# An Economic Model of the Apartheid State

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**Abstract**

Rather than a rigid racial ideology, it is argued that South African apartheid was a pragmatic response of a white oligarchy to changing economic and political constraints. Consequently, the degree to which apartheid principles were applied and enforced by the South African state varied over time. A public choice model is developed to explain apartheid as endogenous policy, the parameters of which are determined by political support-maximizing politicians. The model suggests that the enforcement of apartheid was responsive to changes in such exogenous variables as defence costs, the gold price and the reservation wage of black unskilled labour. Predictions of the model hold implications for the causes of the democratic transition of the 1990s, including the role played by international sanctions.

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## 1 Introduction

Many liberal historians and economists have viewed South African apartheid as an essentially atavistic, irrational body of doctrine whose motivations were explicitly noneconomic, and indeed contradictory to economic efficiency. Thus, for example, Hutt (1964: 30, 44, 81) argued that apartheid policies were the outcome of 'colour prejudice' derived from an historical heritage in which blacks were viewed as 'more primitive' than whites and perpetuated by Afrikaner and particularly Calvinist social psychology which was based on a fatalistic respect for heaven-ordained race and class structures and which was intrinsically opposed to what Hutt called the 'capitalist spirit.'[1] This liberal, or neoclassical,

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[1] It should be noted that Hutt did also concede a role for economic rationality on the part of those who stood to gain from the system. See for example Hutt (1964: 49). In general, however, liberal analysis typically emphasized attitudinal aspects of prejudice and irrational

school maintained that apartheid ideology and policies were inherently incompatible with efficient resource allocation and economic growth. For example, Houghton (1973) pointed out that white voters used their monopoly of political power to restrict the movement and advancement of African workers: 'These contrived scarcities and imperfections in the labour market have a corrosive effect upon economic growth, and prevent optimum resource allocation' (Houghton 1973: 252). Horwitz (1967) viewed South Africa's economic history as essentially one of conflict between the exigencies of the economy on the one hand, driven by the needs of a growing capitalist system, and the polity on the other hand, driven by the ideology of white supremacy and Afrikaner nationalism. See Horwitz (1967: 299) and Nattrass (1981: 72).

The problem with this classical liberal perspective is that, although apartheid policies were certainly costly, it is not always clear that these policies were necessarily detrimental to the growth of the economy. It was often pointed out, for example, that South Africa enjoyed an extremely high rate of economic growth after 1948, surpassed in the 1960s only by that of Japan (Legassick 1974: 6).[2] The relatively robust performance of the South African economy during the heyday of apartheid is generally attributed to the flexibility with which apartheid policies were applied. Houghton observes that 'in periods of rapid economic growth the restrictions on non-white employment tend to be relaxed owing to the need to maintain output' (1973: 151) and suggests that rapid growth after World War II was possible only because of 'a tacit relaxation of restrictive practices' (1973: 153). A similar point is made by Horwitz, who maintains that the very arbitrariness of industrial relations legislation necessitated that provision be made for the granting of individual exemptions from certain ministerial orders (1967: 324). Thus, in boom times, blacks typically benefited from upward occupational mobility, moving into skilled jobs vacated by whites. The appointment of the Wiehahn and Riekert commissions in the late 1970s led to a number of reforms that were implemented from the early 1980s onward. In particular, influx control legislation, including the notorious 'pass laws' and the Urban Areas Act, was repealed. Black trade unions were officially recognized and black workers were inducted into the previously whites-only system of industrial relations. Many other incremental reforms in the 1980s, including the formal legalization of racial intermarriage, provisions for multiracial political

hate or rejection of other race groups, a view that was reinforced by the proclamations of apartheid ideologues themselves, who identified differences in racial and cultural characteristics as the primary motivation for segregationist policies. An historical analysis of the origins and evolution of the 'apartheid idea' leads Rhoodie & Venter (1960) to conclude that 'colour was accepted, by a process of psychological association, as the outward manifestation of more deeply seated cultural and social differences ... Colour became the criterion with which the standard of cultural and social development of an individual was judged ... To a significant degree this may be attributed to ... the fact that, as far as civilisation and general development are concerned, the Bantu was, and still is, by comparison an inferior racial group' (Rhoodie & Venter 1960: 180).

[2] This of course begs the question of how much higher South Africa's growth rate would have been in the counterfactual absence of apartheid. Iyengar & Porter (1990) report general equilibrium simulations suggesting that under a regime of perfectly free labour markets GDP would have been five to ten percent higher.

party membership, the granting of property rights to blacks in some 'white' areas, and the lifting of business zoning restrictions affecting nonwhites, paved the way for the full-blown dismantling of apartheid that occurred in the early 1990s (Lowenberg & Kaempfer 1998: 32). In fact, there is no stronger testimony to the fallacy of the view that apartheid was essentially noneconomic or 'irrational' in its underlying motivation than the remarkable pragmatism and flexibility of the apartheid regime in responding to changing economic circumstances.

The purpose of the present paper is to construct an economic model to explain the apartheid polity as an outcome of rational individual utility maximizing choice processes. This approach follows firmly in the tradition of the models of a 'South African-type economy' developed by the seminal work of Porter (1978) and Lundahl (1982). These authors characterize the South African-type economy as an essentially market economy with constraints and policy parameters determined by whites and for whites. The Porter-Lundahl models suggest that apartheid had an explicitly economic motivation, but one based on the specific interests of the groups that stood to gain from the policies in question.

In order to implement this idea, we use a public choice perspective in which policies are treated as endogenously determined by political support-maximizing politicians responding to the interests of voters and pressure groups. For a survey of the public choice method, see Lowenberg & Kaempfer (1998: 17-30). The main thrust of this approach is to show how it is possible to provide an explicitly *economic* explanation of apartheid institutions. Apartheid is viewed here as a vector of policies that can be varied in intensity along a continuum. Thus the degree to which apartheid principles were applied and enforced by the South African state is treated as a continuous endogenous variable, responsive to the relative influences of interest groups that received benefits or incurred costs associated with apartheid. This model may be used to shed light not only on the motives for apartheid policies in the first instance, but also on the reasons for subsequent liberalization in the enforcement of these policies and on the causes of the democratic transition in 1994.

In the next section we outline a brief political economy of apartheid, and in the following section we develop our model of the apartheid state. Implications of the model and conclusions are discussed in the last two sections.

## 2 The Political Economy of South African Segregationist Policies[3]

It has long been recognized by economists and scholars of South Africa that the apartheid system, representing a comprehensive set of regulations affecting all aspects of economic, social and political life, arose essentially as a response on the part of the white working class to the threat of black labour market competition.[4] However, although apartheid itself was a phenomenon of the post1948

[3] This section draws on Lowenberg & Kaempfer (1998: 33-42).

[4] See especially Van der Horst (1942: 157), Doxey (1961: 11415) and Hutt (1964: 59). These three authors provide seminal treatments of the economic origins of political support for

era of National Party rule, the era of classical apartheid was in fact preceded by a long history of segregationist policies brought about through the medium of an interventionist, statist polity characterized by a racially limited franchise. During the pre-industrial nineteenth century and early twentieth century, racial segregation in South Africa was motivated largely by white employer concerns to secure land and draw cheap agricultural and mine labour from the rural African sector (Horwitz 1967; Kenney 1996: 10).

Throughout its early history, South African commercial agricultural and mining production were plagued by shortages of labour relative to land (Wilson 1971: 117-19; Nattrass 1981: 66). Farmers and mine owners therefore pressured the state to enact various land alienation policies to transform a settled and relatively successful black peasantry (in some regions black peasant farmers earned higher returns than white smallholders[5]) into a low-wage labour force (Hutt 1964: 49; Wilson 1971: 121; Houghton 1973: 23; Nattrass 1981: 59; Lundahl 1992: 298-301).[6] These policies consisted of a combination of taxes and direct land expropriation to undermine the feasibility of subsistence or peasant farming and to force participation in the wage labour force.

