Distortions to Agricultural Incentives

in South Africa

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The Union of South Africa was formed in 1910 out of combining the two British colonies (the Cape and Natal) with the defeated Boer republics (Transvaal and the Orange Free State). In the ensuing years, the South African Parliament set about consolidating legislation from the four component territories and introducing new legislation, among others in agriculture (Vink and van Zyl 1998). In agriculture, for example, the Land Bank was established under its own legislation in 1912 out of similar institutions that had existed in the four territories. Just a year later the first of the notorious Land Acts was promulgated, not only to proscribe black land ownership but also to outlaw labor tenancy and sharecropping. These laws set the scene for an approach to agricultural policy that was to dominate the sector over at least the next seven decades, namely increasing support to white commercial farmers and decreasing opportunities for black farmers.[1] The structural dualism that resulted still exists today after more than a decade of democracy.

Between 1910 and 1935, 87 Acts were passed that allowed the State to assist farmers (Minnaar 1990). For example in 1912, the year of the establishment of the Land Bank, the Land Settlement Act was also promulgated. Its purpose was to regulate the settlement of white farmers on state owned land, and to enable the state to purchase further land for such settlement (Grobler 1988), a process that was to last until after World War II. This was followed in 1922 by the Cooperative Societies Act, aimed at securing input supply and marketing services for farmers through legislation that favored cooperatives by limiting their tax liability and introducing the concept of 'forced cooperation' to enable them to manage free riding. It is estimated that the state spent £112 million on agriculture between 1910 and 1936, and a further £11 million on export subsidies between 1931 and 1937 (de Kiewiet 1942).

The year 1937 saw the advent of the Marketing Act, under whose auspices more than 70 percent of total agricultural output was controlled until 1996, when the new Marketing of

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[1] Because this chapter focuses on the commercial farming sector, the focus in the discussion falls on those policies that affected the sector more directly, i.e. on those policies that favored white commercial farming. For a more exhaustive discussion of the interplay of policy effects between commercial and 'subsistence' farming, see Vink and Van Zyl (1998).

Agricultural Products Act was promulgated by the democratic government. The Marketing Act of 1937 (later consolidated in a new Act in 1968) sanctioned different types of marketing schemes for different agricultural commodities. The powers available under these schemes included monopoly buying, single channel exports, control over agro-processing, and quantitative controls over imports. Of the commodities included in the present study, only poultry meat escaped this form of control, while the sugar industry was regulated under its own legislation.

The main impetus for this agricultural policy was aptly summarized in the Union of South Africa White Paper (1946):

"Farming has been our traditional occupation and it still sustains three-fifths of the population. The industry is therefore of great economic importance. It is of similar importance nutritionally. Great distances separate us from the food exporting regions of the world... A large and healthy farming industry is a key factor in national security. In these circumstances the people of the Union have a vital interest in the farming industry - in its efficiency and prosperity... the farming industry is in large part unable to stand up to overseas competition, the real test of efficiency in normal market conditions. The production of wheat, sugar, maize, dairy, wine, tobacco has expanded chiefly under the stimulus of heavy protection. Even so in bad seasons total production falls short of the effective demand. Nor does the industry in its present state provide reasonable living conditions for the bulk of farmers and farm workers…"

After 1955 the story of agricultural policy towards commercial farmers involved widespread support, regulation and control in a climate of increasing isolation from the rest of the world, especially in the 1980s, followed by rapid deregulation and trade liberalization during the course of the 1990s with the advent of democratization and the terms of the Marrakech Agreement. It is this period that is the focus of the rest of this chapter.

Economic performance of South African agriculture since 1955

The growth performance of South African agriculture is characterized by distinct periods, which correspond with the policy periods described in the next section. During the 1950s and 1960s, as the South African government invested in agricultural research, extension services,

rural infrastructure and settlement of farmers, agricultural output gradually started to grow. Guaranteed markets and guaranteed prices for most farm commodities assisted the growth in the sector. The 1970s was also a period of rapid growth in the economy assisted by high gold prices and high agricultural growth, but the oil crisis in the mid-1970s negatively affected economic growth in the late 1970s/early 1980s. Direct government transfers to farmers plus highly supported farm prices assisted agricultural growth in the late 1980s and pushed it back to the level of the early 1970s. The massive drought in the early 1990s, market liberalization, and the instability before and immediately after the 1994 elections all negatively affected growth opportunities in the sector. It was only after confidence in the democratic change was restored, and with a weakening exchange rate and thus higher commodity prices and export earnings, that agricultural growth marginally increased in the post-Apartheid period.

Relative to the rest of the economy, however, the share of agriculture, forestry and fisheries in GDP declined steadily from 1955 to its current level of less than 4 percent. The mining sector has also experienced a decline in its relative share of GDP, but so has manufacturing. Services account for a steadily increasing share of GDP, as the South African economy has reached a relatively advanced stage of maturity (Appendix Table 1).

Within agriculture, there has been a shift in the relative shares of livestock, field crop and horticultural production. The livestock sector has maintained an overall share of about 45 percent of total agricultural output, moving between 35 and 50 percent with the typical livestock cycle (Abstract of Agricultural Statistics 2006). However, the composition of livestock production has changed considerably. Beef and veal production increased from 450,000 tons to 700,000 tons between 1970/71 and 2005/06, but its share of total meat production nevertheless declined from 52 percent to 39 percent over this period. Likewise, pork production has increased, but its share of the total has declined from 9 percent to 7 percent, while sheep and goat meat has declined in absolute terms (from 214,000 to 112,000 tons) and relatively (from 25 percent to 6 percent). The big shift has been to poultry meat, with production increasing from 121,000 tons to 862,000 tons and its share increasing from 14 percent to 48 percent of the total.

The composition of field crop production has not changed much over the past three decades: sugar cane and maize made up 59 percent of the value of production in 1970, and maintained that share in 2005. Production of some specialty cash crops such as cow peas, lentils and chicory root has virtually come to a halt, while cotton production has also declined considerably.

Within the horticultural sector, fruit has increased its share of physical production

from 55 percent to 60 percent, while within that sector the share of deciduous fruit declined by six percentage points (from 60 percent to 54 percent of the total between 1976 and 2004) while the share of citrus increased to 31 percent. Subtropical fruit, and berries and summer fruit, maintained their relative shares of total output.

Exports of primary agricultural products and agro-food products have also grown rapidly, although their share of total merchandise exports declined from approximately 18 percent in 1975 to around 7 percent in 2004, as would be expected during the process of development of the economy. Exports of processed agricultural products have increased faster than exports of unprocessed agricultural products: the share of processed agricultural exports has increased from around half of total agricultural exports to around 60 percent since the 1980s.

Agricultural imports have also risen and at a faster rate than other imports or agricultural exports. Agricultural imports have more than doubled their share of total imports into the country over the past two decades, from 2.6 percent to 5.4 percent. During this period, imports increased from 6.2 percent of total agricultural output to more than a fifth (22.6 percent) of output. As a result, import cover (the ratio of agricultural exports to agricultural imports, a measure of the ability of the agricultural sector to pay for its own imports) has declined drastically from 5.6:1 to 1.35:1. The main reason for the rapid increase in imports is the emergence of animal feeds, especially poultry feed, as South Africa's main agricultural import item. Along with this has been the emergence of Argentina as the single largest source of agricultural imports.

The export composition and export orientation of agriculture has also shifted over this period. South Africa is generally a net importer of meat, and is an exporter of field crops in some years. Maize exports have remained relatively stable, but as production has risen the share of maize output that is exported has declined from between 30 and 40 percent of the total harvest in the 1970s and 1980s to between 10 and 20 percent over the first five years of the present decade. In the case of horticulture, there has been a considerable shift in export orientation: the share of production exported has increased from around 24 percent to 32 percent over the past three decades. Within deciduous fruit there has been a relative shift away from apples towards apricots, table grapes, pears, peaches and plums, while with citrus the relative shift has been away from grapefruit and lemons. South Africa has traditionally only exported avocados from among the subtropical fruits, and the proportion of the total crop that is exported has increased from some 40 percent in the early 1980s to just over 60 percent.

Nevertheless, the country's export portfolio has not changed much for more than a century. Traditionally, wine, fruit, sugar, maize, wool, and hides and skins were exported, mainly to the UK and other parts of Europe. These items made up 72 percent of total agricultural exports on average between 2002 and 2004 (up from around 45 percent in 1972), while the EU remains the largest export destination, taking more than 40 percent of exports. South Africa's second largest agricultural export market is SADC, accounting for almost 20 percent of total agricultural exports.

Total farm employment increased until the early 1970s, after which it started a long decline (Appendix Table 1). In 1955, agricultural employment still represented more than 25 percent of total formal sector employment in the country (Vink and Kirsten 1999), but it was less than 10 percent at the time of the last census in 2002. However, these data hide the relative shares of permanent and seasonal labor. The trend towards horticultural production is expected to result in a swing to more seasonal workers, as harvesting in this sector is still largely done by hand.

Agricultural policy

State support to commercial farmers increased until around 1980, with the deployment of a host of legal and other policy instruments that affected the prices of and access to natural resources, finance, capital inputs and labor, as well as access to local and foreign markets. The extent of the direct subsidies granted is reflected in Appendix Table 2.

Policies to 1980

The main features of the commercial agricultural sector after the World War II were the mechanization of commercial farming, the consolidation of marketing schemes and increased pressure on food production in the homelands. Regarding the former, the experience in the maize farming areas tells the story of capital and labor substitution in agriculture (De Klerk 1983).

The total number of farm employees in South African agriculture grew to 1970. Although this corresponded with increased mechanization following the large scale introduction of tractors, an increase in area planted led to increased demand for labor to

harvest the bigger crop. Employment then fell between 1970 and 1980, although farm employment was still higher in 1980 than it had been in 1950. The turning point around 1970 coincides with the introduction in the late 1960s of combine harvesters, stimulated by preferential tax treatment. De Klerk (1983) shows that the share of the maize crop that was harvested with combine harvesters grew from 16 percent in 1968 to 81 percent by 1977. This period simultaneously saw the highest rates of forced removal of permanent labor from farms and an increasing use of temporary or seasonal labor, most of whom were women and children (Marcus 1989).

Other features of the commercial farm sector in the post war period include the tightening of control over prices and the movement of produce in terms of the Marketing Act, and an increase in subsidies to white farmers. The latter was partly direct budgetary transfers for disaster relief, irrigation infrastructure, water subsidies, research, etc., as well as through price policy and interest rate subsidies.

South Africa used the full range of policy instruments to support commercial farmers, including direct subsidies (mostly on the use of capital state support of research and extension, and regulatory instruments to ensure health, safety and the protection of natural agricultural resources. Yet the most important instrument used was marketing intervention, mainly through the Marketing Act. This enabling legislation set out the conditions under which farmers or the Minister of Agriculture could set up a marketing scheme, to be administered by a Control Board. The powers of the Board were selected from among those allowed under the Act, while farmers were guaranteed a majority of the seats on the Board. By the 1970s more than 20 Boards were in operation, covering some 80 percent of total agricultural production.

The maize, red meat and deciduous fruit export schemes are discussed below to illustrate the working of the specific control measures selected by each, as well as the economic consequences of these schemes.[2]

The maize scheme

Until the late 19th century sorghum was the most prevalent starchy staple consumed in Southern Africa. However, white maize superseded sorghum as traditional economies became monetized, largely because maize production and preparation places fewer demands on available household time (Low 1986). The result is that the demand for maize in Southern Africa differs from the rest of the world's because of the relatively large human consumption of

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[2] These sections borrow heavily from Vink (1999).

white maize. Thus it was easier for the Maize Board to justify a control regime that precluded imports as far as possible in the name of food self-sufficiency.

Maize marketing was controlled under a single-channel, fixed-price regime. The Maize Board was the sole buyer and seller of maize at a price fixed annually by the parliament's Cabinet. Annual surveys of average production costs by the Department of Agriculture were used as the basis for the price (thus the farmers' selling price to the Maize Board was set at average production cost plus a profit margin, while the Board's selling price to millers was its buying price plus a margin that covered handling, storage and transport). The Board appointed agents to purchase maize from farmers on their behalf, and to store and distribute the produce to millers. The Board usually appointed a cooperative to act as its agent, with the result that the cooperatives gained regional monopoly powers.

The buying and selling price of maize was fixed regardless of when and where maize was delivered (i.e. pan-territorial and pan-seasonal pricing.) The Board also controlled imports and exports. A stabilization fund was set up to defray expenses in times when surpluses had to be exported at a lower world price, and to deposit profits in times of shortage when the Board could import at a lower world price. In practice, the Board set buying and selling prices in such a way that the stabilization fund was perpetually in arrears. During the late 1970s and the 1980s, the Board exported some maize every year and the weighted average of maize domestic prices remained above the export realization price. The pan-territorial pricing regime meant that transport costs of those farmers who delivered maize from distant areas were subsidized by farmers closer to the market. The transport system was expected to transport raw commodities rather than processed foods, thereby increasing the cost structure of the system as a whole. Millers paid the same price regardless of the location of their plant. Over time, therefore, the agribusiness sector gravitated towards the main urban areas, thereby depriving the rural areas of an important source of economic activity.

The red meat scheme

The per capita consumption of beef and veal in South Africa decreased from 36kg in 1948/49 to 22kg in 1980/81, while that of poultry increased from 2.2kg to 12kg over the same period (Nieuwoudt 1985). Thus, any policy intervention that resulted in an artificial increase in the price of red meat would favor the poultry industry. The red meat scheme did precisely that: by restricting sales of red meat, it contributed to the rise in popularity of its greatest competitor.

Formally, the red meat scheme was classified as a 'surplus removal scheme', as the

main instrument used was a minimum price that was set by the Meat Board in order to stabilize the price by removing short term surpluses and adding supply to the market in times of shortages. Again the Board frequently could not resist the temptation to set the minimum price above the market-clearing level, with the result that additional intervention was required to manage the resultant over-supply on the market. To this end, the Board divided the country into controlled and non-controlled areas, where the former covered the areas of greatest demand, i.e. the main metropolitan markets. At the same time the requirements for the erection of abattoirs were tightened, with the result that most of the smaller facilities in the country were closed down. Permits or quotas were required of any producer who wished to sell red meat into the controlled market.

The economic consequences of the scheme are clear. As large producers (mostly feedlots) were more likely to gain access to quotas or permits, they were able to capture the economic rents arising from the difference in price in the controlled and uncontrolled areas by buying stock in the countryside and selling it in the towns and cities. Thus, the largest effect of the intervention lies in the redistribution of wealth towards larger producers (and speculators) and away from smaller producers. Since larger producers were more likely to have their interests represented in the Board, these economic consequences become something of a self-fulfilling prophecy. As a result, 'informal' or unrecorded sales of red meat into the poorer urban areas had become almost the norm rather than the exception by the 1980s (Karaan and Myburgh 1993).

The deciduous fruit scheme
South African fruit exports started in the early 1890s, and apple exports had reached 170,000 tons per annum by 1975, compared to 50,000 tons from a country such as Chile. However, Chilean apple exports grew by some 800 percent from 1975 to 1995, compared to the approximately 66 percent growth in South African exports.

One of the main differences in the marketing regime between South Africa and Chile was the extent of state intervention in this country. Here, deciduous fruit and citrus were marketed under a 'single channel pool scheme' where the respective Boards or their agent were the sole buyer of fruit for the export market, and therefore the sole seller in the export market. The produce of farmers was pooled, and the proceeds divided on the basis of the quantity delivered to the pool. Therefore, farmers who delivered produce that was lower than average quality were favored, while those that delivered higher than average quality were discriminated against.

These monopolistic arrangements probably inhibited growth in the volume of exports. The marketing scheme could have had this effect in a number of ways:

- The South African deciduous fruit industry traditionally focused on selling only the best quality under the 'Cape' trademark, with the result that price premiums of up to 30 percent were regularly achieved. However, this had to be at the expense of volume.

- South African exporters had to finance the facilities required to move their produce from the farm to the respective Boards themselves. The considerable investment in packing houses, combined with relatively high interest rates, limited the amount of investment funds available for the expansion of production.

- South Africa was relatively unsuccessful at exploiting new markets, with only a small proportion of exports going to non-traditional markets such as in Asia and the Middle East, compared to Chile which sells about a third of its export crop in these markets. Again, it could be argued that a monopoly exporter would not be sufficiently flexible to be able to exploit such niche markets.

- A further result of the concentration of exports to a few traditional markets, and South Africa's isolation from the world market, was the relative lack of effort given to the development of new cultivars in the period before 1990. Hence the country's fruit growers have been at a competitive disadvantage with respect to changing tastes abroad.

