reveals an odd pattern -- rising more-or-less steadily until 1971, and subsequently fluctuating erratically with no discernible trend. If taken, literally, this would imply that, in an aggregate sense, South Africa has enjoyed no technical progress since 1971. As it is obvious that this cannot be true, the interpretation suggested here is that, over the last two decades, South Africa has faced a series of influences that have pushed it below its production frontier.

Potential GDPNG is calculated as,

$$YP = A_{MAX}(\gamma(\beta K^{\rho2} + (1-\beta)N^{\rho2})^{\rho0/\rho2}) + \gamma S_{FULL}^{\rho0})^{1/\rho0};$$

where S_{FULL} is S recalculated at historically-observed full employment levels[40/], and A_{MAX} is defined as

$$A_{MAXt} = \max(A_t, A_{MAXt-1}).$$

Or, in other words, A_{MAXt} is defined as the highest value of A observed prior to or at time, t. The potential and actual values of GDPNG are plotted in Figure 8.

40/ The lowest historical value over 1960 to 1990 for NW_s was used. The value was 0.131.

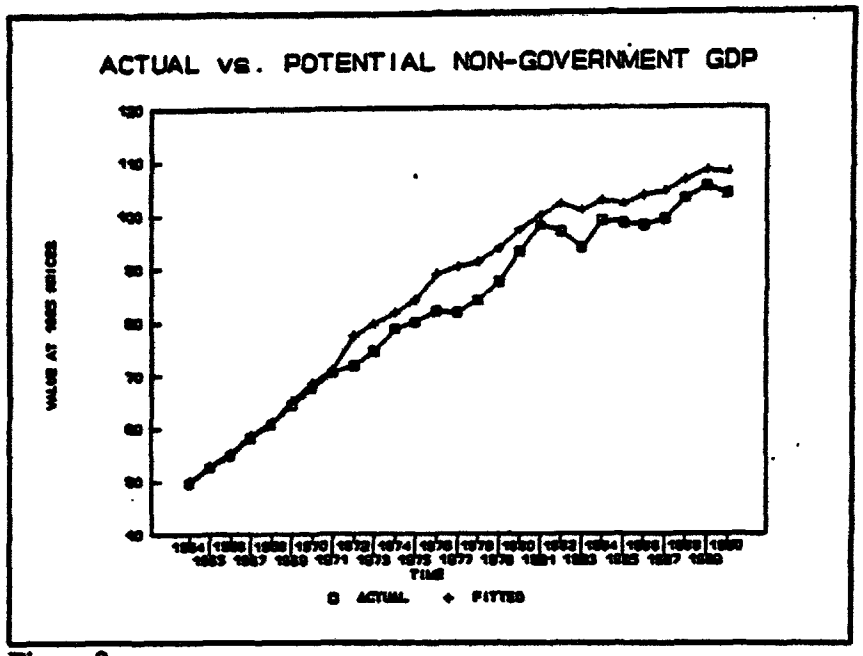

Figure 8

Potential GDPNG is virtually linear up to around 1982, although there is some evidence of slower growth associated with a slower rate of input increase over subsequent years. The striking feature of Figure 8 is the marked divergence between actual and potential GDPNG after 1974, although actual GDPNG does stage a temporary recovery to approach its potential level in 1980.

This figure does reflect the main crises that have affected the economy over the past two decades. These include: international opprobrium following the Soweto uprising in 1976; the effect of the gold price boom in the late 1970s and early 1980s and its aftermath; and the crisis of financial sanctions in the mid-1980s, followed by a partial recovery. While there can be little question that economic growth has slowed very substantially over recent years, it is interesting that the gap between potential and actual GDP was only in the order of 4 percent in 1990. The key point is that the recession seems to be more a matter of a slowdown in the potential growth in the economy arising from the dramatic drop in investment since 1985, rather than a matter of an unusually high level of resource underutilization. As argued in the text, improved employment prospects are therefore much more dependent upon an investment recovery than upon an increased level of resource utilization.