In gold mining, the unskilled labour market was officially monopsonized in 1898 with the creation of a central labour recruiting system known as the 'Rand Native Labour Association,' with the explicit purpose of eliminating rivalry among mine owners over the available labour supply. In 1911 the Native Labour Regulation Act initiated a system of licensing of recruiting agents and prohibited employers from offering higher wages to attract labour away from competitors (Kenney 1996: 12). In 1912 the Native Recruiting Corporation was formed, with responsibility for centralized recruiting of mine labour from within South Africa and from Botswana, Lesotho and Swaziland. Meanwhile the Witwatersrand Native Labour Association recruited from further afield. These two institutions controlled the recruitment of African mine labour for the next 80 years and, together with the 'compound' system of housing on mine premises for single male workers, established the foundations of a migrant labour system that characterized South Africa's industrial labour force throughout the later apartheid era.

Thus, during its early history when South Africa was primarily an agricultural and mineral-extracting economy, segregationist policies were clearly driven by the interests of white farmers and mine owners. However, industrialization

apartheid. For subsequent analysis of this topic, see Lipton (1985), Kendall & Louw (1987), Hazlett (1988), Williams (1989), Dollery (1990), Lingle (1990), Vorhies (1991), Mbaku (1991) and Lundahl (1992).

[5] Bundy (1972) argues that the growth of the colonial economy was initially accompanied by a highly positive African response to trade opportunities in all four provinces, especially between 1870 and 1886. See Kenney (1996) for a summary.

[6] The earliest land expropriations that occurred in South Africa, during the period from 1652 to the last third of the nineteenth century, were motivated by a desire to ensure sufficient land for stock raising and agriculture, adding land to a growing white population in more or less fixed proportions. Only after the increase in the demand for labour as a result of the mineral discoveries of the late nineteenth century did land alienation become an instrument for creating a labour force (Lundahl 1992: 10-11, 299).

began in the 1920s and brought with it the emergence of a powerful white labour aristocracy based in the new urban industrial centers that sprung up around the Witwatersrand and the Orange Free State mining areas. The harnessing of the instruments of state power to further the interests of the white labour force, at the expense not only of blacks but also of white capital owners, dates from this period and comprises the basis for subsequent industrial-era apartheid.

The first manifestation of a formal industrial 'colour bar' occurred when white unskilled and semiskilled mineworkers resisted efforts by mine owners to substitute black workers who were willing to work for wages considerably below the 'civilized' reservation wage of the white.[7] In 1911 the white labour movement had been successful in getting the Mines and Works Act passed, which reserved skilled mining jobs for whites, and in 1918 the white unions extracted an agreement from employers that fixed the ratio of whites to blacks in the mines. But rising costs and falling gold prices after World War I placed mineowners under considerable pressure to hire cheaper workers, with the result that the earlier victories of the labour movement were reversed. The unions responded with open rebellion on the Witwatersrand in 1922, which was forcibly suppressed by government troops (Lundahl 1992: 300).

At the same time that white unions were fighting the incursion of unskilled blacks in the labour market and championing the cause of urbanized 'poor whites,'[8] Afrikaner farmers were concerned about the depletion of the supply of rural blacks and the consequent rise in farmworkers' wages due to the magnetic attraction of the mines and secondary industries.[9] It was precisely a coalition of convenience between these two groups – white labour and rural Afrikaner nationalists – that succeeded, through its numerical dominance of the white electorate, in attaining control of the government in 1924. This so-called 'Pact government' proceeded to erect an extensive lattice of colour bar and influx control legislation that characterized the 1920s and 1930s and provided the prototype for modern apartheid.

Among the legislation enacted by the Pact government and its successors were rate-for-the-job and union certification rules, closed-shop, apprenticeship and minimum wage laws, all of which effectively eliminated the competitive advantage of low-wage black labour over white.[10] Job reservation laws restricted some occupations to whites only.[11] Under the so-called 'civilized labour policy,'

[7] See Doxey (1961: 75, 116), Hutt (1964: 5963) and Kendall & Louw (1987: 3740).

[8] The poor whites were refugees to the towns from the backward rural sector who competed directly with still poorer blacks for urban unskilled jobs (Kenney 1996: 12).

[9] See Van der Horst (1942: 295) and Lipton (1985: 108).

[10] See Hazlett (1988) and Moll (1992: 293). Rate-for-the-job, closed-shop rules and minimum wages in unionized industries were established by the Industrial Conciliation Act of 1924 (amended in 1937 and 1956). Minimum wages were extended to non-unionized industries by the 1925 Wage Act. See Jones & Griffiths (1980) and Mbaku (1991: 141-42).

[11] Job reservation was initiated by the 1911 Mines and Works Act and the Native Labour Regulation Act of the same year. The Mines and Works Act, based on a 1907 ordinance enacted by the Transvaal legislature, reserved for whites most certificates of competency for skilled and semi-skilled mining jobs in the Transvaal and Orange Free State. See Rhoodie & Venter (1960: 121) and Mbaku (1991: 139-40). Job reservation was further entrenched and expanded by the infamous 'Section 77,' contained in the 1956 amendment to the Industrial

initiated in the 1920s, certain public sector jobs were reserved for whites, and preferential treatment was extended to private firms that adhered to prescribed maximum proportions of black to white workers (Nattrass 1981: 76). Preferential treatment often entailed the use of import tariffs to protect the domestic markets of firms whose ability to compete was undermined by the high costs of discriminatory policies (Kenney 1996: 12).[12] Later, in the 1960s, regions adjacent to black reserves were designated as 'controlled areas,' and firms were bribed to locate their factories there by being allowed to hire more blacks than they could in the established 'white' urban areas (Nattrass 1981: 183; Williams 1989: 39-40). Government bureaus and huge state-owned firms (most notably the national railroad) embarked on affirmative action hiring policies designed to provide jobs for relatively unskilled whites. Even when industrial growth necessitated the promotion of some black workers into traditionally white jobs, government and white union policies ensured that white workers shared (through wage increases) in the labour-cost savings that occurred whenever blacks were promoted (Porter 1991: 6).

In addition to industrial relations legislation and regulations, the Pact government and subsequent apartheid regimes enacted influx control and other geographical restrictions on black property rights, which created a permanent migrant labour force that oscillated continuously between residential domicile in reserves or 'homelands' and employment in white urban areas. Residential segregation was enforced by the pass laws and racial property rights legislation that built on earlier land confiscation policies by designating land for occupation by certain races and by restricting black workers' mobility.[13] By limiting the supply of black labour to the white industrial centers, white workers gained higher wages. White farmers, of course, continued to benefit from the existence of a large pool of unskilled rural blacks who were prevented from migrating to the towns, thereby ensuring low agricultural wages (Lundahl 1992: 160, 167).

Apartheid restrictions on the occupational and geographical mobility of black workers raised the costs of labour and imposed high turnover rates on mining- and industrial-sector employers.[14] Capital owners in those sectors were the ob-

Conciliation Act (Hutt 1964: 117). On the early institutionalization and legalization of the colour bar, see Doxey (1961: 9195, 12857) and Hutt (1964: 7278, 154).

[12] In 1924 the Board of Trade and Industries recommended that tariff protection be used to promote the growth of manufacturing industry, with the purpose of ameliorating high unemployment among poor whites. The Board suggested that tariff protection for specific industries be 'partly conditional on good labour conditions' and that 'whenever possible a larger proportion of civilised [i.e., white] labour' be employed. These recommendations were incorporated in the Customs Tariff and Excise Duties Amendment Act of 1925, which provided the foundations for a comprehensive system of import-substitution industrialization (Jones & Muller 1992: 71).

[13] The system of influx control and racial segregation was established by the Native Land Acts of 1913 and 1936, the Group Areas Act of 1950, the Natives (Urban Areas) Consolidation Act of 1952 and the Natives (Abolition of Passes and Coordination of Documents) Act of 1952. See Kendall & Louw (1987: 42-44).

