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Is South Africa's affirmative action policy efficient?

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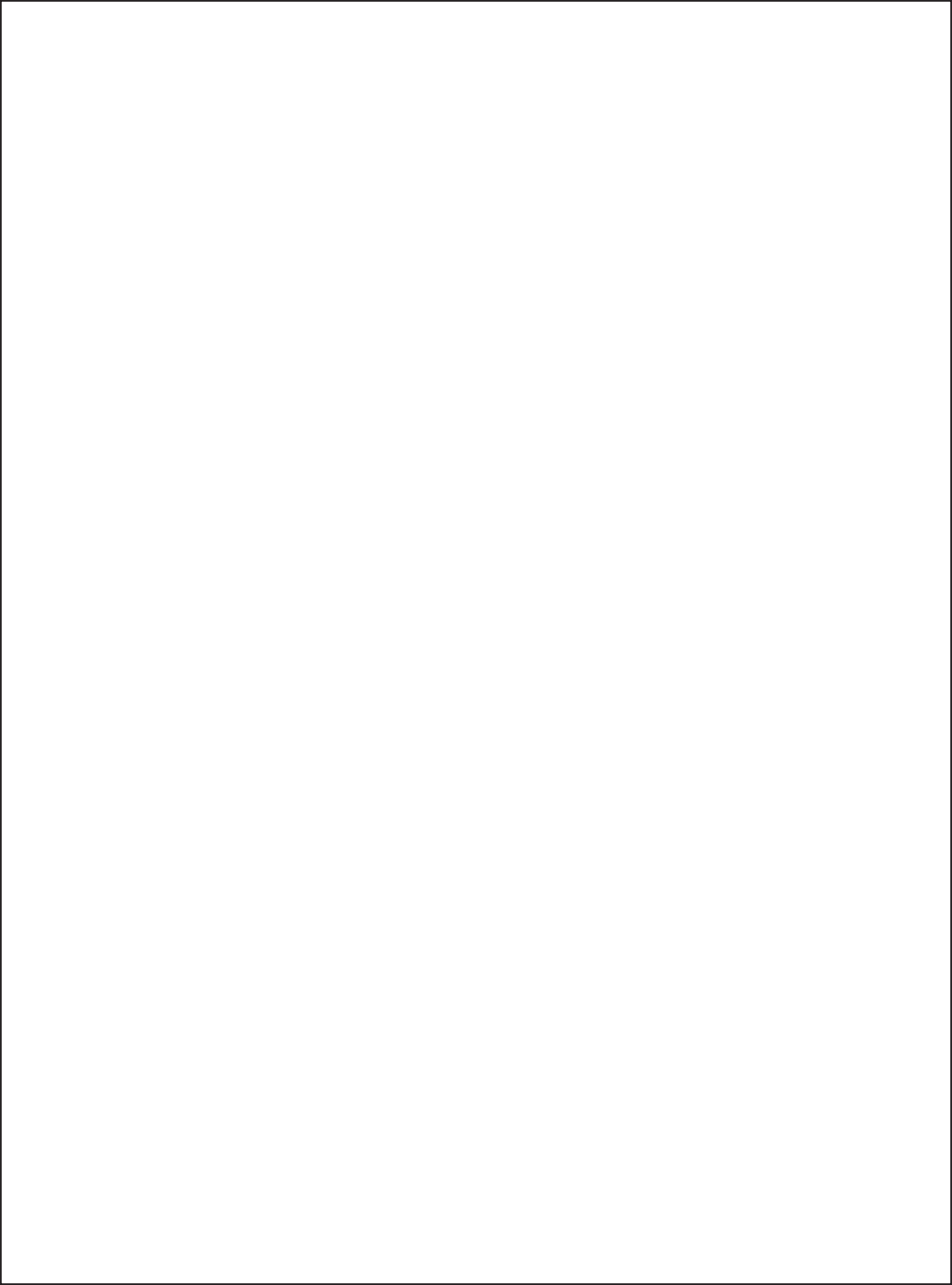
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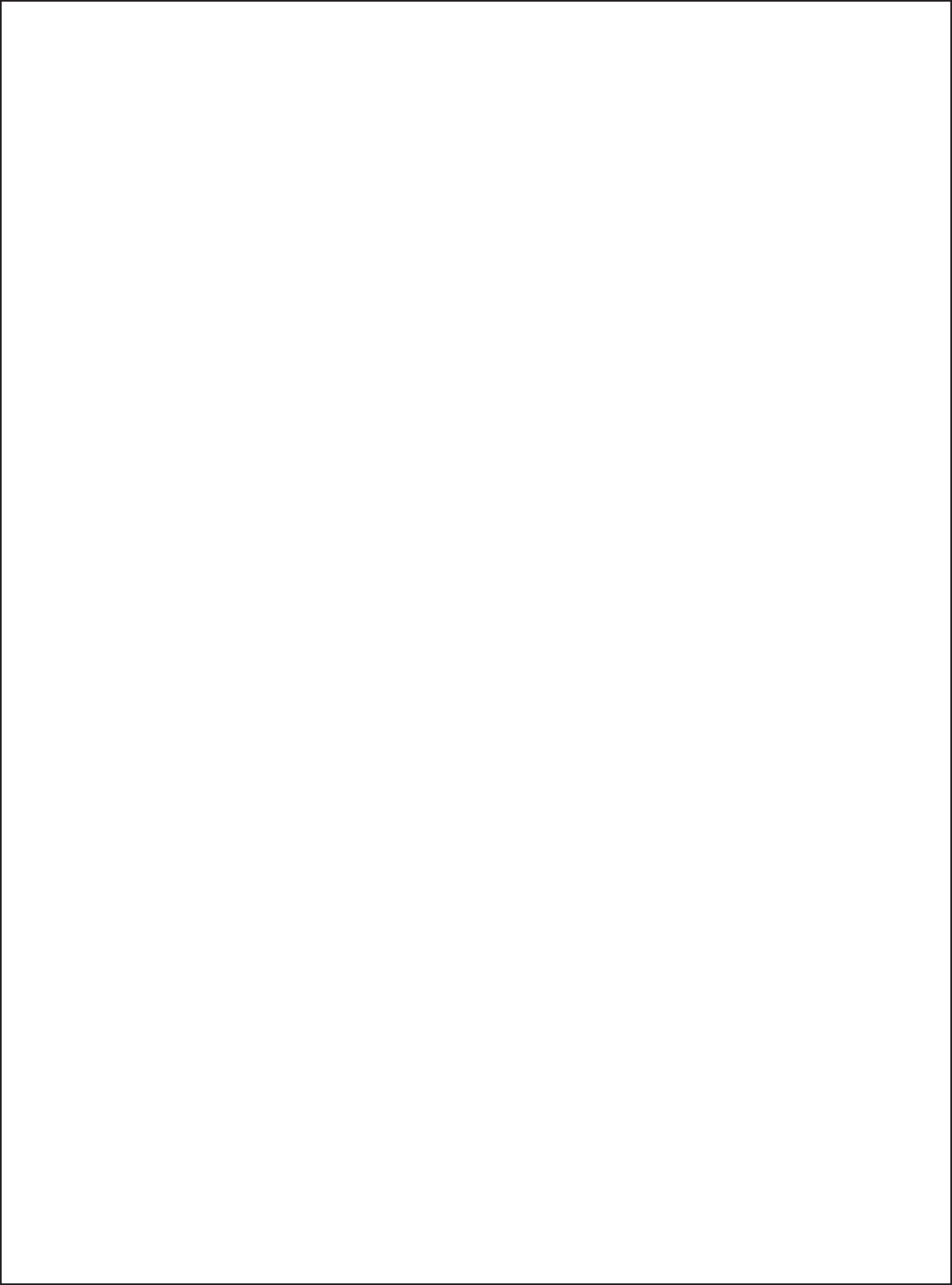


