Kiel Institute for World Economics
Duesternbrooker Weg 120
24105 Kiel (Germany)

Kiel Working Paper No. 1102

The Bias Against Agriculture in Sub-Saharan Africa: Has It Survived 20 Years of Structural Adjustment Programs?

by
Rainer Thiele

April 2002

The Bias Against Agriculture in Sub-Saharan Africa: Has It Survived 20 Years of Structural Adjustment Programs?

Abstract: This paper deals with the question of whether the discrimination against agriculture that prevailed in Sub-Saharan Africa until the early 1980s has continued to characterize the region despite the widespread adoption of structural adjustment programs. The evolution of both direct interventions in agricultural markets and the indirect effects resulting from overvalued exchange rates and import substitution policies is evaluated empirically. It turns out that the taxation of export crops has become less severe but is still significant in most producing countries, and that progress in eliminating macroeconomic distortions has differed enormously between countries, with a slightly positive overall trend.

Keywords: Agricultural Pricing Policies, Exchange Rate Misalignment, Sub-Saharan Africa

JEL–classification: F31; Q18

Rainer Thiele
Kiel Institute of World Economics
24100 Kiel, Germany
Telephone: 0431–8814215
Fax: 0431–8814500
E-mail: r.thiele@ifw.uni-kiel.de

For helpful suggestions I thank Rolf J. Langhammer. Financial support from the German Science Foundation (DFG) is gratefully acknowledged.

CONTENTS

LIST OF TABLES

I. INTRODUCTION

It is a well-established fact that until the early 1980s governments in Sub-Saharan Africa (SSA) laid a heavy tax burden on agriculture, both directly via interventions in agricultural markets and indirectly via overvalued exchange rates and import substitution policies (e.g. Krueger et al. 1992; Wiebelt et al. 1992). Given the strong role that agriculture has always played in the region, this strategy has in all likelihood entailed substantial welfare losses, although the magnitude of these losses can only be guessed because of a lack of empirical evidence on the responsiveness of SSA agriculture to price incentives (Thiele 2000).[1]

This paper deals with the question of whether the discrimination against agriculture, and thus the potential cost it entails, has continued to characterize most of SSA up to the present time. *A priori*, the answer to this question is ambiguous. On the one hand, since 1980 almost all SSA countries have undergone one or more structural adjustment programs which explicitly aim at a removal of the direct and indirect discrimination against agriculture. But, on the other hand, it is known that many of these programs were not fully implemented (Kherallah et al. 2000; World Bank 1997). The objective of the subsequent

---

[1] Only in the extreme case of perfectly inelastic supply the taxation of agriculture would have been costless.

analysis is to resolve the ambiguity by presenting time-series evidence on the evolution of the incentives for agricultural production in a large sample of SSA countries covering the period 1975–98.

The paper is structured as follows. Chapter II keeps track of the policies which directly affect the profitability of agriculture in SSA, distinguishing between output and input measures. Chapter III shows how the indirect incentives provided by the macroeconomic framework have evolved over time, using the black market premium and model-based estimates as alternative proxies for exchange rate misalignment. Chapter IV concludes on the results.

II. DIRECT INCENTIVES FOR AGRICULTURAL PRODUCTION

1. Output Pricing Policy

A suitable concept to measure the impact of price interventions in agricultural output markets is the nominal rate of protection (NRP). The NRP compares domestic and world market prices, where fob prices for export crops and cif prices for import substitutes denote the relevant world market prices. To avoid distortions in measured NRPs, domestic and world market prices should be measured at the same point of the marketing chain (Westlake 1987), e.g. at the

farmgate level. This can be achieved by subtracting internal marketing and transport costs (MTC) from the fob price and adding them to the cif price, respectively. Dollar-denominated world market prices finally have to be converted into domestic currency through multiplication with the exchange rate (*E*). Formally, the NRP for export crops produced by country *i* in period *t* is then given as

$$(1) \qquad NRP_{it}^{\exp} = \frac{P_{it}^{dom}}{P_{it}^{fob} \cdot E_{it} - MTC_{it}},$$

and for import substitutes as

$$(2) \qquad NRP_{it}^{imp} = \frac{P_{it}^{dom}}{P_{it}^{cif} \cdot E_{it} + MTC_{it}}.$$

A protection rate equal to one indicates neutral incentives, a rate below one a discrimination and a rate above one a subsidization of domestic producers.

