Agricultural distortions, poverty and inequality in South Africa

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Abstract

South Africa has rapidly reduced trade barriers since the end of Apartheid, yet agricultural production and exports have remained sluggish. Also, poverty and unemployment have risen and become increasingly concentrated in rural areas. This paper examines the extent to which remaining price distortions, both domestic and foreign, are contributing to the underperformance of the agricultural sector vis-à-vis the rest of the economy. We draw on a computable general equilibrium (CGE) and micro-simulation model of South Africa that are linked to the results of a global trade model. This framework is used to examine the effects of eliminating global and domestic price distortions. Model results indicate that South Africa's agricultural sector currently benefits from global price distortions, and that removing these would create more jobs for lower-skilled workers, thereby reducing income inequality and poverty. We also find that South Africa's own policies are biased against agriculture and that removing domestic distortions would raise agricultural production. Job losses in nonagricultural sectors would be outweighed by job creation in agriculture, such that overall employment rises and poverty falls. Overall, our findings suggest that South Africa's own policies are more damaging to its welfare, poverty and inequality than distortionary policies in the rest of the world. Existing national price distortions may thus explain some of the poor performance of South Africa's agricultural sector and rural development.

JEL codes: D30, D58, D63, F13, O53, Q18

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South Africa rapidly re-entered global markets after Apartheid ended in the early 1990s. The country had previously faced economic sanctions, which created severe foreign exchange shortages and forced the government to restrict imports and encourage exports through a complex system of tariffs and subsidies (Bell 1993). The result was a heavily distorted economy designed to maintain self-sufficiency and macroeconomic stability. Following the change in government, sanctions were lifted and South Africa became a member of the World Trade Organization. The new government placed trade liberalization at the center of its export-oriented growth strategy (Republic of South Africa 1996). Import tariffs were reduced, export subsidies were eliminated, and most quantitative restrictions were replaced by tariffs. However, despite these reforms, South Africa's system of protection remains complex, with import tariffs still favoring a narrow range of sectors (Cassim, Onyango and van Seventer 2004).

South Africa's economic performance improved during the 1990s, with growth reaching five percent per year by 2005. Evidence suggests that removing trade distortions contributed positively to growth during this period (Jonsson and Subramanian 2001) without reducing aggregate employment (Edwards 2001). Studies also find that trade-induced growth did not contribute to the rise in poverty during the 1990s and may have even helped reduce poverty in more recent years (Hérault 2007, Thurlow 2007). However, past distortions were biased in favor of lower-skilled workers, especially those working in the protected textiles and clothing sectors (Edwards 2001). Their removal has thus exacerbated income inequality (Thurlow 2007).

During the 1990s there also emerged a growing rural-urban divide. The share of South Africa's poor population living in rural areas rose from 60 to 70 percent during 1995-2000

(Hoogeveen and Özler 2005).[1] Agriculture is an important sector for rural livelihoods, employing one in four rural workers (more if upstream activities are included). However, agriculture grew only half as fast as non-agriculture during 1990-2005 (World Bank 2008), because gains from export growth were more than offset by rising import penetration (Jooste, Van Schalkwyk and Groenewald 2003). This poor performance is undoubtedly responsible for some of the rise in rural poverty. However, it is unclear why agricultural growth was slow, and to what extent global and/or domestic price and trade policies were biased against agriculture and rural development. One study suggests that domestic policies may have hurt agriculture during the late 1990s when the effective rate of protection was negative, implying that tariffs on inputs more than offset output protection (van Seventer 2001). There is also evidence that global distortions were biased against agriculture (Krueger, Schiff and Valdés 1992). However, a more recent study indicates that agricultural support was above that of other tradable goods sectors during 1961-2006 (Kirsten, Edwards and Vink 2009).

In this chapter we examine the impact on the South African economy of removing distortions on global and domestic prices. More specifically, we estimate the size of the remaining bias against agriculture and identify the transmission channels through which trade distortions influence poverty and income inequality. This is done using a top-down computable general equilibrium (CGE) and microsimulation model. The next section describes South Africa's economic structure and its current system of distortions. The following two sections outline the methodology and present the results from the model simulations. The final section offers some concluding comments.

Economic structure and trade distortions in South Africa

Table 1 describes the South African economy in 2002, when agriculture was already a small sector generating four percent of gross domestic product (GDP). It does, however, have strong linkages to upstream processing, which generate a further five percent of GDP. Agriculture and processing together contribute 8.5 percent to total export earnings and are

[1] Measured using the national 2000 Income and Expenditure survey and a US$2-a-day poverty line (Hoegoven and Özler 2005).

among the country's more heavily traded commodities, with 17 percent of agricultural output being exported. Summer cereals (maize), fruits, cotton, tobacco and livestock are the main export sectors, accounting for more than 90 percent of total agricultural exports. Agricultural growth during the 1990s was driven by the strong export performance of maize, fruits and livestock, although this was offset by rising import demand for these commodities, caused by larger declines in agricultural tariffs. Although import penetration remains low, it doubled during the 1990s as South Africa opened to global markets (Jooste, Van Schalkwyk and Groenewald 2003). Import penetration is particularly high for winter cereals (wheat), cotton and tobacco. International trade is therefore becoming increasingly important for agriculture, and the sector is responsive to changing trade distortions.

Despite agriculture's small and declining share of the economy, it remains an important source of employment. In 2003 more than a million people worked in agriculture out of a total employment of 11.5 million (Casale, Muller and Posel 2004). Around 70 percent of agricultural workers are employed as laborers on large commercial farms, where they earn one-third of the national average wage. These 60,000 commercial farms occupy 87 percent of total agricultural land and produce 95 percent of all marketed output (Vink and Kirsten 2003). By contrast, the remaining 300,000 agricultural workers are smallholder farmers, who occupy 13 percent of agricultural land in the more remote regions of the country. These subsistence-oriented farmers earn less than five percent of the national average wage (Casale, Muller and Posel 2004). Thus, not only is there a growing rural-urban divide, but there is also a divide within agriculture. Smallholders derive much of their income in the form of subsistence production and thus are less likely to be affected by changes in price and trade distortions. By contrast, factors affecting commercial farming may have large impacts on both national employment and rural incomes.

Mining has historically been the cornerstone of the South African economy, primarily as a source of export earnings. However, the mining sector also has strong upstream linkages to metals processing, and together these sectors represent about ten percent of total GDP. However, these sectors are more capital-intensive and generate a smaller share of total employment. By contrast, construction, textiles and clothing are amongst South Africa's more labor-intensive sectors. Finally, food processing is another important manufacturing sector, generating 15 percent of total manufacturing GDP and employment. Dairy products,

grain milling and sugar refining are key processing subsectors. Non-food processing is dominated by the capital-intensive metals and chemicals sectors.

Most export taxes and subsidies were eliminated during the 1990s. The government stopped intervening in input and product markets, allowing farmers to respond more effectively to both climate variability and changing market opportunities (van Schalkwyk et al., 2003). Thus, the largest remaining price distortions are import tariffs. Average tariffs in South Africa are, however, relatively low at 5.3 percent. Tariffs on agricultural commodities are especially low, at between two and three percent, with the exception of a 14.6 percent wheat tariff. Upstream food processing enjoys far greater protection, with average tariffs of 16.8 percent. Especially high tariffs are applied to dairy products and refined sugar. Of the remaining manufacturing sectors, considerable protection is afforded to textiles, clothing and motor vehicles. These are considered 'sensitive sectors' and have received special dispensation under South Africa's various trade agreements. Thus, despite far-reaching reforms during the 1990s, import tariffs are not uniformly applied across sectors, and further rationalization is often subjected to pressure from trade unions, especially in the metals, textiles and clothing sectors. Indeed, tariff revenues account for less than six percent of total government income, and tariffs on agriculture and processed food generate less than 15 percent of these earnings. Removing trade distortions will therefore have direct implications for a few key sectors, but have little impact on overall government revenues.