A broadening of the policy focus

Four events between 1973 and 1976 created a security crisis in South Africa (Vink and Schirmer 2002). These included labor unrest and 'unlawful' strikes by black trade unions in the Durban region in 1973; the OPEC oil crisis of 1973; the *coup d' etat* in Lisbon in April 1974 that resulted in the abortive invasion of Angola by South Africa in 1975; and the Soweto unrest of June 1976. Desperate attempts by the ruling elite to maintain the existing order lasted for less than 20 years after these events, and were doomed to failure. By 1976 the economy had moved into recession, which turned into a period of prolonged stagflation that lasted until 1994. Terreblanche (1998) shows that, over time, the National Party shifted from an exclusive focus on the interests of Afrikaners to a broader focus on the interests of whites. The impact of agricultural policy in the period leading up to 1980 was summarized by Vink (1993) as follows:

"This combination of segregation of land ownership and a two-track approach to access to

support services had a number of major effects on the farming sector. First, it resulted in extraordinary institutional duplication with attendant high fiscal cost … South Africa ended up with 11 Departments of Agriculture by 1980 (14 by 1984) … Second, it created 'two agricultures' … which differed in access to land and support services, productivity, etc… Third, it created the anomaly of a country that regularly exported food 'surpluses' while most of the population lived well below minimum levels of living. In addition, the food self-sufficiency index showed exports of field crops and imports of red meat while the country has a poor arable resource base … Fourth, for much of this period farm input prices were rising faster than product prices despite attempts to keep domestic prices above parity with imports. Fifth, there was much evidence of severe environmental damage to fragile land resources in both the commercial farming areas and the homelands … Sixth, the combination of subsidies and distortive price policies led to high rates of growth in farm land prices. By the beginning of the 1980s the farm sector had become inflexible and it has been argued that these farm policies made the sector particularly vulnerable to the disastrous drought that struck the subcontinent in the early 1980s … Seventh, the processes of forced removals and homeland consolidation created a high level of uncertainty among individual farmers, both black and white, as to the protection of existing property rights, with predictable economic consequences in some of the ecologically most vulnerable parts of the country."

Policies during the 1980s

Financing and assistance formed one of the three pillars on which the Ministry of Agriculture's policy of 'optimum agricultural development' (as defined in the 1984 White Paper (RSA 1984)) was based. The other two were optimum agricultural resource utilization and orderly marketing and price stabilization. Agricultural financing was considered an important third pillar in view of the risks inherent to agriculture in South Africa's relatively unsuitable climate. This, according to the government of the day, necessitated special financing facilities to create confidence in the industry and to give it the necessary stability.

Agricultural financing programs were provided through the Land Bank, commercial banks, other private financiers including the agricultural co-operatives, and finally the funds supplied under the Agricultural Credit Act, 1966. Funds were made available under this Act to provide for assistance to the less well-off farmers to acquire land, and to provide production loans. These programs are summarized in Appendix Table 3.

During this period, marketing policy started to shift quite radically, although within the framework of the Marketing Act and the Control Boards that constituted its institutional infrastructure. Vink (1993) argues that these changes came about as a result of macroeconomic pressures. South Africa's macroeconomic policy changed in the late 1970s and early 1980s from a focus on non-market controls over monetary policy toward market-oriented controls (Strydom 2002). Monetary policy reforms were led by the submission of the report of the De Kock Commission (1985) which, through its interim reports, had already stimulated a shift away from interest rate controls, liquid asset requirements and cash reserve requirements as the main instruments of monetary policy.

The example of the Land and Agricultural Bank is relevant here, as it was allowed to sell scrip of up to three years' duration under the definition of 'liquid assets'. This enabled the Land Bank to pass on these lower borrowing costs to its clients, the commercial farmers, without requiring a direct subsidy from the taxpayer.

Financial sector liberalization preceded the deregulation of the real sector of the economy. One of the results was to allow the free floating exchange rate to depreciate in order to stimulate exports, while import replacement policies were still in place in the manufacturing sector. Fiscal policy was no more successful. Its main feature was the rising cost of maintaining the apartheid system (Strydom 2002). This was reflected in an increase in current expenditure as a proportion of GDP, the growing cost of homeland governments and increased spending on security (military and police), and a high tax burden. One important consequence was that the budget deficit reached a peak of 7.3 percent of GDP in 1993 (Strydom 2002), necessitating high real interest rates.

The most immediate effect on agriculture came from changes in the external value of the currency and in the interest cost of farm borrowing. As the Rand started a decade long decline in value, farm input prices, which have a relatively large import component, rose faster than farm output prices. At the same time, interest rapidly became the single largest cost of production in agriculture. During this period, many of the existing controls over the movement of labor in South Africa were also lifted, setting in motion a vast population movement from the farms and the homelands to the towns and cities (Urban Foundation 1991). This was accompanied by migration of people from most parts of Southern Africa to the rural and urban areas of South Africa (e.g. Simkins 1993). Finally, considerable microeconomic deregulation took place, also starting in the late 1970s and early 1980s and leading to a significant increase in activity in the informal economy (Kirsten 1988, May and Schacter 1991, Moll 1993). One of the most visible effects was the increase in informal

marketing of farm products in the urban areas (Karaan and Myburgh 1993).

Beginning in the 1980s, the agricultural authorities started with a process of deregulation and policy change in the farm sector. The most prominent examples include the following:[3]

- *Deregulation of marketing* in terms of the Marketing Act and other legislation. This included the elimination of restrictive registration of processors in the red meat industry; the abolition of most controls on domestic marketing of deciduous and citrus fruit; the abolition of production quotas in the wine industry; deregulation of the grain sorghum and leaf tobacco single channels; further envisaged deregulation of the mohair and maize schemes; and the eventual abolition of control schemes in the banana, wool, egg and chicory industries. The report of the Kassier Committee (1992) can be regarded as a milestone in this process.

- *Liberalization of price controls* in large parts of the farm sector, again mainly in terms of the Marketing Act. This included the change in price setting in the grain industries from a cost-plus basis to market-based systems (Brand Report 1988), leading to substantial declines in real farm output prices. The most important reason was the restriction on the ability of Boards to carry losses and profits on stabilization funds into a following year. Further examples include the eventual abolition of price control of dairy products, and later of flour, meal and bread; and the termination of consumer price subsidies on maize meal and bread.

- *A change in tax treatment of agriculture* which, among other things, reduced the implicit subsidy represented by income tax concessions to farmers amounting in 1981-84 to 70 percent of their theoretical tax bill (Lamont 1990). Changes in tax policy also resulted in an extension, from 1 to 3 years, of the period over which capital purchases could be written off and restrictions on the extent to which farming could be used as a tax shelter for other income sources.

- *A change in direct budgetary expenditure on agriculture*, including a proportionate increase in budgetary transfers to the Departments of Agriculture in the homelands and a proportionate decrease to commercial agriculture (Vink and Kassier 1991). In addition, there was a reduction in real spending on commercial farming during the 1980s (Brand et al. 1992).

- *Scrapping, in 1991, of the Land Acts* and related legislation that enforced the racially based segregation of access to land. This was the most visible of the policy changes in

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[3] This discussion draws from Vink (1993).

agriculture following the breaking of the political logjam in February 1990.

- *Tariffication of farm commodities,* mainly because of the pressures arising from the Uruguay Round of the GATT.

Policies since the 1990s[4]

Deregulation and liberalization were, therefore, a fact of life in the agricultural sector of South Africa during the 1980s. Yet isolation from the world market, accompanied by the increased isolation of the country in the social, cultural, political and intellectual spheres, meant that the deregulation steps that did take place were aimed at the domestic market. Foreign trade still largely consisted of managing imports and exports in order to manipulate domestic prices (e.g. maize, wheat), or of monopoly export schemes (e.g. for fruit). The steps that were taken were characterized by change within an existing institutional structure, as the main players remained in place despite the general relaxation in State intervention. This changed with the election of the government of national unity in 1994, although in agriculture at least some direct policy changes had to wait until 1996 after the withdrawal of the National Party from the Government of National Unity and the appointment of an ANC Minister of Agriculture.

The most important policy initiatives taken subsequent to this time included land reform, institutional restructuring in the public sector, the promulgation of new legislation including the Marketing of Agricultural Products Act and the Water Act, and trade policy and labor market policy reform, all within the framework of wider macroeconomic policy reform.

Marketing policy[5]
The Marketing of Agricultural Products Act, No. 47 of 1996 changed the way in which agricultural marketing policy was managed in South Africa, not least by opening the sector to world market influences in a manner that could hardly have been anticipated a decade earlier. The Act, promulgated on 1 January 1997, set up the National Agricultural Marketing Council (NAMC), whose immediate task was to dismantle the existing Control Boards by 6 January 1998, and subsequently to manage and monitor state intervention in the sector.

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[4] This section draws on Vink and Schirmer (2002).
[5] For a more detailed discussion see Kirsten and Van Zyl (1996), Vink and Kassier (1991), Vink (1993, 2000a, 2000b). See also the Kassier Committee Report (1992) on the details of the deregulation proposals.

Land reform

The Department of Land Affairs completed the process of land reform policy design with its White Paper (RSA 1997) while implementation of the program had started in 1994. Land reform was to consist of land restitution, redistribution and tenure reform programs. A large proportion of the analytical work that supported the policy positions taken during these debates was subsequently published in Van Zyl et al. (1996). The program was designed more or less in accordance with the market-assisted approach recommended by the World Bank (1993). In practice, however, beneficiary households usually had to pool their meager (means-tested) grants to afford land from a willing seller. The reason was at least partly due to the fact that the Subdivision of Agricultural Land Act (No. 70 of 1970) had yet to be repealed, which would have enabled the sub-division of farms into affordable pieces of land.

At the end of the decade, a new approach, termed the Land Reform for Agricultural Development (LRAD) program, was adopted (LRAD 2000). This provided for an extended scale of grants, dependent on an increasing own-contribution. At the same time the Comprehensive Agricultural Support Program (CASP) was launched. Its purpose was to implement farmer support services such as research, extension, finance, information and infrastructure.

The net effect of the land reform program has, however, been limited. After 12 years of state-sponsored land reform, less than 4 percent of the land had been transferred.

Institutional restructuring in the public sector

One of the main features of South African agricultural policy in the 1990s was the extent of institutional restructuring that took place. Some institutions (e.g., the Development Bank, the Land Bank, the Agricultural Research Council, the Department of Regional and Land Affairs, the Development Corporations in the former homelands) were believed to be too closely aligned with apartheid policies aimed at 'development' of the former homeland areas or at favoring commercial farmers (Callear and Mthethwa 1996, DBSA & LAPC 1997). Such institutions were subjected to restructuring programs aimed at realigning them to a new mandate in support of the development priorities of the new government.

Also, public sector agencies supporting the agricultural sector were subjected to the same processes of 'provincialization' that came about with the adoption of the interim and the final Constitution. In the case of agriculture, the former 'own' and 'general affairs' departments were amalgamated to form the core of the new National Department of

Agriculture, there was a redeployment of functions and staff from the former homeland Departments of Agriculture to the new National Department and to the new Provincial Departments, and the new Provincial Departments of Agriculture were established. All agricultural institutions in the public sector were reoriented to fit in with new policy directions. The most radical of these changes occurred in the agricultural marketing institutions.

Water law reform

Changes resulting from the new Water Act (No. 36 of 1996) that were expected to impact most severely on agriculture include the higher priority afforded to water used by humans, including preferential access for small farmers and the environment, the termination of the riparian principle of water rights, the implementation of an integrated catchment management system, the termination of subsidized water prices and greater cross-border co-operation between Southern African countries. Slow progress in the implementation of the Act has, however, minimized the impact to date.

Labor market policy

Until the 1980s, farm workers in South Africa had little legal protection of their rights to organize and to basic conditions of employment. The Agricultural Labour Act, No. 147 of 1993, addressed this shortcoming to some extent, but it was only after 1994 that farm worker rights were brought into line with workers elsewhere in the economy. Henceforth, the four major labor laws in South Africa, including the Labour Relations Act (1995), the Basic Conditions of Employment Act (1997), the Skills Development Act (1998) and the Employment Equity Act (1998), also applied to the agricultural sector. One consequence has been the adoption of a minimum wage, differentiated by region, for farm workers.

Trade policy

Quantitative restrictions, a multitude of tariff lines, a wide dispersion of tariff rates, and formula, specific and ad valorem duties and surcharges, characterized South Africa's trade regime before 1994 (Lewis 2001, Edwards 2005). In agriculture, quantitative restrictions, specific duties, price controls, import and export permits and other regulations were replaced by tariffs after South Africa became a signatory to the Marrakech Agreement following the GATT's Uruguay Round. Surcharges implemented in response to the balance of payments crisis in the late 1980s were also reduced and eliminated by 1995. The one exception to this

process of liberalization is the sugar industry, where a price pooling system remained and the South African Sugar Association continued to be the only sugar exporter (OECD 2006).

South Africa also engaged in a number of bilateral and regional trade agreements. The three most important trade relations in the Southern African region include SACU, which exhibits the deepest level of integration, SADC, and the South Africa-Zimbabwe bilateral agreement. Of the extra-regional influences, the Lomé (and then Cotonou) preferences, the Africa Growth and Opportunity Act (AGOA) of the United States, and South Africa's separate bilateral Agreement with the EU are most influential.

Initial progress in rationalizing the tariff regime and lowering nominal and effective protection was fast. Between 1990 and 1999, the number of tariff lines was reduced from 12,500 in 200 tariff bands to 7743 in 47 tariff bands or fewer than 2500 in 45 bands if the zero tariffs are ignored. The maximum existing tariff was also reduced from almost 1400 percent to 55 percent and the average economy-wide tariff fell from 28 percent to 7.1 percent, although a number of tariff peaks remain. For example, tariffs in excess of 25 percent (and up to 45 percent) can be found on various meat products, tobacco, refined sugar and beverages. Nevertheless, virtually all tariffs in agriculture are now below the bound rates of the Marrakech Agreement.

The structure of protection also affects agriculture. Tariffs on primary agriculture and other primary products are relatively low compared to tariffs on processed foods and other manufacturing. This cascading tariff structure, which is typical of protection in many developing countries, implies that less progress has been made in reducing the dispersion of effective rates of protection.

State support to agriculture

State spending on the farm sector, measured as the budgeted amounts for the national Department of Agriculture plus the agricultural budgets of the nine provinces, amounted to R2.8bn in 1998. In real terms, this was 46 percent of the budget of the Department of Agriculture plus that of the budgets of the former homeland departments in 1988. The decline in state spending is also illustrated by the rapid decline of government funding of agricultural research. Base line funding for agricultural research provided by government through the parliamentary grant system dropped from a high of R337 million in 1997/98 to R262 million in 2001/2002 – equivalent to only 55 percent in real terms of the parliamentary grant it received in 1992.

Direct and indirect distortions facing producers and consumers

The focus of this section is on the description and presentation of the changing extent of direct distortions faced by producers and consumers since the mid-1950s. The main focus of the present study's methodology (Anderson et al. 2008) is on government-imposed distortions that create a gap between domestic prices and what they would be under free markets. Since it is not possible to understand the characteristics of agricultural development with a sectoral view alone, the project's methodology not only estimates the effects of direct agricultural policy measures (including distortions in the foreign exchange market), but it also generates estimates of distortions in non-agricultural sectors for comparative evaluation.

More specifically, this study computes a Nominal Rate of Assistance (NRA) for farmers including an adjustment for direct interventions on inputs. It also generates an NRA for nonagricultural tradables, for comparison with that for agricultural tradables via the calculation of a Relative Rate of Assistance (RRA).

Distortion estimates are calculated for approximately 80 percent of field crops and animal products (excluding fresh milk and eggs) and 65 percent of horticultural products (excluding vegetables). Distortion estimates are also calculated for related lightly processed products (wheat and maize flour, refined sugar and sunflower oil).[6]

Some caution is required in interpreting the results presented below. Our distortion estimates are very volatile, reflecting volatile exchange rates and imperfect pass-through to domestic prices. Further, identifying appropriate international prices and transport and marketing margins proved difficult. For example, at times we find sudden switches from positive to negative nominal rates of assistance on import-competing products, without a concomitant change in agricultural policy.[7] While this can be ameliorated through adjustments to margins, the quality coefficient or international reference prices, we have chosen not to do so, as this may induce further ad hoc misrepresentations to the existing data.

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[6] To estimate the average distortion for all lightly processed products, we use the NRAs of products directly calculated in this study to estimate distortions for similar processed products not covered in this project. The products covered in this manner are as follows: slaughtering and preserved meat (weighted average NRA poultry, beef, mutton), vegetable and animal oils (sunflower oil), sugar products (refined sugar), sugar confectionary (refined sugar), prepared animal feed, grain mill products and bakery products (weighted average wheat and maize flour). Production values (at distorted prices) based on Input-Output tables are used as weights. Bracketed terms reflect the calculated NRA used to estimate processed NRA. Distortions in the highly processed beverages and tobacco products are not accounted for.

[7] A domestic subsidy is consistent with negative direct rates of assistance on import competing products.

Also, not all data series were available from 1955, and a consistent database could be constructed only from 1965.

The analytical narrative of the changes in distortions presented below should be read in the context of the main policy shifters presented in the earlier sections of the chapter. As a reminder, the major structural changes were initiated sequentially by first the initial voting power of white farmers, then the impact of the sanctions era (especially on exports), then the effect of democratization, and most recently the impact of multilateral trade liberalization.

The trend in the calculated NRA for primary agricultural products covered in this study is presented in Figure 1. Figure 2 compares the NRA for the agricultural sector and the non-agricultural tradable sectors.[8] The five year averages of these data are presented in Tables 1 and 2, respectively.

Nominal rates of assistance to agriculture

The estimates of the total NRA for farmers include the direct transfers that are summarized in Appendix Table 2. All these support programs were suspended more or less at the time of the democratic transition in 1994/95. The extent of direct subsidization to commercial farmers was at its height during the 1970s, 1980s and early 1990s. On average, estimates of the NRA in agriculture reflect a change in policy from one that was anti-trade in the 1970s and 1980s to more-liberal markets in the 1990s, following reductions in both import protection and export taxation. The five-year average NRA for primary agriculture rose to a peak of 31 percent between 1980 and 1984, but then fell to less than 10 percent in the 1990s and close to zero since then. This is consistent with the abolition of the Control Boards and trade liberalization under the Marrakech Agreement on Agriculture.