[14] Griffiths & Jones (1980) show how the various labour market distortions consequent upon statutory job reservation and influx control had the effect of reducing productivity, stimulating inflation and suppressing economic growth. Employers were denied the right to hire any qualified worker, which caused inflation of labour costs and prices, and a loss of international

vious losers from this system because they received a lower rate of return than they could potentially have earned if they were free to hire as many workers as they desired at the market wage (Mbaku 1991: 140, 148). In effect, widespread regulation of the labour market prevented the allocation of labour and other inputs to their highest valued uses[15] and therefore 'taxed' the returns to capital (including human capital). Not surprisingly, therefore, the owners of non-agricultural capital resisted industrial-era apartheid in all of its various guises.[16] '[A]s the costs to [capitalists] of apartheid rose they became vocal in their criticisms of a system they had previously put up with in silence' (Kenney 1996: 13-14).[17]

Several scholars, including Hutt (1964: 85), Sowell (1981: 3839), Olson (1982: 173), Lipton (1985: 34) and Kendall & Louw (1987: 91), have pointed out that periods of rapid economic growth inevitably drove the South African economy toward greater integration of black workers into the industrial sector. During such growth spurts, the demand for semiskilled and skilled labour typically exhausted the pool of white workers and drew large numbers of blacks, Indians and Coloureds into the relatively highpaying industrial workforce. In fact, it was precisely these dynamics of the labour market and the business cycle that ushered in the era of true apartheid in 1948. Boom conditions during and after World War II had brought with them a rapid modernization of the South African economy, with manufacturing industry stimulated by the natural protectionism afforded by wartime isolation of the country from traditional suppliers. The influx of an increasingly settled black labour force into the urban population centers now seemed to be an irreversible reality (Lipton 1985: 21). Either the white electorate would have to accept the inevitable deracialization

competitiveness 'through the necessity of paying "monopoly premiums" to existing labour complements' (Griffiths & Jones 1980: 171). Attempts have also been made to measure the costs attributable to the migrant labour system. These costs included the migrant's travel expenses, periods of unemployment necessitated by periodic return to the reserves, and the relatively unproductive time spent in the subsistence sector (Houghton 1973: 90). In 1955 the Tomlinson Commission for the Socio-Economic Development of the Bantu Areas found that, of a total annual potential of 1.14 million man-years of labour available in the African areas, only 480,000 were economically used and, of this, only 433,000 were in paid employment in the 'white' areas. On the assumption that the average black migrant's home was 500 kilometers from his place of work and that the average work stint was 18 months, the transportation requirement would have amounted to 310 million man-kilometers per year (Houghton 1973: 90-91). Moreover, the high labour turnover associated with the system of influx control tended to restrict the acquisition of skills on the part of black workers.

[15] 'In so far as it prevents any man from performing a task for which he is competent, and confines him to one which is less skilled, there is economic waste of scarce resources' (Houghton 1973: 153).

[16] See Doxey (1961: 111), Olson (1982: 16364), Sowell (1983: 11213) and Lipton (1985: 11216).

[17] Of course industrial capitalists benefited from some aspects of apartheid policy not directly related to racial legislation, such as protectionist tariffs and import substitution strategies pursued by the apartheid government. These policies created gains for white employers that at least partially compensated for the costs that apartheid labour legislation imposed on them. Some white capitalists probably supported the apartheid regime merely because they feared possible nationalization, expropriation or redistribution that might be implemented by a black majority government. See Rosendorff (1996).

and integration associated with capitalist development and market forces, or regulatory intervention by the state would be required to stem the tide (Doxey 1961: 18788). The 1948 elections showed that the median white voter favored the latter course of action, and the new National Party government embarked on its ambitious project of central planning which Hazlett (1987: 16) describes as a sort of ethnic socialism. This comprised the establishment of 'grand apartheid' – meaning rigid geographical separation (creation of separate sovereign national entities in which blacks would hold citizenship) – together with thoroughgoing regulation of economic and social interactions between blacks and whites in the 'white' parts of the country where black workers supposedly sojourned temporarily.

But even this imposing edifice of bureaucratic statism was not immune to the costs associated with suppressing efficient market transactions and the general tide of economic growth. As both Porter (1978) and Lundahl (1982) observe, apartheid inevitably created a paradoxical situation in which the achievement of maximum income for the white group as a whole required increased integration of blacks into the modern economy while the policies of separate development and apartheid were aimed at just the opposite. Thus, for example, continuous modernization and expansion of the industrial sector of the South African economy increased the demand for highly skilled labour well beyond the capacity of the white population alone to supply it, so that some significant concessions had to be made to the need for a stable, educated (and therefore characteristically middle class) black labour force. The scrapping of many apartheid laws commenced in the early 1980s. These reforms reflected a shifting structure of economic interests within the white electorate. Lipton (1985: 7) points out, for example, that labour costs became a much smaller proportion of total production costs in an increasingly capital intensive economy, so that there was less incentive for employers to replace white workers with cheaper black labour. This, in turn, diminished the need for artificial protection of a beleaguered white working class, constantly threatened by low black wages. Furthermore, many whites, including Afrikaners, were effectively coopted into the capitalist class, largely as a result of their acquisition of human capital. Owners of capital (human or physical) have no interest in regulations that inhibit the rational allocation of complementary labour inputs.

The adaptations of apartheid policy in the face of changing constraints suggest that apartheid can be viewed along a continuum of different levels or degrees of application. Apartheid, and segregation more generally, have taken different forms, and have been enforced to differing extents, depending on economic and political circumstances. Apartheid policy was a pragmatic response of a rational white oligarchy that faced changing exogenous constraints over time. Race discrimination, in South Africa as elsewhere, possessed a distinctly *economic*, as opposed to irrational, atavistic or merely prejudicial, rationale.

Apartheid, therefore, can be treated as an endogenous policy, the level or intensity of which was determined primarily by economic interests and external constraints affecting interest groups. In the next section, we develop an economic model in order to formalize a public choice analysis of apartheid as endogenous policy.

# 3 The Model

It will be assumed for the sake of simplicity of exposition that the South African polity consists of three identifiable groups – namely, capitalists (who are all white), white workers (who are all skilled), and black workers who are themselves divided into skilled and unskilled categories. Following Lundahl (1982), we motivate our assumption that all white workers are skilled by the fact that the 'poor white' problem had been effectively eliminated by the end of World War II, so that a skilled white work force is a reasonably accurate reflection of the post-war situation which the present model is intended to describe.[18] Black and white skilled workers are close, but not perfect, substitutes. This means that employers can distinguish between the two categories of skilled labour despite a uniform skilled wage rate applicable to both.[19] Again, following Lundahl and Porter (1978), it will be assumed that the South African economy is fundamentally a market economy, with the various dictates of the apartheid state representing constraints on the operation of the market.

Black unskilled workers may be employed in the reserves (or 'homelands') or in the (white) industrial sector.[20] Skilled workers (both black and white) may only be employed in the industrial sector. For the purposes of the present model, we will not distinguish between white commercial agriculture and white-owned industry. While it is true that the former employed mostly unskilled black labour and the latter employed both skilled and unskilled labour, we can attain a higher degree of generality by combining the two into a single (white) 'capitalistic' sector which employs black skilled and unskilled workers. Our model is intended to apply to the post-World War II period by which time the agricultural sector was much smaller and struggles between agricultural and industrial or mining capital over access to a labor force were largely resolved and certainly no longer as pressing as in the 1920s.

The industrial sector produces two goods: a non-traded good which is consumed domestically by blacks and whites, and a single export good represented by gold, which is South Africa's chief source of foreign exchange.[21] The insti-

[18] [18] Steenkamp points out that the gold boom of the late 1930s and industrial development after World War II practically eliminated cyclical and structural unemployment among whites and produced instead a widespread shortage of skills (1983: 59, 73).

[19] The assumption that black and white skilled labour are imperfectly substitutable in production despite a uniform skilled wage rate is similar to a fairly standard assumption in the immigration literature in which native and immigrant workers with similar skills are treated as imperfectly substitutable due to specialization in different production tasks, stemming potentially from language proficiency or cultural differences. See Card (2009) and Lewis (2011).

[20] Throughout the discussion that follows, the term 'industrial sector' will be used to describe the entire 'modern' or 'capitalistic' economy, and will thus include the services, trade and mining sectors as well as manufacturing and heavy industry.