Modeling approach

In our analysis we draw on the 'rest-of–world' (i.e., global minus South Africa) results for the global trade liberalization scenario from the World Bank's Linkage model (see van der Mensbrugghe 2005). This model provides estimated changes in world import prices, world export prices, and export quantities facing South Africa (see van der Mensbrugghe, Valenzuela and Anderson 2009). These world price and export quantity changes are imposed exogenously on the South African CGE model, where the additional impacts of domestic trade reforms are also modeled. The CGE estimates the impact of global and domestic reforms on domestic commodity prices and factor employment and returns. These results are

then passed down to a microsimulation model, which estimates poverty and inequality effects. This section describes the South African CGE and microsimulation models.

Computable general equilibrium model

The national CGE model contains 110 activities/commodities, including 17 agricultural and 12 food processing sectors.[2] The model identifies four factors of production: three types of labor (unskilled, semi-skilled and skilled) and the factor capital.[3] Agricultural land is not distinguished from other forms of capital.[4] Skilled labor and capital are assumed to be fully employed with flexible wages and returns. To reflect South Africa's high levels of unemployment, we assume that the supply of semi-skilled and unskilled labor is perfectly elastic at a fixed nominal wage.[5] Labor returns in the model are calibrated to capture sector wage differentials, such that agricultural wages are lower than those in most non-agricultural sectors. In addition, labour is fully mobile across sectors. Producers in the model maximize profits under constant returns to scale, with the choice between factors governed by a non-nested constant elasticity of substitution (CES) function. Factors are combined with fixed-share intermediates under a Leontief specification.

Substitution possibilities exist between production for domestic and foreign markets based on a constant elasticity of transformation (CET) function. Profit maximization drives producers to sell in those markets where they can achieve the highest returns. These returns are based on domestic and export prices (where the latter are determined by their world price times the exchange rate adjusted for any border taxes or subsidies). Similar substitution possibilities also exist between imported and domestic goods under a CES Armington specification. The final ratio of imports to domestic goods is determined by the cost-minimizing decision making of domestic demanders based on the relative prices of imports

[2] The International Food Policy Research Institute's static model is used for this study (Lofgren, Harris and Robinson 2002).
[3] Appendix Table A5 shows the factor intensities of various aggregate sectors, as well as the factor substitution elasticities used in the sectoral production functions.
[4] Agricultural land is not separated because arable land is underutilized and land rents are low at five percent of land values (Ortmann and Machethe 2003). Thus, we assume that agricultural production is less constrained by the availability of land, but rather by the availability of other forms of capital (e.g., machinery, irrigation and other infrastructure). Furthermore, commercial land rents, like other forms of capital, mainly accrue to high-income households, leaving the poverty effects of agricultural distortions unaffected by this assumption.
[5] South Africa's unemployment rate was 32 percent in 2003 under a strict definition and 43 percent if the non-searching unemployed are included in the workforce (Casale, Muller and Posel 2004). While nominal wages are fixed, they may vary in real terms due to changes in consumer prices.

and domestic goods (both of which include relevant taxes). Under the small-country assumption, South Africa faces perfectly elastic world demand and supply at fixed world prices. However, this small country assumption is dropped when modeling the impacts of global liberalization. In other words, world import prices are exogenous in the South African CGE model, while world export prices and quantities are determined using the approach outlined in Horridge (2004).

The model distinguishes between various institutions, including enterprises, the government, and a single representative household group. Households and enterprises receive income in payment for producers' use of their factors of production. Both institutions pay direct taxes to government (based on fixed tax rates), save (based on marginal propensities to save), and make transfers to the rest of the world. Enterprises pay their remaining income to households in the form of dividends. Households, unlike enterprises, use their income to consume commodities under a linear expenditure system (LES) of demand. The government receives income from imposing activity, sales and direct taxes and import tariffs, and then makes transfers to households, enterprises and the rest of the world. The government also purchases commodities in the form of government consumption expenditure, and the remaining income of government is (dis)saved. All savings from households, enterprises, government and the rest of the world (foreign savings) are collected in a savings pool from which investment is financed.

In order to balance the model's macroeconomic accounts, it is necessary to specify a set of 'closure' rules. A savings-driven closure is assumed in order to balance the savings-investment account. Under this closure, the marginal propensities to save of households and enterprises are fixed, while investment adjusts to changes in incomes to ensure that the level of investment and savings are equal. For the current account we assume that a flexible exchange rate adjusts in order to maintain a fixed level of foreign savings. Finally, for the government account, the fiscal deficit is fixed in absolute terms, with government revenues and expenditures balanced through uniform changes in direct tax rates on households and enterprises. Table 2 shows current direct tax rates for poor/non-poor and rural/urban households as observed in the microsimulation model. Tax rates are highest for urban households in the top income decile. Changes in tax rates based on the existing tax structure mainly affect higher-income households while poor households are largely unaffected since their income generally falls below the lowest income tax bracket. Accordingly, proportional

changes in income tax rates will influence income inequality, leaving the poverty effects of trade reforms largely unchanged.

The CGE model is calibrated to a 2002 social accounting matrix (SAM). Information on non-agricultural production was taken from the 2002 Supply-Use Tables (StatsSA 2004) and national accounts (SARB 2008). Agricultural production was disaggregated across crops and subsectors using the 2002 Census of Commercial Agriculture (StatsSA 2002). Information on labor employment and wages was drawn from the 2000 Income and Expenditure Survey (IES) (StatsSA 2001) and the 2004 (September) Labor Force Survey (LFS) (StatsSA 2005). Trade elasticities are taken from the Global Trade Analysis Project (Dimaranan 2006) and household income elasticities are those estimated in Case (2000). Initial price distortions, such as import tariff rates, are consistent with the global Linkage model, with agricultural distortions based on Valenzuela and Anderson (2008).

Microsimulation model

Predicted impacts from the national CGE model are passed down to a microsimulation model for South Africa. Under a top-down specification, changes in commodity prices, household tax rates, factor returns, and employment levels from the CGE model are imposed on the MS model, which then estimates behavioral responses at the household level for each of the 26,000 households in the 2000 IES and LFS.[6] There are two parts to the MS model. First, a selection model predicts the employment status of working-age individuals (that is, inactive, unemployed, subsistence agricultural worker, informal worker or formal worker). The probability of an individual having a particular status is derived from a linear utility function based on individuals' characteristics. Second, a regression model predicts formal and informal earnings. The regression and selection models are econometrically estimated for four demographic groups: single women, partnered women, single men and partnered men.

The structure of household income for poor, non-poor and rich households in urban and rural areas are shown in table 3. Since occupational choices are endogenous, these income shares are not assumed to be fixed (and can thus be affected by trade reforms). Individuals' labor earnings are added to other income sources and adjusted to reflect new tax rates in order to update households' disposable incomes in the survey. This is then deflated

[6] See Hérault (2006) for a detailed description of the microsimulation model.

by a household-specific consumer price index based on the household-specific budget shares, shown in table 4, and on changes in commodity prices from the CGE model. This re-estimated level of household expenditure is then compared to various poverty lines to determine changes in poverty.

