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Following independence in 1961 (as Tanganyika, which united with Zanzibar to form Tanzania in 1964), Tanzania experienced a relatively brief period when the share of agriculture in GDP declined as resources were shifted into other, potentially higher value-added, sectors. Between the early 1960s and the early 1970s, agriculture's GDP share fell from about 60 percent to just below 40 percent of GDP. It then grew slowly to just over 40 percent of GDP by the late 1970s and rose steadily back up to about 60 percent of GDP by the late 1980s and early 1990s (World Bank 1994, p. 4). In this sense Tanzania has yet to achieve or complete the traditional 'structural transformation'. Balanced growth is achieved if agriculture becomes increasingly commercialized while the manufacturing sector grows. Initially manufacturing may be based on agriculture, through processing and agri-business, but ultimately manufacturing and the economy will become diversified (Thirlwall 1986). This has not happened in Tanzania, and the economy remains essentially agriculture-based.

Given the major importance of agriculture, which is the dominant sector, this chapter provides an analysis of the combined effect of various government policies (in particular taxes and exchange rates) and features of the agricultural sector (notably inefficiencies in the input supply and product marketing chains) on incentives to production in agriculture. The next two sections provide an overview of agricultural performance and relevant policies since independence. Then the methodology applied to measure distortions faced by agricultural producers and consumers is described, after which the results are discussed.

The analysis reveals that while some reforms have significantly reduced distortions for some crops, many crops still face high distortions and, most worryingly, this includes the two major food crops (maize and rice, which together account for over 40 percent of agricultural output). Although exchange rate liberalization and privatization of marketing has removed many distortions, marketing inefficiencies and limited competition persist for many products, so the level of distortion against agriculture remains reasonably high for all tradables on most of the measures used. For exportables overall, part of the remaining high distortion is attributable to high distribution and marketing costs, due for example to inefficient marketing

structures and high transport costs faced by exporters. For food crops (import-competing products), persistent distortions are attributable to inefficiencies in the domestic marketing chain and/or monopoly power in processing and purchasing. Although reductions in distortions to many crops have to some extent been offset by persistent high distortions facing others, especially certain exports, the overall bias against agriculture has been reduced.

Brief conclusions are offered in the final section. Reforms have been moving in the right direction, especially liberalization of the exchange rate regime and reductions in trade taxes, but much remains to be done to improve the efficiency of marketing (including transport) to eliminate the net distortions against agriculture. The core problem is that effective real producer prices remain low, especially given high costs of inputs and inefficiencies in marketing. In the case of coffee, the major traditional export crop, although government policy distortions have been largely eliminated, so that it faces a neutral policy regime, domestic prices appear insufficient for profitable trading margins, given the decline in the world price (and there is evidence of declining production).

Growth and structural changes

Tanzania experienced fairly steady economic growth from the mid-1960s to mid-1970s, with real GDP increasing by almost four percent, although real agricultural GDP grew at only just over two percent. Performance weakened in the latter half of the 1970s, partly in response to external shocks and partly due to increasing state intervention in the economy, including widespread nationalisation. Between 1976 and 1980, real GDP rose by just over two percent but real agricultural GDP grew by less than one percent (World Bank 1994, pp. 2-3). The combination of the 1979 oil price shock and the war with Uganda precipitated an economic crisis, with negative real growth over 1981-83 (although agriculture grew by over 2 percent). There was recovery from the mid-1980s with the implementation of the World Bank-sponsored Economic Recovery Program (ERP) from 1986 that steadily introduced liberalization policies. Over the period 1986-92 both real GDP and agriculture grew by more than four percent (World Bank 1994, pp. 2-3).

Agriculture has remained the dominant production part of the economy, and its share of GDP has actually increased. Agriculture accounted for about 40 percent of GDP in the 1970s and early 1980s, rising to 48 percent in the early 1980s (when the services share fell) and falling back to 45 percent in the early 2000s. The services sector has varied around 45 percent of GDP, whereas manufacturing has declined steadily from 12 percent in the 1970s to just over 7 percent in the early 2000s. The mining share has been less than 2 percent (Appendix Table 1).

Agriculture performed relatively well in Tanzania in the 1980s (World Bank 1994, McKay et al. 1999), improving from some 45 percent of GDP in 1980 to about 50 percent by 1990. Within agriculture the best performance was in food crops, notably pulses, starches, oilseeds and non-traditional exports (fruit and vegetables) throughout 1976-91, but with good growth in cereals during 1976-85. Traditional export crops performed poorly, with negative growth through 1976-85 and modest growth over 1986-91, reflecting the effect of unfavorable terms of trade on Tanzania: real export prices for coffee, cotton and tea in 1990 were less than half their value in 1984.

The econometric results in McKay et al. (1999), albeit based on data up to the early 1990s, suggest that the agricultural sector is quite responsive to relative prices (although more so for annual than perennial crops in the short term) and so should respond to market liberalization. This is consistent with the evidence of agricultural sector growth following adjustment policies in Tanzania in the mid-1980s. Liberalization of agricultural markets, where it increases the prices paid to farmers, can be effective in promoting production, and is consistent with the observed improved performance of the sector following liberalization in the 1980s. Complementary interventions, to improve infrastructure, marketing, access to inputs and credit, and improved production technology can be expected to make producers even more responsive. This latter point is especially important if the objective is to expand total agricultural output. This evidence is consistent with the view that much of the response is substitution between (export and food) crops, although there is a strong suggestion that total production will respond if constraints are relaxed and incentives improved. Production data support this argument: although there was a dip in the early 1990s, production of (import-competing) food crops has grown dramatically in volume terms since the 1970s, production of staple (non-tradable) foods has also grown, but the volume of export (cash) crop production declined in the 1980s and only recovered in the late 1990s and 2000s (Appendix Figure 1). However, in terms of production shares in total agriculture, it is 'non-

traditional crops' that have increased, especially vegetables such as green beans and fruits, cash crops (for export) have declined as a share of production since 1985, and import-competing products such as maize and rice (and non-traded staples) have maintained their production shares (Appendix Table 2).

The growth of food crop production from the mid-1980s probably contributed to poverty reduction. About 85 percent of the Tanzanian population in 1990 was defined as rural. For the vast majority of these people, agriculture was the primary source of income, almost 60 percent of them were below the poverty line, some 77 percent of their expenditure was on food, and over 40 percent of their food came from home production (World Bank 1994, pp. 45-8). Growth in agriculture, especially food production, makes a major contribution to the income and welfare of rural households, and hence is central to any poverty reduction strategy.

The growth of agriculture following the ERP was not sustained beyond the early 1990s. In particular, the removal of all subsidies for agriculture in 1994 heralded stagnation if not decline in production, especially as the large increase in fertilizer prices discouraged its use and reduced yields. Production levels of the major crops, maize and paddy, are also very susceptible to fluctuating levels of rainfall and especially drought, which can reduce paddy production by up to half (Isinika et al. 2005, pp. 199-200).

Skarstein (2005) argues that the reforms led to failure in food crop production during the 1990s, with declines in labor productivity and in maize and wheat yields. The combination of successive devaluations, the removal of the fertilizer subsidy and privatization of input markets led to a dramatic increase in input prices. Price deregulation in July 1990 was initially associated with significant real producer price increases in the early 1990s (more than doubling for maize, rice, wheat and millet) but then it induced a decline in real producer prices of maize, rice and beans (all to less than half the level of the early 1990s and below the level of the early 1980s by 1999), wheat (relative to the early 1990s but not the 1980s), and millet in the late 1990s (Skarstein 2005, p. 355). Although maize and rice production did increase during the 1990s, low real prices and limited marketing opportunities meant that much of this was absorbed as household own-consumption.

Tanzania's strong economic performance over 2000-04, with average annual real GDP growth of almost six percent, has been helped by farmers, in particular through an increase in the area under cultivation. Although agriculture had lower growth rates than

industry or services, it made a larger contribution to GDP growth than either of the other two sectors (World Bank 2006, p. 4). There appears to have been a slight reduction in poverty in Tanzania, from a headcount of almost 39 percent in 1991/92 to just over 35 percent in 2000/01. Although the major reduction was in Dar-es-Salaam (from 28 percent to 18 percent), rural poverty declined slightly, from 41 percent to 39 percent (World Bank 2006, p. 9). However, sustained growth requires improved manufacturing performance, and to date Tanzania has not achieved any manufacturing growth.

The structure of exports changed notably in the early 2000s, with a decline in the share of traditional (cash crop) exports (from roughly 60 percent of exports in the late 1990s) and an increase especially in mining. The structure of traditional exports has also changed as the major share of coffee and cotton (the main exports before 1990) has declined, largely due to falling world prices, and there has been a renewal of the cashew nut industry. With the exception of tea, most cash crops experienced a significant fall in export volume over 1994-2003, with a notable dip from 1998/99 (especially cotton) due to a decline in international prices (Kweka 2006). There has been a fall in real prices for all major export crops relative to the 1994 prices (prices of cotton, coffee and tea declined by some 50 percent by 2000), hence cash crop production has not been a source of increasing (or even stable) farm incomes. By 2003, non-traditional exports accounted for almost 80 percent of the total exports of which half was from the mining sector.

Brief history of policy evolution

After independence, the institutional structure of agriculture was characterized by cooperatives. This was not particularly successful, and from the mid-1970s there was a shift to parastatals dominating marketing. But these parastatals were not efficient or successful either, and the liberalization policies in agriculture from the mid-1980s have seen a shift back towards cooperatives, with a viable private sector emerging from the 1990s.

1960-75: the cooperative system

In the period following independence, smallholder agriculture was market oriented and supported by cooperatives. The National Agricultural Products Board (NAPB) was established in 1962 and held a monopoly over the marketing of grain, purchased from Cooperative Unions (which in turn sourced from the Primary Cooperatives). The NAPB became the National Milling Corporation (NMC) in 1973, which had the additional responsibility of maintaining the strategic grain reserve (Isinika et al. 2005, p. 201). Cooperatives were owned and controlled by the members on a democratic basis, sales were restricted to the official market and the marketing board purchasing price was fixed. The actual producer price was the board price minus unit marketing costs. Consequently, producer prices varied across the country according to variations in agreed unit costs (an important source of variation was transport costs). Corruption and weak administrative capacity in the cooperative societies and unions were a major problem, but the boards did help to involve farmers and limit marketing costs. The general impact was successful and through the 1960s Tanzania was self-sufficient in food.

The Arusha Declaration in 1967 heralded the government's 'villagization' policy (*Ujamaa*) as rural populations were moved into new villages with a more socialist-oriented mode of production. There was an increase in the area under cultivation, expansion of extension services and increased use of chemical fertilizer to expand food production. The policy was not successful and in the early 1970s, due to a combination of drought and increased prices of imported inputs, production declined (Isinika et al. 2005, p. 198).

1976-1980: the parastatal marketing system

The cooperative system based on the membership of individual farmers was abolished and replaced by parastatal crop authorities from 1976. Ten parastatal crop authorities were established to cover 27 main and about 15 minor crops. This was a highly centralized system with parastatals responsible for production, research and development, project financing, procurement, processing, and marketing of crops. Each parastatal had a country-wide procurement capability and the government fixed uniform producer (and food retail) prices. A major problem is that there was effectively no control on marketing costs, the burden of

which fell on export crops (as food crops were subject to other policy objectives, such as low food prices for consumers, and benefited from input subsidies). Furthermore, the policy of pan-territorial pricing discriminated against producers located close to markets while providing price incentives for remote areas.

The parastatal system created extensive and costly distortions. Due to their inefficiency, the parastatals became effectively bankrupt and began to fail in basic functions such as crop collection and payments to farmers. By 1980, the problems had become so alarming that the government decided to re-establish the cooperative movement. This was achieved through the 1982 Cooperative Act. However, the new marketing system was hastily formed, e.g. primary societies were based on only one village, irrespective of size and market considerations, while parastatals reverted to the status of marketing boards (although with responsibility limited to processing and final sale). Indeed, like the parastatal system, the cooperative system remained in the hands of government officials, thus maintaining the historically high level of state intervention. On a positive note, export taxes were almost completely eliminated by 1985.

The system did allow for regional price differences via a dual price system based on comparative advantage in production (premium prices for regions with high marketed output), although it did not take into account transport cost differences. Distortions persisted, encouraging high production/high transport cost regions (e.g. Southern Highlands) and discouraging low production/low transport cost regions (e.g. the Coast). Regional pricing also had the effect of paying premium prices for less-preferred foods, such as sorghum and cassava in drought-prone areas, so that these foods were accumulated in the NMC reserve, as a result of which the NMC incurred heavy losses (Isinika et al. 2005, p. 202). Price controls also imposed high implicit taxation on producers, encouraging a switch from cash to food crops as the latter could be sold at higher prices on parallel markets. The overvalued exchange rate added to these distortions as it 'taxed exports and subsidized imports to the extent that it sometimes became cheaper for the NMC to import maize than buy locally' (Isinika et al. 2005, p. 202).

1985-2000: market transition

Following ERP policies for agriculture, the Government implemented reforms to move towards a more market-oriented, liberalized agricultural sector. In 1984 the Government started to decontrol prices, initially for food crops, and reduce the role of the NMC. By 1990 the marketing of food was largely run by the private sector: 'in 1985 private trade supplied 50 percent of maize to Dar-es-Salaam, by 1992 this figure had increased to 80-90 percent' (Isinika et al. 2005, p. 205). The major devaluation of 1986 went some way to compensate producers for declining world prices. Between 1980 and 1982, export crop sales changed from being one of the largest single sources of government revenue to being a major recipient of government subsidies because the government increased nominal producer prices and reduced export taxes, rather than devaluing to respond to falling world prices.

With the growth of parallel markets, official prices had become in practice minimum floor prices. With retail prices determined by market forces, farm-gate prices were obtained by deducting marketing and transport costs from retail prices. Thus, producer prices in the regions with the highest transport costs are closest to the official (minimum) prices (and most likely to become the major sources for government procurement), whereas market prices in other surplus regions are much higher than the official premium price.

As liberalization continued throughout the 1990s, the private sector has become more efficient in food marketing. Marketing costs and margins have been reduced, private sector trade has become more competitive, and grain markets are more spatially integrated. Nevertheless, limited access to information on market opportunities has been a problem for small farmers, and increases in input prices reduced profits and discouraged production (Isinika et al. 2005, p. 209). This problem motivated the government to reintroduce fertilizer subsidies from 2003, albeit on a limited basis. Fertilizer use was not widespread, with no more than 15 percent of farmers using it in the late 1980s; its use was concentrated on maize in the Southern Highlands, coffee in Kilimanjaro and tobacco in Tabora (Cooksey 2003, p. 72). Despite the elimination of subsidies, maize yields remained stable and production increased in the 1990s, with the exception of drought years.

Liberalization has also had significant effects on export crops, in particular coffee and cotton (the major and second most important export crops). The monopoly of the Cotton Board was eliminated in 1994, cooperatives were allowed to engage in marketing and ginning and private companies entered the market, purchasing about half of production by 1996/7 (offering higher prices than cooperatives). As a result, marketing improved and

ginning capacity increased. The producer's share of the cotton export price was about 40 percent during 1989-94, and this rose to about 50 percent in 1995-2000 (Baffes 2004, p. 82). Taxes of various forms are high, at 13-14 percent of the producer price in the late 1990s, although often these are not paid in full (Baffes 2004, pp. 90-1). Although cotton is very responsive to prices, there is no evidence of significant supply response, perhaps because the availability of credit collapsed and input use declined, and quality may have declined since liberalization. There are some similarities with cashew nuts, also liberalized in the 1990s: although marketing efficiency increased and production has grown steadily, limited access to credit to finance purchases of inputs, especially sulphur, is a major constraint, particularly for poorer cashew growers (Poulton 1998).

Although almost all of Tanzania's coffee is produced by smallholders, the Tanzania Coffee Board (TCB) had a monopoly over marketing, processing and exporting until the mid-1990s. Private agents were allowed to enter marketing and processing from 1995/5, although exports were still through the TCB auction. 'By 1997 there were five fully vertically integrated exporters (VIEs, subsidiaries of multinational coffee companies) that engaged in domestic trade, owned processing factories, and exported coffee ... accounting for 45 percent of deliveries to the auction' (Temu et al. 2001, p. 207). Other private buyers accounted for 22 percent of deliveries to auction; and, from a zero share prior to 1994, private agents accounted for almost 70 percent of marketed coffee by 1997/8. During this period, marketing margins were reduced dramatically and the producer price as a share of the export price rose from 50 percent to over 90 percent (Temu et al. 2001, p. 207-8). Although there was concern that the VIEs could attain a detrimental dominant position in the market, this had not happened by the late 1990s.