NRPs were calculated for SSA's dominating export crops – cocoa, coffee, and cotton – and for its two major import-competing food crops – maize and rice. Other important grains, notably cassava, millet and sorghum, were not taken into consideration as they are mostly non-traded commodities. The data employed in the analysis are nominal producer prices, export unit values, and import unit values, which are all available from the FAOSTAT data base (FAO 2001). Unit values were converted into domestic currency using official exchange rates. No

adjustment was made for internal marketing and transport costs because data reliability tends to be low and because the focus here is on changes over time rather than exact levels of protection. As a consequence, NRPs are slightly overestimated for food crops and slightly underestimated for cash crops.

Table 1 shows the evolution of price incentives for major producers of the three export crops over the period 1975–95. Not surprisingly, it turns out that all three commodities were heavily taxed during the 1970s and 1980s. In the early 1990s, the tax burden has been lowered, especially in the case of cocoa and coffee, but in almost all countries domestic prices have remained significantly below their world market equivalents.

A much more heterogeneous picture emerges for food crops, as is revealed in Table 2. First, in all sub-periods, some governments have tried to protect domestic farmers against import competition, whereas others have aimed at keeping prices low to satisfy urban consumers. Second, there appears to be no clear trend over time. While Mauritius and Senegal, for example, moved from a more or less neutral regime to a heavy subsidization of domestic maize and rice farmers, respectively, the opposite was true for maize cultivation in Guinea and Togo.

Table 1 — Nominal Protection Rates for Cash Crops, 1975–95[a]

Commodity/Country \ Protection rate	1975–84	1985–89	1990–95	Trend[b]
Cocoa				
Cameroon	0.44	0.66	0.89	+
Congo, Rep. of	0.26	0.36	0.68	+
Côte d'Ivoire	0.51	0.64	0.76	+
Gabon	0.69	0.49	0.85	+
Ghana	0.72	0.37	0.48	–
Nigeria	0.92	1.20	1.00	+
Sierra Leone	0.66	0.48	0.18	–
Togo	0.34	0.46	0.86	+
Average	**0.57**	**0.58**	**0.71**	**+**
Coffee				
Burundi	0.59	0.63	0.84	+
Cameroon	0.47	0.66	0.70	+
Central African Rep.	0.23	0.22	0.37	+
Congo, Rep. of	0.21	0.29	0.77	+
Côte d'Ivoire	0.44	0.53	1.26	+
Ethiopia	0.44	0.57	0.61	+
Gabon	0.57	0.31	0.58	0
Guinea	0.76	0.65	0.80	0
Kenya	0.97	0.92	0.85	–
Madagascar	0.37	0.35	0.79	+
Rwanda	0.58	0.61	0.55	0
Tanzania	0.42	0.42	0.49	0
Togo	0.30	0.42	0.82	+
Uganda	0.25	0.23	0.24	0
Average	**0.47**	**0.49**	**0.70**	**+**
Cotton				
Benin	0.42	0.58	0.74	+
Burkina Faso	0.27	0.47	0.62	+
Cameroon	0.37	0.65	0.78	+
Central African Rep.	0.10	0.08	0.24	+
Chad	0.45	0.34	0.49	0
Mali	0.51	0.30	0.51	0
Mozambique	0.36	0.49	0.28	0
Niger	0.27	0.46	0.47	+
Senegal	0.24	0.38	0.50	+
Sudan	0.54	1.16	1.52	0
Tanzania	1.29	1.27	0.21	–
Uganda	0.62	0.48	0.73	+
Zambia	0.65	0.48	0.40	–
Average	**0.47**	**0.55**	**0.58**	**+**

[a] Protection rates are calculated according to equation (1). – [b] "+" denotes a decreasing distance from a NPR of unity, i.e. a declining bias of production incentives, "–" denotes an increasing distance from a NPR of unity, i.e. an increasing bias of production incentives, and "0" denotes a missing trend.

Source: Own calculations based on World Bank (2000) and FAO (2001).