[21] 'Capitalists', or employers, do not comprise a distinct consumer group. We may justify this assumption by regarding the model as a version of Debreu's 'private ownership economy,' in which each i$^{th}$ producer receives the value of his resources, $W_i$, plus shares of the profits

tution of apartheid enters the model in the form of a state determined quantity constraint on the number of black skilled workers employed in the industrial sector, and a restriction on the flow of black unskilled workers permitted to move from the reserves into the industrial sector. The latter is not a direct quantity constraint on the number of unskilled workers but is modeled instead as a transactions cost in the form of a premium on the unskilled wage rate which must be paid by employers. This assumption reflects the fact that the mobility of unskilled workers is limited by a large number of bureaucratic regulations – including influx control, urban residential zoning restrictions, and industrial location policy – so that the cost of hiring unskilled labour is effectively increased. The restriction on the number of black skilled workers employed in the industrial sector is a direct quantity constraint, however, since it is determined by such factors as access to education and training facilities by blacks, as well as various types of labour legislation which affect the recognition of black trade unions and the job classifications of black workers. In this respect we are again following the example set by Lundahl (1982), who likewise identifies constraints on the employment of black skilled and unskilled labour as the sole instruments of apartheid in his third stage of development (the post-war period), by which time the allocation of land between blacks and whites has been determined so that land alienation no longer constitutes a relevant tool of economic policy.

Once the state has established the desired degree of geographical and skill mobility of black workers, the goods and labour markets determine endogenously the skilled wage rate, the employment levels of black unskilled and white skilled labour, the output levels of both the traded and non-traded goods, and the price of the latter. The unskilled black wage rate is determined exogenously by the supply price of black labour in the reserves, and the world gold price is also exogenous. It should be noted that we are abstracting altogether from capital as an input into the production function of the industrial sector. This is done in the interests of clarity of exposition and is motivated by the fact that its incorporation will not significantly alter the results which are of most concern.

The model thus far appears to consist of little more than a simplification of economic relationships designed to characterize the allocational and distributional effects of apartheid. The purpose of the present paper, however, is to provide a basic framework for explaining the historical evolution of apartheid institutions over time. In order to do this, it must include a theory of political choice or collective decision making. Accordingly, we incorporate a median-voter model of the state in which politicians are assumed to maximize their probability of reelection or survival in office, which in turn involves maximizing a utility function that depends on the utility of each group of constituents – in this case white skilled workers and white capitalists who are the only two groups to comprise the electorate – weighted by each group's share of the total electoral

of each of the other producers, $Q_{ij}$. Thus, the wealth of the consumer-producer is:

$$Z_i = P \cdot W_i + \sum_{j=1}^{n} Q_{ij} \cdot R_{j(P)}$$

where $R_j$ is the profit earned by the j$^{th}$ producer (Debreu 1959: 78-80).

population. Following Downs (1957) and Tullock (1967), it is assumed that the voting franchise within the white group is general, and entry into constitutionally sanctioned political activity is unrestricted. It then follows from Black's theorem – given the necessary assumptions regarding the single-peakedness of individual utility functions – that competition among political entrepreneurs leads to the election of a government that chooses a platform identical to the preferences of the median voter (Borcherding & Deacon 1972: 891; Mueller 1979: 40-41).[22]

Blacks enter the model by virtue of the fact that the costs to the state of maintaining and defending the apartheid system are inversely related to black utility, i.e., directly related to the level of black resentment aroused by the system and the consequent extent of black resistance. These costs also include the expenditures required to duplicate numerous public facilities for the exclusive use of blacks in order to appease external criticism, and the costs of purchasing support for apartheid from African chiefs and other black leaders.[23] According to Savage (1977), the costs of administering and enforcing the system of influx control and 'pass laws' include (i) costs of arrests and summonses for pass violations; (ii) costs of patrolling and policing; (iii) costs of prosecutions; (iv) lost production; (v) imprisonment; (vi) issuing and updating pass documents; (vii) costs of labour bureaus and contracts; and (viii) aid centres and transit camps. These are only the most direct and observable of administrative costs. In addition, account should be taken of the proportion of state spending on national defence, education, foreign affairs and other budgetary categories which are attributable to the need to maintain apartheid institutions. A close relationship between South African domestic policy and international relations developed as a result of the granting of independence to a large number of black African states and the subsequent emergence of a strong anti-colonial and anti-racist lobby in international forums. The mounting pressure of world opinion against apartheid forced South Africa to devote considerable resources to defending its domestic policies on a wide front: 'Thus for a small power its representation abroad became extensive ... Foreign policy became in large part concerned with the attempt to justify Government policy towards the non-white population...' (Spence 1971: 507). The expenses involved in conducting this international defence of apartheid must be counted among the costs of maintaining the system.

Our model consists of three levels of decision making. First, the problem for capitalists is to maximize profit by choosing the optimal combination of inputs (white and black skilled labour and black unskilled labour), given the

[22] Single-peakedness is a sufficient condition for existence of a unique political equilibrium when policy space is one-dimensional. In the present model there are multiple policy instruments, although these might be reduced to a single dimension in terms of income of the white electorate. A more tractable approach might be to simply assume that the political system is designed to maximize average white welfare, which implies the same outcome while avoiding the difficulties of single-peaked preferences. The author is grateful to an anonymous referee for suggesting this point.

[23] In 1962, some $400,000 was allocated under the category of 'allowances, presents and rations to chiefs and headmen' (Hutt 1964: 133).

usual cost constraint as well as the restrictions on labour mobility imposed by the state. Second, white and black workers aim to maximize their utility subject to their disposable income. Third, and most important, the rulers who constitute the government and other state institutions are assumed to maximize their probability of reelection or survival in power, which in turn is a function of the utilities of white capitalists and workers weighted by their population shares in the electorate, subject to the constraint imposed by the various costs involved in maintaining apartheid, which are themselves a function of black utility, relative to the revenue generating capacity of the state.[24] The policy instruments available to the rulers include the tax rates levied on both blacks and whites, and the 'level' or 'degree' of apartheid as measured by the number (or rate of increase) of blacks permitted to hold skilled industrial jobs and the transactions cost premium levied on employers of unskilled labour. It is assumed by definition of apartheid that the smaller the number of black skilled workers who are employed in the 'white' economy, and the larger the transactions cost 'wedge' in the unskilled labour market, the greater the extent to which apartheid institutions are enforced by the state. As noted in the previous section, the application of apartheid policy has followed an extremely flexible pattern. The purpose of our model is therefore to demonstrate how the politically optimal level of apartheid depends on such parameters as the costs of the system, the structure of the white electorate, and other exogenous variables. It should be noted that our model is a static equilibrium one and therefore does not address the growth impacts of changes in the exogenous variables.

The state is assumed to set a binding ceiling restriction on the level of employment of black skilled workers in the industrial sector, denoted by $L_b$, and to raise the average cost to employers of hiring unskilled labour by a factor of $T_a$. These two policy parameters together characterize the existence of apartheid within the model. The industrial sector produces a single non-traded good, $X$, and a single tradd good, $G$, whose production functions are of the form:

$$X = X(L_u^x, L_b^x, L_w^x), \qquad \frac{\partial x}{\partial L_u^x} > 0, \frac{\partial x}{\partial L_b^x} > 0, \frac{\partial x}{\partial L_w^x} > 0 \tag{1}$$

$$G = G(L_u^g, L_b^g, L_w^g), \qquad \frac{\partial x}{\partial L_u^g} > 0, \frac{\partial x}{\partial L_b^g} > 0, \frac{\partial x}{\partial L_w^g} > 0 \tag{2}$$

where $L_u^x, L_b^x$ and $L_w^x$ are the numbers of unskilled, black skilled and white skilled workers employed in the $X$-producing sector and $L_u^g, L_b^g$ and $L_w^g$ are defined analogously for the $G$-producing sector. The unskilled wage rate, $W_u$, is exogenously determined by the average product of labour in the reserves, and the price of gold, $P_g$, is also exogenous.

[24] Here we are following the example of Frey & Schneider (1979). Their model endogenizes the government's choice of the values of certain policy instruments by assuming that the governing party maximizes its probability of reelection subject to a constraint imposed by the requirement that public expenditure may not exceed tax revenue.