However, recent events suggest that these liberalization gains are being reversed, in part because the declining world price for coffee makes the crop unprofitable and squeezes the margins of traders, and in part because cooperatives are gaining political support in a rearguard action to preserve their position (Cooksey 2003, p. 76). In 2001, laws were presented to re-establish the TCB and Tanzania Tobacco Board, under which producers needed the permission of the boards to grow the crops. Similar measures were proposed for sugar (Cooksey 2003, pp. 77-8). There is also some concern that the 2001 Cotton Industry Act provides too much power and intervention to the Cotton Board (Baffes 2004, p. 92). In sum, while liberalization appears to have had limited successes for food crops (but see

Skarstein 2005), the evidence for traditional exports is mixed, as liberalization policies have either not been implemented or not been sustained.

Post-2000 policy issues

Recognizing that agriculture accounts for some 50 percent of GDP, 80 percent of rural employment and over 50 percent of the foreign exchange earnings, Tanzania's Development Vision 2025 places considerable emphasis on the sector. An annual real growth rate of at least 8 percent in agriculture would be needed to provide the basis for economic growth and poverty reduction. A number of policy documents have aimed to achieve this growth: the Agricultural Sector Development Strategy (ASDS) and Agricultural Sector Development Program (ASDP) in 2001, and the Cooperative Development Policy (CDP) of 2002, complemented by a variety of sector policies. These and others are fully reviewed in ESRF (2005), on which this section is based, and we confine attention to three core issues.

First, the policy statements have at least identified the issues and proposed a strategy. The ASDS emphasized the need to improve the efficiency of input markets and product marketing, increase access to credit, enhance the provision of extension services and increase investment in rural areas (especially for irrigation and transport). The ASDP was in principle the strategy to implement these aims, but had limited impact. Thus, the culmination of these initiatives was the formulation of a belief in the need to 'reintroduce selective subsidies, particularly for agricultural inputs, machinery and livestock development inputs and services' (ESRF 2005, p. xii).

Second, despite the CDP, the cooperative sector has failed to respond to the challenge of liberalization. The sector suffers from weak managerial (and advocacy) skills, a lack of financial resources (in particular undercapitalization of cooperative banks, so credit constraints remain), and a weak institutional structure (especially in that they are not accountable to members). Thus although the cooperative sector remains significant, it is not viewed as successful, either in supporting development and growth or in representing the interests of members, giving added impetus to liberalization initiatives.

Third, agriculture is recognized as integral to the Poverty Reduction Strategy, and agricultural sector growth is essential if Tanzania is to achieve sustained economic

development. While this may seem somewhat obvious, it marks a change in emphasis – the whole sector (not only export crops) has attained a higher status on the policy (political) agenda, and a view is emerging that there is a need for positive support to the sector.

Trade policy reforms

Although elements of trade policy reform were introduced as part of adjustment programs from the early 1980s, the major reductions and rationalization of both import duties and domestic sales taxes were announced in 1988 and 1989. The range and levels of tariffs were reduced, and most specific sales taxes were converted to *ad valorem* taxes. The average implicit tariff (revenue relative to value of imports) rose from 2.9 per cent in 1986 to 4.5 per cent in 1988, when there was roughly a 100 per cent devaluation over the period, and it fell slightly to 4.4 per cent by 1990, during which time there had been further devaluation of about 100 per cent and tariff rationalization (Lyakurwa 1992).

The Tax Commission (1991) placed a heavy emphasis on reform of tariffs and sales taxes, recommending that Customs Duty be further simplified to three rates. The 1992 Budget reduced the number of rates to five. Considerable emphasis was placed on the need to limit the scope of exemptions, as too many importers were exempted from tariffs and sales tax, in particular government bodies and parastatals. In 1989 actual import tax revenue represented only 44 per cent of the yield that would have resulted had no importers been exempt (Tax Commission 1991, p. 13). Licenses for virtually all imports and exports were abolished in 1993, and by the end of that year the foreign exchange market was significantly liberalized. The number of tariff rates and the maximum tariff have been reduced a number of times such that by 1997 there were only four rates, the maximum being 30 per cent (with a different and lower schedule of rates applying to members of regional trade agreements).

Tanzania has been implementing a gradual process of trade policy reform since the mid-1980s, with notable policy and institutional reforms during the 1990s, leading to a more open trade regime. These trade reforms have succeeded in lowering tariffs (the average tariff has fallen from about 28 percent in the early 1990s to 16 percent in the early 2000s), and appear to be having a beneficial effect. The import/GDP ratio declined by almost 30 percent (from 37 percent to 26 percent) and the export/GDP ratio increased by almost 50 percent (from 14 percent to 18 percent) between the early and late 1990s. The National Trade Policy

for Tanzania (announced in 2003) seeks to address export promotion to further reduce the trade deficit, but the reform agenda is incomplete. Further harmonization of the tariff structure is needed, with improvements to marketing and input supply for agricultural exports. The National Trade Policy (NTP) is however weak on policies to enhance agriculture (the largest contributor to exports), although the thrust of the NTP is to transform the economy from a supply-constrained one into a competitive export-led economy responsive to the challenges of the global market. A key feature is emphasis on regional integration and commitment to the Multilateral Trade System with demand for trade policy to address poverty eradication as the key development challenge for Tanzania. Agricultural exports feature prominently in the policy, although much remains to be done to integrate trade, agriculture and poverty reduction strategies.

Measuring distortions to agricultural incentives

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. 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).

The quantitative analysis is applied to the most important crops in Tanzania over the period 1976-2004. Almost 80 percent of agricultural crop production is covered, even though the analysis excludes livestock products. While livestock, dairy and chickens have been important contributors to overall agricultural growth over the past decade or so, we did not have adequate data to include them. The 18 products analyzed are classified as cash crops (coffee, cotton, tea, sisal, tobacco, cashew nuts, pyrethrum and beans), import-competing

food crops (maize, rice, wheat and sugar),¹ and non-traded crops (cassava, sorghum, millet, Irish potato, yam and plantain).

The basic principle underlying the measures we estimate is that the price received by producers (farmers or processors), as adjusted to allow for taxes (subsidies), margins (marketing and transport) and exchange rate distortions, is compared to some reference price (an undistorted or international price intended to measure the true opportunity cost). In principle, the result is an estimate of the difference between the domestic and world price (for a product at a comparable point in the supply chain), a non-zero wedge implying distortions. For non-traded goods, there is no reference international price, but the market could be distorted in various ways. We lack information on distortions to input markets, and have no evidence to assume any taxes or subsidies to producers of staples (either because there is no tax or the crops are mostly sold by small traders in local markets where sales taxes are not collected), so we assume there are no (measurable) distortions for the six non-traded staples.

The treatment of exchange rate distortions is common throughout: we assume the undistorted exchange rate is a simple average of the nominal and parallel market exchange rates (as we have no information on the share of currency traded on the black market). We make a number of other general assumptions. First, we treat cash crops as the semi-processed traded product, i.e. the primary crop is treated as a non-tradable and the analysis is conducted for the processed equivalent (e.g. price and production data for coffee are for the clean equivalent that is exported). Second we assume equi-proportionate transmission throughout the value chain. Third, we assume domestic and foreign products are of the same quality. Fourth, we use an international reference price where available, otherwise we use the fob export price.

The measures we estimate do not explicitly account for ‘excess’ international trading costs. Recent analysis (Kweka 2006) suggests that Tanzanian exporters face trading costs above those prevailing in competitive markets, specifically due to inefficiencies in transport and Customs (which increase costs, delays and wastage), which we represent as an implicit

¹ There were often exports of maize and sugar, sometimes even net exports, but they are treated as import-competing products as imports tend to be significant and producers do compete with imports. In the case of maize, informal cross-border exports, especially to Kenya, are often significant but are not included in official trade statistics. This highlights the fact that our estimates relate to the aggregate national sector; specific regions and farmers will tend to face regional price, marketing and trading variations which imply a different level of distortion compared to the national average. This concern applies to all food crops and, to a lesser extent, cash crops (margins and marketing costs may vary by region but prices should be fairly uniform). Unofficial cross-

tax (as these cannot be passed on to foreign buyers). In the case of import-competing products, we treat the marketable product as the primary product and do not consider the processed product separately, and we use the cif import price for reference.

Results

The NRA results for the various crops are given in Table 1. A mixed pattern is evident, reflecting in part the limited quality of the domestic price data available (in effect an observation at one point, and possibly for a particular sub-market, in the marketing chain).

Coffee, traditionally one of the more important crops, faced relatively high negative NRAs from 1976 to the early 1990s (producers received in effect about 30 percent of the reference price; this was a period with State control of marketing). After 1995, marketing was liberalized, exchange rate distortions were largely eliminated and there were no subsidies. Even so, the industry has been under severe stress in recent years, with the share of coffee in export earnings falling from 17 percent in 1999 to 4 percent or lower from 2002 (WTO 2007, p A2-203).

Obtaining reliable local price data was a particular problem for cotton, and we experimented with alternative estimates (see Appendix for a discussion). The results presented are based on estimating the producer price (inclusive of all margins) as a ratio of the export price. The NRA was most distorted at worse than -80 percent from the mid-1970s to the mid-1990s, but then lessened a little to -70 percent during the most recent decade. It seems likely that the extent of disincentive is overestimated. Poulton and Maro (2007) note that significant reforms have been implemented for the cotton sector in Tanzania, especially since 2004, and that the sector now looks quite healthy.

There has been almost no change in the situation for producers of tea over the whole period, the NRA remaining at about -90 percent. It was difficult to get information on the industry, and there are no reports of reforms being implemented (which is consistent with the estimates). While the estimates may overstate the extent of negative distortions, it is likely that the producers face large disincentives. The tea industry in Tanzania involves strong monopsony power, with a few companies dominating processing and marketing; the absence

border trade may be important for many horticultural products omitted from the analysis, and in some cases to crops we define as non-traded.

of competition may be a reason for the persistent high distortions. Nevertheless, it is surprising that the significant reduction in exchange rate distortions did not reduce distortions since the mid-1990s, and this suggests that the data available to us has not captured the true situation for the sector. One implication is that producers have in effect been receiving a diminishing share of the export price, and marketing distortions have increased (i.e. non-exchange rate distortions must have increased to offset reductions in ER distortions). A general implication (which applies also to cotton) is that the data as applied have not properly distinguished the primary from the processed product, and the results imply a continued subsidy to the processing sector. We cannot discount this possibility, but it remains true that the bias against farmers appears to be high.

Similar conclusions can be drawn for tobacco and pyrethrum. The NRA for tobacco has remained over -60 percent, while for pyrethrum it appears to have fallen from over -70 percent to less than -50 percent. There is no evidence that elimination of the exchange rate distortion has reduced distortions, so one must assume inefficiencies remain high and farmers receive a diminishing proportion of the export price. Although the results suggest a subsidy for consumers, there are few actual consumers in Tanzania and this should be interpreted as implying a potential subsidy for processors/traders (at least in the sense that producer prices are lower than they should be). As with tea, the results may be capturing market distortions rather than actual policy distortions, limiting the ability of government to address the problems.

The results for cashew nuts are consistent with observations that (marketing and processing) efficiency in the sector has increased in recent years, reflecting the increased competition in the sector (helping farm-gate prices to keep pace with export prices). An NRA of nearly -70 percent for 1976-89 has become close to zero for the period 1995-2004. Sisal appears to have been the least (negatively) distorted product, and by the mid-1990s to be freely traded. Beans are the only example of a non-traditional export covered: the results suggest relatively unchanged marketing efficiency so that the elimination of exchange rate distortions is reflected in a reduction in distortions as the NRA declines from -75 percent -45 percent.

For maize, the sustained negative assistance to producers implies a subsidy to domestic consumers. A combination of trade and exchange rate policies help to explain this. Until the mid-1990s, access to the overvalued exchange rate lowered the cost of foreign

currency and hence the price of imports, and that was less than offset by the relatively high import tariff (45 percent until 1994). Marketing inefficiencies also kept producer prices (net of margins) relatively low, although the trend has been for distortions to decline from -50 percent to close to zero. To some extent this overstates the actual distortions, as prior to about 1990 and since about 2000 maize farmers have been able to access fertilizer subsidies (not incorporated in the analysis due to lack of data). As fertilizer accounts for 30 percent of production costs on average and the subsidy amounts to 50 percent of the fertilizer costs (on average for those who get the subsidy), production costs of assisted producers would be reduced by 15 percent on average.

The results for rice are somewhat similar to maize although the timing of turning points differs. Negative assistance to producers declined from -50 percent to close to zero by the 1990s and even slightly positive in the early 2000s. Producers have been able to avail themselves of fertilizer subsidies since about 2000 (as they were prior to 1990). As with maize, the combination of trade and exchange rate policies help to explain the trend.

The results for sugar are harder to interpret and data limitations are likely to be severe (in particular in distinguishing stages of production). The industry appears to be now highly protected in Tanzania, as sugar typically is in other countries. A larger proportion of the producer subsidy may be retained by the processor at the expense of the cane farmer than our NRAs suggest, however.

The aggregate NRAs for exportable, import-competing and all covered farm products are summarized in Figure 1. A clear anti-trade bias is evident from that figure, although it is smaller now than it was in the 1980s before the reforms began.

Aggregate distortions to agriculture versus non-agricultural tradables

The aggregate NRA for covered products is repeated at the top of Table 2. Also reported there is a guesstimate of the NRA for non-covered products, accounting for 20-25 percent of production. Those goods (largely nontraded fruits, vegetables and livestock products) are assumed to face distortions only from the market for foreign currency.

Aggregate distortions to agriculture appear to have been reduced quite significantly, from worse than -50 percent in the early 1980s to -25 percent in the 1990s and just -12 percent in the early 2000s.

How does this compare with the NRA for producers of non-agricultural tradables? These are shown in the middle rows of Table 2. The RRA measures the overall bias against agriculture, relative to non-agricultural tradables. The bias has halved since the latter 1980s, from -70 percent to -35 percent recently. This implies the overall bias against agriculture has been reduced, but remains considerable. This change is also depicted in Figure 2.

The final set of rows in Table 2 shows what the distortion indicators would have been had the distortions to exchange rates not been taken into account. They suggest that more than one-quarter of the RRA in the 1980s was due just to exchange rate distortions, but that they have since disappeared.

Prospects and implications

It is important to emphasize that the estimates reported here are based on many assumptions and limited data, that in at least some cases were not really up to the task. For cash crops it was difficult if not impossible to distinguish the effect of policy distortions from inefficiencies in marketing and market structures.² This is particularly important for estimates since the mid-1990s when most policy distortions (relating to the exchange rate and export taxes) were eliminated.³ It is quite possible that for cash crops such as tea, cotton, beans and tobacco, the negative estimates reflect market inefficiencies in addition to (and perhaps even more than) policy distortions. Nonetheless, we believe the relative estimates are reasonably reliable, but probably less reliable for the 1970s. For cash crops, products with high NRA estimates appear to be those where there is limited competition and inefficient marketing or

² Four 'levels' of agricultural market can be identified in Tanzania (Eskola 2005). Local (village) markets are where farmers sell surplus production, typically of (non-cereal) staples, are seasonal and not integrated into regional markets. Regional markets are typically based in district capitals or urban centers, and sell a wide variety of food products. Although some farmers may trade, the markets are dominated by traders who collect products from producers and other markets (and larger scale traders may supply the national market). The national market is essentially Dar-es-Salaam (DSM), the marketing hub of the country (given the nature of transport systems, regional markets are usually linked via DSM) and the largest urban market. It is dominated by relatively large-scale traders. Finally, cash crops serve the export market, and most cash crop production is exported (in largely unprocessed form), which is dominated by large-scale, often foreign, traders.

³ Policy distortions have not been entirely eliminated as commodity boards were established for the cash crops (except beans) and sugar after liberalization to replace the monopoly marketing boards. These boards announce minimum prices to be paid to farmers and impose a 2 per cent levy on exports. There are also a variety of other taxes or levies (imposed at various points on the production chain), some of which vary across districts (WTO 2007, p. A2-173).

processing (cotton, tea and tobacco) whereas NRAs are small for those products where competition has been introduced and efficiency increased (coffee, cashew nuts and sisal).