There is substantial variation within these five-year averages. As shown in the annual data presented in Figure 1, the average NRA for agriculture moved from slightly negative to slightly positive in the period 2000-04. The rise reflects to a large extent a relatively slow pass-through of currency shocks to producer prices during this period. The post-2000 period in South Africa is characterized by a substantial and rapid depreciation of the Rand, from R6.9 per US$ in 2000 to 10.54 R/US$ in 2002, and a subsequent appreciation to 6.46 R/US$ in 2004. Domestic prices of some agricultural products, particularly processed products such as bread and maize flour, appear to be sticky downwards during periods of declining

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[8] The lack of product-specific distortions in input costs implies that the NRA to farm production is equal to the nominal rate of assistance (NRA) to farm output.

agricultural input prices (Cutts and Kirsten 2006), resulting in relatively large increases in measured NRA. The post-2004 depreciation can be expected to have reduced the rise in NRA for the agricultural sector during 2000-04.

Some variations in the trend level of distortions are also evident across importable and exportable products. With quantitative import controls in place for most of the period between 1960 and 1994, the positive NRAs on importables shown in Figure 1 are not unexpected. These drop from an average of 10-21 percent in the 1980s to close to zero percent in the period 1995-2005, reflecting the demise of the Control Boards and the liberalization phase as South Africa complied with the requirements of the Agreement on Agriculture. In all cases, except for poultry, the average NRA in the period 2000-04 was lower than the average during the 1980s. The trend in NRA is, however, volatile during the 1990s and early 2000s, reflecting an imperfect pass-through of the exchange rate to domestic prices as well as changes in the composition of exportables and importable products.[9]

Sugar products (sugar cane and refined sugar) are found to have NRA values in excess of 40 percent for many periods. This can be attributed to high tariff protection as well as a pricing mechanism enabling import parity pricing despite being an export product. More generally, NRAs are volatile over time, especially during the 1970s and 1980s when the government attempted to smooth domestic farm-gate prices. With smoothed domestic prices, international price and exchange rate volatility leads to volatility in the distortion estimates. The dispersion of NRAs among covered products has, however, declined since the early 1980s (see near bottom of Table 1). This is consistent with the shift to a more market oriented agricultural policy.

The picture for exportables could be confusing, given the high levels of average support of over 35 percent in the 1980s and 1990s. In this regard, it is important to recall the dominance of yellow maize and fresh fruit in South Africa's export portfolio up to 1995. After 1995, as deregulation and liberalization measures were introduced, the export portfolio shifted, and all measures to support exports and export losses were abolished. The peak of the NRA series for exportables in 1985-89 can be explained by the large maize exports at a huge loss. Much of this can be attributed to the decline in the world price (33 percent decline from 1985-87), but a rise in the domestic price (44 percent from 1985-87).

The large losses recorded in the exports of surplus yellow maize resulted in large

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[9] For example, yellow maize was an importable product with a negative NRA for the period 2002-04, but became an exportable with a high positive NRA in 2005. This raises the average NRA for importables in 2004.

shortfalls in the Maize Board's stabilization fund. The government bailed out the Maize Board with a payment of R400 million to cover the shortfall, but then indicated that this will not be repeated. As a result the Maize Board changed its price policies to a single channel pool marketing scheme (from a single channel fixed price scheme) to ensure that shortfalls on the stabilization did not re-occur. Given the size of this sector, it caused a substantial increase in the aggregate NRA for exported agricultural products in this period. The relatively high NRA for exported products in the early 1990s is largely due to sugar cane, where stagnant world prices and a sharp increase in domestic cane prices (the domestic price more than doubled between 1988 and 1992) led to high rates of assistance. The decline in the five-year average NRA in the post-2000 period arises from relatively large declines in the NRA for white maize exports.[10]

The average NRA for lightly processed food products tends to be higher than that for primary agriculture, but follows a similar trend for most of the period. Because we do not include dairy products, which have relatively high tariffs and a high Producer Support Estimate (OECD 2006), our NRA for lightly processed products may be biased downwards. NRAs for lightly processed products are generally higher in the 1980s and 1990s than the rates for farmers. However, a decline in distortions is also evident during the 1990s, although this decline has been offset by a rise from 2003. The recent increase reflects the appreciation of Rand (which rapidly lowered border prices), the relatively slow downwards adjustment in domestic prices, and the rise in the NRA for refined sugar and processed meat products. These increases are not associated with changes in the policy environment, hence are not expected to signify the start of a long-run upward trend in distortions.

Relative rates of assistance

A comparison of the NRA for agriculture with that for non-agricultural tradable industries (manufacturing, mining and highly processed agricultural products) is presented in Figure 2. The Relative Rate of Assistance to agriculture (RRA), also presented there, reflects the incentive to produce agricultural relative to non-agricultural tradable products. Both the RRA and the NRA measures are likely to under-estimate the actual level of distortions in the non-agricultural industries as collection rates (import duties over merchandise import value) are

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[10] White maize is not widely traded internationally. South Africa is one of the dominant producers of white maize, hence domestic prices are to some extent affected by domestic supply and demand conditions. The international maize price is based on yellow maize (U.S. No. 2 Yellow, FOB Gulf of Mexico) and may not adequately proxy regional price fluctuations of white maize.

used as the distortion measure for manufacturing.[11] As is shown in Edwards (2005), collection rates under-estimate protection in manufacturing, but unfortunately alternative measures are not available over the entire period.

The results suggest that distortions in the agricultural tradable sector were high relative to non-agriculture during the 1960s, the late 1970s and the 1980s. During the 1990s, distortions declined in both sectors, but fell more rapidly in agriculture. The net effect was that by 2000-04, the incentive for resource allocation had shifted, albeit slightly, against agriculture and towards non-agricultural industries.

The results of the RRA estimates in Table 2 and depicted in Figure 2 clearly reflect the impact of deregulation. The trend in RRA follows that of primary agriculture closely, reflecting the relatively low distortions estimated in the non-agricultural sectors. The low levels of distortion in agriculture from the mid-1990s suggest that economic policies have a relatively neutral impact on aggregate agricultural production on average. However, the significant variation of NRAs within the farm sector, with some industries being taxed and others being protected, suggests there is still ample scope for efficiency gains within the farm sector were those differences in NRAs to be phased out.

Comparison with OECD's PSEs

Our estimates differ somewhat from the OECD (2006) estimates of distortions in South African agriculture (Appendix Table 8). Looking first at the average distortion in primary agriculture, we find a decline in our NRA from 1994-2003 that is consistent with the decline found by the OECD. The turning points are also largely consistent, except for 2000 and 2003 when our estimates of NRA rose sharply while the OECD (2006) derived NRA fell. As argued above, we attribute much of the difference in 2003 to imperfect pass-through of the appreciation in the currency to domestic wholesale prices. We also estimate a sharper decline in distortions than the OECD during the period 1994-2002.

There are a number of reasons as to why the distortion measures differ between the studies. First, we use different international reference prices for some of our products, in particular beef and maize. These differences are discussed in more detail in the product-specific analysis that follows. Second, our coverage differs from the OECD. The OECD

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[11] A zero tariff on services was assumed. Production values (at distorted prices), derived from various input-output tables were used to calculate the weighted average NRA for non-agricultural sectors.

study includes pork, groundnuts, eggs and dairy products. The latter is shown in the OECD study to have relatively high levels of distortions from 1994-97, which may account for the relatively larger decline in our estimates of protection during this period but not afterwards. Third, we have treated fruit differently: we have split apples, oranges and grapes into traded and non-traded products as these products are not perfectly substitutable and have very different prices. Finally, there are important methodological differences in how distortions are measured. In the OECD study, when the producer price is lower than the international reference price (at farm gate), a zero producer distortion is imposed. In our estimates if the producer price is less than the international reference price, we estimate a negative NRA. In the case of imports, this reflects the fact that the producer price is less than the import parity price. The lower domestic price may reflect quality differences, seasonal variation in international and domestic prices or unmeasured margins and distortions in the domestic market. Rather than simply imposing a zero NRA, we have left our estimates as negative in these cases. This difference in approach to a large extent explains the greater variation of our estimates compared to those of the OECD (2006).

Consumer tax equivalents

Appendix Figure 1 presents the three-year average consumer tax equivalent (CTE) on primary agricultural products and processed agricultural products. The total CTE is also presented. The trend in CTEs is very similar to the NRAs for each product, but the average level is higher, reflecting the imposition of sales tax on some food products from 1978 (GST up to 1991, VAT afterwards).[12] The composition of consumption also differs from production, with higher shares of poultry and beef in consumption than production. Relatively high distortions on processed products, that account for a large share of consumption, also raises the average CTE relative to the NRA on primary production.

During the 1970s and 1980s consumer tax equivalents were high but, with liberalization in the 1990s, these distortions then declined. This was aided by the VAT zero-rating for brown bread, brown bread flour, maize meal, fresh and frozen fruit and vegetables and vegetable oil from 1991. The implicit consumer subsidy for these products was 10

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[12] A 4 percent General Sales Tax was introduced June 1978. This was raised to 6 percent in 1982, 7 percent in February 1984, 10 percent in July 1984, 12 percent in April 1985 and 13 percent in 1989. VAT was introduced in Oct 1991 (10 percent) and raised to 14 percent on 7 April 1993. Zero rated products include: Brown bread, maize meal, samp, mealie rice, dried mealies, dried beans, lentils, pilchards, milk powder, milk, rice, unprocessed vegetables and fruit, vegetable oil, and eggs.

percent between 1 October 1991 and 7 April 1993 and 14 percent subsequently. The rise in CTE from 2002 reflects the imperfect pass-through of the exchange rate appreciation. The sharp increase compared to the RRA is due to the larger share of poultry and beef in consumption. The CTE (and NRA) rose for these importables relative to those for other products.

Individual commodity NRAs

In this section a brief discussion on the key features of the NRA estimates in Table 1 for each of the individual commodities is presented in order to highlight the impacts on the NRA estimates of some of the commodity specific policies.

Yellow and white maize

South Africa produces both white maize and yellow maize. The former forms an important component of household consumption, while the latter is an important source of feedstock. In our analysis we separate the two products and estimate NRAs for both. The estimated NRAs for yellow and white maize are shown in Appendix Figure 2. Domestic prices track the international reference price (U.S. No.2 Yellow, FOB Gulf of Mexico, U.S. price, US$ per metric tonne) well. The border price for yellow maize was adjusted to c.i.f. or f.o.b. Randfontein, depending on whether there were net imports or net exports in a given year. The reference price for white maize was treated differently.[13] South Africa is one of the main exporters of white maize and exports primarily to Southern and Eastern Africa, which are net importing regions. Hence, in years where there is a regional shortage in maize production, South African export prices are driven upwards to the f.o.b. border price for the region, which we have estimated as the c.i.f. Randfontein price.[14] This assumption mostly applies to the post-1990s when the SADC region was a net importer of maize. In cases where the country experienced white maize shortages, such as 1987/88 and 1992, yellow maize was imported.

The trend in NRA estimates for white and yellow maize broadly follow each other, although the NRA for white maize is lower than for yellow maize in most periods. The difference in levels is partly explained by a 10 percent premium in international prices for

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[13] If we use the fob Randfontein price, we find average NRAs close to 50 percent in the post-1998 period where no support was granted to exporters. According to FAOSTAT data the SADC region was a net importer during most of this period.

[14] Foreign traders within the region purchase white maize directly from South Africa using the SAFEX wheat price, which is the delivered price in Randfontein.

white maize assumed in the calculations and by the fact that white maize producers receive less than the export parity and import parity prices for many of the years. The negative distortion on white maize in the 1970s diminished in the 1980s when together with yellow maize the NRA rose sharply to an average of 36 percent from 1985 to 1989 (Table 1). The NRA for yellow maize rose to an average of 86 percent over this period. The sharp increase in NRA is associated with the period 1987/88 when domestic maize prices increased while international prices fell and the rand appreciated after the collapse in 1985. Finally, NRAs for maize flour also fluctuate considerably (Appendix Figure 5). Average NRAs for maize flour also appear to have declined from the early 1990s, although they have risen with the appreciation of the currency since 2002.

Wheat

Appendix Figure 2 also presents the estimated NRAs for wheat and wheat flour. South Africa has been classified as a net wheat importer since the end of the 1980s. During the highly subsidized and protected 1970s and 1980s, South Africa exported some wheat, usually to neighboring countries and at a loss. The guaranteed prices established at levels higher than export realization were largely responsible for the high NRAs during those years. The NRA for wheat grain drops dramatically in the 1990s, as wheat is reclassified as an import-competing product. The replacement of import quotas with import tariffs (measured on a formula based on the world price) explains the positive NRA for primary wheat of around 8 percent from 1990.[15]

For the calculation of NRAs for wheat flour, Randfontein (where the major millers are located) was again used as the reference point. The most reliable estimates were obtained by using FAOSTAT unit export values for South African flour exports. The NRA for wheat flour is positive and large (average of 58 percent from 1995-2005) and also rose from the 1980s to the 1990s. This reflects the reduction in the distortion on primary wheat during the 1990s as well as tariff escalation and general protection on wheat flour (average of 37.5 percent from 1996-05).

Sunflower

The traded commodity in the case of sunflower seed is sunflower oil and sunflower oil cake. Sunflower seed was classified as a non-tradable for the period under review. FAOSTAT trade

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[15] The NRA of virtually 0 percent in 2005 reflects the very low tariff of 2 percent imposed during this period.

data were used to determine whether sunflower oil should be considered an exportable or importable for each of the years. Crude sunflower oil export prices for Argentina (FAOSTAT) were used for the international reference price. The NRA results (Appendix Figure 2) confirm the relatively strong protection of the agro-processing sector in the earlier years. It was only after the initial period of deregulation and liberalization in the early 1990s that there has been increased competition from imported crude sunflower oil, explaining the lower NRAs after 1993. Average tariffs on crude sunflower oil imports fell from 33 percent between 1988 and 1994 to 10 percent between 1995 and 2005.

Poultry

The South African poultry industry benefited from strong import protection through tariffs for most of the years, hence the positive NRA's (Appendix Figure 3). Cheap imports of lower quality cuts and several cases of dumping during the late 1990s and early 2000s put the domestic industry under tremendous pressure. The additional imports of certain cuts and frozen whole birds increased domestic supply and placed downward pressure on domestic ex-abattoir prices, causing a decline in the estimated NRA.[16] It was only after the depreciation of the rand in 2002 that the domestic industry was able to compete as imports became more expensive. However, the positive distortion remained below the average tariff rate of 27 percent during the late 1990s.

Mutton

The NRA results for mutton (Appendix Figure 3) reflect the protection to mutton farmers by means of a 40 percent tariff since mid-1990s and a system of import licenses and quantitative import controls before 1994. Increased competition by imports but also stock theft concerns, as well as the instability in the years of political transition, caused a drop in production between 1994 and 1998, after which it stabilized. Imports also increased as a result of drought in 1991. Since then production has never reached earlier levels as a more open trade regime was introduced after 1994. Domestic prices start to follow world price trends until the dramatic depreciation of the exchange rate during 2001/2002, after which domestic prices remained below the landed prices of the equivalent product.

Beef

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[16] To account for the effect of dumping and importation of low quality poultry, international prices are adjusted downwards using the quality adjustment (-15 percent) coefficient.

Selecting the appropriate international reference price for beef was a major problem in trying to estimate the NRA for beef, largely because South Africa imports fresh or chilled beef carcasses only from Botswana and Namibia (also sometimes imported on the hoof and slaughtered in South Africa). Since these countries are part of the Southern Africa Customs Union, these imports are unrecorded. In analyzing beef import trends over the last two decades, it is however evident that most imports are low quality frozen boneless beef mainly imported from the EU (especially during the 1990s) and Argentina. This product is of low quality and not comparable with carcass prices at South African abattoirs. In this respect this analysis departs from the latest OECD (2006) PSE estimates for South Africa, where Australian beef export prices were used as the reference price. This is higher than any other international reference price.

To take account of the low quality imports and to some extent the dumping out of EU intervention stocks in certain years, and also to take account of the increasing dominance of Argentina as country of origin recently, the average between the import unit value for beef imports into South Africa and the international price for Argentinean beef has been used as the international reference price series.

The resulting NRA therefore appropriately reflects the period of quantitative protection during the 1960s, 1970s and 1980s (Appendix Figure 3). The lower NRA numbers for recent years correspond well with the period of cheap imports, a more open trade regime and a drop in world prices for beef at the end of the 1990s. The positive NRA in the last few years also corresponds with the import tariff regime of 40 percent and the application of tariff rate quotas which means that, depending on the country of origin, imports can be tariff free thus bringing about net protection of 20 percent.

Table grapes

All the fruits discussed here (grapes, apples, oranges) operated as single channel pool schemes up to the 1997, when all the marketing schemes were abolished. For each of the fruits we have calculated separate NRAs for high-quality exportable commodities and 2nd and 3rd class fruits which are non-tradable. This approach differs from that followed by the OECD (2006).