The top-down approach used to link the MS model to the CGE model is described in detail in Hérault (2006). The approach ensures that changes in prices, direct tax rates, earnings from wages and salaries, returns from capital, as well as employment levels are transmitted from the CGE to the MS model. Thus, the MS model predicts how individuals' behavior and household incomes are affected by the economy wide impacts predicted by the national CGE model.

Model results

We ran four simulations to examine the effects of price distortions on agriculture, poverty and inequality. We begin by considering the effects of distortions in the rest of the world on the South African economy. The first simulation assesses the impact of removing all merchandise trade policy measures and domestic agricultural policies in other countries of the world, without any change to South Africa's own distortions. The second simulation considers only the removal of agricultural sector distortions in the rest of the world. The effects at South Africa's borders of those liberalizations are drawn from the World Bank's Linkage model. These include changes in the country's import and export prices, as well as changes in the demand for South African exports (table 5). The remaining two simulations examine the effect on South Africa of removing only its own price distortions, first for all tradable goods sectors and then only within agriculture. In both of these latter simulations there are no changes in the rest of the world.

Liberalization of all commodities by the rest of the world (ROW)

Full liberalization by the rest of the world results in a positive terms-of-trade shock for South Africa, with the weighted world price of exports rising and the price of imports falling. The

quantity of agricultural and food products demanded by the rest of the world expands for most items but contracts for horticultural goods which are the main source of agricultural exports (table 1). Demand also expands for other primary products, which is a key export sector since mining accounts for one-third of all export earnings. Demand contracts, however, for non-food manufactures (column 3 of table 3). On the import side, prices fall for non-food manufactures and for most farm products (column 1 of table 5). Overall, South Africa's terms-of-trade improves by 1.4 percent, which causes exports to rise faster than imports. This reduces the trade deficit and places pressure on the current account balance, which, by assumption, is fixed in foreign currency. This induces an appreciation of the real exchange rate by 0.8 percent, which further stimulates import demand while partially offsetting export competitiveness. The net effect is that the volume of exports rises by only 0.2 percent while that of imports rises by 2.3 percent. For primary agricultural goods alone, exports fall 13 percent and imports rise 5 percent (table 6).

The decline in agricultural export demand causes agricultural GDP to fall by 0.2 percent, mainly due to falling fruit production (table 7). Production of oilseeds also contracts, but they are a small share of the agricultural sector. Manufacturing GDP in total changes only slightly since increased production of processed foods is offset by falling production of other manufactured goods, such as textiles, clothing and machinery, which face rising import competition. Dairy and processed sugar production both expand substantially, contributing to food processing expansion and generating positive linkages to the dairy and raw sugar agricultural subsectors. It is, however, the large service sector that expands the most in absolute terms, causing national GDP to increase under full liberalization by the rest of the world. This is because declining production in the agricultural and non-food-processing manufacturing sectors reduces employment for capital and labor, causing them to migrate to the service sector (and to construction).

The reduction in output of farm and textile products reduces the demand for lower-skilled workers, while the expansion in other parts of the manufacturing sector and in services raises the demand for capital and skilled workers (table 8). Real wages for lower-skilled workers thus decline and skilled workers' wages and capital returns increase (table 9). However, with the nominal wage for unskilled and semi-skilled workers fixed by assumption, aggregate employment of both of those types of labor expands, by about one percent. This increase in the number of jobs for lower-skilled workers more than outweighs the decline in

their average real wages, leading to larger net increases in their factor incomes compared to either capital or skilled workers. The net result is that national economic welfare, as measured by the equivalent variation in income, rises by 1.0 percent (final row in table 9).

Falling prices for machinery and construction reduce the cost of investment, which rises as a result. Investment demand is further stimulated by an increase in private savings resulting from higher factor incomes (mainly capital returns). Falling import prices causes consumer prices to fall and real consumer spending to rise. Overall, the increase in real exports, consumption and investment spending, and the increase in employment for lower-skilled labor, causes a slight increase (0.3 percent) in national GDP, despite the large increase in imports (table 6).

The liberalization of all commodities by the rest of the world causes poverty to fall under all of the reported poverty lines (table 10). This is mainly due to the expansion of formal employment. As mentioned above, this expansion is biased towards lower-skilled workers. This is particularly beneficial to poor households because they derive almost all their market income from low-skilled labor (table 3). In addition, poorer households benefit more from lower consumer prices, especially for meat, sugar and ‘other foods’, which form a large share of their expenditures. Food and agricultural products represent more than half of poor households’ expenditures, whereas services and non-food processing manufacturing products make up more than half of rich households’ expenditures (table 4). The reduction in poverty tends to be lower in rural areas than in urban areas at the higher poverty lines. This is because rural households are more deeply rooted in poverty and because wages are significantly lower for rural workers, so that new jobs generate less income in rural than in urban areas.

The rise in average informal earnings is caused by the trickle-down effect of formal sector development on informal earnings. The migration of informal workers into lower-skilled formal jobs also raises the average skill level (and earnings) of the remaining informal workers. Conversely, the rise in lower paying lower-skilled formal employment places downward pressure on average formal earnings. Overall, however, the effects on inequality are negligible. The small reduction in income taxes and the higher returns to capital and skilled labor both contribute to a worsening of income inequality. However, offsetting this effect is the increase in lower-skilled employment and the drop in consumer prices. The net

effect therefore leaves national inequality virtually unchanged, as measured by the Gini coefficient (final row in table 10).

In summary, full global liberalization produces slight gains in GDP for South Africa, but hurts the primary agricultural sector. Yet food processing expands, which offsets some of the decline in competitiveness of the horticultural sector. Import competition encourages farmers to shift towards more labor-intensive production. The decrease in real wages for semi-skilled and unskilled labor leads to a significant increase in employment for lower-skilled workers. This is the main force driving poverty reduction under this scenario.

Liberalization of only agricultural commodities in ROW

Even when reform abroad is restricted to just agricultural liberalization, a positive terms-of-trade effect still results for South Africa. Its export prices rise by somewhat less than in the previous scenario (table 6). This is because export prices for most product groups except textiles and clothing rise rise by less than when all goods are liberalized (table 5). This is especially important for fruits, which are South Africa's main agricultural export. However, in contrast to the previous simulation, there is now a small overall increase in import prices (table 6). This is because industrial and service sector prices rise instead of fall, which is important since heavy manufactures, such as machinery and vehicles, make up almost two-thirds of total imports. The net result in this agriculture-only reform scenario is a 0.7 percent improvement in South Africa's terms-of-trade which is half of the 1.4 percent improvement when all merchandise trade is liberalized by the rest of the world. The real exchange rate appreciation also is slightly smaller, and the impact on real GDP at market prices is only 0.08 percent instead of 0.28 percent (table 6).