The agricultural sector has performed reasonably well since the mid-1990s, and especially in the early 2000s. By 2005, the policy emphasis was on ensuring that the poor shared in growth. For agriculture, this implied a need to focus on improved functioning of output and input markets (especially credit) and public spending on agricultural sector development, especially irrigation and strengthening research and extension (World Bank 2006). Our results reinforce this, as distortions (mostly negative) remain widespread. We have two specific conclusions and one general implication.

First, although liberalization of the exchange rate reduced the black market premium in the 1990s and removed it by about 2000, this did not translate fully into a reduction in distortions to producers in all crops. Benefits in terms of less negative NRA measures can be seen for coffee, cashew nuts, cotton and beans among major exports, and for food crops, but many export crops (such as tea and tobacco) appeared unaffected. This implies that for many cash crops, other distortions, due to high transport costs, marketing inefficiencies and the prices paid to farmers, got worse. Addressing these distortions will require institutional changes.

Second, there is little evidence of improvements in marketing (including processing and transport) efficiency for most products, although it should be stressed that this may simply reflect limitations in the data available. There is evidence that high transport costs are still a major distortion for export crops in the 2000s. For crops where distortions were reduced progressively but remain high, this can be fully attributed to exchange rate liberalization (beans, maize). Where producer distortions did not decline despite exchange rate liberalization, marketing efficiency and/or the (proportion of the world) price paid to farmers must have deteriorated (tea and tobacco), suggesting that commodity boards are still not functioning properly from the viewpoint of farmers.

The general implication is that policy reforms in agriculture have some way to go to eliminate distortions, but certain products may provide examples of what to do (for example, coffee and cashews for exports, and rice for import-competing food). Overall, the negative distortions to agriculture have been reduced, but they still remain high for a number of crops and have not fallen sufficiently relative to the rest of the economy. Given that agriculture is such a large share of the 'productive' economy, sector growth is essential to achieving

sustained economic growth in Tanzania. While measures to improve yields and production efficiency are important, the analysis suggests that measures to improve competitiveness and efficiency in processing and marketing (including transport and distribution) are equally important. Growth in agriculture can also contribute significantly to poverty reduction: the rural poor as producers benefit and, provided productivity and efficiency increase so that real prices can be reduced, the poor as consumers of food can also benefit. In this respect, measures relating to regional cross-border trade, typically omitted from official statistics and often from policy discussions, have a potentially high pay-off. Intra-regional trade facilitation and other measures associated with regional integration could make cross-border trade easier, benefiting those in border areas. The typical focus of analysis of marketing and transport costs is on getting products to Dar-es-Salaam, either as the major domestic market or as the main port for export. While some attention to Dar-es-Salaam is appropriate, it should not be at the expense of local, and especially border, markets.

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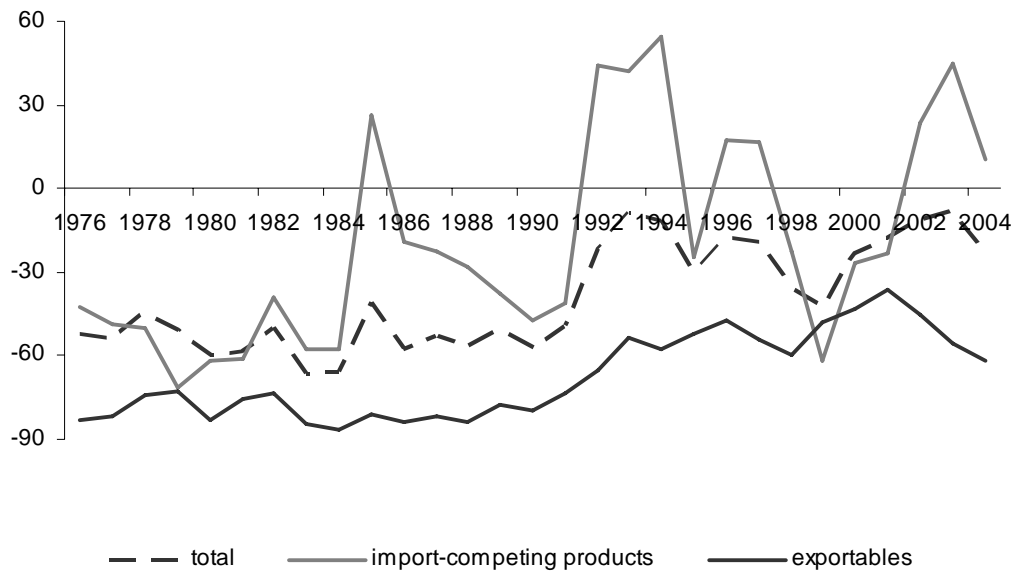
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Figure 1: Nominal rates of assistance to exportables, import-competing and all^a agricultural products, Tanzania, 1976 to 2004

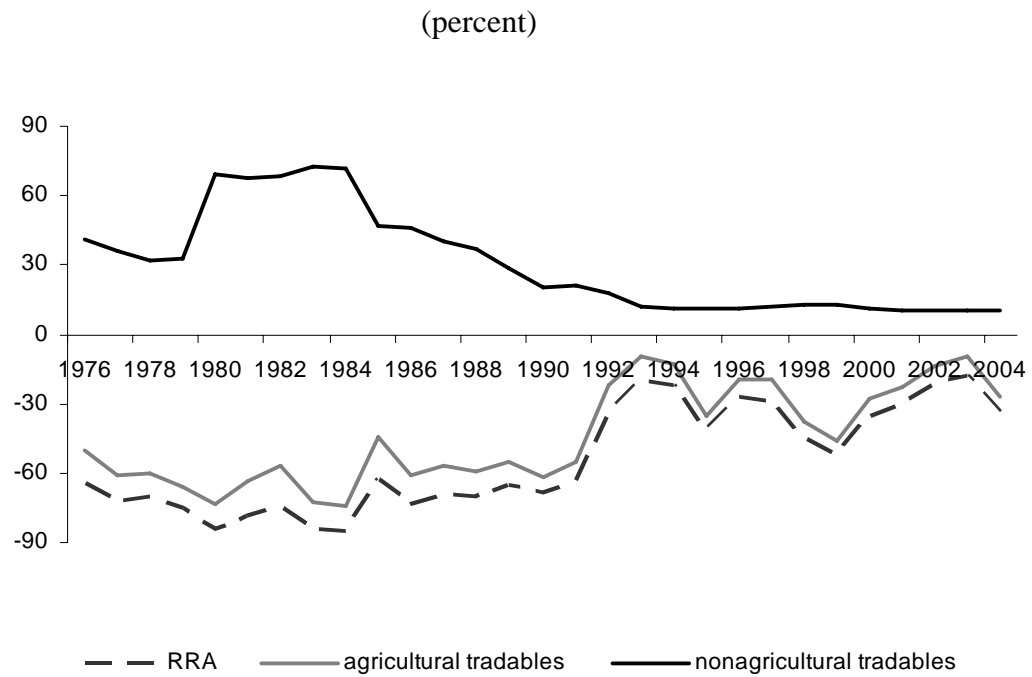
(percent)



Source: Authors' spreadsheet

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.

Figure 2: Nominal rates of assistance to all nonagricultural tradables, all agricultural tradable industries, and relative rates of assistance^a, Tanzania, 1976 to 2004



Source: Authors' spreadsheet

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

Table 1: Nominal rates of assistance to covered products, Tanzania, 1976 to 2004
(percent)

	1976-79	1980-84	1985-89	1990-94	1995-99	2000-04
Exportables^{ab}	-77.9	-80.6	-81.6	-65.9	-52.3	-48.7
Beans	-76.7	-76.1	-81.8	-44.5	-47.8	-45.0
Tobacco	-64.4	-65.9	-65.2	-56.5	-37.0	-55.2
Tea	-90.7	-93.9	-93.5	-89.5	-91.0	-90.8
Sisal	-39.1	-40.7	-29.2	-13.1	-0.5	0.0
Pyrethrum	-82.4	-71.4	-73.5	-37.0	-67.8	-47.7
Cotton	-83.1	-87.4	-84.2	-85.4	-72.8	-70.2
Coffee	-69.3	-74.2	-77.4	-44.0	0.0	0.0
Cashew	-66.1	-71.6	-69.1	-39.0	-8.1	-9.6
Import-competing products^a	-53.1	-55.5	-16.2	10.3	-14.9	5.8
Wheat	-31.5	-54.8	-47.1	44.6	76.4	95.3
Sugar	-8.7	-57.7	-14.7	22.9	39.6	103.1
Rice	-50.7	-63.9	-39.6	2.0	24.8	16.5
Maize	-51.7	-51.7	2.8	13.8	-28.1	-1.1
Nontradables^a	0.0	0.0	0.0	0.0	0.0	0.0
Yam	0.0	0.0	0.0	0.0	0.0	0.0
Sorghum	0.0	0.0	0.0	0.0	0.0	0.0
Millet	0.0	0.0	0.0	0.0	0.0	0.0
Potato	0.0	0.0	0.0	0.0	0.0	0.0
Plantain	0.0	0.0	0.0	0.0	0.0	0.0
Cassava	0.0	0.0	0.0	0.0	0.0	0.0
Total of covered products^a	-50.3	-60.3	-51.9	-29.8	-29.1	-16.6
Dispersion of covered products ^b	37.4	39.1	41.3	46.5	47.0	51.9
% coverage (at undistorted prices)	83	93	87	81	79	74

Source: Authors' spreadsheet

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

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

Table 2: Nominal rates of assistance to agricultural relative to nonagricultural industries, Tanzania, 1976 to 2004

	(percent)					
	1976-79	1980-84	1985-89	1990-94	1995-99	2000-04
Covered products	-50.3	-60.3	-51.9	-29.8	-29.1	-16.6
Non-covered products	-1.2	-3.1	-2.1	-0.3	0.0	0.0
All agricultural products	-41.8	-56.3	-45.3	-25.2	-23.2	-12.4
Trade bias index ^a	-0.43	-0.55	-0.71	-0.58	-0.29	-0.35
Assistance to just tradables:						
All agricultural tradables	-59.6	-68.2	-55.4	-32.3	-31.7	-20.1
All non-agricultural tradables	35.5	69.9	39.8	16.6	11.9	10.3
Relative rate of assistance, RRA^b	-70.3	-81.3	-68.1	-41.3	-38.9	-27.6
MEMO, ignoring exchange rate distortions:						
NRA, all agric. products	-33.0	-39.8	-29.1	-20.8	-22.3	-12.3
Trade bias index ^c	-0.02	0.42	-0.35	-0.45	-0.24	-0.35
RRA (relative rate of assistance) ^d	-58.5	-66.1	-47.9	-34.0	-36.9	-27.3

Source: Authors' spreadsheet

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 $TBI = (1 + NRA_{ag_x}/100)/(1 + NRA_{ag_m}/100) - 1$, where NRA_{ag_m} and NRA_{ag_x} are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.

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

Appendix: Key quantity and price data, assumptions and sources

We use data on production (volumes), producer prices and value added from 1976 to 1991 for 33 crops (more detailed information, including government purchases, is available for maize) and detailed data on tariffs for the 1990s and early 2000s. A general problem is that local price and production data tend to be at the generic product level (e.g. rice, coffee, maize) whereas trade and tariff data tends to be either more or less aggregated. Regarding tariff data (from Tanzania Revenue Authority), the rate can vary by source and, of equal relevance, the scheduled rate is rarely the applied rate. Our approach is to use the same local source as much as possible for all data, for consistency if not accuracy, and identify an appropriate average tariff value.

Averaging is also an issue for prices. Although producer prices tend to be available at the generic product level with an annual price, retail prices are typically available monthly or quarterly for different regional markets. Our approach is to use the average market price in the capital as the retail price.

We have limited data for transport and marketing costs/margins. At a sector level, there are estimates of transport costs for 1998-2001 and some survey data on transport and/or marketing costs for 1991 and 2005. These do not give particularly accurate figures for crop/years, but can form the basis of credible estimates. An example of the problem with transport costs is that they are typically given for a 'truck load' between two places and the cost per kilometer varies according to the quality of the roads.

Classifying cash crops as exportables is straightforward. Similarly, the basic staples such as millet, cassava, yam and plantains (cooking bananas) are generally non-traded. Food crops are a bit more difficult: for example, maize imports were significant over 1980-86, zero over 1987-89 when there were exports, and there were both imports and exports in 1990 and later years, while rice was an importable throughout the 1980s but there were also some exports from 1990. However, these food crops normally exhibit net imports, and very rarely net exports, so it is reasonable to treat them as importables throughout.

Commodity coverage

Two categories of commodities are used in this analysis, that is, cash and food crops. The cash crops include: coffee, cotton, tea, tobacco, cashew nuts, sisal and pyrethrum. Most of the cash crops are (semi) processed and then exported (over 80 percent of production), with limited domestic consumption (and imports are rare). Due to unavailability of purely primary level production data in most of cash crops (except for cotton and tea), we took the data available to represent the processed equivalent. Unlike cash crops, where all crops are processed to a certain level before traded, most of the foods crops (except sugar, maize flour and wheat flour) are in primary form, many of which are non-tradable. Food crops which are tradable include: maize, rice, wheat, beans and sugar cane (sugar), all of which are treated as importables. Typically, imports were equivalent to 2-10 percent of production, although in some years imports of rice and maize were as high as 35 percent while wheat and sugar were as high as 50 percent. Products such as cassava, sorghum, millet, yam, potatoes, plantains, lentils and pulses are non-tradables.

For each commodity, individual spreadsheets were constructed, incorporating time series for prices (both retail and producer), production as well as trade flows and border

prices for the tradables. Insufficient information (usually concerning prices) was available to construct full spreadsheets, so it was not possible to distinguish between true primary and lightly processed products. For the majority of products, consistent data were available for the same definition (e.g. coffee production measured for lightly processed equivalent, maize prices for grain rather than flour and rice in paddy equivalent), so they were treated as primary products. One product where data limitations appear to have created problems in estimation was sugar.

Given the data limitations, specifically on prices at various stages in the production and marketing chain, sensitivity analysis was conducted by using alternative values. This is illustrated for maize, rice and wheat in Appendix Table 3 using farm-gate prices and equilibrium exchange rate, compared to Appendix Table 4 using retail prices and official exchange rate. Estimates can fluctuate significantly from year to year (in rare cases even changing sign), highlighting the ‘fragile’ nature of price data and supporting the use of period averages to report the data. As the exchange rate was liberalized from the mid-1990s, the parallel rate converges to the official rate over time and both are equal by 2001 (Appendix Table 5). This will tend to reduce the distortion against agriculture (negative NRA) as, given the domestic price (DP), the border price (BP) declines (conversion to local currency means BP at equilibrium exchange rate higher than that at official rate). Indeed, one can see a general if erratic trend reduction in NRA in Appendix Table 3.

However, what actually happens to NRA depends on the trend in DP relative to BP, and here there are significant differences across the three products. Only in the case of wheat did farm-gate prices rise relative to import prices so that NRA turned positive after 1993. World (import) prices can vary significantly: if import prices are particularly low, NRA is quite high (1997 for wheat), whereas when import prices are low the NRA can become small or even negative (1999 for wheat). Farm-gate prices for maize and rice have remained consistently and usually significantly below import prices, so although the distortion (negative NRA) declined, it remained quite high even at the end of the period.

A rather different picture emerges if we consider Appendix Table 4, which can be interpreted as the situation facing retailers (who may be producers at market). Here the comparison is of the food retail price against the import price applying the official exchange rate (i.e. the local price of imports that producers are likely to face), and again there can be large year-on-year variations (e.g. 1997 and 1999 for wheat). Wheat retail prices tend to be considerably higher than import prices; the same is true for rice, but to a lesser extent. The situation is different for maize where, at least since 1993, retail prices have tended to be lower than import prices, often considerably so, so NRA is usually negative. As discussed in the text, the estimates do not account for the fertilizer subsidy (discontinued during the 1990s).