In the case of table grape exports, the reported export unit value for South African grapes was used as the international reference price (from FAOSTAT). This was then adjusted downwards by internal transport costs (11 percent of total freight costs), and compared to the reported average farmer payment, alternatively known as the export

realization price. This is the price paid to farmers once all the costs of the marketing board and its agents were accounted for. During some years, especially the early 1980s, the costs of sanction busting impacted negatively on farmer returns. Some windfalls through exchange rate depreciation are shown in the positive NRAs for 1986/87 and 2001/2002. Despite these outliers, the NRA trends adequately reflect the shift in policy regimes (Appendix Figure 4).

South African export grapes used to get a premium in the European market due to being out of season. This was lost post-2000 due to large increases in production area and volume increases resulting in the market window not being exclusive any more. This change in market realities is reflected in the NRA results for the last few years. It could, however, be a concern that the NRA results are still positive in the post-1997 deregulated period when one would have expected NRA results to be zero. However, the positive NRA from 1997-2001 is consistent with the market premium noted above. From 2001 the NRA is almost zero (slightly negative), which is consistent with the removal of the premium.

Apples

In the case of apple exports, the fob unit value (FAOSTAT) adjusted by internal transport costs was also used as the international reference price. This was again compared with the export realization price, which confirmed that the international reference price we selected tracks the export realization figures reasonably well. The NRA results appear to be highly volatile (Appendix Figure 4), but again reflect the periods of exchange rate depreciation and the deregulation period fairly well. Clearer trends are provided by the decade averages in Table 1. During the 1960s, 1970s and 1980s farmers were on average taxed (2-4 percent) by the single channel export system. With market deregulation this negative distortion declined and the NRA averaged between 0 to 1 percent from the 1990s.

Oranges

Prices for oranges were based on the same method as the other fruit types. The resulting NRA estimates suggest that the single channel export scheme of oranges taxed farmers considerably – as much as 50 percent during the early 1970s. Outspan oranges were targeted world-wide during the apartheid years, and the resulting losses can be seen in the negative spike in 1977 (after the 1976 Soweto uprisings). When sanctions were at their height in the 1980s the orange export industry also suffered, as shown by the negative NRAs in that period. The positive image of South Africa post-1994 and some exchange rate windfalls explain some of the positive NRAs in the latter years of the period under review. To some

extent the data also reflects positive gains from the deregulation process, uncoordinated marketing efforts and shirking behavior by many export agents who did not pass returns through to producers.

Sugar

Appendix Figure 4 also includes the three-year moving average NRA for sugar cane. To obtain the international reference price raw sugar export prices (fob from *Abstract of Agricultural Statistics* 2006) are converted to refined sugar equivalent using the average ratio of processed sugar exports to raw sugar exports (calculated using Customs and Excise data from 1988-2004). These prices are then compared with the free on rail (Durban) prices of refined sugar. No data are available on sugar cane export prices. These are estimated by adjusting the refined export price of sugar downwards using South African processing margins and the relevant conversion rates.

As shown in Appendix Figures 4 and 5, high positive NRAs are obtained for both sugar cane and refined sugar, despite their export orientation. Under the single channel mechanism, which continued up to 2000, the South African Sugar Association (SASA) had the authority to set prices and quantities sold in the domestic and international market. Although the revised Sugar Industry Agreement in 2000 ended the statutory authority of SASA to set the industrial sugar price, a tacit local market proceeds-sharing agreement, high concentration in the industry, and the single channel export mechanism still enable millers to sell domestic sugar at import parity prices (NAMC 2003, p. 245). High domestic sugar prices feed into sugar cane prices through the Division of Proceeds formula, whereby revenue that accrues to the sugar industry is allocated to the millers and growers. The lack of trend since the early 1990s to some extent reflects the lack of liberalization within this sector. Average tariffs on refined sugar have fluctuated around 45 percent from 1993, while tariffs on sugar cane have remained stable at 20 percent.

Policy reform needed to deal with existing distortions

The results of this analysis confirm the general perception that since the mid-1990s South African agriculture on average has been operating in a non-distorted environment, where the net effect of price-distorting policies on aggregate resource use in agriculture seems to be

neutral. The NRA and RRA results confirm that the sector on the whole is receiving virtually no policy support.

As stressed by Anderson et al. (2007), however, this does *not* mean that no further policy reforms need to be addressed. There is still considerable dispersion in NRAS within the farm sector, and in particular the sugar industry is still highly protected (as are the dairy and pigmeat industries, according to OECD 2006). High NRA are also found in the processing sector and reflect relatively high import tariffs on processed products and a potential lack of competition in the processing and retail sectors. It appears, for example that there was imperfect pass-through to domestic prices of processed agricultural products of the exchange rate appreciation from 2002, which led to significant increases in NRA and CTE for processed products. The implication is that the policy reforms that have concentrated on primary agriculture may not have adequately filtered through to consumers. This is also shown in the high CTE relative to NRA in primary agriculture. These conclusions are indicative and not conclusive, as the current study does not cover the full range of processed products. Nevertheless, the results suggest that the policy reform agenda should shift to the processing and retail sector.

For primary agriculture the issue is to identify the policies – usually outside the ambit of the agricultural portfolio, such as labor legislation, land taxes, water tariffs, electricity rates and road and fuel taxes – that reduce incentives for agricultural production. When the general deterioration of infrastructure, inefficiencies in government service delivery, poor facilitation in trade-related matters and generally high costs of business operations are added, it is clear that South African agriculture faces rather difficult prospects.

Conclusions

South African agriculture has been subjected to major reform over the past 25 years: from internal market deregulation (from the 1980s within the then-existing institutional framework), to liberalization of trade (after the Uruguay Round Agreement on Agriculture in 1994), and then to further fast-track deregulation under the new Marketing of Agricultural Products Act in 1997 (resulting in the abolition of the elaborate structure of commodity Control Boards). These events coincided with the last decade of the apartheid regime (the 1980s), the lengthy transition to democracy (1990 to 1994), and the first years under the new

democratic Constitution, respectively.

The first phase of internal market deregulation was the result of perceptions about the high fiscal burden of controlled agricultural marketing and about the efficiency costs of overregulation. Nevertheless, the institutions and mechanisms of control were kept in place. Trade liberalization, on the other hand, resulted directly from the new government's drive to create conditions of macroeconomic stability in the country: the impact on agriculture was, therefore, a side-effect of a larger policy objective. The comprehensive deregulation after 1996 reflects the urge to complete the process of deregulation, as well as the declining lobbying power of the commercial farming sector. In the process, however, the mechanisms through which small and emerging farmers can be supported have disappeared, even though there is increasing pressure on the government to provide such support.

In the light of the policy imperative for successful black economic empowerment and land reform, there is an important case to be made for the re-introduction of some of the programs implemented by the apartheid government in the 1950/60s to empower Afrikaner farmers. There is also a powerful imperative not to repeat the mistakes of the past: over-reliance on the state, direct intervention in markets that create distortions, an inability to foresee the high fiscal costs of intervention, etc. To this end, future policies will have to accommodate a larger role for the private sector (commercial farmers and agribusiness), will have to be more market friendly, and will have to account for the country's obligations under the WTO (by using targeted 'green box' assistance measures to support this important political imperative). Examples include an expansion of CASP, as provided for in the new Budget of the Department of Agriculture, improved access to financial services, the revitalization of the extension services at the provincial level, and development of irrigation infrastructure. Such support services would need to be targeted at emerging farmers. It is likely that current political economy forces favor such initiatives, but whether this will hold true in the future is uncertain.

References

Anderson, K., F. de Nicola, E. Jara, M. Kurzweil, D. Sandri and E. Valenzuela (2007), "Distortions to Farmer Prices Since the 1950s: South Africa in International Perspective", *Agrekon* 46(4): 427-59, December.

Anderson, K., M. Kurzweil, W. Martin, D. Sandri and E. Valenzuela (2008), "Methodology for Measuring Distortions to Agricultural Incentives," Agricultural Distortions Working Paper 02, World Bank, Washington DC, revised January.

Brand, S.S., N.T. Christodoulou, C.J. van Rooyen and N. Vink (1992), "Agriculture and Redistribution: Growth with Equity", in R. Schrire (ed.), *Wealth or Poverty? Critical Choices for South Africa*, Cape Town: Oxford University Press.

Brand Report (1988), *Report of the Committee of Inquiry into Alternative Marketing Arrangements for Maize*, Pretoria: Department of Agriculture.

Callear, D. and T. Mthethwa (1996), "South African Agricultural Development Corporations: Where to From Here?" Midrand: Land and Agricultural Policy Centre (LAPC).

Cutts, M. and J. Kirsten (2006), "Asymmetric Price Transmission and Market Concentration: An Investigation into Four South African Agro-Food Industries", *South African Journal of Economics* 74(2): 323-33.

DBSA & LAPC (1997), "The Reorganisation of State-run and Parastatal-run Agricultural Projects", Midrand: Development Bank of Southern Africa and Land and Agricultural Policy Centre.

De Kiewiet, C.W. (1942), *A History of South Africa, Social and Economic,* London: Oxford University Press.

De Klerk, M. (1983), "Technological Change and Employment in South African Agriculture: The Case of Maize Harvesting in the Western Transvaal, 1968–1981", unpublished MA Thesis, University of Cape Town.

De Kock Commission (1985), *Final Report of the Commission of Inquiry into the Monetary System and Monetary Policy in South Africa.* Pretoria: Government Printer, RP. 70/1984.

Department of Agriculture (2006), *Abstract of Agricultural Statistics*, Pretoria: Department of Agriculture.

Edwards, L. (2005), "Has South Africa Liberalised its Trade?" *South African Journal of Economics* 73(4).

Grobler, J.C.H. (1988), Politieke Leier of Meeloper? Die lewe van Piet Grobler, 1873-1942, (*Political Leader or Fellow Traveller? The Life of Piet Grobler, 1873-1942).* Johannesburg: Scripta Afrikana.
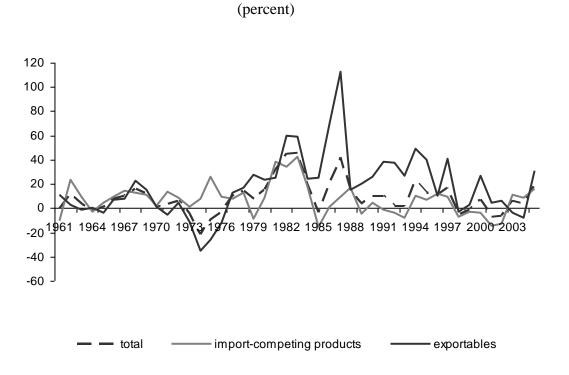
Karaan, M. and A.S. Myburgh (1993), "Food Distribution Systems in the Urban Informal Markets: The Case of Red Meat Markets in the Western Cape Townships", *Agrekon* 31(4): 289-93.

Kassier Report (1992), *Report of the Committee of Inquiry into the Marketing Act*. Pretoria: Department of Agriculture.

Kirsten, J.F. and J. van Zyl (1996), "The Contemporary Agricultural Policy Environment: Undoing the Legacy of the Past', pp. 199-235 in J. van Zyl, J. Kirsten and H.P. Binswanger (eds.) *Agricultural Land Reform in South Africa: Policies, Markets and Mechanisms*, Cape Town: Oxford University Press.

Kirsten, M.A. (1988), "'n Kwalitatiewe en Kwantitatiewe Perspektief op die Informele Sektor", unpublished MA Thesis, University of Stellenbosch.

Lamont, M.P. (1990), "International Tax Reform: Implications for Concessionary Tax Provisions in Agriculture with Special Reference to South Africa", unpublished PhD Dissertation, University of Stellenbosch.

Lewis, J.D. (2001), *Reform and Opportunity: The Changing Role and Patterns of Trade in South Africa and SADC: a Synthesis of World Bank Research*. Africa Region Working Paper Series No.14, World Bank, Washington DC.

Low, A.R.C. (1986), *Agricultural Development in Southern Africa: Farm-household Economics and the Food Crisis,* London: James Currey.

LRAD (2000), *Land Redistribution for Agricultural Development*, Pretoria: Ministry for Agriculture and Land Affairs.

Marcus, T. (1989), *Modernizing Super-exploitation: Restructuring South African Agriculture,* London: Zed Books.

May, J. and M. Schacter (1991), "Minding Your Own Business: Deregulation in the Informal Sector", *Indicator SA* 10(1): 53-58, Summer.

Minnaar, A. (1990), "The Effects of the Great Depression (1929-1934) on South African White Agriculture", *South African Journal of Economic History* 5(2): 83-108.

Moll, T. (1993), "Macroeconomic Policy in Turbulent Times", pp. 235-70 in M. Lipton and C. Simkins (eds.), *State and Market in Post-apartheid South Africa*, Johannesburg: Witwatersrand University Press.

Nieuwoudt, W.L. (1985), "An Economic Analysis of Demand and Policies in the Beef Industry", *Agrekon* 24(2): 9-13.

NAMC (2003), *Food Pricing Monitoring Committee: Final Report*, Pretoria: National Agricultural Marketing Council.

OECD (2006), *OECD Review of Agricultural Policies: South Africa,* Paris: Organisation for Economic Co-operation and Development.

Quantech (2005), "South African Standardised Industry Database", Quantech Research. Available from http://www.tips.org.za/data/

RSA (1984), *White Paper on Agricultural Policy,* Pretoria: Government Printer.

RSA (1997), *White Paper on South African Land Policy,* Pretoria: Government Printer.

Simkins, C. (1993), "State, Market and Urban Development in South Africa", pp. 321-59 in M. Lipton and C. Simkins (eds.), *State and Market in Post-apartheid South Africa,* Johannesburg: Witwatersrand University Press.

Strydom, P.D.F. (2002), "Macroeconomic Policy, 1970-2000", pp. 31-50 in S. Jones (ed.), *The Decline of the South African Economy,* Cheltenham: Edward Elgar.

Terreblanche, S.J. (1998), "Empowerment in Context: the Struggle for Hegemony in South Africa", in J. Kirsten, J. van Zyl and N. Vink (eds.), *The Agricultural Democratization of South Africa,* Cape Town: Francolin Publishers.

Union of South Africa (1946), *White Paper on Agricultural Policy,* Pretoria: Government Printer.

Urban Foundation (1991), *Rural Development: Towards a New Framework,* Johannesburg: Urban Foundation.

Van Zyl, J., J.F. Kirsten and H.P. Binswanger (eds.) (1996), *Agricultural Land Reform in South Africa: Policies, Markets and Mechanisms*, Cape Town: Oxford University Press.

Vink, N. (1993), "Entrepreneurs and the Political Economy of Reform in South African Agriculture", *Agrekon* 32(4): 153-166.

Vink, N. (1999), "South African Agriculture in the 1970s", *South African Journal of Economic History* 14(1&2): 90-113.

Vink, N. (2000a), *Farm Profitability and the Cost of Production Inputs in South African Agriculture,* A Report to the National Department of Agriculture, Pretoria.

Vink, N. (2000b), "Agricultural Policy Research in South Africa: Challenges for the Future", *Agrekon,* 39(4): 432-470.

Vink, N. and W.E. Kassier (1991), "Agricultural Policy and the South African State", in M. De Klerk (eds.), *A Harvest of Discontent: the Land Question in South Africa,* Cape Town: IDASA.

Vink, N. and J.F. Kirsten (1999), "A Descriptive Analysis of Employment Trends in South African Agriculture", *Agrekon* 38(2): 204-228.

Vink, N. and S. Schirmer (2002), "South African Agriculture in the Period 1970 – 2000", pp. 51-67 in S. Jones (ed.), *The Decline of the South African Economy.* London: Edward Elgar.

Vink, N. and J. van Zyl (1998), "Black Disempowerment in South African Agriculture: a Historical Perspective", pp. 61-70 in J. Kirsten, J. van Zyl and N. Vink (eds.), *The Agricultural Democratisation of South Africa,* Cape Town: AIPA/Francolin Publishers.

World Bank (1993), "Experience with Agricultural Policy: Lessons for South Africa", Washington DC: World Bank.

World Bank (2007), *World Development Indicators 2007*, Washington DC: World Bank.

Figure 1: Nominal rates of assistance to exportables, import-competing and all[a] agricultural products, South Africa, 1961 to 2005

(percent)

a. The total NRA can be above or below the exportable and import-competing averages because assistance to nontradables and non-product specific assistance is also included.

Source: Authors' spreadsheet

Figure 2: Nominal rates of assistance to all nonagricultural tradables, all agricultural tradable industries, and relative rates of assistance[a], South Africa, 1961 to 2005

(percent)

a. The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and nonagricultural sectors, respectively.