Summary

This article presents a dynamic computable general equilibrium model which measures the impacts of the affirmative action policy set up in South Africa. In order to reduce inequalities inherited from the former regime on the labour market, the government is encouraging firms to employ Historically Disadvantaged People (HDP) as skilled workers. This study aims to assess the impact of this employment policy on labour and income redistribution. The findings show that this policy reduces unemployment both in the short run and in the long run. Moreover, the government's deficit is reduced in the long run, making South Africa less dependent on the rest of the world.

Key Words: Dynamic Computable General Equilibrium Model; South Africa; Labour Market

JEL Classification: D58; E27; I32; O11; O55



Introduction

The current economic and social situation in South Africa is largely the result of about forty five years of apartheid rule. Racial segregation affected the entire economy throughout this long period. In the labour market, skilled jobs were reserved for white people while other citizens received second-rate education and were forced to live in poor residential areas, often in the outlying areas of cities. South Africa's people have therefore gone through a dual experience characterized by considerable inequalities between its population groups.

South African authorities have endeavoured to reduce inequalities with respect to access to employment since the downfall of the apartheid regime in 1991. This has included positive discrimination legislation in the labour market, which favours Historically Disadvantaged People (HDP), notably people referred to as "African"¹, with the goal of improving their chances of being recruited into the skilled labour market.

In order to capture the redistribution between social groups expected as a result of implementing such measures, a dynamic computable general equilibrium model (CGEM) is used to carry out the present research. On a short run basis, this tool permits analysis of the interactions within the entire economy as well as the redistributive effects among groups. This tool can also be used to carry out such an analysis over a 20 year period of time.

The second section describes the background context of segmentation in the South African labour market. The following section briefly reviews the literature relating to CGE models applied in South Africa. The fourth and fifth sections respectively present the Social Accounting Matrix (SAM) and the model built for the purposes of this study. Section 6 presents the findings for a 20% increase in the number of skilled African workers on both short run and long run employment in each of the sectors of the economy, while Section 7 concludes the work.

1. A segmented labour market as legacy of the apartheid system

Under the apartheid regime, race was the primary factor in determining who was eligible for skilled jobs. Whites were systematically advantaged compared to other population groups, and this segmentation was reinforced by several laws.² Discriminatory laws were abolished with the end of the regime, but as shown in Burger and Woolard (2005), the South African

¹ Local appellations will be used to identify social groups. *African* is used to refer to Black Africans.

² See Van der Berg and Borat (2001) for an historical review.

labour market is faced with the long run effects of an inadequate education system,³ international isolation, and firms' capital intensive policies.