Data construction

A number of studies that have been done in Tanzania have shown that there exist discrepancies and inconsistencies in the agricultural data. Data on the same products are not consistent either over time or between sources. We collected time series data on production, prices (producer, retail and border prices), tariffs and trade flow for the covered commodities, from 1976 to 2004 using local sources to try and get comparable data. In particular, while FAO data often exist, they do not generally allow us to identify stages in the marketing chain; local data proved better in this respect. Some data gaps and divergence exist in most of the commodities covered, and we had to estimate. Official exchange rates are from IMF (various

years) and parallel exchange rates are from International Currency Analysis (various years) updated from Easterly (2006), see summary in Appendix Table 5.

Production data

Cash crops data were collected directly from their respective boards and authorities, for instance; cotton from Cotton Marketing Board, tea from Tanzania Tea Authority and tobacco from Tobacco Marketing Board. Most of the food crops production data (tradable and non-tradable) are from the Statistics Unit (various years) of the Ministry of Agriculture and Cooperatives. We used FAOSTAT production data to fill gaps where possible.

Prices data

Most data on food crop retail prices have only been compiled on a consistent basis from 1983 by the Statistics Unit (various years), while producer price series often have gaps. We combine data on producer prices of food crops from World Bank (1994) for 1976 to 1991 with data from the Statistics Unit for 1992 to 2004. In the case of cash crops, we have a reasonable time series data for producer prices but limited data on prices at different stages of marketing; we used a mark up of 20 percent on the producer prices to get the wholesale prices and allow for a transport cost margin at the 'retail' (export) level.

Trade flow and price data

All of the cash crops are traded commodities as around 80 percent of their processed are exported. Good data are available on the exports of cash crops exist in various sources, but for consistency we used those from Central Bank of Tanzania which are largely comparable to FAOSTAT data. While most of these cash crops are semi/full-processed and then exported, Tanzania does not import similar commodities, the related imports are of the processed product. Only a few of the food crops covered are traded (mostly imported), either at their primary level or processed level. These include maize grain (maize flour), wheat grain (wheat flour), paddy/rice and sugar. Most of data on these import-competing commodities were taken from FAOSTAT data, as it was difficult to get consistent trade data on food crops from the local sources.

As cash crops are exported we take FOB as their border prices. On the other hand, since the tradable food crops are mostly imported we take CIF as their border prices. FOB prices which are expressed in the US\$ are taken from the World Bank (1994) for the period 1976 to 1991 and for 1992 to 2004 from the *Tanzania Economic Survey* (2002 and 2005). CIF prices were taken from FAOSTAT, imports divided by the volume of that trade, with those data extracted from FAO (1996) for years prior to 1995.

Treatment of marketing chains

Marketing chains in Tanzania, as is the case in most African countries, are complex. One commodity usually leads to various processed products from where it is produced through local/village markets on its way to regional/districts and national/city markets. For instance a fresh cassava (or Irish potatoes) converts to cassava (potato) chips and flour. And sometimes the growers themselves sell both primary and part-processed production. Thus if one is to trace the chain from the growers to consumers in urban areas, a number of traders of different scale are involved and commodities are transformed into various processed products.

Most exportables (with the exception of seed cotton and tea leaves which are primary at their first record and then converted into processed cotton lint and tea made) are treated, and data recorded, as the processed commodities. For importables, maize and wheat in their primary form are converted into flour (processed), and the data relate to flour. Sugar is a processed food product transformed from sugarcane. Given lack of data, all non-tradables are treated as primary (unprocessed) products.

Like most countries in the region, Tanzania grows two types of coffee, Robusta and Arabica. These are processed into clean coffee (also called green coffee). Arabica coffee accounts for about 75 percent of the total production. About 27,000 small holders produce coffee in small plots averaging 0.5 hectares. However, production is on a downward trend, as it fallen from a peak of nearly 67,000 ton in 1980/81 to only 33,000 tons in 2004 – a fall of 50 percent. Likewise, yields per hectare are low, averaging 151 kilograms for Arabica and 260 kilograms for Robusta (ESRF 2005). In the case of cotton, farmers (usually smallholders on farms of about 0.5 to 10 hectares, the average being 1.5 hectares) produce seed cotton which is assembled and brought for ginning. The ginning process produces lint and cottonseed. The cotton lint is mainly exported but with a proportion is retained for domestic use, while cottonseed is crushed to produce cottonseed oil and a residual cake. We use data for cotton lint as the most comprehensive series available.

Information on margins

A number of studies of the agricultural sector or specific crops in Tanzania include information on marketing costs and margins. Brokers and traders tend to charge a fixed price per specified quantity and as prices vary regionally and seasonally, converting this to a percentage of the retail or producer price (as an annual average) is inevitably no more than a rough approximation. Although such information is neither collected nor reported in a uniform way, and there will be considerable variations over time, across products and across regions and producers, it does permit us to make some estimates of the magnitude of margins. In general:

Non-traded food crops (H), in particular non-cereal staples such as cassava and tubers, tend effectively to have very low margins because they are mostly sold locally (near the point of production). Food staples have low price/weight ratios, hence transport costs are a relatively high proportion of the price, and are less popular amongst urban consumers (except perhaps the poorest). Thus, although they are ‘the major crops traded at the village and regional markets, they rarely enter into the national market’ (Eskola 2005, p. 17).

Food crops, which are in principle importables (*M*) even if not always imported, face margins that increase as they move through the supply chain to the urban (DSM) market, where they may compete with imports. In 2004/05, the margins on grains, such as rice or maize, tends to be around 10 percent for regional markets rising to 20 percent in DSM (with similar margins for bananas), but the margins on potatoes and fruits, such as oranges, in DSM can be much higher than 20 percent (Eskola 2005, p. 19). Land transport costs for foods are estimated at 2.7 percent in 1998 and 3.6 percent in 2002 (Kweka 2006 and Table 8).

Cash crops (X) are almost entirely exported, with very low domestic demand (except for some processed coffee, tea and cotton lint, and non-traditional exports of fruits and vegetables). Estimates of export cost margins vary considerably, but if marketing was efficient 10 percent would be a reasonable figure. To these should be added transport costs, estimated at about 33 percent in 1998 and 25 percent in 2002 (Kweka 2006 and Table 8). For coffee (clean) in the early 1990s, marketing board margins were up to 7 percent of the

auction price and other levies, including some taxes, added another 3-6 percent (World Bank 1994, p. 126). The marketing cost for parchment coffee is estimated to have fallen from 0.59 \$/kg to 0.14 \$/kg, so the margin fell from 54 percent of the export price in 1992/3 to six percent in 1997/8 (Temu et al. 2001, p. 208). In the case of cotton, export market costs were over 30 percent of the export price, although efficiency gains could have reduced this to about 10 percent (World Bank 1994, p. 131). Baffes (2004, p. 90) shows that various taxes amounted to about 14 percent of the producer price of cotton in the late 1990s. Export agents for cashew nuts charged up to 5 percent of the producer price in 2004/05 (Eskola 2005, p. 19).

Appendix Table 6 presents our (rough) estimates of the magnitude of marketing margins and trade costs for types of crops in Tanzania. The high values in the early 1990s reflect the inefficiencies of marketing boards, and similar excess margins probably prevailed in the 1980s. The available evidence suggests that liberalization increased efficiency and reduced margins from the mid-1990s down to about 10 percent (higher or lower depending on the vagaries of world prices). Thus, 10 percent is taken as the base estimate unless better data are available.

We only have estimates of margins for foods in the mid-2000s, information suggesting that the margin on grains in regional markets is around 10 percent rising to 20 percent in DSM, while margins on fruits and vegetables are about ten percentage points higher in each market. In the analysis below, we utilize two retail reference prices (taken as averages for each year to smooth of seasonal variations). The DSM price refers to the national market, and as a lower bound we select the regional market in which the product was traded (i.e. a price recorded) in all months that had the lowest price.

Transport Costs

Kweka (2006) has calculated effective protection incorporating transport costs (but not at a highly disaggregated level). This analysis was based on broad sectors, and we summarize the results below to provide a flavor.

Estimates of freight costs in Tanzania, comparing 1998 and 2002, suggest that average costs were quite low, especially for overland freight, but increased slightly (Appendix Table 7). While sea freight costs on average fell from 12 percent to 11 percent, land freight costs rose from four to almost seven percent (due largely to an increase in rail freight rates in 2001), and overall average costs rose from 16 percent to 18 percent. There were significant variations for the major export sectors. For the main cash crops (cotton, coffee, tea) overall costs fell significantly from 33 percent to 25 percent, due to a fall in sea freight costs. For non-traditional exports (fish and mining) however, overall transport costs appear to have risen. As the average changes are quite small and the data reliability is limited on actual freight rates, the cross-sector pattern of costs is more informative than the estimated trends over time. This suggests that transport costs for major export products remain quite high, especially for the non-traditional sectors into which Tanzania is aiming to diversify.

In contrast, there have been significant reductions in tariffs, and hence in protection due to trade policy. Estimates for Tanzania are in Appendix Table 8, comparing 1995 with 2001. Average (unweighted) nominal tariffs were reduced from 15 percent to just over 8 percent, contributing to a reduction in effective protection of imports from 31 percent to 17 percent. The most significant reductions were in building materials, machinery and other manufacturing. The results for effective taxation of exports give rise to concern, as this

increased from 32 percent to 40 percent. The rates are especially high, and increased, for cash crops – the traditional export sector; this almost entirely due to high and increasing levels of transport costs.

Treatment of Cotton

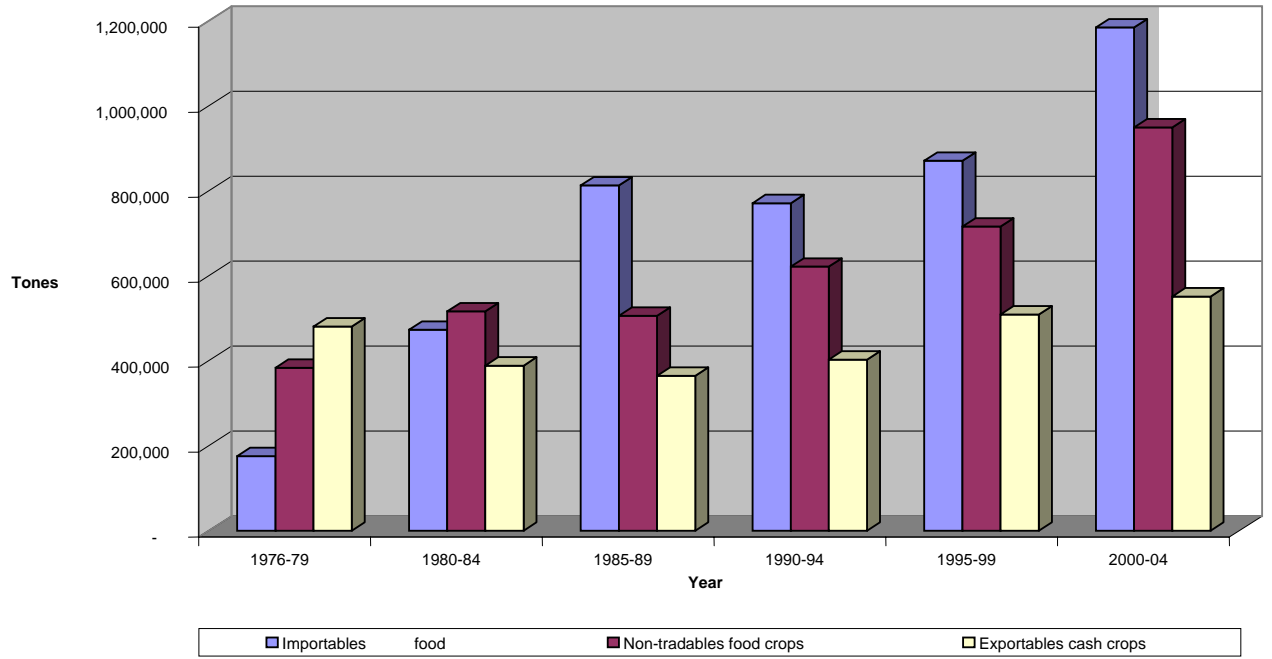
As Baffes (2007, pp. 17-18) notes, aspects of the structure of cotton production facilitates estimating distortions (provided one has adequate data). There is a generally accepted international reference price and as almost all cotton is exported conditions in the domestic market are not very important. The distortion to cotton lint captures the distortions to the cotton sector quite well, while the rate of conversion (the ginning ratio) from cotton seed to cotton lint is usually known. On the other hand, it is usually very difficult to fully incorporate the effects of taxes, government interventions at various stages of production and marketing, and true marketing and distribution costs.

The initial estimates of distortions to cotton were based on seed cotton prices, for which data were available covering the whole period, as a measure of the primary (farm-gate) product. These estimates ('Initial' in Appendix Table 9) suggested implausibly high distortions, and did not capture the expected reductions in distortions from the mid-1990s as exchange rate distortions were eliminated. In the light of comments from Colin Poulton, it was evident that ginning ratios and margins had not been properly incorporated so we revised our estimates of distortions to the sector, as set out in Appendix Table 9.

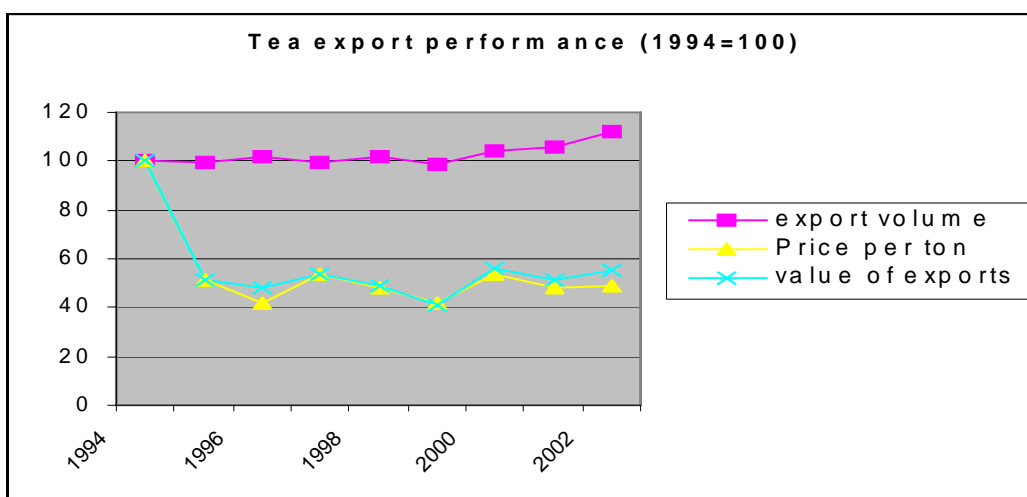
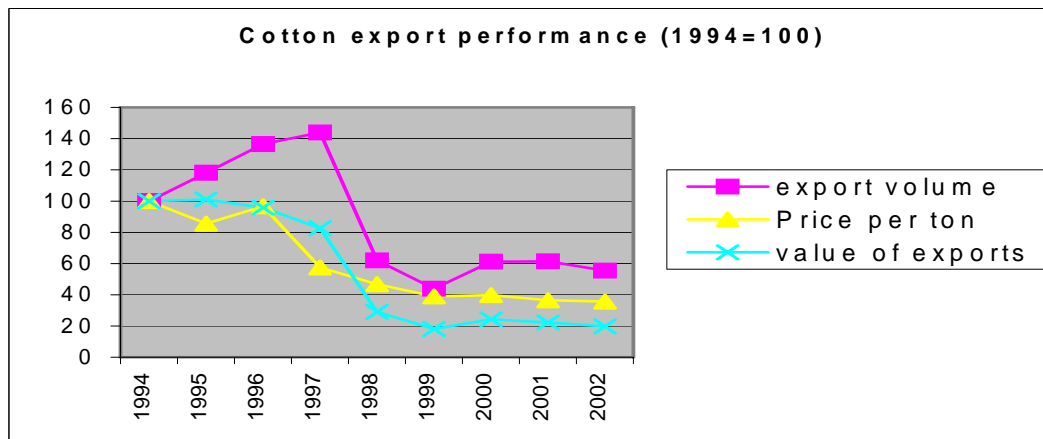
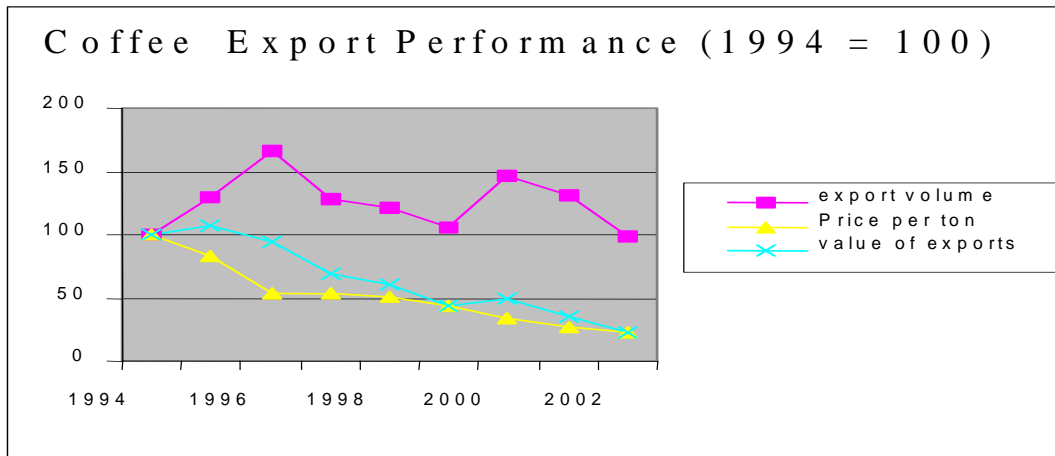
For Revision1, we used cotton lint prices (applying the ginning ratio only to link this to farm production). These prices were not available for all years, so some estimation was required. This generated substantially different estimates ('Revision1' in Appendix Table 9), suggesting much lower levels of distortions being eliminated by the early 1990s. However, these estimates reveal implausibly large positive distortions from the mid-1990s and especially 2000s. On inspecting the data from the mid-1980s, the domestic producer (cotton lint) prices are seen to have been increasing at implausibly rapid rates (e.g. doubling between 1984 and 1985, trebling between 1986 and 1988, then more than doubling by 1992 and again by 1995). This contrasts with an international reference price that was stagnant or even declining during this period. It also contrasts with seed cotton and other local prices: Appendix Figure 4 (for Cotton) suggests farm-gate and wholesale local seed cotton prices appear to have stagnated since the late 1980s, although export prices rose significantly.