Source: Authors' spreadsheet

Table 1: Nominal rates of assistance to covered products, South Africa, 1961 to 2005

(percent)

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-05
Exportables [a]	**3.3**	**9.6**	**-9.4**	**3.7**	**38.2**	**48.5**	**35.3**	**18.1**	**9.5**
Sugar	32.5	43.3	-15.3	3.4	49.5	39.0	78.9	35.9	44.4
Apple	-6.1	-4.1	2.3	-10.6	-17.3	12.9	9.0	-7.3	0.7
Orange	-7.3	-17.9	-40.3	-28.3	-15.5	-18.2	-4.4	2.9	13.0
Grape	-20.6	-20.6	2.8	0.2	-33.1	23.6	5.5	8.8	6.7
Import-competing products [a]	**4.9**	**10.5**	**6.4**	**9.3**	**28.3**	**1.5**	**0.1**	**3.7**	**0.6**
Beef	7.3	16.4	4.2	34.6	52.2	0.9	-12.5	-0.6	-5.7
Sheepmeat	19.5	13.6	40.1	39.0	28.3	32.4	33.1	23.4	4.1
Poultry	-12.9	-12.9	-15.7	-23.8	18.4	-2.9	6.5	12.9	6.0
Nontradables [a]	**0.0**	**0.0**	**0.0**	**-0.9**	**-3.1**	**-6.1**	**-1.6**	**0.0**	**0.0**
Apple	0.0	0.0	0.0	-0.6	-2.8	-6.0	-2.3	0.0	0.0
Orange	0.0	0.0	0.0	-1.0	-3.5	-6.2	-1.0	0.0	0.0
Grape	0.0	0.0	0.0	-0.6	-2.8	-6.0	-2.3	0.0	0.0
Mixed trade status [a,b]									
Wheat	-2.0	11.6	25.7	61.1	67.4	65.8	13.4	-0.1	7.6
Maize (Yellow)	4.9	19.0	4.6	13.7	39.2	86.3	56.0	12.7	19.7
Maize (White)	-10.3	0.9	-20.0	-15.8	20.0	35.8	32.6	5.0	-7.8
Sunflower	18.9	17.7	6.2	7.2	19.9	7.4	6.9	-6.9	-2.9
Total of covered products [a]	**3.3**	**9.5**	**-3.2**	**3.9**	**31.1**	**15.5**	**9.3**	**6.8**	**3.6**
Dispersion of covered products [c]	15.3	18.8	25.0	31.1	42.7	38.3	34.5	20.4	21.7
% coverage (at undistorted prices)	68	67	69	68	64	66	68	68	69

a. Weighted averages, with weights based on the unassisted value of production.

b. Mixed trade status products included in exportable or import-competing groups depending upon their trade status in the particular year.

c. Dispersion is a simple 5-year average of the annual standard deviation around the weighted mean of NRAs of covered products.

Source: Authors' spreadsheet

Table 2: Nominal rates of assistance to agricultural relative to nonagricultural industries, South Africa, 1961 to 2005

(percent)

	1961-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-05
Covered products [a]	3.3	9.5	-3.2	3.9	31.1	15.5	9.3	6.8	3.6
Non-covered products	-1.5	0.1	-2.9	-1.4	4.0	-2.5	2.4	-0.3	-0.9
All agricultural products [a]	1.7	6.4	-3.3	2.1	21.2	9.0	7.0	4.4	2.0
Non-product specific (NPS) assistance	2.4	3.0	2.5	1.7	1.7	2.7	3.8	1.3	0.1
Total agricultural NRA (incl. NPS) [b]	**4.1**	**9.4**	**-0.7**	**3.8**	**22.9**	**11.7**	**10.8**	**5.7**	**2.1**
Trade bias index [c]	0.01	0.00	-0.14	-0.03	0.07	0.40	0.33	0.13	0.11
Assistance to just tradables:									
All agricultural tradables	5.2	11.9	-0.7	5.2	31.7	17.5	14.6	7.9	3.2
All non-agricultural tradables	2.8	3.3	2.6	2.7	5.0	5.3	7.3	4.6	2.7
Relative rate of assistance, RRA [d]	**1.5**	**8.4**	**-3.1**	**2.4**	**24.4**	**11.3**	**7.2**	**3.7**	**0.1**

a. NRAs including product-specific input subsidies.

b. NRAs including product-specific input subsidies and non-product-specific (NPS) assistance. Total of assistance to primary factors and intermediate inputs divided to total value of primary agriculture production at undistorted prices (percent).

c. Trade bias index is $TBI = (1+NRAag_x/100)/(1+NRAag_m/100) - 1$, where $NRAag_m$ and $NRAag_x$ are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.

d. The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Source: Authors' spreadsheet

Appendix: Key quantity and price data, assumptions and sources

Quantity data for agricultural products and lightly processed foods
　　　Production volume data are compiled from various volumes of the Abstract of Agricultural Statistics issued by the Department of Agriculture. Data in some years reflected some inconsistencies and were adjusted after consultation with producer organizations, official annual reports of the various marketing boards (pre-1995) and official statistics from the South African Grain Information Service (SAGIS). These various sources were incorporated in more unified and correct database as part of the BFAP (2006) commodity market database and formed a key input in this study.
　　　Export and import volume data are from Customs and Excise and Agricultural Marketing Boards.
　　　Apparent consumption data are derived as follows: Official data from Agricultural Marketing Boards as well as Abstract of Agricultural Statistics and SA Grain Information Service (for the various grains).

Farm-gate product prices
　　　These are from the annual reports of the various Agricultural Marketing Boards prior 1994 and a combination of Abstract of Agricultural Statistics and producer organizations for the post 1994 years. All export realization figures for the fruit exports were obtained from producer organizations.

Wholesale product prices
　　　Margins are based on actual industry processing cost data for maize meal, sunflower oil, wheat flour and sugar - all contained in the BFAP database.
　　　Sugar wholesale prices are weighted average price of white and brown (f.o.r Durban). Prices for 1961-69 are estimated using the average 1970-05 margin between the retail and the processor selling price.
　　　Rates of assistance for processed sunflower oil are based on the crude oil price on the Reef (Gauteng). The crude oil price is estimated from Retail price data (from Statistics South Africa) using 2003 margins provided in the Food price monitoring committee report (2003)
　　　Wheat flour wholesale prices were estimated due to lack of official data. We converted the cake flour retail price (Statistics SA) to bread flour using relative extraction rates (0.7 for cake flour, 0.76 for white flour, 0.81 for brown bread flour). GST and VAT were deducted to obtain the Retail price excluding tax. We assumed 14 percent retail margin to obtain Wholesale price of flour. The retail price of flour is estimated using cake flour retail prices (Statistics SA) benchmarked on 2000-03 wheat chain analysis prepared for the Food Pricing Monitoring Committee (NAMC, 2003).
　　　White maize flour wholesale prices are estimated using retail price data for 2.5kg bag of maize (Statistics SA) and margins derived from the maize chain analysis over 2000-03 prepared for the Food Pricing Monitoring Committee (NAMC, 2003).
　　　Sunflower crude oil price (at Reef) is estimated from Retail price data (Statistics SA_ using 2003 margins provided in the Food price monitoring committee report (2003).

Wholesale prices for the remaining products are obtained from the producer organizations or the Abstract of Agricultural Statistics.

Border prices

The calculation for fob and cif prices varied according to the most reliable source of the international reference prices. The main task was to find a comparable reference price and then to adjust for transport and handling margins to obtain fob or cif prices. International shipping rates for the major commodities were used for this purpose.

For grains, mutton and sugar IFS world prices were mainly used. In other cases the prices were calculated as the value of the country's exports or imports divided by the volume of that trade. Due to the unreliable results generated by some of these methods we in a few cases such as beef and grapes took an average of the most representative world price series and the calculated unit value of exports or imports.

In some cases (like poultry) we used FAOSTAT (1961-1993) and the recent OECD PSE database on South Africa to complete the series.

In the case of poultry the world export price derived from FAOSTAT is used for 1961-1993. This is then adjusted, using the gap between the OECD PSE data for SA poultry (OECD, 2006) and the World export price over period 1994-97, to adjust the World export price data to ensure consistency between the series. The data for 1993-2003 is taken from OECD PSE estimates. Border price values for 2004 and 2005 are estimated using growth rates derived from the international price of US poultry (International Financial Statistics). From 1998-2005, the border price is adjusted upwards by 15 percent to account for dumping of cheap low quality poultry imports.

Selecting the appropriate international reference price for beef was the major problem we faced in trying to estimate the NRA for beef. The main reason for this is that South Africa does not import fresh or chilled beef carcasses. This only comes from Botswana and Namibia (also sometime imported on the hoof and slaughtered in SA). To take account of the low quality imports and to some extent dumping out of EU intervention stocks in certain years and also to take account of the increasing dominance of Argentina as country of origin recently we have used the average between the import unit value for beef imports into South Africa (FAOSTAT) and the international price for Argentinean beef (IFS) as the international reference price series. In this way we have automatically factored in the quality adjustment to ensure that we compare 'beef' with 'beef'.

Border prices for wheat grain are based on US HRW wheat obtained from IFS. The prices are adjusted downwards using a quality adjustment of 10 percent. This adjustment is obtained from Export Parity price calculations conducted by SAGIS. Flour export prices for SA are obtained from FAOSTAT data.

Freight rates used to calculate wheat border prices for 1978-05 are for Heavy Grain, Gulf to Cape Town (obtained for the International Grains Council). Data for 1960-77 are inferred using Ocean Freight rates (Grains) from World Bank "Commodity trade and price trends" (1985).

Maize is split into yellow and white maize. The border price is based on U.S. No.2 Yellow, FOB Gulf of Mexico obtained from the IFS. The border price for yellow maize was adjusted to c.i.f. or fob Randfontein, depending on whether there were net imports or net exports in a given year. The reference price for white maize was treated differently. South Africa is one of the world's main exporters of white maize and exports primarily to Southern and Eastern

Africa. SA export prices are determined by the regional market. Therefore in years where there is a shortage of maize in the SADC region, we use the f.o.b border price for the region, which we have estimated as the c.i.f. Randfontein price. This is mostly applicable in the post 1990 period. US export unit values are used as the international reference price for flour (FAOSTAT). This data appears consistent with SA customs & excise fob prices from 1997. Freight rates are equivalent to those used for wheat. Discharging rates and internal transport costs are obtained from SAGIS.

To obtain the international reference price raw sugar export prices (f.o.b. from *Abstract of Agricultural Statistics* 2006) are converted to refined sugar equivalent using the average ratio of processed sugar exports to raw sugar exports (calculated using Customs and Excise data from 1988-2004). No data are available on sugar cane export prices. These are estimated by adjusting the refined export price of sugar downwards using SA processing margins and the relevant conversion rates.[17]

The traded commodity in the case of sunflower seed is really sunflower oil and sunflower oil cake. Sunflower seed was classified as a non-tradable for the period under review. FAOSTAT trade data are used to determine whether sunflower oil should be considered an exportable or importable for each of the years. Crude sunflower oil export prices for Argentina (FAOSTAT) are used for the international reference price, except from 1969-77 where the United Kingdom export price (International Financial Statistics) is used. Export prices for 2004-05 are estimated using growth rates of EU sunflower oil prices obtained from South African Grain Information Service (SAGIS). Freight and discharging costs are obtained for 2000-05 from SAGIS. Discharging costs are backdated using the South African Producer Price Index (SA Reserve Bank). Freight costs are backdated using the estimated rates for heavy grain (Gulf to Cape Town) (see above).

We use the export realization price obtained from the Abstract of Agricultural Statistics for apples, oranges and grapes. For grapes and apples, export prices over the period 1960-65 and 1974 are estimated using the price of non-traded grapes and apples respectively. The data from 1975 are shifted one period ahead to correspond with seasons (Oct-Sept), i.e. 1975 = Oct74-Sept75. Export prices for oranges over period 1961-69 are estimated using orange data obtained from Department of Agriculture.

Exchange rates

Official exchange rates are from the South African Reserve Bank. Parallel exchange rates are assumed to be not applicable because no commodity traded at those exchange rates.

Production, consumption, input and trade taxes and subsidies

These are from various government policy documents and also budget reports of the Department of Agriculture. Tariff data are obtained from Edwards (2005).

List of data sources

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[17] Based on Table 7.3 "Food pricing monitoring committee report, 2003" (NAMC, 2003). We use average for 1988-03 for out of period years. Includes discounts, rebates, packing costs, marketing & distribution, warehousing & handling, working capital cost plus milling and refining costs plus SASA levy.
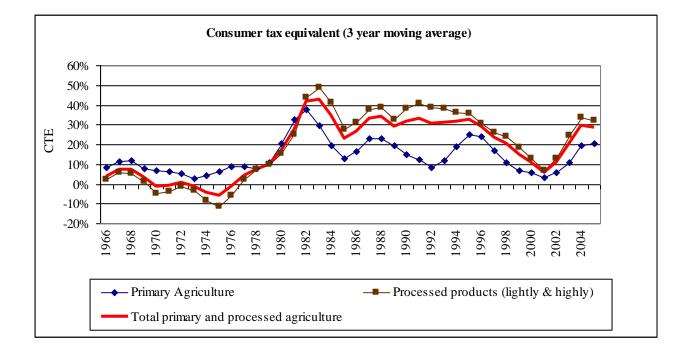
Anderson, K., M. Kurzweil, W. Martin, D. Sandri and E. Valenzuela (2008), "Methodology for Measuring Distortions to Agricultural Incentives," Agricultural Distortions Working Paper 02, World Bank, Washington DC, revised January.

BFAP (2006), Database of the South African grain and livestock partial equilibrium model. Bureau for Food and Agricultural Policy (BFAP), University of Pretoria, Pretoria, South Africa.

Department of Agriculture (various years), *Abstract of Agricultural Statistics*. Department of Agriculture, Pretoria, South Africa

Edwards, L. (2005), "Has South Africa Liberalised its Trade?", *South African Journal of Economics* 73(4).

FAOSTAT (2006), *Food and Agriculture Organization Statistics Databases*. Available at: //faostat.fao.org. Accessed June 2006.

FAO (1996), *Trade Yearbook 1996,* Rome: Food and Agriculture Organization.

IMF (2006 and earlier years), *International Financial Statistics,* Washington DC: International Monetary Fund (annual).

National Agricultural Marketing Council (NAMC) (2003), *Food Pricing Monitoring Committee: Final Report*, Pretoria: NAMC.

OECD (2006), *OECD Review of Agricultural policies: South Africa,* Paris: Organisation for Economic Co-operation and Development.

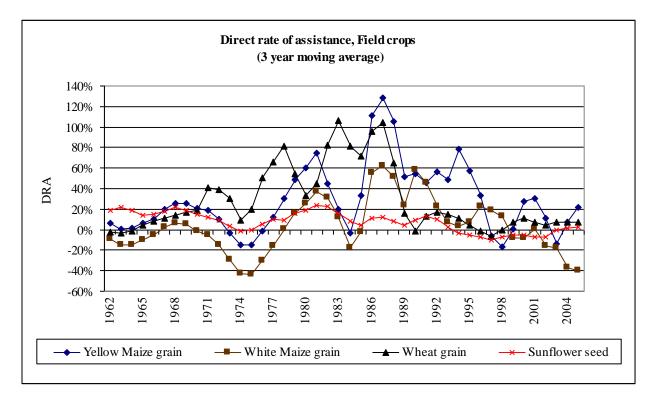South African Grain Information Service, http://www.sagis.org.za/

South African Reserve Bank (various years), *Quarterly Bulletin of Statistics*. Pretoria.