One of the main issues in South Africa is the high level of unemployment, whether it is defined broadly or narrowly. In 2003, 30% of the active population was unemployed according to the strict definition, whereas 42% was unemployed if we use the broad one (Kingdon and Knight, 2005). These rates are not uniform among population groups. Indeed, the White unemployment rate, at just 4.1%, is nearly seven times lower than that of Africans (table 1). Unemployment is a structural issue in South Africa, with a mismatch between the excess of unskilled workers and a shortage of the skilled workers that firms are looking for.

Table 1: Status of people aged 15-65 years old on the labour market, by population group, in 2001 (%)⁴

	African	Coloured	Indian	White	Total
Employed (full and part time)	27.8	46.1	49.2	61.4	33.7
Unemployed (strict definition)	28.1	17.1	10.0	4.1	24.0
Non economically active ⁵	44.1	36.9	40.9	34.5	42.3

Source: Statistics South Africa. 2001 Census.

The South African labour market has not created enough jobs between 1995 and 2004 to maintain the level of employment in a growing labour market. Oosthuizen (2006), for example, shows that the South African economy did not create enough jobs, whereas Pauw et al (2008) show that unemployment among skilled workers has increased due to the mismatch between the skills offered by students and those sought by firms.

According to Kingdon and Knight (2005), the unemployment rate has increased between 1995 and 2003 for each population group. Oosthuizen (2006) explains this increase as being due to the high propensity for the population to enter the labour market and weak job creation. The authors of the first of these studies also estimate that, in 1995, an African person was about 30 percentage points more likely to be unemployed than a White person with the same characteristics. This probability has risen by 6.5 percentage points in 2003 (Kingdon and Knight (2005)).

³ The education system was also racially organized: Whites could attend the best schools whereas other population group studied in poor quality schools. Thus the system created very few skilled workers and a lot of unskilled workers. South Africa suffers now from skills shortage.

⁴ As our Social Accounting Matrix (SAM) is based on 2001, we will focus on this year.

⁵ Includes students, the retired and people that choose not to work

Burger and Jafta (2006) analyse the employment gap between population groups from 1995 to 2003. They find that the White-Black employment gap increased strongly between 1995 and 2000 and then stabilised. They use the Oaxaca-Blinder technique to decompose this gap and find that the unexplained component did not decline in the post apartheid period. They interpret this result as an indication that affirmative action is not very successful in reducing discriminatory practices. However, they moderate their finding by explaining the important role of quality education.

The post apartheid government has implemented a series of remedial measures, notably an affirmative action policy to reduce inequalities in the labour market and Black Economic Empowerment (BEE), a program which looks to achieve a better distribution of productive capital.⁶

In 2004, the government decided to go further because changes were very slow in the labour market. It created a scorecard, requiring firms to have good results to apply for government contracts. These public contracts represent 12% of the South African GDP, (French Trade Commission, (2007)). To attain a good mark, a firm has to have equitable ownership (including people from previously disadvantaged groups) as well as a significant proportion of black persons in the executive management. The employment equity component is a further part of the scorecard. As such, failing to comply with the law is costly due to lost opportunities for government contracts.

The absence of tangible results has pushed the government to intervene and ensure that African workers are easily appointed to key positions within their companies. This policy, which seeks to compensate for inequalities inherited from the former regime, is consistent with a social requirement that targets improved integration of formerly marginalized groups.

2. Literature Review

Many CGE models have been built for the South African economy, but to our knowledge none of them are used to address questions regarding affirmative action. Most of the models contribute to a body of analytical work that analyzes the impacts of trade liberalisation or negative world price shocks. For example, Gelb et al. (1992) developed a dynamic one-sector CGE model to evaluate the impact of a negative external shock and the implementation of a government stimulus program. In a similar vein, many World Bank experts have developed CGE models (Van der Mensbrugge (1995, 2005), Devarajan and Van der Mensbrugge (2000)) to understand the impacts of trade liberalisation and increases in public spending. Finally, Thurlow and Van Seventer (2002) proposed a standard CGE modelling framework for South Africa.

Cockburn et al. (2005) evaluate gender discrimination in the labour market after trade liberalisation using a CGE model that takes household's home production into account. They find that trade liberalization has a better impact on men's salaries than on women's due to distribution of the effects among sectors. Thurlow (2006) similarly finds that trade liberalization has affected men and women differently and that it has worsened inequality in

⁶ See for example Burger and Jafta (2006) for an explanation of BEE

the country.

Heraut (2005) analyses the impacts of trade liberalisation using all the information contained in household surveys. His analysis finds that, regardless of whether the closure is neoclassical or Keynesian, trade liberalisation seems to be pro-poor. Employment creation in the formal sector seems to be the cause of this decrease in poverty. In terms on inequality, intra group inequalities decrease whereas inter group inequalities increase.

McDonald and Van Schoor (2005) and Essama-Nssah et al. (2007) use a CGE macro-micro framework to understand the structural and distributional consequences of oil price increases for South Africa. Fofana et al. (2007) follow this approach, showing that oil price increases have negative effects on the economy and welfare.

Chitiga and Mabugu's (2007) analysis of the impact that protection in the textiles sector has on poverty uses a dynamic microsimulation CGE model. They find that increasing protection in this sector has negative effects on the economy as a whole, with decreasing welfare and increasing poverty.