As this implies serious concern over the reliability of the price data, the second revision estimates the producer price (inclusive of all margins) as a fixed ratio of the export price (on which we did have reliable data). 'From 1990-94 the mean share of the c.i.f. export price received by producers was 45%; from 1995-2006 it has been 59%' (Poulton and Maro 2007, p. 40). To stretch the revision back to 1985, we assumed the proportion received over 1985-89 was 40 percent. This generated the final estimates ('Revision2' in Appendix Table 9) that appear more plausible. It seems likely that the extent of distortions is underestimated for the 1970s, and overestimated from the mid-1980s (especially 1985-94). Nevertheless, we feel that Revision2 is a marked improvement over the initial estimates.

Appendix Figure 1: Annual crop production, Tanzania, 1976 to 2004
(metric tons)



Appendix Figure 2: Export performance for major crops, Tanzania, 1994 to 2002



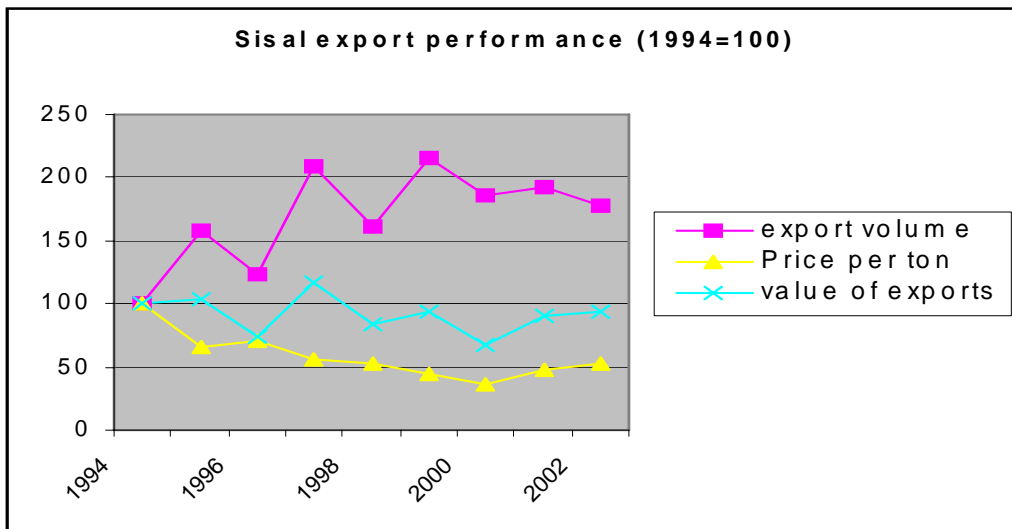
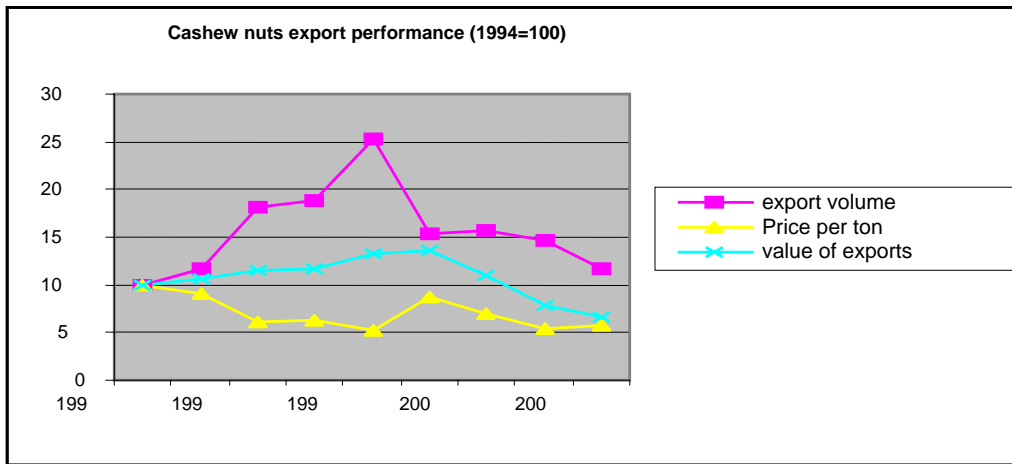
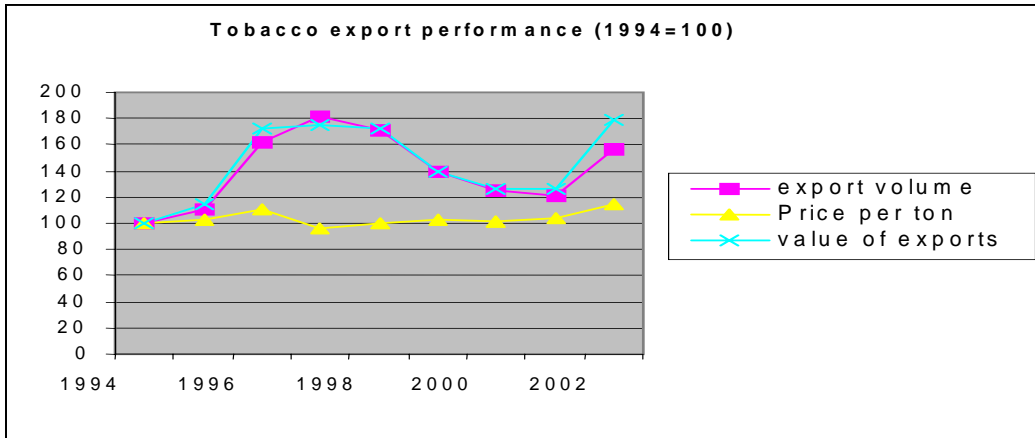