Statistics South Africa (various years), Statistical release: P3051.1

Appendix Figure 1: Consumer tax equivalent, primary and processed agriculture, South Africa, 1966 to 2005

(percent, three-year moving average)
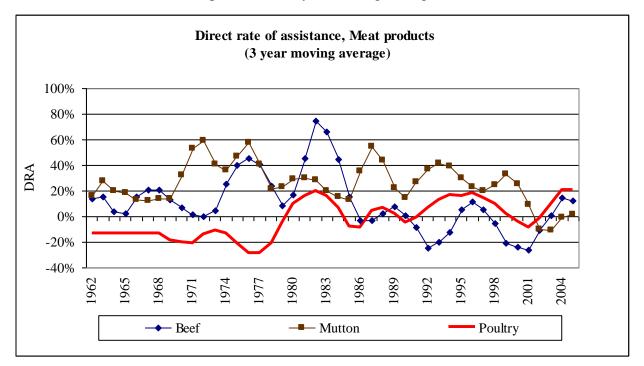

Consumer tax equivalent (3 year moving average)

Source: Authors' spreadsheet

Appendix Figure 2: Nominal rates of assistance, field crops, South Africa, 1961 to 2005

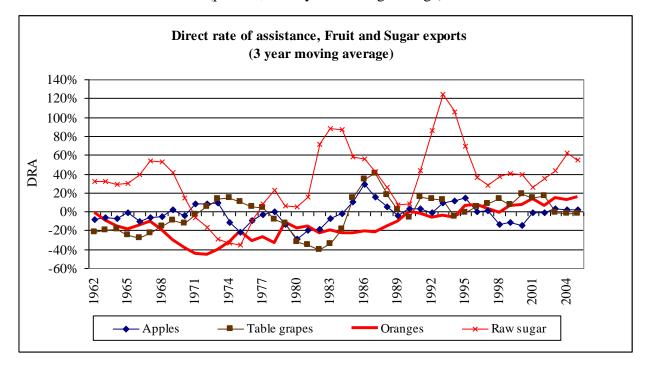(percent, three-year moving average)

Source: Authors' spreadsheet

Appendix Figure 3: Nominal rates of assistance, meat products, South Africa, 1961 to 2005

(percent, three-year moving average)

Source: Authors' spreadsheet

Appendix Figure 4: Nominal rates of assistance, exportable fruit and sugar, South Africa, 1961 to 2005

(percent, three-year moving average)

Direct rate of assistance, Fruit and Sugar exports (3 year moving average)

Source: Authors' spreadsheet

Appendix Figure 5: Nominal rates of assistance, processed foods, South Africa, 1961 to 2005
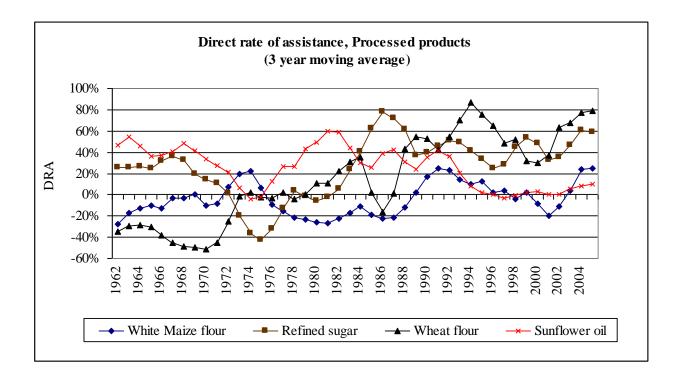
(percent, three-year moving average)

Direct rate of assistance, Processed products (3 year moving average)

Source: Authors' spreadsheet

Appendix Table 1: Basic economic indicators, South Africa, 1065 to 2004

	Year	1965	1975	1985	1995	2004
Population	Population **total (mill)**	20	25	31	39	46
	Proportion rural (percent)	53	52	52	47	43
GDP	GDP (Current US$ mill)	10971	36948	67066	151113	212777
	GDP per capita (current US$)	553	1494	2142	3863	4675
Share GDP	Agriculture (percent)	9	8	5	4	3
	Industry (percent)	40	41	44	35	32
	Manufacturing (percent)	23	23	22	21	20
	Services (percent)	51	51	51	61	65
Agricultural land & employment	Number employed in agriculture (1000) [1]	2512	2280	1921	1868	1616
	Agricultural land (1000 ha)	97262	95132	94547	99525	99640
	Arable land area (1000 ha)	12200	12570	12355	14915	14753
	Arable land (hectares per person) [1]	0.6	0.5	0.4	0.4	0.3
	Arable Land by Agriculture worker [1]	4.9	5.5	6.4	8.0	9.1
	Crop and pasture Land per capita [1]	4.9	3.8	3.0	2.5	2.2
	Agricultural value added/worker (US$) [1]	382	1177	1667	2851	3959
Exports	Total goods & services exports (US$ mill)	2905	10207	18183	34703	56327
	Exports of goods and services (% of GDP)	26	28	31	23	27
	Total Merchandise Exports (US$ mill)	2547	8770	16424	30007	47290
	Agricultural, fishing & Forestry (US$ mill)		831	554	970	1569
	Food exports (US$ mill)		771	707	1160	1694
	Other Manufactures exports (US$ mill)		2259	4667	15526	29602
	Mining exports (US$ mill)		4909	10496	12352	14425
	Agricultural (percent merchandise exports)		9	3	3	3
	Food(percent merchandise exports)		9	4	4	4
	Manufactures (percent merchandise exports)		26	28	52	63
	Mining (percent of merchandise exports)		56	64	41	31
Imports	Total goods & services imports (US$ mill)	3027	11143	12921	33386	58560
	Imports of goods and services (% of GDP)	28	30	23	22	27
	Total Merchandise Imports (US$ mill)	2563	10001	11665	29933	53090
	Agricultural, fishing & Forestry (US$ mill)		155	235	835	962
	Food imports (US$ mill)		300	517	1326	2002
	Other Manufacturing imports (US$ mill)		7839	8895	24626	42663
	Mining imports (US$ mill)		1707	2019	3145	7463
	Agricultural (percent merchandise imports)		2	2	3	2
	Food (percent merchandise imports		3	4	4	4
	Manufactures (percent merchandise imports)		78	76	82	80
	Mining (percent of merchandise imports)		17	17	11	14

1. Values for the previous year

Source: World Bank (2007) and, for trade data, Quantech (2005)

Appendix Table 2: Agricultural subsidies, South Africa, 1950 to 2000

Programme	Type/details	1950s	1960s	1970s	1980s	1990s
Interest Subsidies		33,500	1,833,400	52,355,000	637,780,074	619,268,000
Water Quota Subsidies					144,977,700	20,777,800
Subsidy on Railway Rates	Grants/Subsidy	5,860,000	0	0	0	0
Subsidy on Fertilizers	Grants/Subsidy	15,300,000	61,900,000	158,100,000	49,500,000	0
Subsidy on Railway Rates for Manure & Fertilizer	Grants/Subsidy	2,850,000	17,975,000	9,500,000	0	0
Soil conservation	Grants/Subsidy	44,500	12,282,300	0	48,175,981	61,576,000
Distress relief		0	500,000	8,805,000	547,284,000	1,325,094,000
Payment to cooperatives and the state guarantee scheme	State provided guarantee to farm credit at the agricultural cooperatives				168,418,000	1,161,371610
Food price stabilization		0	0	20,000,000	0	0
Crop insurance		0	0	5,000,000	7, 318,000	0
Livestock	Payment to SAR&H Administration for outstanding promissory notes for transport of stock from and fodder to drought stricken areas	6,000	5,524,000	0	0	0
	stock feed and grazing	0	6,800,000	10,700,000	486,900,000	521,397,000
	Subsidy on Railway Rates for Fodder & Livestock under drought relief scheme	22,600,000	34,600,000	26,800,000	74,036,000	53,562,000
Dairy Products	Subsidy on Dairy Products from South West Africa	48,700	0	0	0	0
	Subsidy on Butter	23,760,000	41,900,000	70,042,000	12,701,000	0
Wheat	Duty on Imported Wheat	2,617,000	0	0	0	0
	Price Stabilization of Bread	97,061,000	175,122,000	520,502,000	1,316,349,980	60,000,000
	Subsidy on Imported Wheat and Flour	11,664,000	24,000	0	0	0
	Loss of shipment of Canadian Wheat during 1949/50	262,000	0	0	0	0
Maize	Expenses for the stabilization of the price of maize	44,253,200	101,001,400	257,600,000	819,634,000	1,532,400,000
	Subsidy on railway rates for maize & Maize Products	2,345,000	37,416,300	28,300,000		
	Handling and Storage of maize	8,000	8000	0	0	0
	Duty on Imported Maize	482,000	0	0	0	0
	Subsidy on Maize & Maize products	3,784,300	2,624,300	0	0	0
	Subsidy on Imported Oats and Barley	400	0	0	0	0
Oats & Barley	Duty on Imported Oats and Barley	66,500	200	0	0	0
	Subsidy on Sunflower Seed & Cake	497,000	0	0	0	0
Oilbearing Seeds	Subsidy on Groundnut Cake & Oil	225,000	0	0	0	0
Distribution of Wool Profits		5,000,000	0	2,003,000	0	0
Industry Assistance: Fruit		0	0	1,275,000	3,225,000	0
Industry assistance: Grain sorghum		0	2,356,000	4,756,000	3,900,000	0
Industry Assistance: Citrus		0	1,850,000	0	0	0

Industry Assistance: Wool	0	2,500,000	13,000,000			
Assistance to municipal markets			0	2,325,000	628,000	0

Source: Compiled from various budget reports of the South African Department of Agriculture.

Appendix Table 3: Financial aid to South African farmers in the 1980s

Program	Purpose	Funding history
Purchase of agricultural land	To enable a farmer who does not own agricultural land to acquire his own land and/or to enable a farmer to make his existing property and economic unit or more economical	R40 million during 1981 – 1992 then suspended
Consolidation of debt	For the payment of pressing farming debts to a farmer who experiences problems due to circumstances beyond this control and who cannot obtain assistance elsewhere	R499 million between 1981 and 1992
To bring about improvement	To enable a farmer to improve his property and operate his enterprise on a more economical basis	R3.5 million between 1981 and 1990 and then suspended
Purchase of implements and vehicles	To enable a farmer to operate his enterprise economically with the necessary implements and vehicles	R 1.2 million between 1981 and 1991 and then suspended
Purchase of livestock	To enable a farmer to purchase additional livestock or to incorporate the livestock factor in his enterprise	R5.5 million between 1981 and 1992
Means of crop production	To enable a farmer who, as a result of adverse farming conditions, cannot acquire assistance elsewhere, to produce a crop	R765 million spent between 1981 and 1992
Farm laborers' housing	Loans to create better housing facilities for permanent farm laborers to promote a better relationship between the farmer and the laborers	R52 million between 1981 and 1990 and then suspended
Erection of waterworks	To construct approved waterworks to enable a farmer to make better use of his land	R23 million between 1991 and 1992
Sinking of boreholes	To enable a farmer to sink boreholes for livestock and domestic purposes	R423 000 between 1981 – 1986 – suspended
Erection of soil conservation works	The financing of essential soil conservation works, such as planned and approved by the Directorate of Resource Protection, to improve and protect the soil	R16 million between 1981 and 1992
Flood disaster loans	To enable farmers to return to the position they held prior to the flood damage	R10.6 million between 1981 and 1992
Stock feed loans	Loans to enable farmers to maintain a nucleus herd during an extended drought	R88 million between 1981 and 1990
Interest on carry-over debt and prodn. credit		R1059 million between 1981 and 1992
Subsidies on farm bond interest and interest on consolidated agricultural debt	Mainly on consolidated debt between 1987 and 1992	R99 million between 1981 and 1992
Stock feed purchases and incentives		R443.5 million between 1981 and 1992
Subsidies on the transport of stock feed		R72 million between 1981 and 1992
Flood disaster subsidies	To enable farmers to return to the same position which they held prior to the flood damage	R267 million: 1981 – 1992
Water quota subsidies	To enable farmers on irrigation scheme, where water is no longer adequate/available to survive and to keep their farm laborers in their employ and to prevent collapse of the infrastructure of the town or region	R15.6 million between 1981 and 1992
Conversion of marginal lands	To enable farmers to convert marginal ploughed lands where crop production is risky to convert to cultivated pastures by establishing permanent pasture crops	R125.6 million between 1987 and 1992 and 834 000 hectares

Emergency drought schemes	Subsidizing the production inputs of farmers in certain areas where there were crop failures as a result of drought in 1987/88 to enable them to again purchase production inputs in the 1988/89 season	R104 million
TOTAL		**R3 912 million**

Source: Authors' compilation from official documents

Appendix Table 4: Prices and NRAs for primary products, South Africa, 1960 to 2005

	Yellow Maize				White Maize				Wheat			
	Domestic price per MT	Border price per MT		NRA = DP-BP / BP	Domestic price per MT	Border price per MT		NRA = DP-BP / BP	Domestic price per MT	Border price per MT		NRA = DP-BP / BP
1960												
1961	34.3	29.2	X	0.17	33.6	33.0	X	0.02	60.4	59.2	M	0.02
1962	31.0	29.8	X	0.04	30.2	33.7	X	-0.11	59.7	60.2	M	-0.01
1963	32.5	33.4	X	-0.03	31.0	37.7	X	-0.18	60.2	64.9	M	-0.07
1964	34.2	33.9	X	0.01	32.6	38.3	X	-0.15	63.3	64.7	M	-0.02
1965	35.9	34.1	X	0.05	34.2	38.6	X	-0.11	63.3	60.0	M	0.06
1966	40.3	35.9	X	0.12	39.3	40.5	X	-0.03	66.6	60.8	M	0.10
1967	37.5	33.1	X	0.14	36.4	37.4	X	-0.02	70.0	64.4	M	0.09
1968	37.7	28.4	X	0.33	36.0	32.1	X	0.12	70.0	60.8	M	0.15
1969	41.1	31.4	X	0.31	39.2	36.0	M	0.09	70.0	59.0	M	0.19
1970	39.8	35.6	X	0.12	37.7	40.2	X	-0.06	72.4	62.7	M	0.16
1971	42.2	35.4	X	0.19	37.9	40.0	X	-0.05	73.5	60.7	M	0.21
1972	45.3	36.1	X	0.25	39.0	40.9	X	-0.05	75.8	40.5	X	0.87
1973	51.4	59.7	X	-0.14	43.5	67.4	X	-0.36	83.4	77.8	X	0.07
1974	64.4	80.6	X	-0.20	47.0	91.0	X	-0.48	95.9	98.8	X	-0.03
1975	70.1	77.8	X	-0.10	50.0	88.0	X	-0.43	107.6	86.8	X	0.24
1976	73.5	85.5	X	-0.14	59.0	96.6	X	-0.39	123.9	89.9	X	0.38
1977	83.6	69.7	X	0.20	71.5	78.7	X	-0.09	124.0	65.6	X	0.89
1978	94.9	73.1	X	0.30	83.1	82.7	X	0.01	141.6	83.0	X	0.71
1979	115.4	80.9	X	0.43	102.2	91.4	X	0.12	188.1	101.9	X	0.85
1980	138.6	79.5	X	0.74	122.7	89.8	X	0.37	220.0	202.9	M	0.08
1981	151.6	93.4	X	0.62	134.2	105.6	X	0.27	246.7	227.9	M	0.08
1982	175.2	93.8	X	0.87	155.3	106.0	X	0.47	280.0	128.2	X	1.18
1983	192.2	222.1	M	-0.13	170.1	140.8	X	0.21	280.4	126.8	X	1.21
1984	248.0	287.9	M	-0.14	224.5	325.4	X	-0.31	303.0	167.6	X	0.81
1985	250.2	215.3	X	0.16	246.6	423.4	M	-0.42	329.2	231.5	X	0.42
1986	320.5	161.6	X	0.98	308.9	185.8	M	0.66	364.9	190.3	X	0.92
1987	359.3	112.9	X	2.18	310.0	127.5	X	1.43	398.3	157.0	X	1.54
1988	325.4	192.8	X	0.69	322.0	416.1	X	-0.23	400.3	237.3	X	0.69
1989	302.8	233.8	X	0.30	354.0	264.2	X	0.34	450.0	618.9	M	-0.27
1990	342.0	219.2	X	0.56	393.0	247.8	X	0.59	562.6	532.8	M	0.06
1991	404.1	226.6	X	0.78	464.0	256.1	X	0.81	648.4	551.1	M	0.18
1992	502.9	484.1	M	0.04	530.0	547.1	X	-0.03	743.5	641.2	M	0.16
1993	471.2	253.3	X	0.86	545.0	614.3	X	-0.11	802.5	691.0	M	0.16
1994	461.5	296.7	X	0.56	461.5	335.6	X	0.38	884.6	791.7	M	0.12
1995	677.7	351.1	X	0.93	677.7	794.0	M	-0.15	969.6	909.0	M	0.07
1996	722.4	592.5	X	0.22	677.4	678.5	X	0.00	1099.4	1152.2	M	-0.05
1997	673.2	785.4	M	-0.14	873.6	476.5	X	0.83	947.6	997.8	M	-0.05
1998	621.6	852.9	M	-0.27	710.7	959.5	X	-0.26	919.9	1000.3	M	-0.08
1999	783.5	872.4	M	-0.10	797.4	969.6	X	-0.18	1127.4	1019.4	M	0.11
2000	667.3	479.7	X	0.39	642.8	533.9	X	0.20	1357.3	1134.8	M	0.20
2001	956.6	622.9	X	0.54	948.1	1298.9	X	-0.27	1562.3	1502.0	M	0.04
2002	1449.1	1475.3	M	-0.02	1795.6	1656.7	X	0.08	1991.3	2010.7	M	-0.01
2003	974.3	1211.9	M	-0.20	955.6	1363.1	X	-0.30	1664.5	1519.8	M	0.10
2004	946.4	1183.6	M	-0.20	919.1	1319.5	X	-0.30	1654.5	1444.5	M	0.15
2005	716.1	440.0	X	0.63	682.3	1364.6	X	-0.50	1519.0	1532.4	M	-0.01

Appendix Table 4 (continued): Prices and NRAs for primary products, South Africa, 1960 to 2005