3. Data used

We use the same Social Accounting Matrix as Cockburn et al. (2005), based on 2001 data. We also use the same elasticity and Frisch parameters. Unemployment rates are calibrated using the Labour Force Survey (2001).

Table 2 presents the desegregation of skilled workers by race for each activity. Analysing this table, we find that "White" workers form the largest share of skilled labour except in the government sector. The gold and real estate sectors stand out for this disparity, with White workers respectively filling 66.6% and 84.3% of skilled positions in these sectors. In the public sector, the difference between races is less conspicuous: Africans represent 35.6% of skilled workers and Whites hold 51.8% of these jobs. In the context of such figures, we would like to move towards a better understanding of the consequences of implementing an affirmative action strategy that seeks to increase the share of Africans among employed skilled workers.

Table 2 : Skilled labour segregated by race for 2001

SECTOR	African	Coloured	Indian	White	Total skilled
Agriculture (AGRI)	16.2	6.1	2.2	75.5	100.0
Coal (COAL)	19.1	1.3	2.0	77.6	100.0
Gold (GOLD)	31.2	0.9	1.3	66.6	100.0
Others mining (OTHMIN)	18.4	3.4	1.9	76.3	100.0
Food (FOOD)	13.8	7.3	6.3	72.6	100.0
Textiles (TEXT)	10.0	17.4	14.8	57.8	100.0
Footwear industries (FOOTWEAR)	10.4	7.3	7.3	75.0	100.0
Petroleum (PETROL)	10.6	5.7	6.4	77.3	100.0
Other non metallic mineral products (OTHNON)	13.6	5.5	4.3	76.6	100.0
Basic Iron/Steel (STEEL)	10.5	4.0	3.8	81.7	100.0
Electrical machinery (ELEC)	12.3	6.9	7.5	73.3	100.0
Radio (RADIO)	9.9	7.7	7.3	75.1	100.0
Transport equipment (TRANSEQ)	11.3	7.3	6.7	74.7	100.0
Other manufacturing (OTHMAN)	12.1	7.9	7.5	72.5	100.0
Electricity (ELECT)	14.9	4.5	4.8	75.8	100.0
Water (WAT)	13.9	3.2	6.5	76.4	100.0
Construction (CONSTR)	13.7	5.9	4.6	75.8	100.0
Trade (TRADE)	14.1	7.8	7.6	70.5	100.0
Hotels-Restaurants (HOT)	19.5	5.3	5.4	69.8	100.0
Transports services (TRANSSER)	12.1	4.6	5.4	77.9	100.0
Communications (COM)	15.8	8.9	5.0	70.3	100.0
Financial Intermediation (FININT)	11.7	5.2	4.4	78.7	100.0
Real Estate (REALE)	8.3	4.0	3.4	84.3	100.0
Business Activities (BUSAC)	10.5	4.4	4.6	80.5	100.0
General Government (SERN)	35.6	8.4	4.2	51.8	100.0

Source: Own computations from SAM (2001).

4. The modelling framework

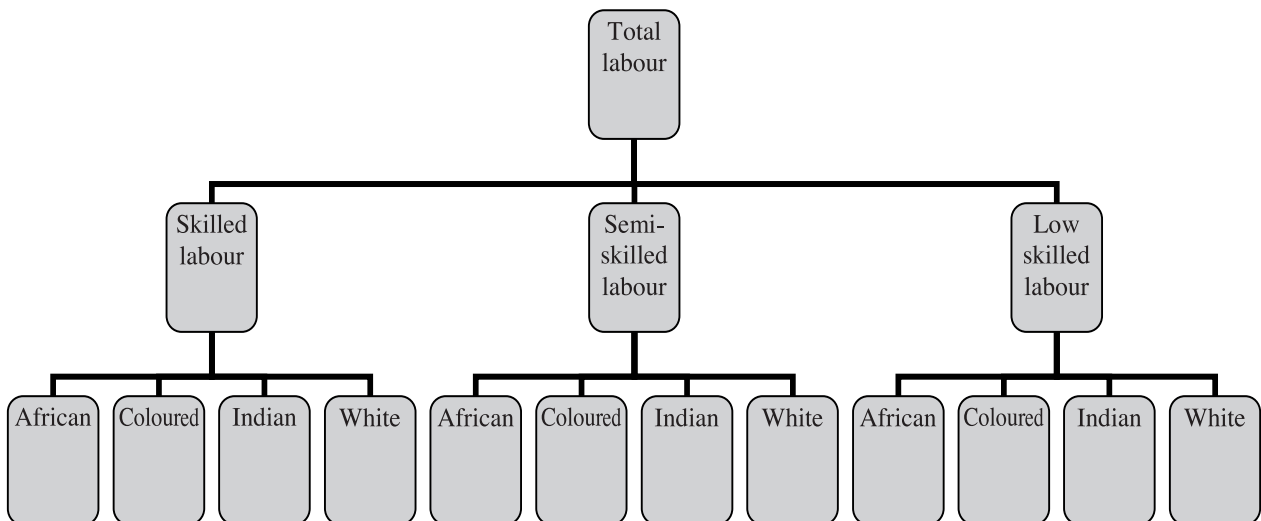
Our model is inspired by the CGE model developed by Decaluwé et al. (2001). Our South African model has two production factors, being capital and labour, but we have disaggregated labour by population group and skill level to take into account the specificities of the South African labour market, such that we end up with twelve different labour categories. Both production factors are used in each activity. We also assume that there is unemployment in each labour market.