Figure 3: Tea Prices (current), 1976 to 2004

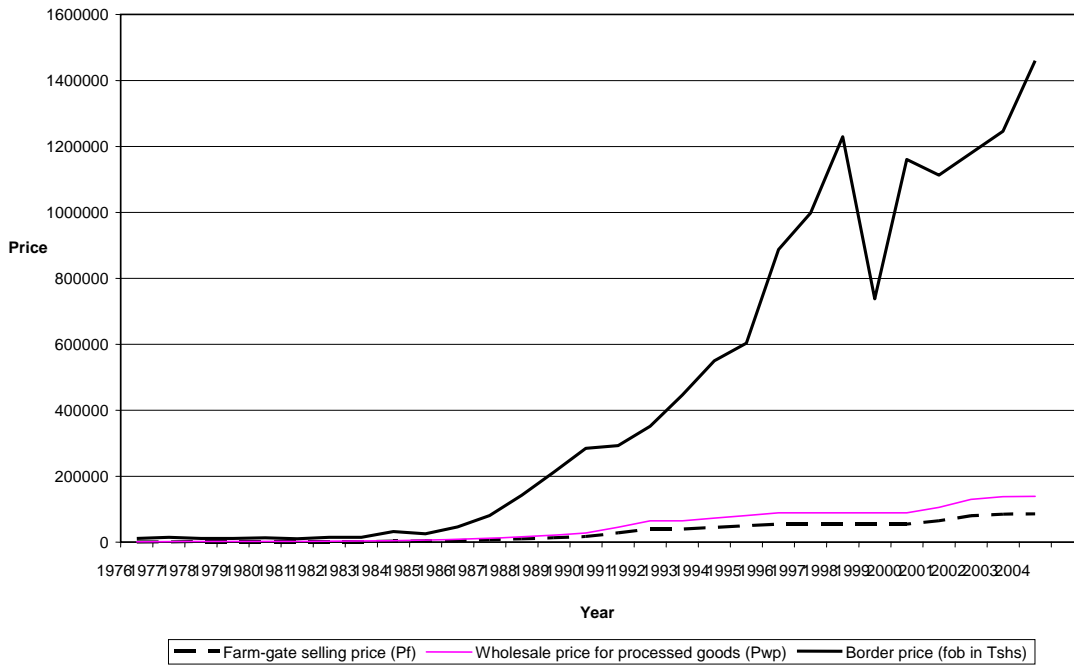


Figure 4: Cotton Prices (current), 1976 to 2004

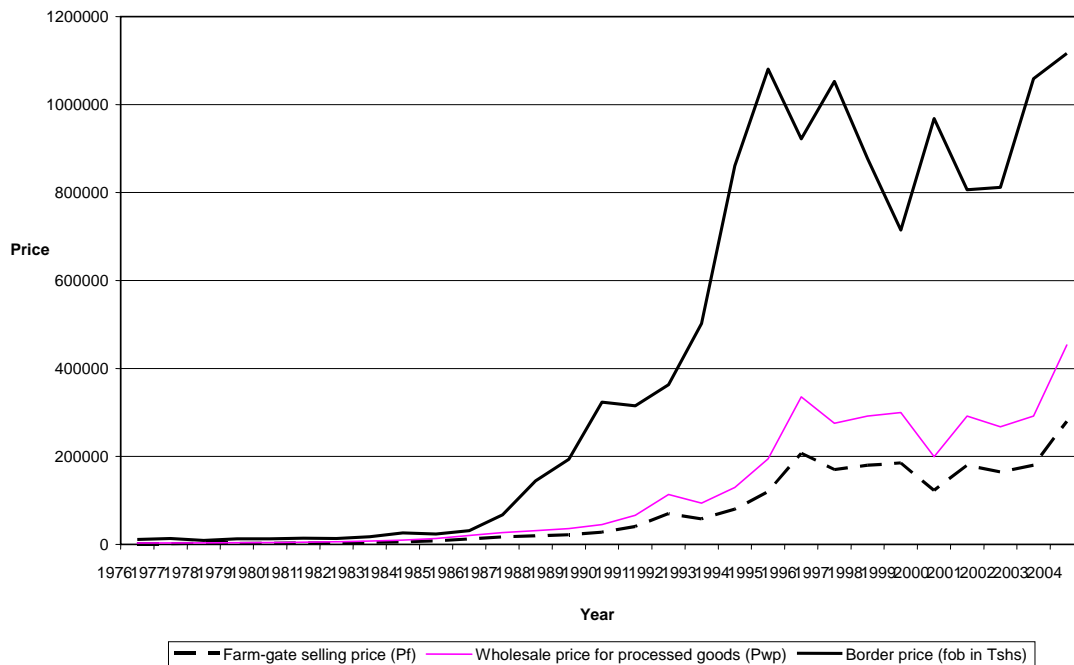


Figure 5: Tobacco Prices (current), 1976 to 2004

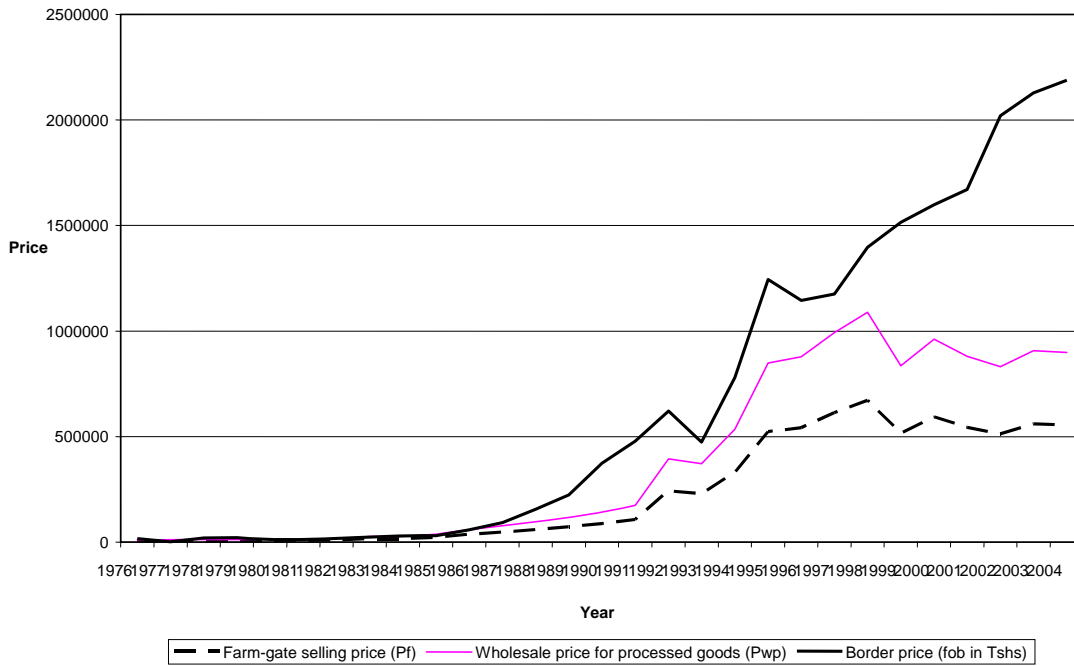


Figure 6: Pyrethrum Prices (current), 1976 to 2004

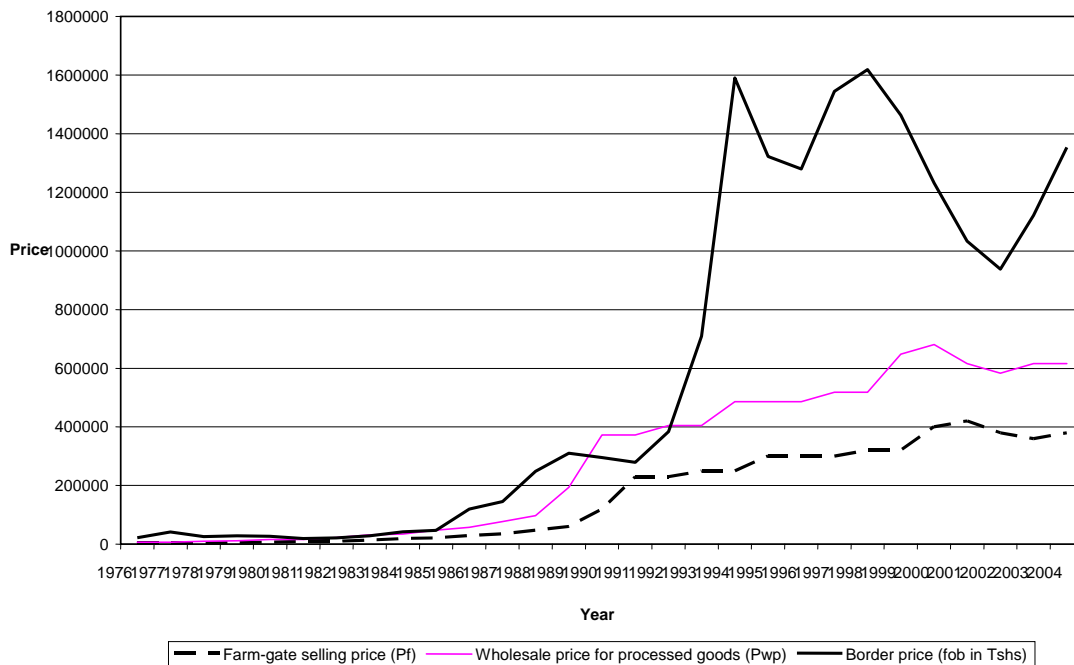


Figure 7: Cashewnut Prices (current), 1976 to 2004

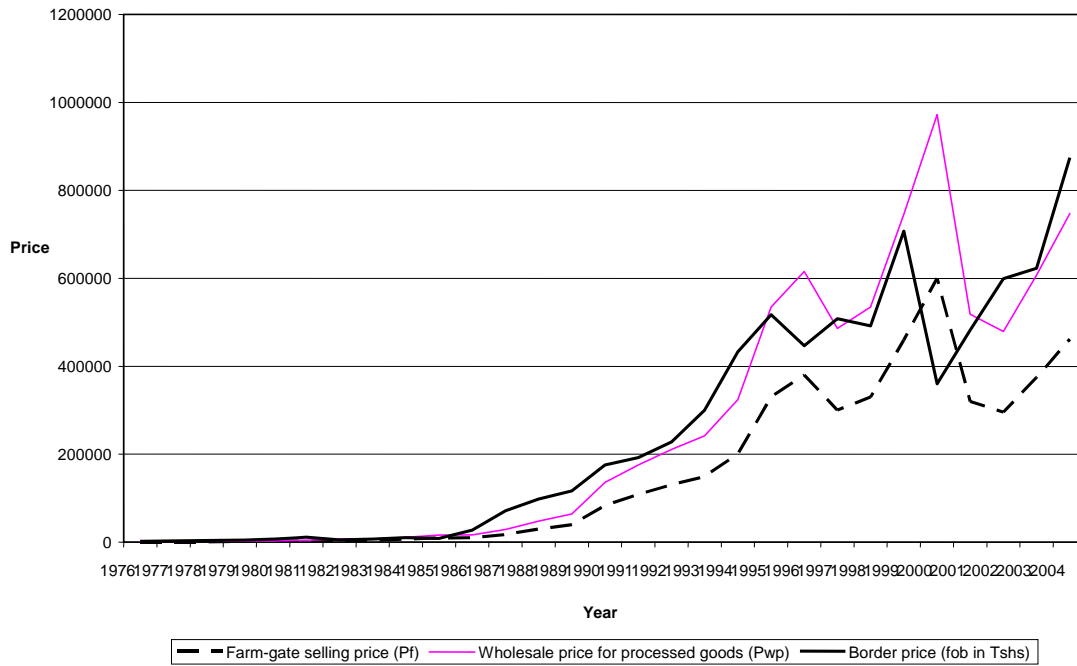


Figure 8: Sisal Prices (current), 1976 to 2004

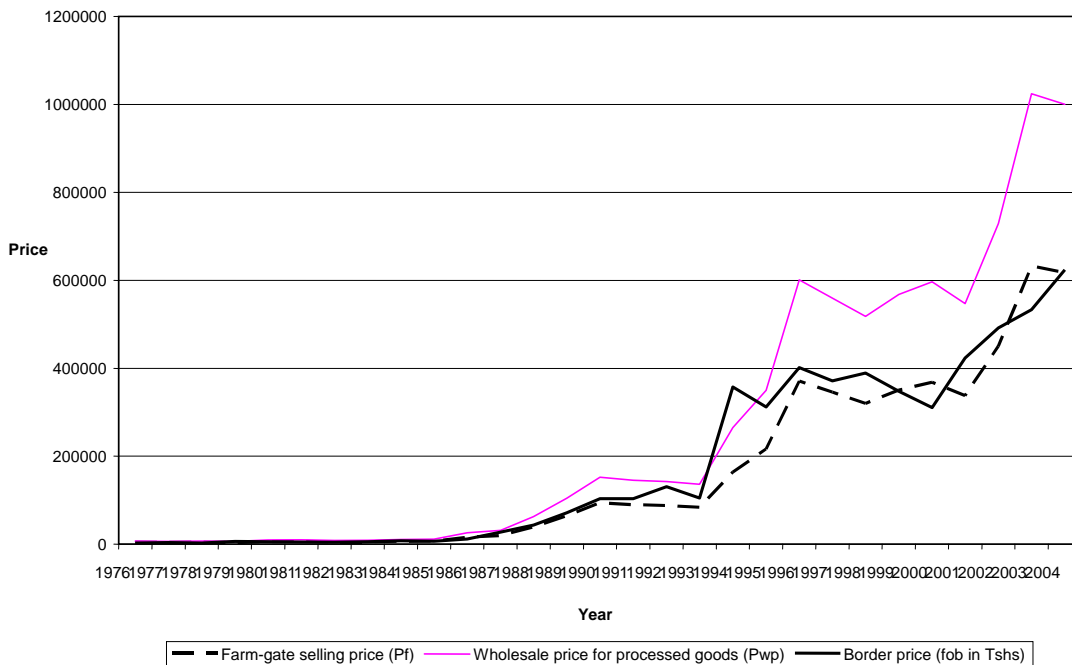


Figure 9: Maize Prices (current) 1976 to 2004

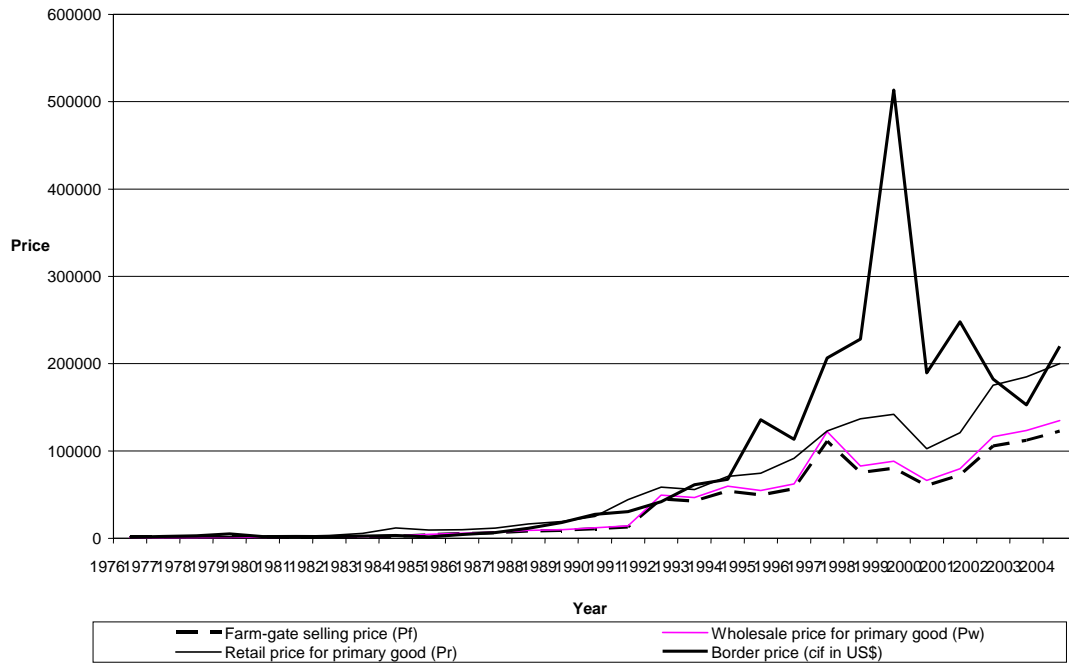


Figure 10: Paddy Prices (current), 1976 to 2004

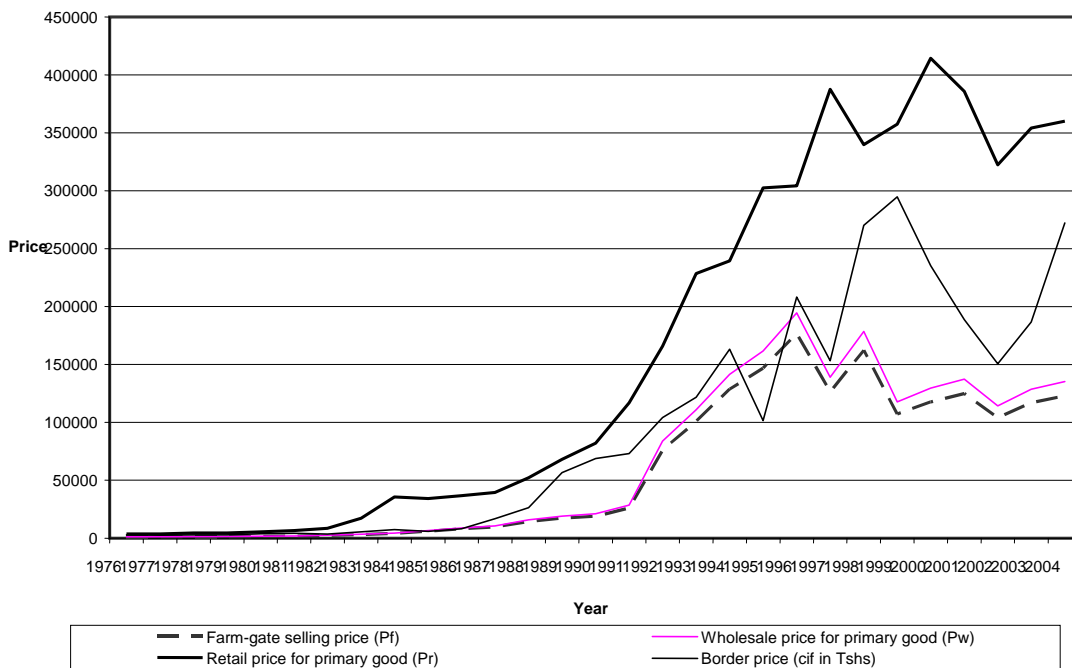


Figure 11: Wheat Prices (current), 1976 to 2004

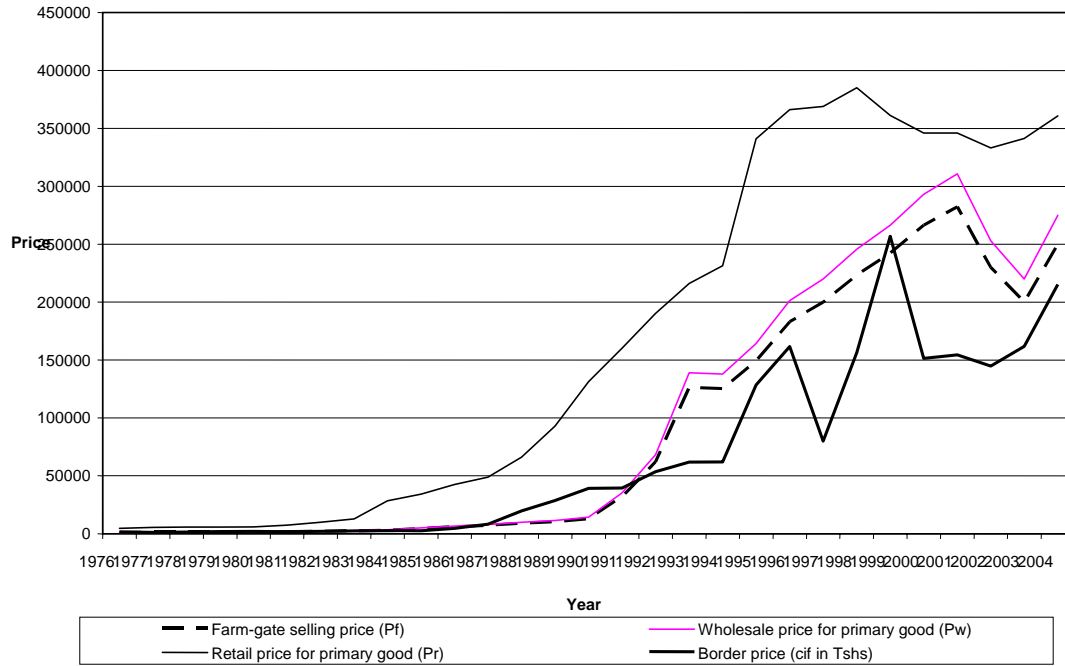


Figure 12: Sugar Prices (current), 1976 to 2004

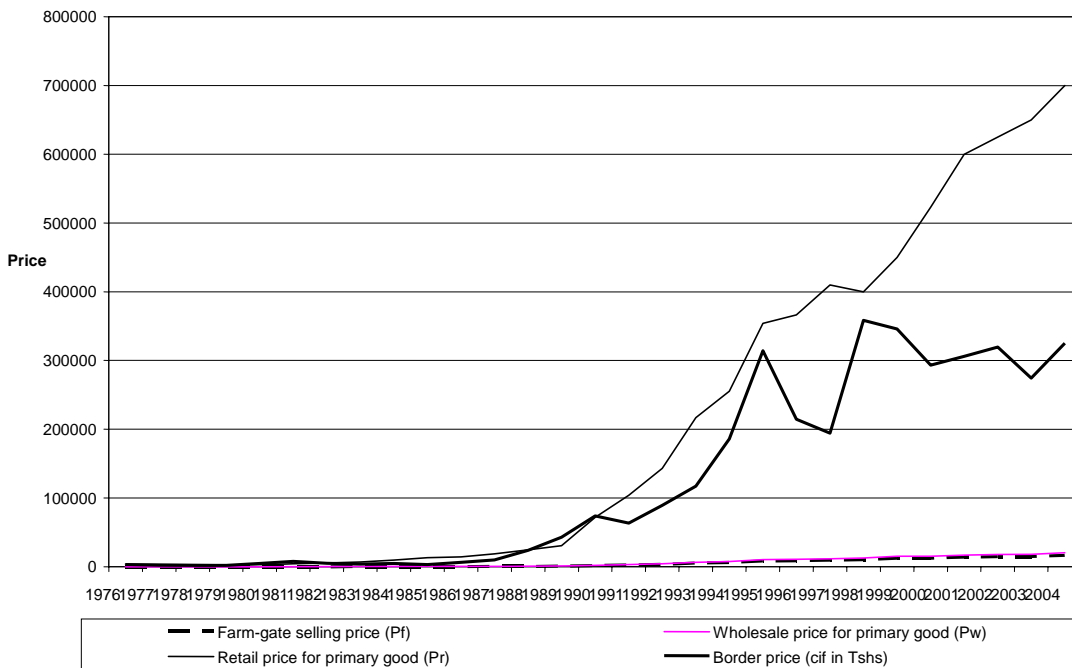


Figure 13: Coffee Prices (current), 1976 to 2004

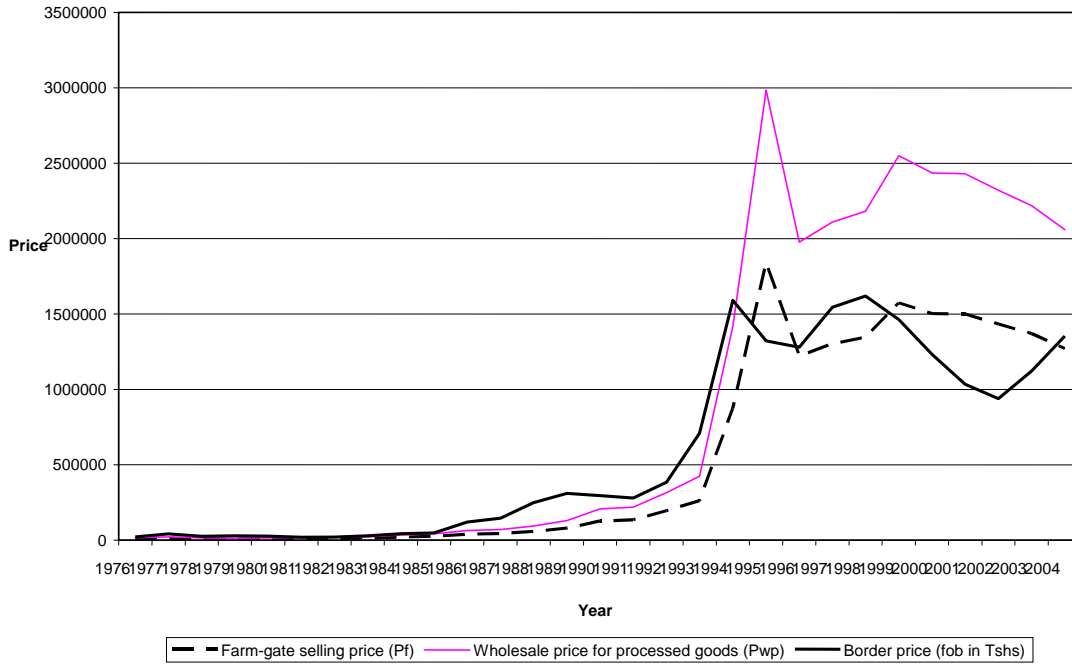


Figure 14: Sorghum Prices (current), 1976 to 2004

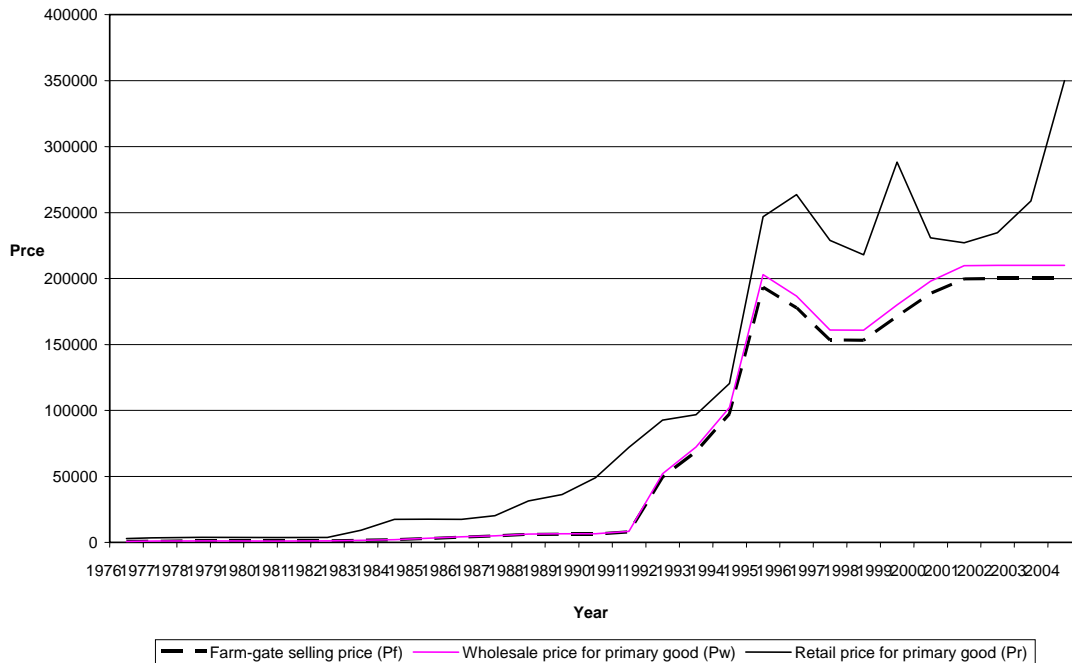


Figure 15: Millet Prices (current), 1976 to 2004

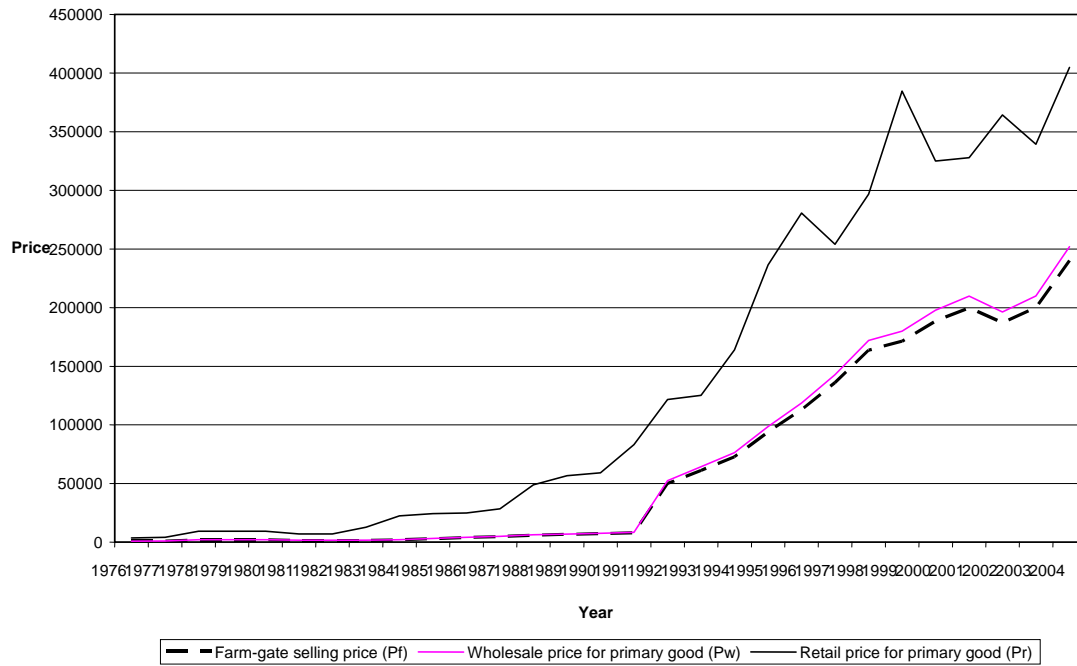
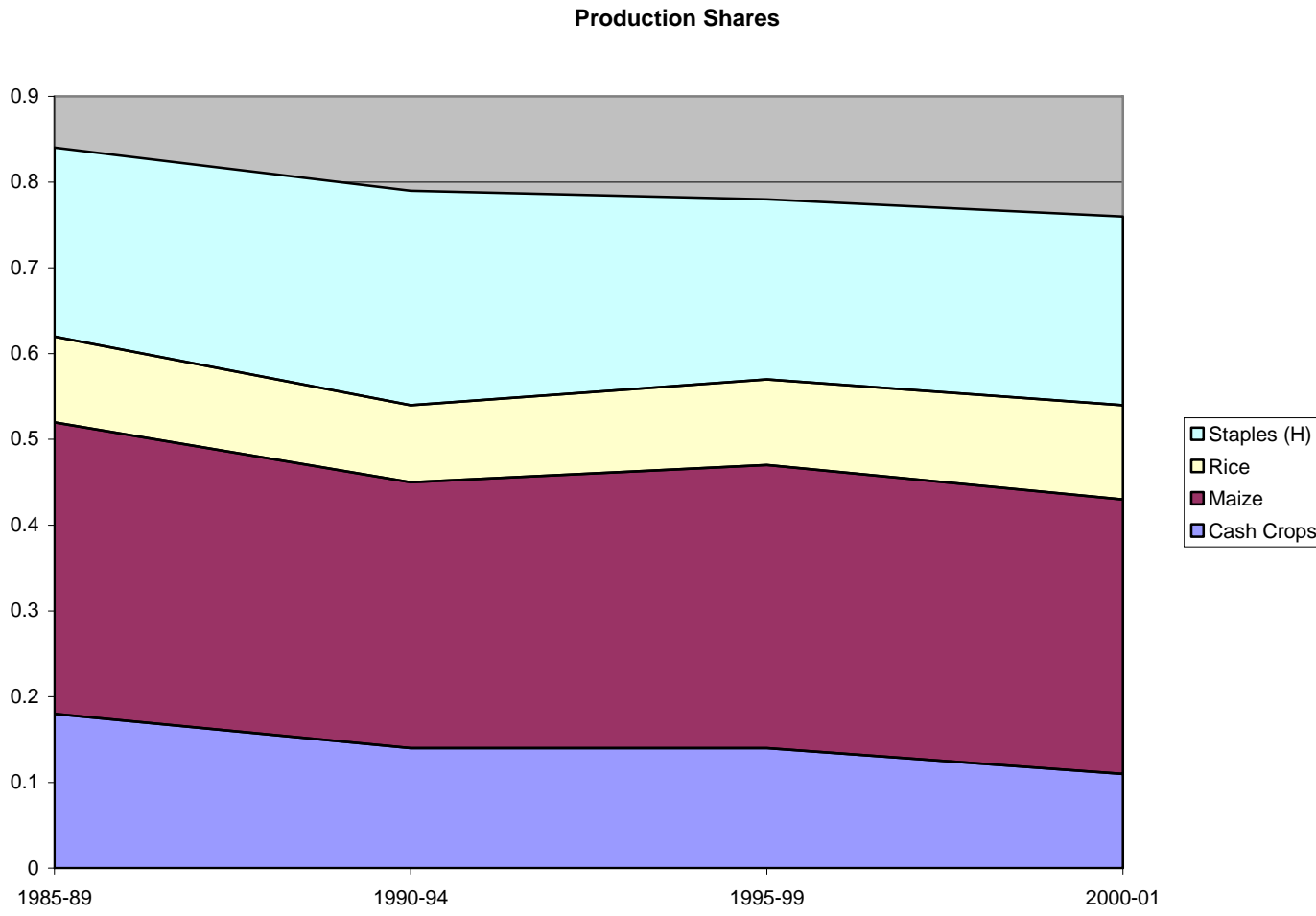


Figure 16 Production Shares of Main Crop (types), Tanzania 1985-2001



Appendix Table 1: Sector Contribution to GDP at factor cost (current prices), Tanzania, 1976 to 2004

(percent)

Sector	1976-79	1980-84	1985-89	1990-94	1995-99	2000-04
Agriculture	41.0	40.1	48.0	47.1	46.5	45.1
Mining	1.0	0.8	0.6	1.1	1.3	1.9
Manufacturing	12.4	9.8	8.1	8.1	7.4	7.3
Services	45.8	49.3	43.3	43.7	44.9	45.2

Source: Tanzania Economic Survey, 1991 and 2005. Figures may not add to 100 due to rounding.

Appendix Table 2: Product shares of total crop output, Tanzania, 1985 to 2001

Crop Shares	1985-89	1990-94	1995-99	2000-01
Coffee	0.03	0.02	0.02	0.01
Cotton	0.03	0.02	0.02	0.01
Cashew nuts	0.01	0.01	0.02	0.02
Beans	0.07	0.06	0.07	0.06
<i>Cash Crops (X)</i>	<i>0.18</i>	<i>0.14</i>	<i>0.14</i>	<i>0.11</i>
Maize	0.34	0.31	0.33	0.32
Rice	0.10	0.09	0.10	0.11
<i>Food Crops (M)</i>	<i>0.45</i>	<i>0.41</i>	<i>0.44</i>	<i>0.44</i>
Millet/ Sorghum	0.08	0.07	0.06	0.05
Cassava	0.05	0.06	0.06	0.05
Sweet Potatoes	0.03	0.06	0.03	0.03
Bananas	0.05	0.05	0.05	0.08
<i>Staples (H)</i>	<i>0.22</i>	<i>0.25</i>	<i>0.21</i>	<i>0.22</i>
Other Foods	0.15	0.17	0.19	0.19
Total	0.98	0.98	0.98	0.99

Notes: Crop shares are value of crop output as a proportion of total agricultural production. Comparable data series were only available for 1985-2001, and excluded sugar. Only the most important crops are listed under each of the three types (*X*, *M* and *H*).

Appendix Table 3: Prices and NRAs for food importables, Tanzania, 1976 to 2004 (using the estimated equilibrium exchange rate)

	Maize			Rice			Wheat		
	DP	BP	(BP-DP) /BP	DP	BP	(BP-DP) /BP	DP	BP	(BP-DP) /BP
1976	800	1743	-0.541	1000	4966	-0.799	1000	2670	-0.625
1977	800	2820	-0.716	1000	3705	-0.730	1200	1584	-0.242
1978	850	3424	-0.752	1200	3635	-0.670	1250	1668	-0.251
1979	850	6386	-0.867	1200	3696	-0.675	1250	2378	-0.474
1980	1000	3683	-0.728	1500	8057	-0.814	1300	4094	-0.682
1981	1000	3720	-0.731	1750	8399	-0.792	1650	4099	-0.597
1982	1500	3667	-0.591	2300	7294	-0.685	2200	3651	-0.397
1983	1750	5877	-0.702	3000	14063	-0.787	2500	5896	-0.576
1984	2200	7640	-0.712	4000	18019	-0.778	3000	6484	-0.537
1985	4000	3681	0.087	6000	14215	-0.578	4500	5926	-0.241
1986	5250	9406	-0.442	8000	18064	-0.557	6000	10054	-0.403