	Poultry				Beef				Mutton			
	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP
1960												
1961			M	-0.13	239.4	285.3	M	-0.16	355.2	376.1	M	-0.06
1962			M	-0.13	256.0	184.8	M	0.39	412.3	301.7	M	0.37
1963			M	-0.13	257.3	216.4	M	0.19	440.5	374.7	M	0.18
1964			M	-0.13	334.9	380.3	M	-0.12	455.0	351.5	M	0.29
1965			M	-0.13	344.6	326.1	M	0.06	431.0	385.0	M	0.12
1966			M	-0.13	376.3	333.0	M	0.13	484.0	423.4	M	0.14
1967			M	-0.13	429.2	338.5	M	0.27	469.0	417.1	M	0.12
1968			M	-0.13	427.3	349.6	M	0.22	439.0	395.7	M	0.11
1969			M	-0.13	404.3	354.1	M	0.14	469.0	396.3	M	0.18
1970	395.2	570.9	M	-0.31	448.6	436.7	M	0.03	511.0	452.1	M	0.13
1971	482.0	568.5	M	-0.15	449.0	435.1	M	0.03	633.0	383.2	M	0.65
1972	578.3	685.4	M	-0.16	444.0	444.7	M	0.00	832.0	461.9	M	0.80
1973	780.8	864.0	M	-0.10	586.0	609.4	M	-0.04	963.0	723.5	M	0.33
1974	780.8	843.8	M	-0.07	807.0	678.4	M	0.19	1111.0	1018.8	M	0.09
1975	790.4	1005.6	M	-0.21	893.0	552.5	M	0.62	1182.0	710.0	M	0.66
1976	805.8	1230.1	M	-0.34	872.0	621.5	M	0.40	1293.0	782.7	M	0.65
1977	911.3	1282.1	M	-0.29	936.0	698.9	M	0.34	1192.0	838.9	M	0.42
1978	1062.0	1355.1	M	-0.22	935.0	627.3	M	0.49	1209.0	1050.9	M	0.15
1979	1208.8	1380.3	M	-0.12	969.0	1098.1	M	-0.12	1443.0	1356.0	M	0.06
1980	1614.0	1341.2	M	0.20	1190.0	1348.8	M	-0.12	1950.0	1329.9	M	0.47
1981	1735.0	1413.8	M	0.23	2024.0	1155.7	M	0.75	2137.0	1574.2	M	0.36
1982	1610.0	1519.5	M	0.06	2122.0	1225.0	M	0.73	2069.0	1925.1	M	0.07
1983	1814.0	1383.0	M	0.31	2114.0	1199.9	M	0.76	2334.0	1642.6	M	0.42
1984	2128.2	1904.9	M	0.12	2229.0	1503.2	M	0.48	2563.0	2339.1	M	0.10
1985	2173.8	2765.7	M	-0.21	2284.0	2080.6	M	0.10	3087.0	3244.0	M	-0.05
1986	2890.1	3315.8	M	-0.13	2573.0	2943.0	M	-0.13	3840.0	2839.7	M	0.35
1987	3378.6	3089.0	M	0.09	3534.0	3776.0	M	-0.06	4744.2	2716.9	M	0.75
1988	4064.2	3455.3	M	0.18	4516.0	4151.1	M	0.09	5311.0	3458.5	M	0.54
1989	3835.6	4138.9	M	-0.07	4826.0	4606.4	M	0.05	5036.0	4858.5	M	0.04
1990	4366.7	4519.3	M	-0.03	4736.0	4337.2	M	0.09	4786.0	4349.0	M	0.10
1991	4851.4	5046.3	M	-0.04	4749.0	5348.4	M	-0.11	5645.0	4346.7	M	0.30
1992	5361.7	5090.3	M	0.05	5220.0	6763.4	M	-0.23	6216.0	4428.7	M	0.40
1993	6231.7	5174.7	M	0.20	5219.0	8612.5	M	-0.39	7711.0	5496.4	M	0.40
1994	6980.8	6137.9	M	0.14	7283.0	7160.1	M	0.02	8771.0	6056.4	M	0.45
1995	7110.8	6157.2	M	0.15	7468.0	7459.1	M	0.00	8261.0	6264.8	M	0.32
1996	8159.2	6820.0	M	0.20	7855.0	6887.7	M	0.14	10573.0	9418.5	M	0.12
1997	8380.8	6927.7	M	0.21	8208.0	6865.1	M	0.20	10645.0	8529.6	M	0.25
1998	8028.3	7750.4	M	0.04	7997.3	9650.8	M	-0.17	10126.0	8248.8	M	0.23
1999	8220.8	7836.4	M	0.05	7868.0	9771.4	M	-0.19	13002.0	10388.2	M	0.25
2000	8530.0	8669.9	M	-0.02	8379.1	11136.0	M	-0.25	14624.0	9669.8	M	0.51
2001	9780.0	11489.3	M	-0.15	8376.8	11411.5	M	-0.27	15223.0	15275.0	M	0.00
2002	11580.0	12859.6	M	-0.10	10259.4	13930.4	M	-0.26	18181.0	23650.1	M	-0.23
2003	12390.0	10287.3	M	0.20	12775.0	10691.6	M	0.19	20120.0	21537.8	M	-0.07
2004	12018.5	10047.4	M	0.20	13255.0	12211.0	M	0.09	21000.0	21617.5	M	-0.03
2005	11817.7	9652.8	M	0.22	14363.0	12448.3	M	0.15	22000.0	20724.4	M	0.06

Notes: NRA for poultry over period 1961-69 is equivalent to the average NRA for poultry over period 1970-81.

Appendix Table 4 (continued): Prices and NRAs for primary products, South Africa, 1960 to 2005

	Apples Exportable				Oranges Exportable				Grapes Exportable			
	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP
1961	127.9	134.2	X	-0.05	86.2	88.5	X	-0.03	210.6	240.2	X	-0.12
1962	136.3	143.8	X	-0.05	77.8	80.1	X	-0.03	238.3	296.9	X	-0.20
1963	123.7	145.3	X	-0.15	81.6	80.1	X	0.02	251.1	241.9	X	0.04
1964	137.7	137.3	X	0.00	64.7	87.2	X	-0.26	255.3	273.2	X	-0.07
1965	132.1	140.8	X	-0.06	65.2	85.4	X	-0.24	251.1	297.7	X	-0.16
1966	166.1	163.3	X	0.02	64.4	68.6	X	-0.06	250.0	310.3	X	-0.19
1967	113.3	153.8	X	-0.26	62.3	71.9	X	-0.13	252.0	294.4	X	-0.14
1968	189.5	180.0	X	0.05	65.0	74.1	X	-0.12	302.0	298.1	X	0.01
1969	159.9	152.1	X	0.05	74.6	113.2	X	-0.34	326.0	310.9	X	0.05
1970	153.7	158.1	X	-0.03	67.9	120.0	X	-0.43	329.6	305.4	X	0.08
1971	134.8	156.0	X	-0.14	83.2	130.4	X	-0.36	334.2	368.4	X	-0.09
1972	235.7	167.8	X	0.40	85.7	185.3	X	-0.54	443.1	324.3	X	0.37
1973	151.7	152.9	X	-0.01	89.2	166.9	X	-0.47	446.3	332.2	X	0.34
1974	166.8	188.9	X	-0.12	106.5	136.2	X	-0.22	518.7	427.3	X	0.21
1975	163.7	205.2	X	-0.20	122.1	167.5	X	-0.27	696.1	501.5	X	0.39
1976	163.7	246.2	X	-0.34	122.1	141.7	X	-0.14	696.1	572.7	X	0.22
1977	281.4	225.3	X	0.25	111.9	231.2	X	-0.52	723.9	700.0	X	0.03
1978	320.6	320.7	X	0.00	199.0	233.0	X	-0.15	944.4	701.2	X	0.35
1979	247.2	325.5	X	-0.24	195.8	298.3	X	-0.34	879.5	1130.5	X	-0.22
1980	290.2	341.4	X	-0.15	236.9	206.9	X	0.15	978.6	1086.9	X	-0.10
1981	211.8	411.7	X	-0.49	182.2	272.8	X	-0.33	832.9	1253.0	X	-0.34
1982	512.3	484.0	X	0.06	232.7	322.5	X	-0.28	1037.5	1524.1	X	-0.32
1983	393.0	450.0	X	-0.13	264.9	285.6	X	-0.07	962.7	1341.7	X	-0.28
1984	443.6	528.6	X	-0.16	266.4	350.1	X	-0.24	1060.8	1199.4	X	-0.12
1985	646.1	522.8	X	0.24	434.4	703.5	X	-0.38	1336.9	1112.1	X	0.20
1986	955.9	765.7	X	0.25	580.0	624.1	X	-0.07	2323.5	1254.4	X	0.85
1987	883.8	637.4	X	0.39	537.7	650.2	X	-0.17	2381.7	1491.6	X	0.60
1988	747.2	905.5	X	-0.17	491.0	812.7	X	-0.40	2707.8	1118.4	X	1.42
1989	924.8	976.6	X	-0.05	669.0	600.8	X	0.11	2723.0	2559.0	X	0.06
1990	1791.0	1619.5	X	0.11	709.6	726.7	X	-0.02	3051.5	2811.6	X	0.09
1991	1913.8	1825.6	X	0.05	850.3	926.4	X	-0.08	3365.8	3054.6	X	0.10
1992	1598.4	1714.8	X	-0.07	988.0	948.8	X	0.04	3868.9	2151.4	X	0.80
1993	927.7	948.1	X	-0.02	894.9	1051.3	X	-0.15	4496.0	4379.9	X	0.03
1994	2130.2	1538.7	X	0.38	1192.7	1201.3	X	-0.01	4556.4	4318.2	X	0.06
1995	1720.6	1773.9	X	-0.03	1120.2	1168.9	X	-0.04	4881.1	4080.7	X	0.20
1996	2597.8	2404.2	X	0.08	1647.8	1345.0	X	0.23	5021.0	4341.4	X	0.16
1997	2191.9	2296.1	X	-0.05	1501.5	1434.7	X	0.05	5698.8	4437.2	X	0.28
1998	2420.1	2444.5	X	-0.01	1409.3	1691.6	X	-0.17	6935.5	5277.3	X	0.31
1999	1467.8	2289.8	X	-0.36	1828.8	1690.7	X	0.08	7493.9	5733.7	X	0.31
2000	2191.5	2145.8	X	0.02	1964.1	1523.8	X	0.29	6372.1	5891.2	X	0.08
2001	2159.0	2403.3	X	-0.10	1202.2	1432.4	X	-0.16	9231.7	6200.1	X	0.49
2002	3440.9	3256.6	X	0.06	2126.7	1681.8	X	0.26	6427.5	6287.4	X	0.02
2003	3245.7	3184.8	X	0.02	2058.6	1902.1	X	0.08	6760.7	6879.2	X	-0.02
2004	3793.6	3707.3	X	0.02	2265.3	2068.6	X	0.10	7440.6	7577.8	X	-0.02
2005	3625.7	3539.8	X	0.02	2425.1	2003.5	X	0.21	5369.2	5435.7	X	-0.01

Appendix Table 4 (continued): Prices and NRAs for primary products, South Africa, 1960 to 2005

	Sugar Cane				Sunflower			
	Domestic price per MT	Border price per MT		NRA = DP-BP / BP	Domestic price per MT	Border price per MT		NRA
1960								
1961	4.5	3.2	X	0.41	52.2		H	0.09
1962	4.4	3.1	X	0.41	52.2		H	0.23
1963	5.8	4.1	X	0.41	59.3		H	0.24
1964	5.3	3.8	X	0.41	59.3		H	0.20
1965	4.5	3.7	X	0.22	60.5		H	0.12
1966	5.0	3.7	X	0.36	62.0		H	0.11
1967	4.7	2.9	X	0.61	74.6		H	0.23
1968	5.1	3.1	X	0.64	80.9		H	0.20
1969	5.6	4.2	X	0.34	80.0		H	0.23
1970	6.4	5.0	X	0.27	84.6		H	0.13
1971	5.7	6.7	X	-0.15	94.2		H	0.08
1972	6.1	8.6	X	-0.29	104.1		H	0.14
1973	8.9	9.5	X	-0.06	120.0		H	0.06
1974	10.1	21.5	X	-0.53	154.5		H	-0.10
1975	13.8	23.3	X	-0.41	183.2		H	0.00
1976	13.1	14.8	X	-0.12	172.2		H	0.08
1977	13.9	11.2	X	0.24	187.2		H	0.09
1978	15.3	13.5	X	0.13	150.6		H	0.14
1979	18.2	13.7	X	0.33	193.7		H	0.06
1980	24.7	33.1	X	-0.25	236.7		H	0.29
1981	22.8	21.1	X	0.08	240.0		H	0.23
1982	25.3	15.4	X	0.65	280.8		H	0.20
1983	33.6	13.9	X	1.42	309.0		H	0.27
1984	27.3	17.3	X	0.58	339.0		H	0.01
1985	30.8	18.9	X	0.63	389.0		H	-0.03
1986	36.0	23.3	X	0.54	428.0		H	0.16
1987	32.6	21.6	X	0.51	503.0		H	0.19
1988	41.1	33.6	X	0.22	566.0		H	0.02
1989	50.6	48.4	X	0.05	580.0		H	0.02
1990	55.4	57.3	X	-0.03	672.0		H	0.08
1991	56.8	45.5	X	0.25	722.0		H	0.18
1992	94.7	45.3	X	1.09	780.0		H	0.13
1993	99.9	44.7	X	1.23	843.0		H	0.01
1994	103.7	43.1	X	1.41	978.5		H	-0.05
1995	104.8	67.8	X	0.55	1065.6		H	-0.05
1996	108.9	96.0	X	0.13	961.1		H	-0.07
1997	119.1	85.1	X	0.40	1097.4		H	-0.08
1998	125.9	97.0	X	0.30	1458.7		H	-0.15
1999	121.4	85.7	X	0.42	1354.8		H	0.01
2000	130.5	87.6	X	0.49	1199.0		H	-0.01
2001	160.2	125.4	X	0.28	1963.0		H	-0.15
2002	171.8	169.5	X	0.01	2552.0		H	-0.07
2003	169.1	94.9	X	0.78	2353.5		H	0.00
2004	159.6	104.4	X	0.53	2185.0		H	0.04
2005	162.5	103.3	X	0.57	1827.7		H	0.01

Source: Authors' spreadsheet

Notes: Sunflower seeds are non-traded, while sunflower oil is traded. See Anderson et al. (2008) for method of calculating NRA in this case. NRA for sugar cane over period 1961-64 is equivalent to the average NRA over period 1965-1970.

Appendix Table 5: Prices and NRAs for lightly processed foods, South Africa, 1960 to 2005

	Maize flour				Wheat flour				Refined sugar				Sunflower oil			
	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP	Domestic price per MT	Border price per MT		NRA = DP-BP BP
1960																
1961	51.5	84.4	X	-0.39	80.6	135.7	X	-0.41	81.2		X	0.49	250.3	191.0	X	0.31
1962	52.3	75.2	X	-0.30	81.2	112.0	X	-0.27	81.9		X	0.49	248.1	141.1	X	0.76
1963	52.8	76.4	X	-0.31	80.9	135.6	X	-0.40	81.6		X	0.49	239.9	133.7	X	0.79
1964	52.5	67.8	X	-0.23	81.7	111.7	X	-0.27	82.4		X	0.49	239.1	144.1	X	0.66
1965	52.8	65.1	X	-0.19	85.5	106.7	X	-0.20	86.2	61.0	X	0.41	245.9	173.9	X	0.41
1966	54.7	63.5	X	-0.14	86.3	137.5	M	-0.37	87.0	61.0	X	0.43	253.3	186.7	M	0.36
1967	56.4	70.3	X	-0.20	91.8	161.3	M	-0.43	92.6	51.3	X	0.80	253.3	143.5	X	0.77
1968	56.6	43.0	X	0.32	94.0	150.3	M	-0.37	94.8	53.8	X	0.76	254.8	153.5	M	0.66
1969	57.9	60.2	X	-0.04	95.1	176.8	M	-0.46	95.9	73.3	X	0.31	263.8	149.7	M	0.76
1970	58.5	66.8	X	-0.13	101.2	175.9	M	-0.42	102.0	82.7	X	0.23	285.1	199.7	X	0.43
1971	59.8	71.3	X	-0.16	102.3	171.1	M	-0.40	131.9	115.3	X	0.14	291.5	227.4	X	0.28
1972	64.9	72.3	X	-0.10	106.6	98.1	X	0.09	122.1	143.8	X	-0.15	311.6	212.0	X	0.47
1973	72.2	76.4	X	-0.06	114.2	96.8	X	0.18	122.1	160.7	X	-0.24	338.5	283.5	X	0.19
1974	83.2	116.6	X	-0.29	132.3	110.6	X	0.20	113.2	367.5	X	-0.69	381.9	572.2	X	-0.33
1975	91.4	143.7	X	-0.36	163.2	189.0	X	-0.14	107.1	413.6	X	-0.74	464.1	467.2	X	-0.01
1976	103.5	170.6	X	-0.39	185.4	146.1	X	0.27	150.0	264.6	X	-0.43	540.3	429.4	X	0.26
1977	126.9	175.0	X	-0.27	211.6	114.1	X	0.85	112.4	194.5	X	-0.42	606.8	471.3	X	0.29
1978	147.5	177.6	X	-0.17	230.6	179.4	M	0.29	268.1	234.0	X	0.15	653.9	430.6	X	0.52
1979	162.9	201.6	X	-0.19	269.9	201.6	M	0.34	301.8	230.1	X	0.31	733.1	579.6	X	0.26
1980	198.7	207.7	X	-0.04	330.2	228.4	M	0.45	338.3	548.8	X	-0.38	822.0	398.0	X	1.07
1981	226.7	247.4	X	-0.08	382.4	302.5	M	0.26	378.7	381.6	X	-0.01	904.2	492.4	X	0.84
1982	254.7	257.1	X	-0.01	443.0	320.7	M	0.38	424.8	265.8	X	0.60	904.2	511.4	X	0.77
1983	291.1	286.9	X	0.01	503.5	182.0	X	1.77	466.2	257.3	X	0.81	1091.1	540.1	M	1.02
1984	347.7	549.0	X	-0.37	553.0	265.7	X	1.08	562.7	309.6	X	0.82	1330.2	1128.6	M	0.18
1985	400.0	726.3	X	-0.45	627.3	541.7	X	0.16	666.5	319.6	X	1.09	1614.2	1451.3	M	0.11
1986	507.7	514.7	X	-0.01	627.3	579.1	X	0.08	788.9	402.1	X	0.96	1591.8	897.2	M	0.77
1987	547.7	369.9	X	0.48	737.4	487.6	X	0.51	889.4	395.7	X	1.25	1442.3	760.2	M	0.90
1988	553.8	737.2	X	-0.25	833.7	431.5	X	0.93	990.1	584.9	X	0.69	1337.7	1036.2	M	0.29
1989	704.6	624.1	X	0.13	916.2	577.0	X	0.59	1075.1	800.3	X	0.34	1711.3	1312.2	M	0.30
1990	824.6	515.0	X	0.60	1133.6	891.8	X	0.27	1186.7	971.3	X	0.22	1980.4	1318.5	M	0.50
1991	950.8	473.8	X	1.01	1249.1	803.1	X	0.56	1354.6	758.9	X	0.79	2055.1	1107.4	X	0.86
1992	1110.8	978.9	X	0.13	1554.5	866.5	X	0.79	1560.3	739.8	X	1.11	2256.9	1394.5	M	0.62
1993	1246.2	1160.1	X	0.07	1655.4	955.3	X	0.73	1725.6	816.2	X	1.11	2219.5	1733.8	M	0.28
1994	1255.4	963.2	X	0.30	1791.8	888.6	X	1.02	1848.4	770.8	X	1.40	2496.0	2334.7	M	0.07
1995	1381.5	1511.4	X	-0.09	1898.1	850.8	X	1.23	2012.4	1292.4	X	0.56	2593.8	2487.7	M	0.04
1996	1593.8	1301.0	X	0.23	2119.1	1754.2	X	0.21	2113.3	1685.9	X	0.25	2695.5	2686.4	M	0.00
1997	1657.8	1345.7	X	0.23	2380.2	1557.1	X	0.53	2303.0	1487.0	X	0.55	2801.2	2884.5	M	-0.03
1998	1832.4	2053.1	X	-0.11	2447.5	1561.6	X	0.57	2446.6	1599.5	X	0.53	3237.1	3951.8	M	-0.18
1999	1910.6	2139.6	X	-0.11	2566.3	1783.0	X	0.44	2604.8	1372.4	X	0.90	3834.3	3262.1	M	0.18
2000	1923.1	1784.3	X	0.08	2713.6	2552.1	X	0.06	2712.3	1462.2	X	0.85	3243.3	2849.7	M	0.14
2001	1929.2	3221.5	X	-0.40	2765.4	1688.5	X	0.64	2887.1	2114.6	X	0.37	3422.7	4134.1	M	-0.17
2002	2747.7	3785.4	X	-0.27	3324.3	2128.1	X	0.56	3201.8	2647.5	X	0.21	5238.6	5233.5	X	0.00
2003	2747.7	2705.0	X	0.02	3568.1	1947.6	X	0.83	3238.8	1549.3	X	1.09	5395.6	4671.0	M	0.16
2004	2538.5	2577.7	X	-0.02	3566.3	1916.5	X	0.86	3159.4	1698.1	X	0.86	5589.9	4509.0	M	0.24
2005	2203.1	2463.2	X	-0.11	3360.9	1815.6	X	0.85	3220.1	1659.6	X	0.94	5388.1	4613.6	M	0.17