Table 2 — Nominal Protection Rates for Food Crops, 1975–95[a]

Commodity/Country \ Protection rate	1975–84	1985–89	1990–95	Trend[b]
Maize				
Botswana	0.84	0.88	0.76	0
Cameroon	1.08	0.85	1.07	0
Côte d'Ivoire	1.01	0.55	0.70	–
Gabon	0.48	0.72	1.05	+
Guinea	1.88	0.64	1.02	+
Kenya	0.75	1.23	0.74	0
Malawi	0.49	0.32	0.41	0
Mauritius	0.97	2.13	2.00	–
Mozambique	0.86	1.04	0.45	–
Swaziland	0.89	1.01	0.95	0
Tanzania	0.69	1.52	0.46	0
Togo	1.53	1.11	1.15	+
Uganda	0.72	1.86	1.58	–
Zambia	0.46	0.21	0.22	–
Average	**0.90**	**1.00**	**0.90**	**0**
Rice				
Burundi	0.61	0.82	0.96	+
Côte d'Ivoire	1.05	1.45	1.26	–
Guinea	1.54	1.32	1.02	+
Madagascar	0.81	0.85	0.70	–
Malawi	0.28	0.44	0.44	+
Mali	0.55	1.23	1.21	+
Mauritania	1.32	1.29	1.13	+
Mozambique	1.07	1.46	0.50	–
Senegal	1.15	1.89	2.59	–
Tanzania	0.83	1.35	0.65	–
Average	**0.92**	**1.21**	**1.04**	**0**

[a] Protection rates are calculated according to equation (2). – [b]"+" denotes a decreasing distance from a NPR of unity, i.e. a declining bias of production incentives, "–" denotes an increasing distance from a NPR of unity, i.e. an increasing bias of production incentives, and "0" denotes a missing trend.

Source: Own calculations based on World Bank (2000) and FAO (2001).

2. Input Pricing Policy

To obtain a complete picture of the price incentives provided to farmers, measures directed at the use of inputs have to be taken into account in addition to output pricing policies. Asia's Green Revolution, for example, was to a large extent driven by a massive subsidization of secondary inputs – mainly fertilizers, pesticides, and irrigation facilities – which by far outweighed any taxation at the output level, thus effectively protecting domestic farmers.

Has something similar happened in SSA, if perhaps on a lower scale? A look at the use of secondary inputs in agricultural production provides a first indication that this has not been the case. As Table 3 shows, the application of fertilizers, the most important secondary input, is very limited throughout the region and almost stagnated, on average, between 1975 and 1998. This stands in sharp contrast to the performance of a control group of 6 low and lower-middle income Asian countries where over the same period average fertilizer consumption increased by 90 percent, starting from much higher initial quantities. Within SSA, only a small minority of countries was able to more than double fertilizer consumption, albeit from a very low base, while many others even experienced a decline.

Table 3 — Fertilizer Consumption in SSA and Asia, 1975–98 (kg/ha)

Region \ Fertilizer consumption	1975–84	1985–89	1990–98	Growth between first and third period (percent)
Sub-Saharan Africa				
High performers (5 countries)a	1.5	3.2	4.4	182
Medium performers (11 countries)b	13.6	15.3	16.2	20
Low performers (10 countries)c	6.8	6.1	3.9	–73
Average	**8.8**	**9.8**	**9.6**	**9**
Asia				
High performers (4 countries)d	40.3	71.5	100.6	150
Medium performers (2 countries)e	117.1	164.6	173.4	48
Average	**65.9**	**102.5**	**124.9**	**90**

[a] Countries where fertilizer consumption increased by more than 100 percent between the first and third period: Burkina Faso, Burundi, Guinea, Nigeria, Togo. – [b] Countries where fertilizer consumption increased by 0–100 percent between the first and third period: Chad, Côte d'Ivoire, Kenya, Madagascar, Malawi, Mali, Niger, Rwanda, Sudan, Tanzania, Zimbabwe. – [c] Countries where fertilizer consumption declined between the first and third period: Cameroon, Central African Rep., Congo, Gabon, Gambia, Ghana, Mozambique, Senegal, Uganda, Zambia. – [d] India, Indonesia, Pakistan, Thailand. – [e] The Philippines, Sri Lanka.

Source: Own calculations based on World Bank (2000).