We have also disaggregated households by population groups (African, Coloured, Indian and White). Households' consumption behaviour is described by a Stone-Geary Linear Expenditure System (LES) function (1954), and we assume that transfers between institutions are significant. Finally, we consider that South Africa can not export as much as it wants by introducing an export demand function with finite price elasticity for world demand.

The CGE model has 25 activities. The production function technology is assumed to have constant returns to scale and is presented in four -level production process. At the first level, output is Leontief input-output of value added and intermediate consumption. At the second level, a CES function is used to represent the substitution between aggregate labour and capital. At the third level, composite labour demand is also a Cobb-Douglas function with three different skill levels (skilled, semi-skilled and unskilled).

To take into account the characteristics of the South African labour market, we have disaggregated labour demand in each sector by population group. We know that, for historical reasons, job opportunities are not the same for White workers as for workers with the same skill level in other groups. This systematic bias is not only explained by economic factors (worker productivity, wages, etc.) but is also related to social behaviours and habits. Such elements are accounted for by assuming that firms maintain a constant share of workers from each population group. Thus, in technical terms, we assume that race composition for each skilled level is determined by a Leontief function. In that way, a skilled White worker can not be a substitute for another skilled worker. These shares are assumed fixed and are the result of social behaviours that are unexplained by strictly economic factors. Figure 1 gives the labour market structure.

Figure 1: Labour market structure



We know that South Africa faces sizeable unemployment issues, which are complicated by the fact that unemployment rates differ between population groups and skill levels. Following Blanchflower and Oswald (1995), we assume that there exists an equilibrium wage rate compatible with the unemployment rate. Blanchflower and Oswald show the existence of an empirical relation linking wage rates and unemployment rates. This wage curve is econometrically stable, regardless of which country or socio-economic category is being considered. The relationship they find is a negative slope between unemployment rates and wage rates. We will follow this approach for our twelve labour markets.

Kingdon and Knight (2006) have pointed out a wage curve for South Africa, showing that wages rates decrease strongly when the unemployment rate increases. They find the same result as OECD countries, specifically, that a 10% increase in the unemployment rate leads to a 1% decrease in wages.

As previously mentioned, we have four categories of households. The model distinguishes three sources of income: labour income (salaries and wages), capital income and transfers from institutional sectors (households, firms, the government and the rest of the world). Note that, on average, African households are the only ones who receive transfers from other population groups. Households' disposable income is equal to their income net of income taxes and transfers paid to other institutions, while their savings is a fixed proportion of disposable income. Household sectoral consumption is described by a Linear Expenditure System and is subject to its budget constraint. Consequently, sectoral consumption depends on total consumption, specified minimum consumption levels and the vector of consumer prices.

Firm's income is computed as a portion of total capital income plus transfers from other institutions. The remainder after paying income taxes and transfers to other institutions is firm's savings. Government income is composed of direct taxes paid by households and firms, indirect taxes on domestic sales, import tariffs, transfers from the rest of the world and a share of capital income. Government consumption is spending on the volume of production in the non tradable sector multiplied by the price of non tradable goods. Government savings is equal to government income less its consumption and transfers paid to other institutions.

The model allows for imperfect substitution in consumption and production between domestic and foreign goods. Consumers have a choice between local or imported products. Their choices are specified by a Constant Elasticity of Substitution (CES) function following the Armington assumption. This function specifies that products are not perfectly substitutable, and that quality differences can exist depending on the origin of the product. The elasticity of substitution varies across sectors, with a lower elasticity reflecting a greater difference between domestic and imported goods. The demand for imports relative to domestically produced goods is derived from a cost minimization problem subject to the CES function. Substitution is also possible between domestic and exported goods. Such producer decisions are represented by a Constant Elasticity of Transformation (CET) function.

We have assumed that South Africa is a small country. However, we reject the hypothesis that South Africa has infinite export demand for its products. Indeed, we assume that South African producers cannot sell as much as they want on international markets. To sell more on these markets, South African producers have to be more competitive than other producers. Thus, export supply is constrained by export demand, which is assumed to have finite elasticity, reflecting the competitiveness of local products on the international market. Finally, the current account balance is determined by imports and transfers paid abroad, net of exports and transfers received.

The static model developed into a dynamic model in a sequential manner. Labour supply growth is determined endogenously for each type of labour and is driven by an exogenous population growth rate. This figure is also used to as an approximation for other exogenous variables, such that transfers also grow at this same rate. Capital stocks are calculated for each period based on investment, capital stocks and depreciation in that period. Allocation of new investments is determined with the Bourguignon et al. (1989) investment demand function.⁷

We assume that the exchange rate is our numeraire. We assume that transfers between institutions are exogenous in the first period and then grow at the population rate.

5. Results of the policy

The study consists of imposing an increase in the proportion of skilled African workers employed by firms in each sector, starting from the first period. The chosen shock has been to increase this proportion by 20 per cent in each sector. As previously shown in table 2, the initial proportion of skilled African workers in most sectors is relatively low, so the new target does not necessarily imply a large number of new jobs.