The impacts on sectoral output differ from the previous scenario too (table 7). Agricultural GDP decreases by less, even though vegetables and fruit production falls slightly more and wheat now declines. Livestock production also increases more than in the previous simulation. Industrial GDP now falls slightly, despite rising output in the food processing subsector. The drop in manufacturing production adds to the small fall in agricultural GDP, which again causes a migration of workers to the service sector. However, the impact is less pronounced than in the previous scenario, given the smaller size of the terms-of-trade shock. Investment demand is bolstered by the increase in private savings resulting from higher

national GDP and the shift to more capital-intensive sectors outside of food processing. Finally, while import prices rise in this simulation, the real appreciation is sufficient to offset this and the consumer price index still falls, albeit by less than under full merchandise trade reform. Falling prices cause an increase in household real incomes and aggregate consumer spending (table 6).

Household incomes also benefit from increased employment for lower-skilled workers and higher returns for skilled labor and capital. The changes from this more-limited reform are about two-thirds the size of those from full merchandise trade liberalization, and the increase in national economic welfare is about three-fifths as large (table 9). This is a significant result, given the relatively small size of the agricultural sector, both globally and in South Africa. The result reflects the large distortions in agricultural markets in the rest of the world.

The impacts on income inequality and household poverty are similar to the previous simulation and similarly small in magnitude, especially in rural areas (table 10). The fall in consumer prices plays a more important role in poverty alleviation than in the previous simulation, with poor households in particular benefiting from falling food prices.

In summary, removing the rest of the world's agricultural distortions would have a positive impact on South African GDP, national welfare, inequality and poverty. This impact is roughly two-thirds as large as those achieved under full merchandise trade reform, despite the fact that agriculture accounts for less than one-twelfth of both global and South African GDP and trade.

Unilateral liberalization of all commodity markets

Agricultural import tariffs are generally quite low in South Africa, with duty collection rates averaging five percent (table 1). Moreover, there are high tariffs on a relatively small range of manufactured goods, including a 15 percent tariff on wheat imports that dominates price distortions in South Africa. Import tariffs are particularly high on certain processed foods (dairy and processed sugar), textiles and clothing, and motor vehicles and related parts (e.g., tires and engines). By contrast, export taxes are low and uniform across commodities, with the exception of agriculture, which faces no export taxes. Output taxes and subsidies are

equally negligible, so it is the reduction in import tariffs that drives the results in the two unilateral liberalization simulations considered in this and the next sub-section.

Eliminating all of South Africa's border measures and domestic agricultural subsidies causes a large increase in import demand (table 6). This widens the trade deficit and induces a 1.9 percent depreciation of the real exchange rate, which offsets some of the rise in real imports. Export competitiveness is enhanced by the depreciation, thus encouraging producers to increase production for foreign markets. Total exports rise by 7.5 percent, while farm and manufactured exports rise by more than 10.0 percent.

The exchange rate depreciation is sufficient to offset the decline in tariffs for some import-competing industries, causing their GDP to expand (table 7). By contrast, for heavily protected commodities such as wheat, dairy, textiles and clothing imports increase and GDP falls. Thus, in line with the initial distribution of tariffs, agricultural imports increase by less than manufactured imports. Export expansion is more evenly distributed across both agricultural and nonagricultural sectors. Within agriculture, it is cotton, tobacco and fruits that drive the increase in exports.

Unilateral liberalization has a larger positive impact on real consumer spending than liberalization by the rest of the world. This is because falling import prices reduce the consumer price index, thereby raising real household incomes. Rising incomes also increases the level of savings and investment in the economy. Investment is further supported by the expansion of the metals and machinery sectors and the reduction in import prices for capital goods, both of which contribute to a reduction in the cost of investment. Ultimately, rising consumption, exports and investment lead to larger increases in total GDP from unilateral reform, of 1.0 percent compared to less than 0.3 percent from rest-of-world reform (table 6).

Increased production also creates additional jobs for lower-skilled workers, and again more so than under only rest-of-world reform (table 9). Although most of these are lower-paying agricultural jobs, there is also an increase in higher-paying jobs in the manufacturing sector. New jobs are created in the metals and machinery sectors, both of which pay higher wages than the textiles and clothing sectors, where jobs are lost. Unskilled workers also migrate to service sector jobs, not all of which are in the lower-paying trade sector. Overall, there is a net migration into higher-paying sectors, causing average real wages and total employment to rise for unskilled workers. There is also increased demand for skilled workers, although their shift into higher-paying sectors is less pronounced. For instance, most

skilled workers are already employed in the service sector, where wages are typically highest. So it is the overall increase in demand rather than intersectoral shifts that drives the increase in wages for these workers. Finally, semi-skilled workers are more intensively employed in the textile subsectors and so these workers face the largest declines in employment once protection for these sectors is removed.

Larger increases in factor incomes cause aggregate household welfare to improve by more in this simulation than in the previous two scenarios. Poverty reduction is also larger (table 10). The increase in unskilled and semi-skilled real wages, combined with the expansion of employment for these workers, is the main force driving poverty alleviation. Indeed, low-income households are the most dependent on low-skilled labor. The slight decline in national inequality is due to the combination of these labor market changes and the substantial increase in income taxes needed to replace lost tariff revenues. In this scenario, aggregate household income taxes rise by more than ten percent (not percentage points).

In summary, unilaterally removing price distortions in South Africa would cause national GDP to expand and would boost agricultural GDP more than twice as much as industry or services. This suggests that current domestic distortions are biased against the agricultural sector. However, much of the benefits to agriculture accrue to specific export-oriented crops, such as cotton, tobacco and fruits, while other farm subsectors would be adversely affected. Manufacturing employment would also decline, especially in the 'sensitive' textiles and clothing sectors. This is, however, more than offset by new jobs in the heavier industrial and service sectors. Thus, aggregate household welfare improves, national poverty declines, and, there is a small decline in inequality.

Unilateral liberalization of only agricultural commodities

Removing price distortions only in South Africa's agricultural and processed food sector produces macroeconomic results similar to but much smaller than those in the previous simulation. Raising import demand and export supply induces a small depreciation of the real exchange rate, which enhances the competitiveness in foreign markets of domestic producers of exports. Falling import prices also lower consumer prices, benefiting private consumption and increasing national GDP but only one-ninth as much as in the previous scenario (table 6). However, while these effects are similar to those under full domestic liberalization, their size

is much smaller. This is not surprising since South Africa's agricultural and food processing sectors are only a small part of national GDP and are not as protected as the manufacturing sector.

Under the unilateral liberalization of all goods, agriculture benefited from the large depreciation of the exchange rate driven by declining nonagricultural tariffs and rising import penetration for nonagricultural commodities. However, in the current agriculture-only scenario, the depreciation is smaller and is driven entirely by falling agricultural supports and food processing tariffs. Thus, only agriculture faces an increase in import competition and it is the nonagricultural sectors that benefit from the resulting depreciation. Accordingly, there is a decline in agricultural GDP in this scenario. This is driven by declining wheat production, which has high initial tariffs. Fruit, cotton and tobacco, which had increased production substantially under the previous scenario, now expand more modestly because of the smaller depreciation, while livestock declines as producers shift production towards more export-oriented activities and because of increased imports of processed meats. Food processing suffers the largest drop in production under agriculture-only liberalization. For instance, the dried fruit and tobacco sectors now contract, contributing further to agriculture's decline. The industrial and service sectors expand production, mainly due to increased export demand following the depreciation. The largest increases are in the metals, machinery and motor vehicles sectors. The slowdown in investment, however, causes a slight decline in construction, and the modest expansion of services is driven by trade, which benefits from South Africa's increased openness. Overall, there is a much smaller increase in national GDP under this scenario because of the smaller size of the shock and the decline in investment demand (table 7).