The slow growth of fertilizer applications observed in SSA may of course be due to other factors than lacking price incentives.[2] A more direct assessment of the input pricing policies pursued by SSA governments is, however, severely impaired by the scarcity of appropriate information on the prices paid by farmers for secondary inputs. Domestic price data are only available over time for selected fertilizers such as ammonium sulphate and superphosphate, and not at all for other inputs. World fertilizer prices, in turn, can only be calculated for broad aggregates (nitrogenous fertilizers, phosphate fertilizers, potash fertilizers). To make domestic and international prices comparable, individual domestic fertilizer prices were aggregated using consumption shares as weights. This procedure does, however, not resolve the problem that domestic and world market prices may reflect very different commodity bundles. The resulting protection coefficients thus have to be regarded as a very rough indication of the incentives prevailing in SSA.

The NRPs presented in Table 4 reveal that between 1975 and 1998 fertilizer consumption was always subsidized in some countries and taxed in others, with no trend over time. Only in three cases – nitrogenous fertilizers in Malawi and

---

2 A recent study by Minot et al. (2000), for example, comes to the conclusion that the crop mix, rather than subsidies, has mainly determined fertilizer use in Benin and Malawi since the early 1980s.

Mauritius, and phosphate fertilizers in Tanzania – measured protection rates point towards a permanent subsidization of domestic farmers. Overall, together with the low fertilizer consumption levels reported in Table 3, these results suggest that input pricing policies in SSA have been of minor importance during the period under consideration relative to output pricing policies.

III. INDIRECT EFFECTS OF MACROECONOMIC POLICY

Agriculture as a sector that mainly produces tradable goods is not only affected by direct government interventions but also by the general macroeconomic and trade policy framework. The World Bank study on the political economy of agricultural pricing policies even concluded that the indirect effects emanating from trade protection and macroeconomic disequilibria often dominate the direct incentives (Krueger et al. 1992). In the following, the evolution of general economic policies in SSA will be examined using two different concepts.

Table 4 — Nominal Protection Rates for Fertilizers, 1975–98[a]

Types of Fertilizer/Country \ Protection Rate	1975–84	1985–89	1990–98	Trend[b]
Nitrogenous Fertilizer				
Cameroon	0.83	0.85	1.13	0
Côte d'Ivoire	0.86	0.93	1.58	–
Ghana	1.41	0.88	0.72	0
Kenya	0.95	1.12	1.15	0
Madagascar	1.37	1.11	1.01	+
Malawi	0.62	0.71	0.63	0
Mauritius	0.69	0.55	0.72	0
Tanzania	0.86	1.03	0.87	0
Average	**0.95**	**0.90**	**0.98**	**0**
Phosphate Fertilizers				
Côte d'Ivoire	1.55	1.39	1.79	–
Gambia	0.79	0.90	1.40	–
Mauritius	0.87	0.95	1.15	0
Niger	1.16	0.86	0.88	0
Tanzania	0.76	0.49	0.73	0
Zambia	1.66	1.14	0.85	+
Zimbabwe	0.83	1.16	1.36	–
Average	**1.09**	**0.98**	**1.16**	**0**
Potash Fertilizers				
Benin	0.77	1.07	1.04	+
Côte d'Ivoire	0.86	0.82	0.96	+
Kenya	1.46	1.52	1.20	+
Madagascar	0.93	1.41	1.33	–
Togo	1.54	1.11	1.46	0
Zimbabwe	0.96	0.82	0.70	–
Average	**1.09**	**1.13**	**1.12**	**0**

[a] Protection rates are calculated using prices paid by farmers as domestic prices. Accordingly, a protection rate below unity indicates a subsidization of domestic farmers, and vice versa. – [b] "+" denotes a decreasing distance from a NPR of unity, "–" denotes an increasing distance from a NPR of unity, and "0" denotes a missing trend.

Source: Own calculations based on World Bank (2000) and FAO (2001).