We have deliberately decided to stimulate discussion by focusing our analysis on the African group because it faces the greatest difficulty accessing employment in the skilled labour sector. The proportion of skilled African workers in the base year is about 10% in most sectors, except for the gold sector and non tradable services, where African workers fill more than 30 per cent of positions. The consequence of the new policy will be presented step by step in order to understand the channels whereby the effects of the shock are transmitted through the whole economy. We start with an analysis of the short-term consequences on the labour market.

6.1 The short term

6-1-1 Impacts on the overall demand for labour

Implementation of an affirmative action policy will, as expected, lead to an increase in demand for skilled African labour. The average increase in this demand is in the range of 3%, but this figure is not uniform across sectors:

⁷ Refer to Jung and Thorbecke (2001), Bchir et al (2002), Agenor (2003) for other specifications relating to the investment function.

the increase in demand for skilled African labour is about 5% across the economy when excluding the gold and non tradable sectors⁸ with increased demand in these last two sectors varying between 0.8 and 1.2%.

The demands for skilled Coloured and Indian workers both increase marginally, whereas demand for skilled White workers decreases. This is logical, and the decrease in percentage point is not very large given the initial level of White workers in the base year (reduction of 0.04%) . The demand for skilled White workers actually increases in all sectors other than the gold and non tradable sectors. However, the decrease is sufficiently strong in these two activities to outweigh the effects in the rest of the economy, resulting in an overall decline in demand for skilled White workers. The 20% increase in the proportion of African workers among those employed in these two sectors represents a significant increase given that the initial proportion was already relatively high (See Table 2). The total number of jobs created for African workers in these sectors is therefore quite large, which implies a sizeable decrease in the employment of skilled White workers. The overall demand for skilled workers for the whole economy increases by an average of 0.6%, reflecting an increase in sectors outside gold and non tradable services.

The demands for semiskilled and unskilled workers increase for each population group. When these groups are aggregated, this means that overall demand for semiskilled and unskilled labour all increase, which suggests an economy-wide increase in demand for labour. It is thus noted that implementing the affirmative action policy is favourable to employment, which increases by 0.23%. These impacts on labour demand also have consequences with respect to unemployment and wages. The next section will address the mechanisms of transmission for these developments.

5-1-2 Impacts on employment rates and labour income

It is first of all observed that the unemployment rate among skilled African workers decreases by 18.26%, whereas that of skilled White workers increases in a smaller proportion, by 6.27%⁹. Unemployment rates in other segments of the labour market decrease. Since wages vary inversely with unemployment, we find that the wage among skilled Africans increases substantially. Similarly, wages rates are expected to increase in all other segments of the labour market except among skilled White workers. This is shown in the following table.

⁸ The initial proportion of skilled African workers in these sectors is known to be relatively higher than in other sectors.

Table 3 : Variations in employment and salary rates based on skills and population groups

	Unemployment rate (base) ¹⁰	Variation in unemployment (%)	Wage rate (base) ¹¹	Variation in wage rate (%)
Skilled African	0.139	-18.6	1	15.04
Skilled Coloured	0.019	-0.02	1	0.20
Skilled Indian	0.053	-0.60	1	0.36
Skilled White	0.006	6.14	1	-5.78
Semiskilled African	0.416	-0.31	1	0.07
Semiskilled Coloured	0.191	-0.41	1	0.12
Semiskilled Indian	0.165	-0.35	1	0.12
Semiskilled White	0.077	-0.48	1	0.17
Unskilled African	0.285	-0.32	1	0.12
Unskilled Coloured	0.204	-0.43	1	0.15
Unskilled Indian	0.138	-0.25	1	0.12
Unskilled White	0.110	-0.28	1	0.14

The average wage rates in each sector decrease for skilled workers despite the fact that only one group of skilled workers sees lower wages. This is because the increase in the wage rate for skilled African workers is outweighed by the decrease in the wage rate among skilled White workers, with the two other components only changing marginally.

The average wage rates in each of the semiskilled and unskilled segments of the labour market increase somewhat, which is in line with our expectations as well as previous findings, since semiskilled and unskilled wage rate was increasing for each population group. In general, the average wage rate per sector has decreased slightly (due to the decrease of skilled wage rate) except, as expected, in the two atypical sectors: the non tradable sector and the gold sector.

5-1-3 Impacts on production

What about the impacts of the affirmative action policy on production? The capital stock is specific by sector and is fixed in the first period. The increase in labour supply means that capital becomes a relatively rare factor and so capital remuneration is expected to increase in capital-intensive sectors. This is the result that is observed, but the 0.026% increase is sufficiently small that it can be considered as negligible.

⁹ The initial level of skilled White unemployment rate is very low (less than 1%) and raises to 1%.

¹⁰ Unemployment rates per skill and racial group have been calibrated using data provided by the Labor Force Survey (2001).

¹¹ Indices of wages rates at the reference period are equal to 1 even though the levels of salaries may differ from one category to another.