Increased import competition for agricultural commodities and only modest additional demand from nonagricultural expansion causes agricultural prices to fall by more than nonagricultural prices. This increases relative returns in non-agriculture, causing workers to migrate out of agriculture. The real returns to lower-skilled agricultural labor increase slightly causing the decline in unskilled employment due to the contraction of agricultural production. Increased nonagricultural production creates additional jobs for semi-skilled workers, but these jobs pay similar wages to agriculture, leaving average wages largely unchanged and raising national economic welfare only slightly (table 9).

This scenario thus has the smallest impacts on poverty and inequality, even though they are in the same direction as in the previous simulation (except for unskilled labor's real wage, which declines very slightly). Unlike in previous scenarios, poverty alleviation under unilateral agricultural liberalization is driven mainly by consumer price changes. Although the reduction in the consumer price index is smaller than in the previous scenario, the changes are more beneficial for the poor as there are substantial declines in prices of food items that are a large share of poor households' expenditures. Hence poverty is alleviated and income inequality declines slightly even in this scenario (table 10).

In summary, while unilaterally removing agricultural and food processing distortions has a negative impact on these sectors' production, it lowers food prices and the net effect is reduced poverty and inequality in South Africa.

Conclusions

Model results indicate that South Africa's agricultural sector currently benefits from global price distortions, especially local fruit producers. Most of the remaining agricultural subsectors are, however, adversely affected by global distortions. This is especially true for traditional exports crops, such as tobacco, sugar and cotton. Global distortions are also biased against the livestock and dairy sectors, which are important components of South Africa's food processing sector. Thus, despite a decline in agricultural GDP, removing global distortions would favor the creation of new formal sector jobs for lower-skilled agricultural and food processing workers, including some who are currently unemployed. There would need to be a period of structural adjustment in the country, with manufacturing workers migrating to the service sector. In the long-run these workers would benefit from higher-paying jobs. Removing global price distortions thus improves national economic welfare, reduces poverty, and lowers income inequality, albeit only slightly.

South Africa's own policies are also biased against agriculture. Tariff protection is higher for nonagricultural commodities than for farm products, such that their removal raises overall agricultural GDP and employment. There is some contraction of farm industries and textiles and clothing. Job losses in these sectors are, however, outweighed by job creation elsewhere in the agricultural and food processing sector, such that overall employment rises

when domestic distortions are removed. Household welfare would also improve, especially amongst poorer rural households.

Our findings suggest that own-country policies are more damaging to welfare, poverty and inequality in South Africa than distortionary policies in the rest of the world. Further rationalization of the country's system of protection, so that tariffs are more uniformly applied across sectors, would reduce some of the existing bias against agriculture and the poor. Price distortions may thus explain some of the poor performance of the agricultural sector and rural development over the last decade. Removing these distortions entirely would increase the benefits from South Africa's broader reform process. This reform would involve less adjustment to the South African economy if domestic reforms are accompanied by reform abroad, such as is hoped for under the World Trade Organization's Doha Development Agenda.

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Table 1: Economic structure and price distortions in South Africa, 2002

	GDP share (%)	Share (%)	Imports Intensity (%)[a]	Tariff (%)	Share (%)	Exports Intensity (%)[b]	Tax rate (%)	Elas-ticity
Total	100.00	100.0	13.3	5.3	100.0	13.2	0.8	3.10
Agriculture	4.33	1.8	8.1	4.8	4.3	17.3	0.1	2.03
Summer cereals	0.54	0.2	5.0	1.0	0.3	7.9	0.0	1.30
Winter cereals	0.21	0.4	23.3	14.6	0.0	2.4	0.0	4.45
Oilseeds & legumes	0.11	0.1	14.0	4.1	0.0	4.3	0.0	2.45
Fodder crops	0.03	0.0	2.4	2.5	0.1	28.2	0.0	3.25
Sugarcane	0.26	0.0	0.0	0.0	0.0	0.0	0.0	2.70
Cotton & tobacco	0.06	0.4	91.8	3.9	0.3	95.0	0.0	0.50
Vegetables	0.27	0.0	0.3	2.8	0.1	7.0	0.0	1.85
Fruits	0.97	0.1	6.7	2.8	2.8	58.9	0.0	1.85
Livestock	1.58	0.3	2.8	0.5	0.4	4.5	0.0	1.53
Fishing	0.01	0.1	95.8	1.7	0.1	97.3	2.0	1.25
Forestry	0.29	0.2	15.1	1.7	0.2	10.7	2.0	2.50
Industry	33.10	86.1	22.1	6.2	80.9	22.5	0.9	3.31
Mining	8.36	11.0	43.1	0.1	31.4	67.7	1.8	0.96
Manufacturing	19.97	75.1	23.3	7.2	49.4	18.4	0.4	3.71
Meat	0.07	0.2	2.0	5.9	0.1	0.9	0.0	3.85
Fish	0.11	0.4	31.5	19.7	0.1	15.7	0.0	4.40
Fruit	0.16	0.2	12.6	14.6	1.1	44.8	0.0	3.30
Oils	0.08	1.0	39.9	24.2	0.2	12.9	0.0	3.30
Dairy	0.22	0.2	5.5	66.9	0.1	5.0	0.0	3.65
Grain milling	0.27	0.9	15.3	4.8	0.3	6.1	0.0	2.60
Animal feeds	0.08	0.2	7.5	19.9	0.0	1.3	0.0	2.00
Bakeries	0.25	0.1	2.6	47.0	0.0	1.3	0.0	2.00
Sugar	0.20	0.0	0.8	48.2	0.2	12.9	0.0	2.70
Confectionery	0.14	0.0	3.6	18.8	0.1	5.3	0.0	2.00
Other foods	0.31	0.5	16.1	22.0	0.4	13.6	0.0	2.00
Bev. & tobacco	1.14	0.8	6.0	6.5	1.6	15.7	0.0	1.15
Textiles	0.36	1.8	21.2	22.7	0.4	6.9	2.0	3.74
Clothing & footwear	0.57	2.4	17.3	43.8	0.5	6.4	1.9	3.92
Wood & paper	1.91	2.4	10.1	7.7	1.3	6.0	1.9	4.05
Chemicals	4.75	14.5	18.9	4.9	11.3	16.4	0.3	3.21
Non-metals	0.69	1.4	18.3	11.6	0.8	11.4	0.3	2.90
Metals	3.41	7.1	17.7	4.1	13.3	28.7	0.4	3.76
Machinery	1.59	22.6	52.8	2.9	6.0	27.4	0.3	4.22
Transport equipment	1.92	16.7	37.4	9.7	8.7	24.6	0.3	3.88
Other manufacturing	1.75	1.8	11.9	5.5	2.9	20.9	0.3	3.75
Other industry	4.77	0.1	0.2	0.0	0.1	0.1	0.3	2.28
Private services	47.58	12.1	4.3	0.0	14.9	4.9	0.0	1.90
Public services	14.99	0.0	0.0	0.0	0.0	0.0	0.0	1.90

[a] Import intensity is the share of imports in total domestic demand.

[b] Export intensity is the share of exports in total domestic output.

[c] Elasticity is the trade elasticity applied to both import demand and export supply functions.

Source: South Africa 2002 social accounting matrix (SAM).