Producers ('capitalists') maximize the following profit function:

$$\begin{aligned}\underset{Lu,Lb,Lw}{Max\ Q} &= (1-T_c)\cdot\{P_x\cdot X(L_u^x,L_b^x,L_w^x)+P_g\cdot G(L_u^g,L_b^g,L_w^g)\}\\ &\quad -(1+T_a)\cdot W_u\cdot L_u - W_s\cdot(L_b+L_w) \qquad (3)\end{aligned}$$

where $L_u = L_u^x + L_u^g$
$L_b = L_b^x + L_b^g$
$L_w = L_w^x + L_w^g$.

$T_c$ is the tax rate applied to the capitalists' revenues,[25] $W_s$ is the skilled wage rate, is the price of the non-traded good, $P_x$ is the gold price, and $T_a$ is the apartheid-imposed transactions cost incurred by employers of unskilled labour. The first-order conditions define a maximum profit function, the optimal quantities of $X$ and $G$ produced, and the amounts of skilled and unskilled labour demanded in the two industries ($L_u^d$, $L_b^d$ and $L_w^d$) as functions of prices, wage rates, $T_c$ and $T_a$. The partial derivatives of these maximum value functions can then be calculated by applying a lemma of the envelope theorem (Varian 1978: 268).

Workers choose to consume $X$ and supply labour in such a way as to maximize their individual utility functions subject to disposable income constraints. For white skilled workers, the problem may be expressed as follows:

$$\underset{\{Xw,Lw\}}{Max\ U_w} = U_w(X_w, L_w), \quad \frac{\partial U_w}{\partial X_w} > 0, \frac{\partial U_w}{\partial L_w} < 0 \qquad (4)$$

subject to $P_x.X_w = (1-T_w).W_s.L_w$

where $X_w$ is the quantity of $X$ consumed by white workers, $L_w$ is the quantity of white skilled labour supplied and $T_w$ is the tax on white labour earnings. Black workers face a more limited range of choice, since their employment levels are assumed to be constrained by apartheid restrictions. Thus black skilled workers behave as follows:

$$\underset{\{Xb\}}{Max\ U_b} = U_b(X_b, L_b), \quad \frac{\partial U_b}{\partial X_b} > 0, \frac{\partial U_b}{\partial L_b} < 0 \qquad (5)$$

subject to $P_x.X_b = (1-T_b).W_s.L_b$

where $X_b$ is the quantity of $X$ consumed by black skilled workers and $T_a$ is the tax rate levied on black labour earnings.[26] Similarly, in the case of black unskilled workers:

$$\underset{\{Xu\}}{Max\ U_u} = U_u(X_u), \quad \frac{\partial U_u}{\partial X_u} > 0 \qquad (6)$$

[25] The distinction between 'capitalists' and 'workers' has no real content in a pure general equilibrium setting, since all factors earn a normal rate of return. However, we can distinguish capitalists from workers by assuming that the former possess some specialized skills in organizing and monitoring production.

[26] The tax rate levied on black labour earnings, $T_b$, need not necessarily be the same as the tax on white labour earnings, $T_w$. Our focus is on the comparative static effects of changes in these tax rates, not on the relative levels of the tax rates themselves.

subject to $P_x.X_u = (1 - T_b).W_u.L^d_u.(P_x, P_g, W_u, W_s, T_a, T_c)$

where $X_u$ is the quantity of $X$ consumed by black unskilled workers. The supply of unskilled labour is perfectly elastic at the exogenous unskilled wage rate, $W_u$, so that the number of unskilled workers employed at any given wage rate is determined by the labour demand schedule, $L^d_u$ (.).[27] Again, the first-order conditions define maximum value functions for $X_w, X_b, X_u$ and $L_w$, whose partial derivatives may be evaluated using the envelope theorem.

Equilibrium in the goods market is defined by:

$$\begin{aligned}\bar{X}(P_x, P_g, W_u, W_s, T_a, T_c) =& \bar{X}_w(P_x, W_s, T_w) + \bar{X}_b(P_x, W_s, L_b, T_b) \\ &+ \bar{X}_u(P_x, P_g, W_u, W_s, T_a, T_c, T_b)\end{aligned} \qquad (7)$$

where the 'bar' ($^-$) indicates a maximum value function. Equilibrium in the skilled labour market is likewise defined by:

$$\bar{L}^d_w(P_x, P_g, W_u, W_s, T_a, T_c) + \bar{L}^d_b(P_x, P_g, W_u, W_s, T_a, T_c) = \bar{L}_w(P_x, W_s, T_w) + L_b. \qquad (8)$$

Invoking these market clearing conditions, we can obtain reduced form expressions for $X$, $G$, $P_x$ and $W_s$ which can then be substituted into the maximum value profit, output, white labour supply and white and black utility functions.

Turning now to the political sector of the model, political support-maximizing politicians are assumed to maximize a utility function of the form:

$$U_r = U_r(z), \quad \frac{\partial U_r}{\partial z} < 0 \qquad (9)$$

where $z$ is the probability of reelection or survival in office, and is defined as a population share weighted sum of the utilities of the component groups of the (white) electorate. It will be assumed that producers' utility is a monotonically increasing function of profit, so that we may substitute the profit function, $Q$ (.), for a white capitalist utility function. We can then simplify further by treating $U_r$ as itself a weighted sum of white workers' utility and producers' profits.[28] The choice problem facing the politicians may be represented as follows:

$$\underset{Lb,Ta,Tc,Tw,Tb}{Max\ U_r} = a.U^*_w(.) + (1 - a).Q^*(.) \qquad (10)$$

[27] Note that the quantity of unskilled labor is excluded from the black unskilled utility function. This is done in the interests of computational simplicity on the grounds that the quantity of black unskilled labor employed is not a choice variable for black unskilled workers.

[28] In long-run equilibrium all profits are reduced to zero. We may, however, postulate the existence of some fixed factor owned by white employers. The rents accruing to this factor will be diminished if capitalists are constrained in their ability to hire other factors in the desired proportions.

subject to

$$T_c.P_x^*(.).X^*(.) + T_c.P_g.G^*(.) + T_w.L_w^*(.).W_s^*(.)$$
$$+T_b.L_u^*(.).W_u + T_{_b}.L_{_b}.W_s^*(.) = C(U_{_b}^*(.), U_{_u}^*(.), D\},\ \frac{\partial C}{\partial U_{_b}^*(.)} < 0,$$
$$\frac{\partial C}{\partial U_{_u}^*(.)} < 0, \frac{\partial C}{\partial D} > 0,\ \frac{\partial^2 C}{\partial U_{_b}^*(.)\partial D} < 0,\ \frac{\partial^2 C}{\partial U_{_u}^*(.)\partial D} < 0$$

where $a$ is the proportion of the white population that consists of skilled workers (as opposed to employers and suppliers of both physical and human capital), $C$ is the 'apartheid cost function,' and $D$ is a shift parameter that depends on such factors as external support or opposition, military technology, organizational cohesion of internal resistance groups and internal opposition, etc.[29] In effect, the government chooses optimal levels of the apartheid policy parameters, $L_b$ and $T_a$, as well as the tax rates, $T_c, T_w$ and $T_b$, subject to the constraint that the total tax revenue of the state equals the cost of administering, maintaining and defending the apartheid system, which itself is inversely related to black utility. The first-order conditions for a maximum define the following reduced form expressions for the five policy instruments:

$$L_b' = L_b'(a, P_g, W_u, D) \tag{11}$$

$$T_a' = T_a'(a, P_g, W_u, D) \tag{12}$$

$$T_c' = T_c'(a, P_g, W_u, D) \tag{13}$$

$$T_w' = T_w'(a, P_g, W_u, D) \tag{14}$$

$$T_b' = T_b'(a, P_g, W_u, D). \tag{15}$$

Because of the general equilibrium structure of the model, it is not possible to derive unambiguous or determinate comparative static results without imposing a number of restrictions on the signs and relative magnitudes of various