Production is expected to increase across sectors, resulting, *ceteris paribus*, in an imbalance on the products market, where supply is temporarily higher than demand for many commodities. The price of the majority of products is therefore expected to decrease, restoring the equilibrium between supply and demand. This is the case for all sectors except for gold non tradable services, where prices are on the increase (respectively by 0.07% and 0.89%). Production will therefore decrease in those two sectors, by 0.29% in the gold sector and 0.88% in non tradable services. Since the government is expected to maintain constant budget expenditures, the increase in production costs means that the provisions of government services to the population are constrained.

Producers have the choice between exporting or selling products on the local market. Yet, increasing exports for any given product can only be accomplished by selling at a cheaper price, which means that the *FOB* price will go down. This price reduction will be more pronounced the lower price elasticity is. Exports and local supply are expected to increase in sectors where production increases. Furthermore, in sectors where producer's prices are on the decrease, the improvement of export competitiveness will tend to increase the share of exported production. As for the gold sector, which exports 92% of its production, rising costs for its production factors affects its export performance in the opposite direction, with the volume of exports in this sector falling by 1.06%.

Table 4 : Variation of volumes supplied on the local market and exported volumes

Sector	Local supply variation (%)	Exports variation (%)
Agriculture (AGRI)	0.43	0.30
Coal (COAL)	0.29	0.28
Gold (GOLD)	0.02	-0.32
Other minerals (OTHMIN)	0.48	0.33
Food industries (FOOD)	0.45	0.50
Textile Industries (TEXT)	0.38	0.56
Footwear (FOOTWEAR)	0.52	0.72
Oil (PETROL)	0.4	0.77
Other minerals (OTHNON)	0.22	0.48
Iron (STEEL)	0.48	0.80
Electric appliances (ELEC)	0.37	0.67
Radio telecommunications (RADIO)	0.42	0.80
Transport equipment (TRANSEQ)	0.34	0.66
Other industries (OTHMAN)	0.33	0.54
Electricity (ELECT)	0.36	0.34
Water (WAT)	0.19	Nil
Construction (CONSTR)	0.16	0.41
Trade (TRADE)	0.46	0.59
Hotel-Restaurant (HOT)	0.21	0.04
Transport Services (TRANSSER)	0.56	0.78
Communications (COM)	0.32	0.48
Financial intermediation (FININT)	0.51	1.14
Real estate (REALE)	0.34	0.14
Business activities (BUSAC)	0.26	1.10

In order to properly understand the interactions between the various industrial sectors, the structure of product demand should be considered. Additional production in most sectors means that intermediary consumptions must also increase. Products from agriculture, business services, transportation services, water and electricity are particularly important among these products that are highly demanded as inputs for other sectors. As such, the rise in production among other industrial sectors has a ripple effect, increasing production in sectors that supply a large portion of inputs. This is a particularly important phenomenon for agricultural products, which are heavily in demand by other sectors. Furthermore, since the agricultural sector is highly labour-intensive, increased demand for agricultural products brings additional capital into this sector.

In order to address supply of local and imported goods, a high elasticity of substitution has been selected in the Armington function. This means that, although local and imported products are imperfect substitutes in South Africa, local products are sufficiently similar to their foreign analogues that the end users perceive them as acceptable substitutes. The relatively high degree of homogeneity between imported and local products makes the drop in the prices of local products favourable to domestic suppliers, to the disadvantage of foreign competitors. This substitution behaviour explains why imports decline in most sectors.

5-1-4 Impact on the agents

Households

Household's income is expected to rise. This number is determined as the sum of exogenous elements (all transfers) and income earned from production factors (labour and capital). The pressure related to increase in wages¹², the rise in capital remuneration and the reduction in the unemployment rate each add to average household income. Households' disposable income is then determined by subtracting direct taxes and transfers to other institutions from gross income. Since direct taxes are a proportion of the households' income and the transfers are exogenous, disposable income is expected to increase. Households' savings and consumption budget, as a proportion of disposable income, should also increase.

Table 5: Impact on households (%)

Households	Income	Savings	Consumption budget
African	0.22	0.22	0.22
Coloured	0.26	0.38	0.38
Indian	0.25	0.26	0.26
White	0.24	0.25	0.25

Households benefit from an increase in their income, in that they are able to consume more goods. They similarly benefit from the fall in production prices, which prompts households to substitute more local products for imported products.

Firms

The impact on firms is similar in magnitude to the impact on households. Firms' income is made up of capital income and exogenous transfers. As seen above, capital remuneration rises, resulting in a 0.15% increase in firms' income. Firms' savings, as the remaining financial resources after exogenous elements (notably transfers) are subtracted from income increase by 0.17%.

The government

We assume that the value of government expenditure is kept constant. Rising household incomes increase total personal income taxes, which, together with the increase in indirect taxes on production yield a 0.17% increase in government income. Government savings are determined as a residual, or the difference between income (which increases) and expenditures (which are exogenous). At the end there is a 0.6% increase in savings.

The rest of the world

It is assumed that savings from the rest of the world are endogenous. It means that borrowing from abroad is unconstrained, allowing for an increase (or decrease) in the current transactions deficit. The present simulation sees exports from South Africa increase and imports decrease,

¹² As shown in table 3, only White skilled wage rate is decreasing.

while foreign savings decline by 14.64%.¹³ In sum, South Africa substantially reduces its external deficit.