Table 2: Household direct tax rates,[a] South Africa, 2000

	Taxes as a share of gross household income (%)		
	Rural areas	Urban areas	Both areas
Poor households ($US2/day poverty line)	0.0	0.0	0.0
Non-poor households	1.6	4.2	3.2
Rich households (top income decile)	11.3	18.1	17.2

[a] Direct taxes only concern formal labor income.

Source: South Africa microsimulation model based on StatsSA (2001) and StatsSA (2005).

Table 3: Household income shares, South Africa, 2000

	Rural			Urban		
	Poor ($2/day)	Non-poor	Rich (top income decile)	Poor ($2/day)	Non-poor	Rich (top income decile)
Skilled labor	0.3	1.2	9.8	0.2	5.6	35.5
Semi-skilled labor	3.1	9.9	26.6	5.7	26.4	31.4
Unskilled labor	20.5	35.4	38.8	32.8	40.7	11.9
Unspecified labor	3.4	1.9	1.3	3.9	2.4	2.2
Home production	4.4	3.0	0.9	0.4	0.1	0.1
Capital income	4.3	6.9	12.3	5.0	6.7	14.4
Government transfers	34.5	23.2	5.4	33.1	11.1	2.6
Inter-household transfers	29.5	18.5	4.9	19.0	7.0	2.0
Total	100	100	100	100	100	100

Source: Authors' South African microsimulation model based on StatsSA (2001) and StatsSA (2005).

Table 4: Household expenditure shares, South Africa, 2000

	Share of total household expenditures (%)					
	Rural			Urban		
	Poor ($US2/day)	Non-poor	Rich (top income decile)	Poor ($US2/day)	Non-poor	Rich (top income decile)
Total	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	16.3	12.9	6.7	10.1	6.1	2.4
Food processing	44.4	39.7	26.7	41.1	32.5	15.4
Meat products	8.8	9.6	7.2	10.0	8.9	4.3
Fish products	1.4	1.5	0.9	1.3	1.1	0.7
Fruit & vegetables	0.8	0.9	0.8	0.8	1.1	0.9
Oils & fats products	2.3	1.7	1.0	2.0	1.2	0.4
Dairy products	3.1	2.9	2.0	3.3	2.9	1.7
Grain mill products	9.4	6.2	2.9	6.0	3.3	1.0
Animal feeds	0.0	0.0	0.0	0.0	0.1	0.2
Bakery products	5.9	5.7	3.3	6.7	4.6	1.3
Sugar products	5.9	3.4	1.4	3.6	1.5	0.4
Confectionary products	0.1	0.1	0.2	0.1	0.2	0.3
Other processed foods	4.3	3.6	2.5	4.2	3.2	1.6
Beverages & tobacco	2.5	4.1	4.5	3.1	4.1	2.6
Textiles and clothing	7.3	8.1	8.1	6.0	7.5	4.4
Other manufacturing	17.4	18.1	22.2	18.0	17.3	22.4
Other industry	2.7	3.5	4.5	8.9	7.2	5.9
Services	11.9	17.6	31.8	16.0	29.4	49.5

Source: Authors' South African microsimulation model based on StatsSA (2001) and StatsSA (2005).

Table 5: Exogenous demand and border price shocks for South Africa from liberalization in the rest of the world

(percent change from baseline)

	Rest-of-world reform (all commodities) Scenario 1			Rest-of-world reform (agriculture only) Scenario 2		
	Import	Export		Import	Export	
	price	Price	Quantity	Price	Price	Quantity
Primary sector						
Rice	0.00	0.00	0.0	0.00	0.00	0.0
Wheat	0.73	0.46	21.6	0.72	0.35	-15.9
Other grains	-5.49	0.46	48.6	-5.45	0.35	59.3
Oil seeds	-2.28	0.47	-25.5	-2.02	0.34	-13.8
Sugarcane	0.00	0.00	0.0	0.00	0.00	0.0
Cotton	-1.21	0.44	53.2	-0.11	0.33	52.9
Vegetables & fruit	-0.90	0.47	-38.6	-0.42	0.34	-33.7
Other crops	1.87	0.49	7.0	2.81	0.35	10.9
Cattle & sheep	-2.21	0.50	5.7	-0.44	0.33	17.1
Other livestock	0.74	0.57	-10.5	1.37	0.34	-1.2
Other primary products	0.19	0.55	0.3	0.71	0.41	1.0
Secondary sector						
Beef and sheep meat	5.06	0.51	443.5	5.82	0.38	489.9
Other meat products	3.71	0.57	-11.4	4.77	0.42	-1.9
Oils & fats	-1.80	0.33	-1.1	-2.50	0.14	0.7
Dairy products	16.58	0.57	405.9	17.47	0.46	447.6
Grain milling	5.03	0.59	-47.2	4.57	0.47	-41.5
Sugar refining	1.15	0.49	147.2	2.09	0.39	173.5
Other food & beverages	4.97	0.53	58.3	-0.41	0.36	-10.4
Textile & clothing	-0.94	0.32	-21.2	0.50	0.43	-0.1
Other manufacturing	-0.34	0.45	-2.3	0.20	0.41	-1.2
Services	-0.14	0.55	-2.7	0.27	0.43	-0.6

Source: Results from the World Bank's LINKAGE model (see van der Mensbrugghe, Valenzuela and Anderson 2009).

Table 6: Macroeconomic simulation results of prospective liberalizations abroad and nationally, South Africa[a]

	Base share (% of GDP)	Change from base (%)			
		Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
Real GDP at market prices	100.0	0.3	0.1	1.0	0.1
Consumption	61.9	1.0	0.6	1.2	0.3
Investment	16.1	1.6	1.0	1.6	-0.3
Government	18.4	0.0	0.0	0.0	0.0
Consumer price index	-	-0.4	-0.1	-1.0	-0.3
Real exchange rate	-	-0.8	-0.6	1.9	0.3
World export prices	-	1.2	1.0	0.0	0.0
World import prices	-	-0.2	0.2	0.0	0.0
Terms-of-trade	-	1.4	0.7	0.0	0.0
Volume of exports	32.6	0.2	0.0	7.5	1.0
Agriculture	4.3	-13.2	-11.0	10.7	1.8
Mining	31.4	0.3	0.2	-0.4	-0.1
Manufacturing	49.4	1.7	1.1	12.3	1.5
Other industry	0.1	-0.5	-0.7	5.2	0.2
Services	14.9	-1.2	-1.2	5.5	1.0
Volume of imports	-28.9	2.3	1.6	8.4	1.1
Agriculture	1.8	5.0	2.4	6.6	8.9
Mining	11.0	-1.4	-1.1	3.3	0.6
Manufacturing	75.1	2.7	1.7	11.5	1.3
Other industry	0.1	3.7	3.4	-1.3	-0.5
Services	12.1	3.4	2.9	-2.9	-0.6

[a] The domestic price index is the numéraire in the model.

Source: Authors' simulation results using their South African CGE model.