1987	6300	10857	-0.420	9600	28298	-0.661	7200	13833	-0.480
1988	8200	16995	-0.518	14400	39445	-0.635	9000	29406	-0.694
1989	9000	21077	-0.573	17300	66557	-0.740	10350	33724	-0.693
1990	11000	34220	-0.679	19000	86025	-0.779	13000	48747	-0.733
1991	13000	39540	-0.671	26000	94610	-0.725	32000	51089	-0.374
1992	44860	49574	-0.095	76130	123134	-0.382	62000	63326	-0.021
1993	42500	64091	-0.337	100830	127316	-0.208	126330	64693	0.953
1994	54150	69355	-0.219	128620	167974	-0.234	125330	63740	0.966
1995	49690	139256	-0.643	146851	104049	0.411	149330	131636	0.134
1996	56740	115728	-0.510	176758	212683	-0.169	183000	165080	0.109
1997	111140	214038	-0.481	126330	158813	-0.205	200000	82847	1.414
1998	75325	240715	-0.687	162330	285170	-0.431	223330	165011	0.353
1999	80264	539194	-0.851	107000	309400	-0.654	242216	269688	-0.102
2000	60347	194218	-0.689	117700	241042	-0.512	266438	155120	0.718
2001	72343	247958	-0.708	124762	188730	-0.339	282424	154421	0.829
2002	105761	182311	-0.420	103850	150500	-0.310	230000	144741	0.589
2003	112188	152612	-0.265	116884	186544	-0.373	200000	161694	0.237
2004	122627	219958	-0.443	122915	272177	-0.548	250000	215313	0.161

Note: Domestic price (DP) is farm-gate (primary) in LC/MT; border price (BP) is cif import price (\$/MT) converted to LC using equilibrium exchange rate.

Source: Authors' spreadsheet using methodology from Anderson et al. (2006)

Appendix Table 4: Prices and NRAs for food importables, Tanzania, 1976 to 2004 (using retail price and official exchange rate)

	Maize			Rice			Wheat		
	RP	MP	(BP-RP) /BP	RP	MP	(BP-RP) /BP	RP	MP	(BP-RP) /BP
1976	1704	1010	0.687	3715	2877	0.291	4523	1547	1.924
1977	1705	1951	-0.126	3715	2564	0.449	5427	1096	3.952
1978	1811	2649	-0.316	4458	2811	0.586	5653	1290	3.382
1979	1811	4833	-0.625	4458	2798	0.593	5653	1800	2.141
1980	2131	1738	0.226	5573	3801	0.466	5879	1931	2.045
1981	2131	1895	0.125	6502	4278	0.520	7462	2088	2.574
1982	3196	1813	0.763	8545	3605	1.370	9950	1805	4.512
1983	5500	2345	1.345	17200	5611	2.065	12700	2352	4.400
1984	11700	3141	2.725	35500	7407	3.793	28400	2666	9.653
1985	9400	1532	5.136	34200	5915	4.78	34200	2466	12.869
1986	9800	4199	1.334	36800	8064	3.563	42400	4488	8.447
1987	11500	6407	0.795	39400	16700	1.359	48800	8163	4.978
1988	16433	11330	0.450	52150	26297	0.983	66100	19604	2.372
1989	19167	17922	0.069	68112	56594	0.204	93000	28675	2.243
1990	24875	27386	-0.092	82081	68843	0.192	131400	39011	2.368
1991	44284	30531	0.450	116900	73052	0.600	160200	39448	3.061
1992	58553	41950	0.396	165700	104198	0.590	190300	53587	2.551
1993	55914	61205	-0.087	228500	121582	0.879	216100	61780	2.498
1994	70690	67335	0.050	239500	163082	0.469	231300	61884	2.738
1995	74444	135860	-0.452	302600	101511	1.981	340900	128426	1.654
1996	91562	113316	-0.192	304200	208250	0.461	366100	161639	1.265
1997	122950	206489	-0.405	387600	153213	1.530	368900	79925	3.616
1998	136780	228045	-0.400	339800	270161	0.258	385100	156326	1.463
1999	142000	513518	-0.723	357400	294666	0.213	361300	256845	0.407
2000	102490	189481	-0.459	414500	235162	0.763	346000	151336	1.286
2001	120770	247958	-0.513	385800	188730	1.044	346000	154421	1.241
2002	175400	182311	-0.038	322300	150500	1.142	333100	144741	1.301
2003	185000	152612	0.212	354200	186544	0.899	341200	161694	1.110
2004	200000	219958	-0.091	360000	272177	0.323	360700	215313	0.675

Note: Domestic Retail price (RP) in LC/MT; import price (MP) is cif import price (\$/MT) converted to LC using official exchange rate. (RP-MP)/MP captures the retail level effect.