Altogether, an affirmative action policy has very positive effects on economic activity in the short run: sectors are expanding, exports increase, and households increase their consumption and take advantage of lower prices for domestic goods. Consumers shift toward local products, which become relatively cheaper than imported products, thus improving the current transactions balance. Savings by domestic institutions increases, leading to an overall increase in investment. The government deficit improves, but remains very high. The following will show the impacts of this policy over the long term.

5-2 The long term (2020)

The model is solved recursively for a period of 20 years following the principle that the economy grows naturally in the absence of shocks¹⁴. The resulting effects of the affirmative action policy are therefore analysed in relation to this growth path. It is assumed that the increase in the proportion of skilled African workers occurs in the very first period and remains constant thereafter.

5-2-1: Impact on labour demands

It is found that demand for skilled African workers increases substantially (by 2.96%) in relation to the long term BAU equilibrium, while demand remains constant for skilled Coloured workers and increases by 0.02% for skilled Indian workers. These increases are detrimental to demand for skilled White workers, which decreases by 0.04%. The above increases take place in all sectors except for gold and non tradable services, which see a drop in demand. This increase in demand holds across all skill categories of workers.

¹³ The initial level of the current account balance is very low, which translates a relative increase.

¹⁴ It is in line with the growth path known under the appellation of Business As Usual (BAU).

Table 6: Long-term impact on labour demands:

Labour demands	Skilled	Semiskilled	Unskilled	Total
Variation (%)	+0.35	+0.08	+0.06	+0.16

This policy has a positive effect on labour over the long term as well, with total labour demand increasing by 0.16%, but this effect is smaller than in the short term.

5-2-2 *Impact on unemployment and labour incomes rates*

The trend which has been observed over the short term continues, while the unemployment rate for skilled African workers decreases. All unemployment rates are in decline except for skilled White workers. This is a very important result since, as previously stated, unemployment is a major problem in South Africa, particularly among African nationals.

Table 7: Long-term impacts on unemployment and labour income rates

	Variation in unemployment (%)	Variation in wage rate (%)
Skilled African	-18.31	14.81
Skilled Coloured workers	0.49	-0.44
Skilled Indian workers	-0.40	0.32
Skilled White workers	6.62	-5.77
Semiskilled African	-0.18	0.07
Semiskilled Coloured	-0.23	0.13
Semiskilled Indian	-0.24	0.14
Semiskilled White	-0.24	0.18
Unskilled African	-0.25	0.11
Unskilled Coloured	-0.25	0.15
Unskilled Indian	-0.21	0.14
Unskilled White	-0.23	0.16

The average wage rate for unskilled workers across all sectors rises by 0.13% in the long term, while the corresponding figures are 0.12% for semi-skilled workers and a decline of 1.41% for skilled workers. In total, the average composite wage rate decreases by 0.37% when considering all sectors and all segments of the labour market.

5-2-3 *Impact on production*

The effects of the policy are similar in the short run and the long run. Production is expected to increase except in the gold and non tradable sectors. The average increase in production is 0.62%, with the decreases in the gold (-0.08%) and non tradable (-1.25%) sectors being notable exceptions to the general increase in production.

Exports and local supply are expected to increase in all expanding sectors. Exports ease off by 0.09% in the gold sector, but exports in all other sectors increase by an average of 1%. Local sales also increase for each sector, by an average of 0.67%.

Increasing production requires a drop in producers' prices for the markets to reach equilibrium, *ceteris paribus*, except in the two atypical sectors¹⁵. On average, prices go down by 0.2%.

5-2-4 Impacts on agents

The same mechanisms determine the long run impacts on agents. Households' income increases thanks to higher wages and the creation of jobs. Households' savings also increase in proportion to disposable income over the long run.

Table 8: Impact on households' income over the long-term

	Households Income variation	Variation in savings
African	0.32	0.33
Coloured	0.39	0.56
Indian	0.37	0.4
White	0.37	0.37

As for firms, they benefit from the increase in returns to capital, resulting in a 0.3% increase in their income. It is no surprise that savings also increases, in this case by 0.62%.

Rising income among households and firms incomes result in a proportional increase in the amount of direct taxes paid to the government. As mentioned earlier, increasing production in the majority of sectors also increases the total amount of indirect taxes paid. As a result, government income increases by 0.21%. The amount of public spending is assumed to be constant per capita, with the result that government savings actually increase by 0.91%.

Lastly, it was observed earlier in the report that the volume of imports was decreasing due to lower domestic prices and that the volume of South Africa's exports was on the rise. It is no surprise that foreign savings drop substantially, by 4.8%, which indicates a much improved situation in terms of the current account.

¹⁵ The gold and non tradable sectors

6. Conclusion

The objective of this study is to assess the effects of the positive discrimination policy on employment as well as the short run and long run effects on income distribution. Such a policy appears to be quite beneficial to the South African economy, insofar as total employment increases in both the short run and the long run. The rate of unemployment rate decreases among various categories of workers,¹⁶ an important achievement for the country. The combined effect of rising salaries and lower unemployment leads to a net improvement in households' incomes. With respect to the government, a smaller current account deficit is observed. This improvement in public finances, along with higher levels of investment, means that South Africa becomes significantly less dependent on the rest of the world in the long run. The long run findings of this study are encouraging and confirm the conclusion of the short run analysis.

¹⁶ Skilled *White* workers being the exception.

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