Table 7: Effects of prospective liberalizations abroad and nationally on GDP by sector at factor cost, South Africa

	Base share (% of GDP)	Change from base (%)			
		Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
Total	100.0	0.3	0.2	0.7	0.1
Agriculture	4.3	-0.2	-0.1	1.3	-0.9
Summer cereals	0.5	3.3	3.7	0.1	-0.8
Winter cereals	0.2	2.0	-0.6	-12.3	-14.3
Oilseeds & legumes	0.1	-1.4	-1.8	-4.9	-6.0
Fodder crops	0.0	10.4	12.9	-0.4	-2.8
Sugarcane	0.3	8.6	8.6	-0.2	-0.6
Cotton & tobacco	0.1	40.5	40.2	25.2	6.1
Vegetables	0.3	-1.0	-1.8	-0.8	-1.3
Fruits	1.0	-14.5	-15.1	8.1	0.9
Livestock	1.6	4.2	5.3	-0.8	-0.6
Fishing	0.0	0.0	0.0	0.0	0.0
Forestry	0.3	-1.0	-0.8	2.3	1.2
Industry	33.1	0.1	-0.1	0.5	0.1
Mining	8.4	0.0	0.0	0.0	0.0
Manufacturing	20.0	0.0	-0.2	0.7	0.2
Meat	0.1	6.7	7.9	-0.2	-0.1
Fish	0.1	0.9	2.6	-13.9	-16.2
Fruit	0.2	-0.8	-0.8	9.2	-0.5
Oils	0.1	-2.2	-3.2	-17.8	-21.1
Dairy	0.2	35.0	41.1	-7.7	-9.1
Grain milling	0.3	0.7	0.4	0.4	-1.0
Animal feeds	0.1	5.0	4.7	-2.5	-2.7
Bakeries	0.3	1.3	0.3	-0.8	-1.0
Sugar refining	0.2	19.7	22.1	0.6	-0.7
Confectionery	0.1	3.8	0.7	-0.1	-0.5
Other foods	0.3	8.9	-1.0	-2.2	-3.6
Bev. & tobacco	1.1	8.0	-1.6	1.2	0.3
Textiles	0.4	-2.8	-0.5	-13.4	0.6
Clothing & footwear	0.6	-1.3	0.0	-13.4	0.4
Wood & paper	1.9	-0.1	-0.2	0.2	0.4
Chemicals	4.8	-1.2	-0.8	-1.4	0.5
Non-metals	0.7	-0.2	-0.1	-2.5	0.1
Metals	3.4	-2.3	-1.7	3.3	0.9
Machinery	1.6	-2.1	-1.5	4.6	0.8
Transport equipment	1.9	-2.1	-1.5	7.3	1.1
Other manufacturing	1.8	-0.9	-0.7	2.4	0.6
Other industry	4.8	0.7	0.5	0.8	0.0
Private services	47.6	0.6	0.4	1.0	0.2
Public services	15.0	0.0	0.0	0.0	0.0

Source: Authors' simulation results using their South African CGE model.

Table 8: Factor intensity structure in South Africa, 2002

	Share of factor income in total value-added (%)					Elas-ticity[a]
	Skilled labor	Semi-skilled labor	Unskilled labor	Capital	All factors	
Total	11.9	21.7	16.5	50.0	100.0	1.44
Agriculture	3.3	1.2	19.4	76.1	100.0	1.50
Summer cereals	2.7	1.0	16.3	80.0	100.0	1.50
Winter cereals	3.1	1.2	18.7	77.0	100.0	1.50
Oilseeds & legumes	2.9	1.0	16.8	79.3	100.0	1.50
Fodder crops	3.0	1.1	18.5	77.4	100.0	1.50
Sugarcane	3.4	1.3	20.0	75.4	100.0	1.50
Cotton & tobacco	4.6	1.7	26.7	67.0	100.0	1.50
Vegetables	4.0	1.5	23.7	70.8	100.0	1.50
Fruits	3.9	1.5	23.5	71.1	100.0	1.50
Livestock	2.9	1.1	17.1	78.9	100.0	1.50
Fishing	3.7	1.5	22.4	72.4	100.0	1.50
Forestry	3.2	1.2	19.2	76.4	100.0	1.50
Industry	7.8	9.4	27.6	55.3	100.0	1.31
Mining	4.1	2.9	31.5	61.5	100.0	0.75
Manufacturing	9.1	12.4	25.2	53.2	100.0	1.50
Meat	1.2	2.5	4.2	92.2	100.0	1.50
Fish	7.1	15.1	25.8	51.9	100.0	1.50
Fruit	7.9	16.9	28.7	46.5	100.0	1.50
Oils	4.8	10.5	17.7	67.0	100.0	1.50
Dairy	8.1	17.2	29.3	45.4	100.0	1.50
Grain milling	3.9	8.4	14.2	73.5	100.0	1.50
Animal feeds	5.4	11.4	19.4	63.8	100.0	1.50
Bakeries	10.5	22.5	38.2	28.8	100.0	1.50
Sugar	6.5	13.8	23.6	56.1	100.0	1.50
Confectionery	10.2	21.8	37.0	31.1	100.0	1.50
Other foods	7.4	15.9	27.0	49.7	100.0	1.50
Bev. & tobacco	0.0	12.3	16.0	71.7	100.0	1.50
Textiles	1.8	6.0	54.2	38.0	100.0	1.50
Clothing & footwear	4.6	4.7	59.4	31.3	100.0	1.50
Wood & paper	3.2	3.3	42.1	51.3	100.0	1.50
Chemicals	20.4	7.7	12.7	59.2	100.0	1.50
Non-metals	1.4	8.2	24.6	65.8	100.0	1.50
Metals	2.2	17.0	23.7	57.1	100.0	1.50
Machinery	11.3	20.6	32.6	35.5	100.0	1.50
Transport equipment	4.2	17.2	36.2	42.4	100.0	1.50
Other manufacturing	9.2	6.3	12.3	72.2	100.0	1.50
Other industry	8.7	7.8	30.4	53.1	100.0	1.50
Private services	10.2	23.1	11.0	55.7	100.0	1.50
Public services	28.5	50.5	8.7	12.3	100.0	1.50

[a] Elasticity is the substitution elasticity between factors.

Source: South Africa 2002 social accounting matrix (SAM) based on StatsSA (2004).

Table 9: Effects of prospective liberalizations abroad and nationally on factor rewards, employment and welfare, South Africa

	Base value	Change from base (%)			
		Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
Average real factor returns (R1000/year)					
Skilled labor	127	0.4	0.3	1.2	0.1
Semi-skilled labor	78	-0.2	-0.2	0.1	0.0
Unskilled	49	-0.5	-0.2	1.6	0.3
Capital	-	0.6	0.4	2.3	0.2
Employment (1000s)					
Skilled labor	969	0.0	0.0	0.0	0.0
Semi-skilled labor	2910	1.2	0.7	2.0	0.2
Unskilled	3519	1.0	0.6	1.6	0.0
Capital	-	0.0	0.0	0.0	0.0
National economic welfare (equivalent variation in income)	-	1.0	0.6	1.2	0.2

Source: Authors' simulation results using their South African CGE model.