[29] Pressure on the south African government that originates outside the country may be conceptually divided into three categories: (i) events in Africa (e.g., transition to black rule in neighboring countries such as Angola, Mozambique and Zimbabwe, and the changing attitudes of the so-called 'front-line states' and the OAU); (ii) international political developments, of which the most important include the policies of major Western industrialized countries. 'If Southern Africa is to be defended for the West – and powerful economic interest as well as strategic considerations seem to suggest this intention without doubt – the country has to be made defensible by removing the most objectionable aspects of the present system' (Thomas 1977: 4); and (iii) factors related to the world economy, such as the availability of foreign capital and access to markets for South Africa's industrial exports. Sources of internal political pressure include the activities of blacks, both within the urban areas and the governments of 'independent' homelands, the reactions of white opposition groups and the general economic situation, especially rising defence expenditures, increased taxes and unemployment (Thomas 1977: 8-10).

elasticities and partial effects.[30] The important point for our present purpose is to show that it is possible to choose a particular set of mutually consistent assumptions in order to yield comparative static predictions which are intuitively plausible in light of the underlying economic theory. With appropriate assumptions (detailed below), we are able to obtain the following comparative static results of the model:

$$\begin{array}{llll}
(1)\frac{\partial L_b'}{\partial_a}<0; & (2)\frac{\partial L_b'}{\partial P_g}<0; & (3)\frac{\partial L_b'}{\partial W_u}<0; & (4)\frac{\partial L_b'}{\partial D}<0; \\
(5)\frac{\partial T_a'}{\partial_a}<0; & (6)\frac{\partial T_a'}{\partial P_g}<0; & (7)\frac{\partial T_a'}{\partial W_u}<0; & (8)\frac{\partial T_a'}{\partial D}<0; \\
(9)\frac{\partial T_c'}{\partial_a}<0; & (10)\frac{\partial T_a'}{\partial D}<0; & (11)\frac{\partial T_w'}{\partial_a}<0; & (12)\frac{\partial T_w'}{\partial D}>0; \\
(13)\frac{\partial T_b'}{\partial_a}>0; & (14)\frac{\partial T_b'}{\partial P_g}>0; & (15)\frac{\partial T_b'}{\partial W_u}>0; & (16)\frac{\partial T_b'}{\partial D}<0.
\end{array}$$

The specific restrictions needed in order to evaluate the signs of some of the above partial derivatives are as follows:[31]

$$\frac{\partial L_b'}{\partial P_g}>0 \text{ if } T_c\cdot\frac{\partial \bar{X}}{\partial W_u}\cdot\frac{\partial \bar{P}_x}{\partial P_g}+T_c\cdot\frac{\partial \bar{P}_x}{\partial L_b}\cdot\frac{\partial \bar{X}}{\partial P_x}+T_w\cdot\frac{\partial \bar{W}_s}{\partial L_b}\cdot\frac{\partial \bar{L}_w}{\partial P_x}+T_w\cdot\frac{\partial \bar{L}_w}{\partial W_u}\cdot\frac{\partial \bar{W}_s}{\partial P_g}>0, \tag{16}$$

which is not an unreasonable assumption since all of these terms are positive except for the second one.

$$\frac{\partial L_b'}{\partial W_u}>0 \text{ if } T_b\cdot\frac{\partial \bar{L}_u}{\partial W_u}\cdot\frac{\partial \bar{X}}{\partial W_u}+T_c\cdot\frac{\partial \bar{P}_x}{\partial L_b}\cdot\frac{\partial \bar{X}}{\partial P_g}+T_w\cdot\frac{\partial \bar{W}_s}{\partial L_b}\cdot\frac{\partial \bar{L}_w}{\partial P_g}+T_w\cdot\frac{\partial \bar{L}_w}{\partial W_u}\cdot\frac{\partial \bar{W}_s}{\partial W_u}>0, \tag{17}$$

which is again not an unreasonable assumption since only the first of these

[30] The need for these restrictions arises out of the fact that no explicit assumptions were made at the outset regarding the relative factor intensities of the gold and consumption goods industries. In a general equilibrium model with two goods and three factors (in which none of the factors is employed uniquely in a particular sector), the effects of changes in goods prices or factor endowments on output and factor returns depend crucially on the ranking of factor intensities in the two sectors of production as well as on the degree of substitutability or complementarity between factors. Thus Jones & Easton (1983) show that, in such a general model where no factor is sector-specific, comparative static results depend on which factor is chosen as the 'middle factor' in terms of intensity in the two sectors and on whether the 'extreme factors' are assumed to be better substitutes for each other than for the middle factor (1983: 68, 84). Unlike 'even' models of general equilibrium with equal numbers of factors and commodities, factor prices in the general 2 x 3 model are determined not only by commodity prices but also by factor intensities and substitutability.

[31] These restrictions are essentially of three types: (i) technical conditions regarding the relative slopes of goods and factor demand and supply functions; (ii) those specifying the relative magnitudes of effects on prices and wages of changes in exogenous and policy variables; and (iii) those specifying the relative magnitudes of the marginal utility or disutility attached by various groups to changes in policy variables. Even after establishing these restrictions, it remains difficult to evaluate the effects of changes in the gold price and the unskilled wage rate on the optimal tax rates levied on employers and on white workers because of the interdependencies which are inevitable in a general equilibrium model.

terms is negative.

$$\frac{\partial T_a'}{\partial P_g} > 0 \text{ if } T_c \cdot \frac{\partial \bar{X}}{\partial W_s} \cdot \frac{\partial \bar{P}_x}{\partial P_g} + T_c \cdot \frac{\partial \bar{P}_x}{\partial T_a} \cdot \frac{\partial \bar{X}}{\partial P_x} + T_w \cdot \frac{\partial \bar{W}_s}{\partial T_a} \cdot \frac{\partial \bar{L}_w}{\partial P_x} + T_w \cdot \frac{\partial \bar{L}_w}{\partial W_s} \cdot \frac{\partial \bar{W}_s}{\partial P_g} > 0. \tag{18}$$

$\frac{\partial T_a'}{\partial D} < 0$ if the marginal disutility to black unskilled workers from a rise in $T_a$ exceeds, in absolute terms, the marginal utility to black skilled workers. This does not seem to be an unreasonable assumption since $T_a$ has a much more direct impact on black unskilled workers than on black skilled workers.

$\frac{\partial T_c'}{\partial a} > 0$ if the marginal disutility of a rise in $T_c$ has a greater absolute value for employers than for white workers, which seems reasonable given that $T_c$ is a tax on firms' revenues.

$\frac{\partial T_w'}{\partial D} > 0$ if the absolute value of the marginal utility to black unskilled workers from a rise in $T_w$ exceeds that of the marginal disutility to black skilled workers.

$\frac{\partial T_b'}{\partial a} > 0$ if the marginal utility to white workers from an increase in $T_b$ exceeds that to employers, which seems reasonable since employers might have to pay higher wages to blacks if the tax on black earnings is increased, giving white workers a competitive advantage in the labour market.

$$\begin{aligned} \frac{\partial T_b'}{\partial P_g} > 0 \text{ if } & T_c \cdot \frac{\partial \bar{X}}{\partial T_b} \cdot \frac{\partial \bar{P}_x}{\partial P_g} + T_c \cdot \frac{\partial \bar{P}_x}{\partial T_b} \cdot \frac{\partial \bar{X}}{\partial P_x} + T_w \cdot \frac{\partial \bar{W}_s}{\partial T_b} \cdot \frac{\partial \bar{L}_w}{\partial P_x} \\ & + T_w \cdot \frac{\partial \bar{L}_w}{\partial W_s} \cdot \frac{\partial \bar{W}_s}{\partial P_g} + w_u \cdot \frac{\partial \bar{L}_u}{\partial P_x} + L_b \cdot \frac{\partial \bar{W}_s}{\partial P_g} > 0. \end{aligned} \tag{19}$$

$$\begin{aligned} \frac{\partial T_b'}{\partial w_u} > 0 \text{ if } & T_c \cdot \frac{\partial \bar{X}}{\partial T_b} \cdot \frac{\partial \bar{P}_x}{\partial W_u} + T_c \cdot \frac{\partial \bar{P}_x}{\partial T_b} \cdot \frac{\partial \bar{X}}{\partial P_g} + T_w \cdot \frac{\partial \bar{W}_s}{\partial T_b} \cdot \frac{\partial \bar{L}_w}{\partial P_g} \\ & + T_w \cdot \frac{\partial \bar{L}_w}{\partial T_b} \cdot \frac{\partial \bar{W}_s}{\partial W_u} + w_u \cdot \frac{\partial \bar{L}_u}{\partial P_g} + L_b \cdot \frac{\partial \bar{W}_s}{\partial w_u} > 0. \end{aligned} \tag{20}$$

A discussion of results 1 through 16 follows in the next section.