Notes: NRA for sugar cane over period 1961-64 is equivalent to the average NRA over period 1965-1970.

Source: Authors' spreadsheet

Appendix Table 6: Official foreign exchange rate, South Africa, 1960 to 2005

(Rand per US dollar)

	Official rate
1960	0.71
1961	0.71
1962	0.71
1963	0.71
1964	0.71
1965	0.71
1966	0.71
1967	0.71
1968	0.71
1969	0.71
1970	0.71
1971	0.72
1972	0.77
1973	0.69
1974	0.68
1975	0.74
1976	0.87
1977	0.87
1978	0.87
1979	0.84
1980	0.78
1981	0.88
1982	1.09
1983	1.11
1984	1.48
1985	2.23
1986	2.29
1987	2.04
1988	2.27
1989	2.62
1990	2.59
1991	2.76
1992	2.85
1993	3.27
1994	3.55
1995	3.63
1996	4.30
1997	4.61
1998	5.53
1999	6.11
2000	6.94
2001	8.61
2002	10.54
2003	7.56
2004	6.46
2005	6.36

Appendix Table 7: Annual distortion estimates, South Africa, 1961 to 2005
(a) Nominal rates of assistance to covered products

(percent)

	Apple [a]	Beef	Grape [a]	Maize (Yellow)	Maize (White)	Orange [a]	Poultry	Sheep meat	Sugar	Sunflower	Wheat
1961	-5	-16	-24	17	2	-3	-13	-6	33	9	2
1962	-5	39	-30	4	-11	-3	-13	37	33	23	-1
1963	-15	19	-10	-3	-18	2	-13	18	33	24	-7
1964	0	-12	-19	1	-15	-26	-13	29	33	20	-2
1965	-6	6	-27	5	-11	-24	-13	12	22	12	6
1966	2	13	-30	12	-3	-6	-13	14	36	11	10
1967	-26	27	-26	14	-2	-13	-13	12	61	23	9
1968	5	22	-12	33	12	-12	-13	11	64	20	15
1969	5	14	-9	31	9	-34	-13	18	34	23	19
1970	-3	3	-6	12	-6	-43	-31	13	27	13	16
1971	-14	3	-21	19	-5	-36	-15	65	-15	8	21
1972	40	0	19	25	-5	-54	-16	80	-29	14	87
1973	-1	-4	17	-14	-36	-47	-10	33	-6	6	7
1974	-12	19	6	-20	-48	-22	-7	9	-53	-10	-3
1975	-20	62	21	-10	-43	-27	-21	66	-41	0	24
1976	-34	40	6	-14	-39	-14	-34	65	-12	8	38
1977	25	34	-10	20	-9	-52	-29	42	24	9	89
1978	0	49	17	30	1	-15	-22	15	13	14	71
1979	-24	-12	-32	43	12	-34	-12	6	33	6	85
1980	-15	-12	-22	74	37	15	20	47	-25	29	8
1981	-49	75	-42	62	27	-33	23	36	8	23	8
1982	6	73	-41	87	47	-28	6	7	65	20	118
1983	-13	76	-38	-13	21	-7	31	42	142	27	121
1984	-16	48	-23	-14	-31	-24	12	10	58	1	81
1985	24	10	5	16	-42	-38	-21	-5	63	-3	42
1986	25	-13	61	98	66	-7	-13	35	54	16	92
1987	39	-6	39	218	143	-17	9	75	51	19	154
1988	-17	9	21	69	-23	-40	18	54	22	2	69
1989	-5	5	-7	30	34	11	-7	4	5	2	-27
1990	11	9	-6	56	59	-2	-3	10	-3	8	6
1991	5	-11	-4	78	81	-8	-4	30	25	18	18
1992	-7	-23	56	4	-3	4	5	40	109	13	16
1993	-2	-39	-11	86	-11	-15	20	40	123	1	16
1994	38	2	-8	56	38	-1	14	45	141	-5	12
1995	-3	0	4	93	-15	-4	15	32	55	-5	7
1996	8	14	1	22	0	23	20	12	13	-7	-5
1997	-5	20	12	-14	83	5	21	25	40	-8	-5
1998	-1	-17	14	-27	-26	-17	4	23	30	-15	-8
1999	-36	-19	14	-10	-18	8	5	25	42	1	11
2000	2	-25	-6	39	20	29	-2	51	49	-1	20
2001	-10	-27	49	54	-27	-16	-15	0	28	-15	4
2002	6	-26	2	-2	8	26	-10	-23	1	-7	-1
2003	2	19	-2	-20	-30	8	20	-7	78	0	10
2004	2	9	-2	-19	-32	10	20	-3	53	4	15
2005	2	15	-1	66	13	21	22	6	57	1	-1

Appendix Table 7 (continued): Annual distortion estimates, South Africa, 1961 to 2005
(b) Nominal and relative rates of assistance to all agricultural products, to exportable and import-competing agricultural industries, and relative[a] to non-agricultural industries
(percent)

	Total ag NRA				Ag tradables NRA				
	Covered products		Non-covered products	All products (incl NPS)	Export-ables	Import-competing	All	Non-ag tradables NRA	RRA
	Inputs	Outputs							
1961	0	0	0	2	10	-9	3	0	0
1962	0	12	0	10	2	19	13	3	8
1963	0	4	-4	4	-2	4	4	5	1
1964	0	-2	-2	1	0	-4	1	4	-2
1965	0	1	-3	3	-4	3	3	3	0
1966	0	8	1	8	6	8	10	3	7
1967	0	11	-1	9	6	11	12	3	8
1968	0	16	2	15	21	11	19	3	15
1969	0	12	1	12	13	9	15	4	12
1970	0	1	-3	3	-1	1	4	3	2
1971	0	4	0	5	-7	13	6	2	3
1972	0	6	2	8	4	9	10	3	8
1973	0	-5	-6	-3	-12	-1	-3	2	-6
1974	0	-22	-8	-17	-35	5	-20	3	-22
1975	0	-10	-4	-6	-26	22	-7	3	-9
1976	0	-3	-2	-1	-13	9	-1	1	-2
1977	0	10	3	10	12	9	13	1	9
1978	0	14	-2	10	16	7	14	4	9
1979	0	8	-2	6	24	-9	8	4	5
1980	0	15	6	13	22	11	17	2	13
1981	0	31	3	23	21	36	30	4	24
1982	0	45	7	33	56	32	45	5	37
1983	0	46	6	33	53	39	46	6	35
1984	0	19	-2	13	21	14	19	8	12
1985	0	-4	-7	-3	23	-16	-3	6	-6
1986	0	21	0	15	58	2	21	3	17
1987	0	42	3	30	90	11	43	4	36
1988	0	15	-3	12	12	15	17	6	9
1989	0	4	-5	5	19	-6	8	7	0
1990	0	10	-3	10	24	2	14	8	7
1991	0	10	2	10	36	-2	14	7	5
1992	0	2	3	5	33	-3	7	8	0
1993	0	2	3	7	24	-6	10	7	3
1994	0	22	6	21	48	10	29	7	21
1995	0	13	4	13	34	7	18	6	11
1996	0	11	1	9	10	10	12	6	8
1997	0	17	1	14	38	8	18	4	13
1998	0	-6	-5	-5	-3	-8	-6	4	-9
1999	0	-1	-2	-2	1	-3	-2	3	-5
2000	0	7	2	5	26	-3	7	3	5
2001	0	-8	-5	-7	3	-15	-8	2	-9
2002	0	-6	0	-4	6	-12	-5	1	-6
2003	0	6	-2	4	-3	8	5	2	1
2004	0	3	-1	2	-6	7	3	4	-1
2005	0	19	1	13	29	12	17	4	12

a. Relative Rate of Assistance (RRA) is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table 7 (continued): Annual distortion estimates, South Africa, 1961 to 2005
(c) Value shares of primary production of covered[a] and non-covered products, (percent)

	Apple	Beef	Grape	Maize	Orange	Poultry	Sheepmeat	Sugar	Sunflower	Wheat	Non-covered
1961	2	18	2	17	4	3	8	8	1	7	31
1962	2	12	2	21	4	4	6	9	1	5	33
1963	2	13	2	21	3	4	7	8	1	7	32
1964	2	22	2	14	4	4	7	7	1	8	31
1965	3	21	2	15	4	5	9	4	1	5	32
1966	3	19	2	17	3	5	8	6	1	4	32
1967	3	13	2	25	3	4	7	5	1	6	33
1968	3	16	2	14	4	6	9	5	1	8	33
1969	3	16	2	14	4	7	8	6	1	7	33
1970	3	17	2	15	4	6	9	5	1	7	32
1971	3	15	1	19	3	7	5	8	1	7	32
1972	2	14	1	20	4	8	4	9	1	4	31
1973	2	16	1	12	3	11	6	8	2	8	31
1974	2	9	1	29	2	7	5	12	1	5	27
1975	2	9	1	24	2	10	4	13	1	5	29
1976	1	11	1	20	2	13	4	9	1	6	30
1977	2	13	1	20	3	13	4	7	2	4	32
1978	2	11	1	19	3	12	5	7	2	3	34
1979	2	18	1	14	3	11	6	6	1	5	33
1980	2	15	1	16	2	10	5	10	1	6	32
1981	2	11	1	19	2	9	5	6	1	8	36
1982	2	14	1	12	3	12	7	5	1	5	37
1983	3	15	2	11	3	13	7	4	1	4	38
1984	2	14	1	14	2	13	7	5	1	5	35
1985	2	13	1	21	3	14	7	4	1	4	31
1986	2	18	1	10	3	17	5	4	1	4	35
1987	2	19	1	7	3	15	4	4	1	4	38
1988	2	16	1	13	3	14	4	5	1	5	34
1989	2	16	1	13	2	14	5	5	1	7	33
1990	3	17	2	9	3	16	5	6	2	5	33
1991	3	19	2	8	3	17	4	5	2	6	32
1992	3	26	1	6	3	18	4	3	1	4	30
1993	2	23	2	13	3	15	3	2	1	5	30
1994	2	15	2	13	3	18	2	3	1	5	34
1995	3	15	2	8	3	20	3	4	2	6	35
1996	2	10	2	15	3	17	3	6	2	8	32
1997	2	10	3	14	3	19	3	6	2	6	32
1998	2	13	3	14	3	18	2	6	2	4	32
1999	2	15	3	14	4	17	3	4	4	4	31
2000	2	14	3	12	3	20	2	5	1	6	32
2001	2	12	3	14	3	20	3	5	2	6	31
2002	2	12	2	20	2	18	4	5	3	6	25
2003	2	11	3	17	4	18	4	3	2	3	33
2004	2	13	3	17	3	17	4	3	2	3	33
2005	2	14	2	15	3	18	4	3	1	4	33

a. At farmgate undistorted prices, US$
Source: Authors' spreadsheet

Appendix Table 8: Comparison of NRA estimates in this study and by OECD, 1994 to 2003
(percent)

Commodity	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
NRA estimates based on OECD 2007 Nominal Protection Coefficient										
Wheat	16.6	0.0	9.6	4.4	0.0	22.7	9.2	0.0	0.0	0.0
Maize	0.0	23.8	0.0	8.2	0.0	3.8	0.0	0.0	34.9	0.0
Sunflower	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0
Groundnuts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sugar	41.4	52.3	36.3	28.4	45.5	70.6	18.0	18.6	40.9	45.7
Grapes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oranges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apples	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milk	64.7	51.8	2.4	43.2	64.8	40.3	19.6	-11.8	15.0	18.2
Beef & Veal	0.0	35.2	21.5	9.3	0.0	0.0	0.0	0.0	0.0	0.0
Pigmeat	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8
Sheepmeat	153.0	98.5	36.1	70.8	78.4	41.0	84.6	14.7	-12.0	3.0
Poultry	8.0	15.9	8.6	21.1	0.0	0.0	0.0	0.0	0.0	0.0
Eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mean NRA, all covered products	**10.4**	**21.2**	**8.0**	**13.3**	**8.8**	**9.7**	**5.4**	**1.4**	**9.8**	**4.0**
Standard deviation	44.0	30.0	13.3	21.2	28.0	22.6	23.1	7.2	15.3	13.2
Other (incl. decoupled & non-product-specific) subsidies	0.4	-2.2	0.2	0.3	0.5	0.2	0.1	0.8	-1.2	1.5
Total support	**10.8**	**19.0**	**8.2**	**13.6**	**9.2**	**9.9**	**5.5**	**2.2**	**8.6**	**5.5**
% coverage (at undistorted prices)	77.3	71.5	74.3	74.1	71.0	72.0	74.0	74.6	78.2	72.5
NRAs of present study										
Wheat grain	11.7	6.7	-4.6	-5.0	-8.0	10.6	19.6	4.0	-1.0	9.5
Yellow Maize grain	55.6	93.0	21.9	-14.3	-27.1	-10.2	39.1	53.6	-1.8	-19.6
White Maize grain	37.5	-14.6	-0.2	83.3	-25.9	-17.8	20.4	-27.0	8.4	-29.9
Weighted average maize	46.8	24.4	8.4	19.8	-26.4	-15.0	27.2	-8.1	4.3	-26.5
Sunflower seed	-5.1	-5.0	-6.8	-8.3	-15.4	1.2	-0.6	-15.0	-7.0	0.2
Raw sugar	140.6	54.7	13.5	40.0	29.8	41.7	48.9	27.7	1.4	78.2
Table grapes export	-8.2	4.0	0.6	11.7	14.3	13.7	-5.9	48.9	2.2	-1.7
Oranges export	-0.7	-4.2	22.5	4.7	-16.7	8.2	28.9	-16.1	26.4	8.2
Apples export	38.4	-3.0	8.1	-4.5	-1.0	-35.9	2.1	-10.2	5.7	1.9
Beef	1.7	0.1	14.0	19.6	-17.1	-19.5	-24.8	-26.6	-26.4	19.5
Mutton	44.8	31.9	12.3	24.8	22.8	25.2	51.2	-0.3	-23.1	-6.6
Poultry	13.7	15.5	19.6	21.0	3.6	4.9	-1.6	-14.9	-10.0	20.4
Mean NRA, all covered products	**22.2**	**13.0**	**10.7**	**17.0**	**-5.5**	**-1.4**	**6.7**	**-7.5**	**-6.0**	**5.8**
Standard deviation	39.6	29.0	10.7	25.8	17.3	19.5	23.4	27.0	13.6	24.7

Source: NRA estimates for OECD are based on Nominal Protection Coefficient estimates of the OECD (2006)

which, unlike the Producer Support Estimate (PSE), is expressed at undistorted prices.