Table 10: Effects of prospective liberalizations abroad and nationally on sectoral employment, income inequality and poverty, South Africa

	Base value	Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
		Change from base (%)			
Real factor returns (R/year) [a]					
Informal sector workers	12,828	2.40	1.31	6.67	0.93
Formal sector workers	50,488	-0.20	-0.23	0.83	0.41
Employment ('000s)					
Subsistence agriculture	736	-0.10	-0.07	-0.16	0.01
Informal sector workers	3,357	-0.25	-0.18	-0.15	0.10
Formal sector workers	7,307	0.94	0.58	1.54	0.06
Unemployment ('000s)	3,806	-0.66	-0.40	-1.17	-0.07
Inactive ('000s) [b]	28,032	-0.12	-0.07	-0.22	-0.02
Real per capita income (R/year) [c]	10,874	0.91	0.61	1.13	0.42
Poverty headcount ratios (%)		Percentage point change from base (%)			
$1/day poverty line (R87/m)	9.8	-0.28	-0.27	-0.78	-0.21
Rural	16.7	-0.35	-0.34	-1.09	-0.33
Urban	4.0	-0.22	-0.21	-0.51	-0.10
$2/day poverty line (R177/m)	29.2	-0.34	-0.26	-1.12	-0.26
Rural	46.4	-0.28	-0.24	-1.32	-0.32
Urban	14.8	-0.39	-0.29	-0.96	-0.21
Lower poverty line (R322/m)	50.1	-0.39	-0.23	-1.05	-0.25
Rural	71.5	-0.18	-0.12	-0.72	-0.22
Urban	32.2	-0.56	-0.32	-1.33	-0.28
Upper poverty line (R593/m)	67.5	-0.25	-0.16	-0.67	-0.23
Rural	86.3	-0.09	-0.08	-0.46	-0.15
Urban	51.8	-0.39	-0.23	-0.86	-0.30
Gini coefficient	0.67	-0.001	-0.001	-0.005	-0.001
Rural	0.63	-0.001	-0.001	-0.004	-0.001
Urban	0.62	-0.001	-0.001	-0.006	-0.001

[a] Average real per capita earnings

[b] Includes 652,000 "unspecified" workers

[c] Average real disposable income per capita

Source: Authors' simulation results using their South African microsimulation model.

Appendix Table A1: Changes in the real value of exports, South Africa

	Base share (%)	Change from base (%)			
		Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
Total	100.00	0.23	0.01	7.47	0.95
Agriculture	4.26	-13.15	-10.95	10.74	1.79
Summer cereals	0.27	24.82	30.03	1.86	-0.50
Winter cereals	0.03	10.00	-10.36	-5.45	-12.12
Oilseeds & legumes	0.03	-14.62	-8.95	-1.69	-5.36
Fodder crops	0.06	6.80	10.13	4.40	-1.96
Sugarcane	0.00	0.00	0.00	0.00	0.00
Cotton & tobacco	0.31	41.74	41.45	26.21	6.38
Vegetables	0.11	-21.34	-19.11	1.81	-0.81
Fruits	2.80	-25.15	-23.10	11.99	1.58
Livestock	0.42	-5.81	-0.46	2.53	1.65
Fishing	0.06	-0.01	-0.05	0.33	0.38
Forestry	0.16	-1.66	-1.04	12.88	8.73
Industry	80.88	1.15	0.77	7.65	0.89
Mining	31.43	0.29	0.23	-0.35	-0.11
Manufacturing	49.39	1.66	1.09	12.34	1.48
Meat	0.07	433.36	503.60	10.05	3.23
Fish	0.11	-7.93	-2.23	-5.09	-12.77
Fruit	1.13	-2.60	-1.91	20.75	3.10
Oils	0.23	-2.84	-2.47	-5.09	-13.44
Dairy	0.14	446.27	522.81	2.92	-5.95
Grain milling	0.26	-24.94	-22.00	6.47	1.46
Animal feeds	0.03	32.79	-3.78	4.05	1.30
Bakeries	0.03	32.43	-6.56	4.35	0.90
Sugar refining	0.24	109.71	132.83	6.03	0.40
Confectionery	0.06	32.13	-5.65	4.64	1.26
Other foods	0.38	34.84	-6.78	4.35	0.24
Bev. & tobacco	1.55	33.55	-7.62	4.40	1.22
Textiles	0.42	-13.93	-1.73	8.22	2.30
Clothing & footwear	0.46	-15.23	-1.62	15.44	3.26
Wood & paper	1.31	-2.69	-2.17	12.28	1.89
Chemicals	11.30	-2.84	-2.19	5.17	1.41
Non-metals	0.78	-2.30	-1.80	2.21	0.72
Metals	13.26	-3.23	-2.63	7.91	1.45
Machinery	5.99	-2.33	-1.90	14.34	1.29
Transport equipment	8.72	-2.72	-2.25	27.85	1.82
Other manufacturing	2.92	-3.65	-2.94	18.89	2.57
Other industry	0.06	-0.52	-0.73	5.23	0.23
Private services	14.86	-1.15	-1.15	5.45	1.02
Public services	0.00	0.00	0.00	0.00	0.00

Source: Authors' simulation results using their South African CGE model.

Appendix Table A2: Changes in the real value of imports, South Africa

	Base share (%)	Change from base (%)			
		Rest-of-world reform		Unilateral reform	
		All goods	Agric. only	All goods	Agric. only
Total	100.00	2.34	1.56	8.43	1.07
Agriculture	1.81	4.98	2.40	6.61	8.85
Summer cereals	0.16	8.28	7.39	-0.42	0.09
Winter cereals	0.39	4.78	2.44	43.58	47.01
Oilseeds & legumes	0.11	8.72	6.81	1.21	2.47
Fodder crops	0.00	12.07	10.20	-0.50	3.45
Sugarcane	0.00	0.00	0.00	0.00	0.00
Cotton & tobacco	0.44	4.67	0.48	-2.51	0.88
Vegetables	0.00	6.22	3.84	1.34	3.04
Fruits	0.14	5.14	-0.69	1.29	3.08
Livestock	0.26	4.98	2.85	-2.72	-0.46
Fishing	0.06	1.89	5.43	-28.90	-33.66
Forestry	0.24	2.45	0.83	-0.11	1.91
Industry	86.13	2.12	1.32	10.31	1.17
Mining	10.96	-1.42	-1.10	3.28	0.58
Manufacturing	75.08	2.71	1.73	11.51	1.27
Meat	0.21	-11.97	-14.67	11.80	16.17
Fish	0.43	-4.42	-7.50	46.04	49.50
Fruit	0.24	6.79	3.48	25.36	33.85
Oils	1.04	7.15	7.54	35.66	38.55
Dairy	0.23	-38.17	-40.97	221.24	229.82
Grain milling	0.85	-5.48	-5.69	6.01	7.50
Animal feeds	0.17	-3.03	7.15	28.46	30.76
Bakeries	0.08	-5.18	3.03	76.35	79.40
Sugar refining	0.02	-4.28	-10.12	110.26	113.74
Confectionery	0.04	-6.29	3.72	30.62	33.53
Other foods	0.49	-5.39	3.90	30.04	31.77
Bev. & tobacco	0.75	-3.16	2.33	4.19	5.27
Textiles	1.84	4.83	1.48	41.04	-0.71
Clothing & footwear	2.37	5.89	1.81	98.01	-0.78
Wood & paper	2.38	4.26	2.51	13.39	-0.73
Chemicals	14.48	3.01	1.97	7.34	-0.64
Non-metals	1.35	3.87	2.57	21.18	-0.48
Metals	7.06	2.71	1.72	8.34	-0.14
Machinery	22.57	2.72	1.77	2.84	-0.37
Transport equipment	16.73	2.55	1.64	13.64	-0.29
Other manufacturing	1.77	5.85	3.74	7.03	-0.87
Other industry	0.09	3.74	3.36	-1.33	-0.49
Private services	12.06	3.38	2.94	-2.88	-0.61
Public services	0.00	0.00	0.00	0.00	0.00

Source: Authors' simulation results using their South African CGE model.