1. Exchange Rate Misalignment as Measured by Black Market Premia

The simplest measure of macroeconomic distortions uses the premium of the nominal black market exchange rate (B) over the official rate (E) as a proxy for real exchange rate misalignment. For country i in period t, this measure is given by

$$(3) \qquad RERMIS_{it} = \left(\frac{B_{it}}{E_{it}} - 1 \right) \cdot 100.$$

The black market premium has been employed in a number of empirical studies (e.g. Collier and Gunning 1999) to gauge the impact of distortions such as overvalued exchange rates, capital controls, and import restrictions on economic growth. Being a very crude indicator, the main advantage of the black market premium lies in its simplicity and its availability for a large sample of developing countries. It has, however, been demonstrated that the black market premium tends to be quite strongly correlated with other, more sophisticated measures (e.g. Ghurra and Grennes 1993) so that one can also have some confidence in its reliability.

Table 5 shows the evolution of the black market premium over the period 1975–97 for 22 SSA countries. A very heterogeneous picture emerges. While some

Table 5 — Black Market Premia in Selected SSAn Countries, 1975–97 (percent)[a]

Black Market Premium / Country	1975–84	1985–89	1990–97	Trend[b]
Botswana	23	27	8	+
Burundi	28	22	39	0
Ethiopia	70	148	136	–
Gambia	6	10	7	0
Ghana	698	67	3	+
Guinea	362	242	16	+
Kenya	18	8	17	0
Lesotho	9	9	5	0
Madagascar	53	5	10	+
Malawi	77	25	19	+
Mauritania	79	137	65	0
Mozambique	719	2352	14	+
Nigeria	109	124	151	–
Rwanda	44	31	42	0
Sierra Leone	42	146	50	0
South Africa	12	9	5	+
Sudan	1525	2250	3173	–
Swaziland	–	11	10	0
Tanzania	202	208	21	+
Uganda	53492	15170	23	+
Zambia	69	217	55	0
Zimbabwe	109	55	21	+

[a]Black Market Premia were calculated using equation (3). No results are given for the members of the CFA zone (Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Gabon, Mali, Niger, Senegal, Togo), because in these countries the free convertibility of currencies vis-à-vis the French Franc has prevented the occurance of a parallel market for foreign exchange. – [b] A „+" indicates an improvement over time, a „–" indicates a deterioration, and a „0" indicates a missing trend.

Source: World Bank (various issues).

countries – notably Ghana, Mozambique and Uganda – succeeded in removing huge macroeconomic disequilibria, others such as Sudan and Nigeria experienced a dramatic deterioration. Between these two extremes lies a group of countries where changes were relatively modest. Overall, a weakly positive trend can be discerned, with the number of countries exhibiting moderate black market rates of below 20 percent, for example, increasing from 3 in the period 1975–84 to 11 in the period 1990–97.

2. Model-Based Estimates of Exchange Rate Misalignment

The second measure of real exchange rate misalignment employed in this study is based on a formal model of real exchange rate determination developed by Edwards (1989).[3] According to Edwards, the equilibrium real exchange rate is only affected by real variables, which can be categorized as external and internal "fundamentals", while inappropriate macroeconomic policies may induce deviations of the actual real exchange rate from its equilibrium value. In a situation of misalignment, a nominal devaluation may have a significant impact on the real exchange rate if it is accompanied by consistent macropolicies.

---

[3] A full exposition of the model is provided in Chapter I of Edwards (1989). Here, only some basic features will be described in order to motivate the subsequent empirical analysis.

The most important external fundamentals are the international terms of trade, the world interest rate, and capital inflows including foreign aid. Internal fundamentals encompass variables that are controlled by the government, such as various trade impediments, capital account restrictions, and public expenditures on nontradables, as well as variables that are independent of policy decisions, such as technical progress. Inappropriate macroeconomic policies can take the form of large fiscal deficits relative to GDP or rapid growth in the money stock relative to money demand. Such policies are inconsistent with a regime of fixed exchange rates and cause an appreciation in the actual real exchange rate, thereby raising the degree of misalignment.