# 4 Implications of the Model

Perhaps the most striking conclusion to be drawn from the above analysis is the complexity of the relationships between the various groups of beneficiaries and subordinates. The general equilibrium nature of the model ensures that it is not always possible to produce a clear delineation between group interests. The model starts out with the simplest possible postulate of individual utility maximization and proceeds to show that the effects of apartheid policies on the endogenous variables are by no means unambiguous. Nevertheless, by appending a model of political decision making and by specifying appropriate assumptions, it is possible to indicate how the politically optimal 'level' or extent of enforcement of apartheid institutions is chosen, and how changes in certain variables are likely to affect this choice. The model is therefore able to provide a 'rationale' for apartheid which lies within the boundaries of economic method.

More specifically, the analysis in the previous section shows that an increase in the costs of defending, administering and otherwise maintaining the apartheid system will result, ceteris paribus, in a reduction in the 'level' of apartheid, i.e., a reduction in the extent to which apartheid policies are applied and enforced, which is represented in the model by an increase in the number (or growth rate) of black skilled participants in the labour market and a decrease in the transactions cost premium on the unskilled wage rate (results 4 and 8). Results 1, 5, 9 and 13 imply that an increase in the degree to which white workers benefit from apartheid, measured in terms of an increase in the proportion of white workers in the total voting population, $a$, translates into an increase in the 'demand' for apartheid. This in turn will result in a larger amount of apartheid being 'purchased,' in the sense that there will be a reduction in the rate of absorption of blacks into the modern sector economy and taxes on employers and blacks will be raised in order to finance the higher level of enforcement of apartheid institutions, which now have a higher marginal utility to white decision makers. Results 2 and 6 mean that an increase in the world gold price will cause a reduction in the optimal level of apartheid, which in turn derives partially from the positive output effect of such an increase and the consequent decline in the perceived need by white workers to artificially restrict black competition.

For similar reasons, a rise in the exogenous unskilled wage rate will reduce the benefit derived from the maintenance of a given level of apartheid (results 3 and 7). A higher unskilled wage implies that it is no longer necessary to artificially restrict the inflow of black unskilled workers to the same extent because unskilled labour is rendered less competitive by virtue of the increased wage. The 'demand' for apartheid institutions is accordingly reduced. The positive output effect of a rise in the gold price also enable blacks to be taxed at a higher rate without raising the level of resistance by an amount that would impose unacceptably high costs on the maintenance of the system (result 14). Results 10 and 16 imply that an upward shift in the costs of policing and administering apartheid institutions (due to a change in the parameters of the 'apartheid cost function') will reduce the optimal tax rate levied on blacks and on white employers, because such taxes enter negatively into black utility functions and therefore lead to resistance by blacks to apartheid policies. Result 15 means that an exogenous increase in black unskilled wages makes it less costly to tax black workers, so that the optimal black tax rate increases. Finally, result 11 shows that a rise in the proportion of white workers in the total white population causes a fall in the optimal tax rate on white wage income, while result 12 shows that this tax rate will increase if the apartheid cost function shifts upwards.

Most of these results are potentially testable. For example, the model leads us to expect a negative relationship between exogenous cost changes and the 'level' of apartheid. The latter might be measured either directly by the sizes (or rates of growth) of the urban black skilled and unskilled labour forces, or indirectly by the expenditure of government departments entrusted with the task of administering apartheid policy, e.g., Bantu Administration, black education and housing, etc. A shift in the 'apartheid cost function' may be proxied by changes in expenditures on national defence, foreign affairs and propaganda efforts, as well as other expenditure categories which are responses to perceived threats to the system. In addition, we might test the predictions of the model regarding the effect of demographic changes, e.g., in the proportion of white workers in the electorate and alterations in the level of white net immigration, on the politically optimal extent of apartheid policy. We may broaden the definition of 'capitalist' to include those white workers possessing large endowments of human capital (e.g., professional and technical workers), and the model will then imply that a shift in the occupational structure of the white population toward these job categories will cause a decline in the application and enforcement of apartheid institutions. [32]

# 5 Conclusions

The public choice model developed here facilitates an explanation of apartheid as endogenous policy and accounts for the pragmatism and flexibility with which apartheid principles were applied over time. Although there are certainly conceptual difficulties in quantifying apartheid, our model is not without operational empirical content. Moreover, our approach enables us to identify some of the key variables that are relevant in determining the ability of apartheid to survive as a viable political system. In particular, we are able to shed light on the reasons for the ultimate unwinding and collapse of apartheid. If, as we have suggested, the apartheid system represented an essentially rational response of a heterogeneous white oligarchy to the costs and benefits associated with alternative institutional arrangements, then it follows that the system would inevitably change as a result of changing constraints. The white ruling group would not intransigently cling to the status quo merely for the sake of ideology, but at the same time apartheid would not have been abandoned in the absence of the necessary changes in exogenous variables.

The approach proposed here also has important implications for the debate on the role of international sanctions in ending apartheid.[33] Lowenberg & Kaempfer (1998: chapters 5, 8) use a public choice model to analyze the effects of sanctions on a target country. Their model suggests that the real purpose of the anti-apartheid sanctions campaign, in many instances, was simply to appease domestic protectionist interests in the sanctioning countries or to satisfy the demands of human rights groups by appearing to 'do something' about egregious human rights violations in South Africa. Not surprisingly, therefore, the content and enforcement of sanctions often had very little to do with achieving

[32] For empirical tests of the determinants of the level of apartheid along these lines, see Lowenberg (1989).

[33] See Becker (1987), Hazlett (1987) and Kaempfer & Lowenberg (1986, 1988a).

maximum impact on the apartheid government and its supporters.[34] Moreover, our present study implies that, as long as the economy was experiencing healthy economic growth, the demand for apartheid policies to protect white workers from black labour market competition would likely fall. However, recession, whether induced by a cyclical downturn or by external sanctions, could be expected to intensify the demand for apartheid on the part of white labour and farming interests, as well as to reduce the capacity of blacks to mount successful resistance against apartheid.[35]

In general, if an unhampered and flourishing market economy is a catalyst for the breakdown of race discrimination, then any trade intervention, embargo or boycott which distorts resource allocation and inhibits the possibilities for voluntary exchange in factor and goods markets holds a serious risk of entrenching socially regressive policies. On these grounds alone, it might be concluded that anti-apartheid sanctions could not have played a positive role in bringing about the dismantling of apartheid, and might even have hampered the liberalization process. This is too simplistic, however. Kaempfer & Lowenberg's (1988b) public choice analysis of sanctions indicates that even symbolic sanctions that do not inflict severe economic damage might nevertheless precipitate desirable policy changes in a target country if they encourage opponents of the target regime to organize successful collective action against the regime, or if they weaken the ability of pro-regime groups to mobilize support. In an empirical test of the public choice theory of sanctions, Kaempfer et al. (1995) find that anti-apartheid sanctions strengthened the political effectiveness of black opposition movements within South Africa, but that this was typically a short-term effect, ultimately swamped by the negative income effects of sanctions on both blacks and whites. Lowenberg (1997) identifies the various exogenous changes that contributed to the collapse of apartheid, and concludes that although foreign sanctions certainly played a role in undermining the viability of the apartheid system, it was not a decisive role, and was certainly less important than some other factors arising out of the fundamental inefficiencies and costs of apartheid, which intensified in the 1970s and 1980s, including rising levels of black resistance.[36]

# References

[1] Becker, CM, 1987. Economic Sanctions against South Africa. World Politics 39, 147173.

[2] Borcherding, TE & Deacon, RT, 1972. The Demand for the Services of Non-Federal Governments. American Economic Review 62, 891-901.

[34] On the motives and effects of anti-apartheid sanctions, see Kaempfer et al. (1987a, 1987b) and Kaempfer & Lowenberg (1989).