Source: Authors' spreadsheet using methodology from Anderson et al. (2006)

Appendix Table 5: Foreign exchange rates, Tanzania, 1976 to 2004

(Tanzanian Shillings per \$US)

	Official rate	Parallel market rate	Estimated equilibrium exchange rate
1976	8.37677	20.539	14.4578
1977	8.28920	15.672	11.9808
1978	7.71204	12.224	9.9705
1979	8.21662	13.494	10.8553
1980	8.19659	26.553	17.3751
1981	8.28350	24.243	16.2634
1982	9.28259	28.274	18.7786
1983	11.14278	44.713	27.9282
1984	15.29225	59.109	37.2006
1985	17.47233	66.508	41.9904
1986	32.69802	113.798	73.2484
1987	64.26035	153.518	108.8892
1988	99.29211	198.584	148.9382
1989	143.3769	193.859	168.6184
1990	195.0559	292.416	243.7362
1991	219.1574	348.500	283.829
1992	297.7081	405.916	351.8124
1993	405.274	443.5	424.387
1994	509.6309	540.208	524.9198
1995	574.7617	603.499	589.1308
1996	579.9767	604.666	592.3215
1997	612.1225	656.875	634.499
1998	664.6712	738.523	701.5974
1999	744.7591	819.235	781.997
2000	800.4085	840.428	820.4187
2001	876.4117	876.411	876.4117
2002	966.5828	966.582	966.5828
2003	1038.419	1038.419	1038.419
2004	1053.3	1053.3	1053.3

Note: No commodity-specific exchange rates available, nor did we have any data on proportion of currency sold on parallel market, nor retention or discount rates.

Equilibrium rate based on simple average of nominal and parallel rates.

Source: Authors' spreadsheet using methodology from Anderson et al. (2006)

Appendix Table 6: Estimates of margins in the food value chain, Tanzania
(percent of price)

Sector	External Trade			Marketing Margin		
	Early90s	Late90s	2000s	Early90s	Late90s	2000s
<i>Cash Crops (X)</i>	35	33.4	24.5	25	10	10
Coffee				50	6	10
Cotton				30	10	10
Cashews						5
<i>Food Crops (M): grains</i>	25	20.6	15.5			10-20
Other food crops						20-30
<i>Manufactured foods</i>	20	17.2	18.5			
<i>Staple foods (H)</i>	na	na	na	<5	<5	<5

Notes: Figures for 'External Trade' are estimates of international trading costs expressed as a percentage of the export or import price. Figures for 'Marketing Margin' are estimates of supply chain margins as a share of producer price (these correspond to the sum of mark-ups on farm gate price and retail markup in the spreadsheet template as it was not possible to distinguish wholesale and retail margins). The margin in the 'cash crop' row is the figure used if no product-specific estimates are available; similarly for food crops and manufactured foods rows. The margin range given for food crops in 2000s is the regional-DSM spread.

Appendix Table 7: Transport cost estimates, Tanzania, 1998 and 2002

Sector	Land		Sea		Total	
	1998	2002	1998	2002	1998	2002
Livestock	0.071	0.110	0.062	0.070	0.133	0.179
Food products	0.027	0.036	0.179	0.119	0.206	0.155
Coffee, tea, cotton & sugar	0.058	0.083	0.276	0.162	0.334	0.245
Fish products	0.000	0.000	0.056	0.066	0.056	0.067
Manufactured foods	0.006	0.012	0.166	0.173	0.172	0.185
Beverages and tobacco	0.092	0.121	0.251	0.260	0.343	0.381
<i>Average</i>	<i>0.042</i>	<i>0.066</i>	<i>0.121</i>	<i>0.114</i>	<i>0.164</i>	<i>0.181</i>

Notes: Only agriculture sectors reported. Figures can be interpreted as nominal protection rates for imports, tax rates on exports.

Source: Kweka (2006)

Appendix Table 8: Tariffs, protection and taxation, Tanzania, 1995 and 2001

Sector	Tariffs		Protection		Taxation	
	1995	2001	1995	2001	1995	2001
Livestock	0.086	0.188	0.054	0.156	0.160	0.221
Food products	0.106	0.087	0.296	0.189	0.251	0.205
Cash crops	0.319	0.141	0.788	0.582	0.750	1.059
Fish products	0.134	0.046	0.197	0.083	0.083	0.090
Manufactured foods	0.118	0.124	0.438	0.501	0.535	0.853
Beverages & tobacco	0.150	0.025	0.472	0.073	0.874	1.010
<i>Average</i>	<i>0.149</i>	<i>0.085</i>	<i>0.308</i>	<i>0.167</i>	<i>0.320</i>	<i>0.401</i>

Notes: Only agriculture sectors reported. Tariffs indicates NRP, Protection refers to ERPs for imports (including transport costs), and Taxation is total effective taxation of exports.

Source: Kweka (2006)

Appendix Table 9: Alternative estimates of NRAs for cotton, Tanzania, 1976 to 2004

	1976-79	1980-84	1985-89	1990-94	1995-99	2000-04
Initial	-0.80	-0.83	-0.80	-0.83	-0.72	-0.69
Revision1	-0.57	-0.36	-0.64	-0.70	-1.38	-5.15
Revision2	-0.33	-0.53	-0.15	-0.25	-0.30	-0.31

Notes: Computed as detailed in text and spreadsheets. **Initial** estimates based on prices for seed cotton and do not fully account for transformation to cotton lint. **Revision1** is based on the cotton lint price, but this was not always available and gives implausible results after mid-1990s. **Revision2** estimates the producer price as a proportion of the export price, using figures reported in Poulton and Maro (2007).

Appendix Table 10: Annual distortion estimates, Tanzania, 1976 to 2004

(a) Nominal rates of assistance to covered products
(percent)

	Bean	Cashe w	Cassa va	Coffee	Cotton	Maize	Millet	Plantai n	Potato	Pyreth rum
1976	-84	-65	0	-68	-88	-24	0	0	0	-87
1977	-79	-62	0	-72	-87	-51	0	0	0	-92
1978	-76	-69	0	-63	-75	-55	0	0	0	-76
1979	-67	-69	0	-74	-82	-76	0	0	0	-74
1980	-83	-86	0	-81	-88	-57	0	0	0	-80
1981	-69	-85	0	-67	-87	-57	0	0	0	-69
1982	-55	-49	0	-68	-85	-35	0	0	0	-62
1983	-86	-70	0	-78	-88	-54	0	0	0	-70
1984	-88	-68	0	-77	-90	-56	0	0	0	-77
1985	-83	-46	0	-74	-83	68	0	0	0	-71
1986	-87	-81	0	-83	-80	-13	0	0	0	-85
1987	-82	-82	0	-79	-82	-4	0	0	0	-77
1988	-81	-75	0	-81	-89	-17	0	0	0	-80
1989	-77	-61	0	-70	-87	-21	0	0	0	-55
1990	-79	-49	0	-54	-91	-42	0	0	0	-17
1991	-62	-43	0	-51	-87	-41	0	0	0	-17
1992	-43	-35	0	-42	-78	68	0	0	0	-25
1993	-4	-32	0	-50	-84	30	0	0	0	-52
1994	-35	-36	0	-23	-87	54	0	0	0	-74
1995	-43	-10	0	0	-84	-29	0	0	0	-68
1996	-33	0	0	0	-68	-3	0	0	0	-67
1997	-45	-18	0	0	-78	2	0	0	0	-71
1998	-64	-5	0	0	-71	-39	0	0	0	-72
1999	-55	-7	0	0	-63	-71	0	0	0	-61
2000	-42	0	0	0	-81	-39	0	0	0	-49
2001	-24	2	0	0	-66	-42	0	0	0	-43
2002	-38	-24	0	0	-69	16	0	0	0	-41
2003	-56	-7	0	0	-74	47	0	0	0	-48
2004	-65	-19	0	0	-61	12	0	0	0	-57

Continued over

Appendix Table 10(a) (cont)

	Rice	Sisal	Sorghu m	Sugar	Tea	Tobacc o	Wheat	Yam	All covered
1976	-67	n.a.	0	-40	-95	-70	-60	0	-52
1977	-53	n.a.	0	9	-95	n.a.	-15	0	-54
1978	-41	n.a.	0	2	-86	-60	-12	0	-44
1979	-42	-39	0	-6	-86	-63	-39	0	-51
1980	-71	-37	0	-74	-94	-62	-67	0	-60
1981	-67	-20	0	-77	-92	-59	-58	0	-59
1982	-50	-31	0	-55	-94	-66	-37	0	-50
1983	-67	-55	0	-47	-94	-69	-58	0	-67
1984	-66	-60	0	-36	-96	-74	-54	0	-66
1985	-35	-49	0	39	-92	-64	-24	0	-41
1986	-31	-27	0	-22	-95	-67	-39	0	-58
1987	-44	-49	0	-6	-93	-64	-44	0	-53
1988	-37	-25	0	-42	-94	-68	-66	0	-56
1989	-52	5	0	-43	-93	-62	-63	0	-51
1990	-60	-4	0	-29	-94	-75	-68	0	-57
1991	-51	-12	0	13	-90	-77	-27	0	-49
1992	15	-23	0	26	-87	-55	18	0	-22
1993	55	9	0	73	-88	-34	148	0	-9
1994	51	-36	0	31	-89	-41	152	0	-12
1995	n.a.	-3	0	9	-88	-41	46	0	-30
1996	65	0	0	66	-91	-33	43	0	-18
1997	56	0	0	100	-92	-28	208	0	-19
1998	11	0	0	3	-94	-32	71	0	-36
1999	-32	0	0	21	-89	-51	14	0	-43
2000	-4	0	0	72	-93	-45	121	0	-23
2001	32	0	0	96	-91	-50	138	0	-18
2002	38	0	0	96	-90	-61	107	0	-11
2003	25	0	0	137	-90	-59	61	0	-8
2004	-10	0	0	115	-91	-61	51	0	-23

Appendix Table 10 (continued): Annual distortion estimates, Tanzania, 1976 to 2004
 (b) Nominal and relative rates of assistance to all^a agricultural products, to exportable^b and import-competing^b agricultural industries, and relative^c to non-agricultural industries (percent)

	Total ag NRA				Ag tradables NRA	Non-ag tradables NRA	RRA
	Covered products		Non- covered products	All products (incl NPS)			
	Inputs	Outputs					
1976	0	-52	-2	-36	-50	41	-65
1977	0	-54	-1	-45	-61	36	-72
1978	0	-44	-1	-40	-60	32	-70
1979	0	-51	-1	-46	-66	33	-75
1980	0	-60	-3	-57	-74	69	-84
1981	0	-59	-3	-52	-63	68	-78
1982	0	-50	-3	-46	-57	68	-75
1983	0	-67	-4	-64	-73	72	-84
1984	0	-66	-4	-63	-74	72	-85
1985	0	-41	-3	-35	-45	47	-62
1986	0	-58	-3	-51	-61	46	-73
1987	0	-53	-2	-47	-57	40	-69
1988	0	-56	-1	-50	-59	37	-70
1989	0	-51	0	-44	-55	28	-65
1990	0	-57	-1	-50	-62	20	-68
1991	0	-49	-1	-44	-55	21	-63
1992	0	-22	0	-17	-22	18	-34
1993	0	-9	0	-6	-9	12	-19
1994	0	-12	0	-9	-13	12	-22
1995	0	-30	0	-24	-35	11	-42
1996	0	-18	0	-14	-19	11	-27
1997	0	-19	0	-15	-20	12	-28
1998	0	-36	0	-29	-38	13	-45
1999	0	-43	0	-35	-46	13	-52
2000	0	-23	0	-17	-28	11	-35
2001	0	-18	0	-15	-23	10	-30
2002	0	-11	0	-8	-13	10	-21
2003	0	-8	0	-6	-10	10	-18
2004	0	-23	0	-17	-27	10	-33

Appendix Table 10 (continued): Annual distortion estimates, Tanzania, 1974 to 2004: (c)
 Value shares of primary production of covered^a and non-covered products,
 (percent)

	Bean	Cashe w	Cassa va	Coffee	Cotton	Maize	Millet	Plantai n	Potato	Pyreth rum
1976	4	1	9	7	15	7	1	1	2	0
1977	9	1	13	13	13	13	1	1	2	1
1978	20	1	15	6	7	14	4	1	3	0
1979	11	1	15	6	10	26	4	1	3	0
1980	17	2	10	11	13	13	2	1	3	0
1981	12	3	4	8	13	18	1	1	3	0
1982	9	1	5	10	14	19	1	3	5	0
1983	19	2	3	9	15	18	1	1	3	0
1984	19	1	3	8	15	17	1	5	2	0
1985	21	1	5	9	9	10	1	5	2	0
1986	20	1	3	13	13	13	1	4	2	0
1987	16	2	4	7	18	12	1	5	2	0
1988	15	1	3	9	18	14	1	5	2	0
1989	17	1	4	7	10	13	1	5	2	0
1990	12	2	3	5	17	16	1	6	2	0
1991	9	3	4	5	14	17	1	8	2	0
1992	9	1	0	3	18	11	4	4	1	0
1993	8	2	6	3	9	14	5	4	1	0
1994	9	2	5	5	9	11	3	3	1	0
1995	9	2	5	7	15	15	4	2	1	0
1996	10	2	5	4	13	13	3	4	1	0
1997	12	2	5	2	10	19	2	3	1	0
1998	21	2	6	3	4	17	2	3	1	0
1999	16	3	5	3	3	27	2	4	1	0
2000	13	4	5	4	4	13	2	13	1	0
2001	9	1	10	3	3	22	1	10	3	0
2002	6	2	10	5	4	11	0	18	1	0
2003	11	1	11	2	3	12	0	12	3	0
2004	18	1	9	1	3	11	1	9	2	0

Continued over ...

Appendix Table 10(c) (cont)

	Rice	Sisal	Sorghu m	Sugar	Tea	Tobacc o	Wheat	Yam	Non- covered
1976	5	n.a.	1	1	6	2	1	4	33
1977	3	n.a.	2	0	7	n.a.	0	3	17
1978	4	n.a.	2	0	5	2	0	6	9
1979	2	2	1	0	4	2	1	2	9
1980	5	2	1	1	6	1	1	3	5
1981	7	2	1	3	6	1	1	4	12
1982	6	2	1	2	9	2	1	2	7
1983	8	1	1	1	8	2	1	1	5
1984	8	1	2	1	9	1	1	1	5
1985	6	1	2	0	7	1	1	1	18
1986	6	1	1	0	6	2	1	1	12
1987	10	1	2	0	6	1	1	1	13
1988	10	1	1	0	6	1	1	1	12
1989	13	1	2	1	7	1	1	2	13
1990	7	1	2	1	9	2	1	1	12
1991	7	1	2	1	9	4	1	1	12
1992	8	0	7	1	6	2	1	1	23
1993	7	0	6	1	6	2	1	1	25
1994	7	1	10	1	6	0	0	1	25
1995	n.a.	0	13	1	3	2	1	1	20
1996	5	1	8	1	5	0	1	1	23
1997	4	0	5	0	5	3	0	2	24
1998	6	0	5	1	7	2	1	1	19
1999	6	1	5	1	3	1	0	1	19
2000	2	0	6	0	4	1	0	2	24
2001	6	0	5	0	3	1	0	2	19
2002	2	0	3	1	5	2	0	1	30
2003	4	1	4	0	3	2	0	2	29
2004	4	1	4	1	4	2	0	2	26

Source: Authors' spreadsheet

a. At farmgate undistorted prices