[35] This latter effect is confirmed empirically by Kaempfer et al. (1995).

[36] Similar findings regarding the limited role of sanctions in bringing about the demise of apartheid are reported by Levy (1999).

[3] Bundy, C, 1972. The Emergence and Decline of a South African Peasantry. African Affairs 71, 369-387.

[4] Card, DE, 2009. Immigration and Inequality. American Economic Review 99, 1-21.

[5] Debreu, G, 1959. Theory of Value: An Axiomatic Analysis of Economic Equilibrium. Yale University Press, New Haven, CT

[6] Dollery, BE, 1990. Labour Apartheid in South Africa: A Rent-Seeking Approach to Discriminatory Legislation. Australian Economic Papers 29, 113-127.

[7] Downs, A, 1957. An Economic Theory of Democracy. Harper and Row, New York.

[8] Doxey, GV, 1961. The Industrial Colour Bar in South Africa. Oxford University Press, Cape Town.

[9] Frey, BS & Schneider, F, 1979. An Econometric Model with an Endogenous Government Sector. Public Choice 34, 29-43.

[10] Griffiths, HR & Jones, RA, 1980. South African Labour Economics. McGraw-Hill, Johannesburg.

[11] Hazlett, TW, 1987. American Sanctions on South African Apartheid. Program in Applied Public Policy Research Working Papers 1, Institute of Governmental Affairs, University of California, Davis.

[12] Hazlett, TW, 1988. Economic Origins of Apartheid. Contemporary Policy Issues 6, 85-104.

[13] Horwitz, R, 1967. The Political Economy of South Africa. Frederick A. Praeger, New York.

[14] Houghton, DH, 1973. The South African Economy, 3rd Edition. Oxford University Press, Cape Town.

[15] Hutt, WH, 1964. The Economics of the Colour Bar. Andre Deutsch Ltd, London.

[16] Iyengar, M & Porter, RC, 1990. South Africa without Apartheid: Estimates from General Equilibrium Simulations. Journal of International Development 2, 1-59.

[17] Jones, RA & Griffiths, HR, 1980. Labour Legislation in South Africa. McGrawHill, Johannesburg.

[18] Jones, RW & Easton, ST, 1983. Factor Intensities and Factor Substitution in General Equilibrium. Journal of International Economics 15, 65-99.

[19] Jones, S & Muller, A, 1992. The South African Economy, 1910-90. St Martin's Press, New York.

[20] Kaempfer, WH, Lehman, JA & Lowenberg, AD, 1987a. Divestment, Investment Sanctions, and Disinvestment: An Evaluation of AntiApartheid Policy Instruments. International Organization 41, 457473.

[21] Kaempfer, WH, Lehman, JA & Lowenberg, AD, 1987b. The Economics of the Call for AntiApartheid Investment Sanctions. Social Science Quarterly 68, 528538.

[22] Kaempfer, WH & Lowenberg, AD, 1986. A Model of the Political Economy of International Investment Sanctions: the Case of South Africa. Kyklos 39, 377396.

[23] Kaempfer, WH & Lowenberg, AD, 1988a. South Africa's Vulnerability to Oil Sanctions. Journal of Energy and Development 14, 19-44.

[24] Kaempfer, WH & Lowenberg, AD, 1988b. The Theory of International Economic Sanctions: A Public Choice Approach. American Economic Review 78, 786793.

[25] Kaempfer, WH & Lowenberg, AD, 1989. Sanctioning South Africa: The Politics Behind the Policies. Cato Journal 8, 713-727.

[26] Kaempfer, WH, Lowenberg, AD, Mocan, HN & Topyan, K, 1995. International Sanctions and AntiApartheid Politics in South Africa: An Empirical Investigation. Journal for Studies in Economics and Econometrics 19, 1-27.

[27] Kendall, F & Louw, L, 1987. After Apartheid: The Solution for South Africa. Institute for Contemporary Studies, San Francisco.

[28] Kenney, HF, 1996. Coase, North, and South African Economic Development. Working Paper, Department of Business Economics, University of the Witwatersrand, Johannesburg

[29] Legassick M, 1974. Legislation, Ideology and Economy in Post-1948 South Africa. Journal of Southern African Studies 1, 5-35.

[30] Levy, PI, 1999. Sanctions on South Africa: What Did They Do? American Economic Review 89, 415-420.

[31] Lewis, EG, 2011. Immigrant-Native Substitutability: The Role of Language Ability. NBER Working Paper 17609, National Bureau of Economic Research.

[32] Lingle, C, 1990. Apartheid as Racial Socialism. Kyklos 43, 229-247.

[33] Lipton, M, 1985. Capitalism and Apartheid: South Africa, 191084. Rowman and Allanheld, Totowa, NJ

[34] Lowenberg, AD, 1989. An Economic Theory of Apartheid. Economic Inquiry 27, 5774.

[35] Lowenberg, AD, 1997. Why South Africa's Apartheid Economy Failed. Contemporary Economic Policy 15, 62-72.

[36] Lowenberg, AD & Kaempfer, WH, 1998. The Origins and Demise of South African Apartheid: A Public Choice Analysis. University of Michigan Press, Ann Arbor, MI.

[37] Lundahl, M, 1982. The Rationale of Apartheid. American Economic Review 72, 11691179.

[38] Lundahl, M, 1992. Apartheid in Theory and Practice: An Economic Analysis. Westview Press, Boulder, CO.

[39] Mbaku, JM, 1991. Property Rights and Rent Seeking in South Africa. Cato Journal 11, 135-150.

[40] Moll, PG, 1992. The Decline of Discrimination Against Colored People in South Africa, 1970 to 1980. Journal of Development Economics 37, 289-307.

[41] Mueller, DC, 1979. Public Choice. Cambridge University Press, Cambridge.

[42] Nattrass, J, 1981. The South African Economy: Its Growth and Change. Oxford University Press, Cape Town.

[43] Olson, M, 1982. The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities. Yale University Press, New Haven, CT.

[44] Porter, RC, 1978. A Model of the South AfricanType Economy. American Economic Review 68, 743755.

[45] Porter, RC, 1991. Redressing Inequality in the Post-Apartheid South African Economy. Papers in Political Economy 19, Political Economy Research Group, University of Western Ontario.

[46] Rhoodie, NJ & Venter, HJ, 1960. Apartheid: A Socio-Historical Exposition of the Origin and Development of the Apartheid Idea. HAUM, Cape Town.

[47] Rosendorff, BP, 1996. The Transition to Democracy in South Africa: Trade, Contest and Sanctions. Working Paper, Department of Economics, University of Southern California, Los Angeles.

[48] Savage, M, 1977. Costs of Enforcing Apartheid and Problems of Change. African Affairs 76, 287302.

[49] Sowell, T 1981. Markets and Minorities. Basic Books, New York.

[50] Sowell, T, 1983. The Economics and Politics of Race: An International Perspective. William Morrow and Company, New York.

[51] Spence, J, 1971. South Africa and the Modern World. In Wilson, M & Thompson, L (Eds), The Oxford History of South Africa, vol. 2. Oxford University Press, New York, 477-527.

[52] Steenkamp, WFJ, 1983. Labour Problems and Policies of Half a Century. South African Journal of Economics 51, 58-87.

[53] Thomas, WH, 1977. Plural Democracy: Political Change and Strategies for Evolution in South Africa. South African Institute of Race Relations, Johannesburg.

[54] Tullock, G, 1967. The Welfare Costs of Tariffs, Monopolies, and Theft. Western Economic Journal 5, 224-232.

[55] Van der Horst, ST, 1942. Native Labour in South Africa. Frank Cass and Company, London.

[56] Varian, HR, 1978. Microeconomic Analysis. W. W. Norton, New York.

[57] Vorhies, F, 1991. The Mercantilist Roots of Apartheid. Working Paper, Department of Business Economics, University of the Witwatersrand, Johannesburg.

[58] Williams, WE, 1989. South Africa's War Against Capitalism. Praeger Publishers, New York.

[59] Wilson, F, 1971. Farming, 1866-1966. In Wilson, M & Thompson, L (Eds), The Oxford History of South Africa, vol. 2. Oxford University Press, New York, 104-171.