To measure misalignment within this approach, a real exchange rate equation has to be estimated first. The empirical form chosen here closely resembles that employed in previous studies (e.g. Edwards 1989; Ghurra and Grennes 1993) and is given by

$$\log(RER_{it}) = \beta_0 + \beta_1 \log(TOT_{it}) + \beta_2 \log(CAPFLOW_{it}) + \beta_3 \log(CLOSE_{it}) + \beta_4 TECHPRO_{it} + \beta_5 EXCR_{it} + \beta_6 NOMDEV_{it} + u_{it}, \quad (4)$$

where

RER: actual real exchange rate, measured using the U.S. wholesale price index as a proxy for the foreign currency price of tradables and the domestic CPI as a proxy for the price of nontradables;

TOT: external terms of trade, defined as the ratio of the index of dollar export prices to the index of dollar import prices;

CAPFLOW: capital inflow measured as net increases in foreign borrowing and transfers, minus net factor payments;

CLOSE: ratio of GDP over the sum of imports and exports;

TECHPRO: technical progress, captured in a simple way by using a time trend;

EXCR: excess domestic credit, measured as the difference between growth in domestic credit and real GDP growth;

NOMDEV: growth in the official nominal exchange rate;

u: error term.

The effects of changes in the terms of trade on the real exchange rate depend on the size of the income and substitution effect. If the former dominates the latter, a rise in TOT will appreciate the equilibrium RER. Net capital inflows tend to cause an increase in spending on both tradables and nontradables. While prices of tradables are to a large extent determined in the world market, a surge in demand for nontradables exerts upward pressure on the respective prices, thus

leading to an appreciation of the equilibrium RER. The variable CLOSE is used as a proxy for trade restrictions which reduce openess and thereby cause the equilibrium RER to appreciate via a falling price of tradables. It has to be noted, however, that CLOSE is no exogenous variable as it is not only affected by trade policy but also by many other factors, including the RER itself (Cottani et al. 1990).[4] Furthermore, to adequately reflect the impact of trade policies across countries, CLOSE should be adjusted for differences in country size and endowments. These two problems are resolved simultaneously by employing an instrumental variable technique where size and endowments are among the instruments. Finally, the equilibrium RER is influenced by technical progress. Assuming that productivity improvements are largely confined to tradable sectors, the equilibrium relative price of tradables to nontradables will tend to decline over time (Balassa-Samuelson effect). Beside these determinants of the equilibrium RER, the variable EXCR captures the effect of over-expansionary macro policies which induce inflation and thereby appreciate the RER.[5] If the actual RER is overvalued, its depreciation can be brought about by a nominal devaluation.

---

4 More direct indicators of trade policy such as the ratio of import tariffs to imports were not considered here because for most SSAn countries they are only available for a few years.

5 The fiscal deficit ratio was considered as an additional proxy for distorted macro policies but it did not turn out to be significant.

Equation (4) was estimated with pooled time-series and cross-section data, covering the period 1975–98 for 35 SSAn countries. The estimated equation (with t-statistics in parentheses) is

$$\log(RER_{it}) = \underset{(8.12)}{-0.31\log(TOT_{it})} \underset{(2.62)}{-0.32\log(CAPFLOW_{it})} \underset{(20.24)}{-0.91\log(CLOSE_{it})} \quad (5)$$
$$\underset{(2.81)}{-0.01\,TECHPRO_{it}} \underset{(2.71)}{-0.24\,EXCR_{it}} \underset{(3.10)}{+0.18\,NOMDEV_{it}}$$

Adj. $R^2 = 0.75$, F-value = 41.25

All the estimated coefficients are significant at the 5 percent level and have the expected signs. Of particular importance for the analysis of the indirect discrimination of agriculture is that both trade restrictions and macroeconomic distortions have a significant impact on the RER.

The parameters of the estimated RER equation together with the sources of misalignment can be used to construct a model-based measure of RER misalignment. While strictly speaking EXCR is the only variable in equation (5) that causes the actual exchange rate to deviate from its equilibrium level, excessive trade restrictions can also be regarded as a source of policy-induced misalignment as they impose a tax on agricultural tradables. Nominal devaluations, by contrast, may reduce the degree of misalignment. Adopting a

procedure along the lines of Cottani et al. (1990), RER misalignment was then calculated as

$$(6)\ RERMIS_{it} = \left[\exp(0.24 EXCR_{it} + 0.91 \frac{CLOSE_{it}}{MINCLOSE_i} - 0.18 NOMDEV_{it}) - 1 \right] \cdot 100,$$

where $MINCLOSE_i$ denotes the average of the three lowest values of *CLOSE* for country i, representing the years in which openess was highest.

The results of these calculations are reported in Table 6, with a separate entry for the CFA zone members who share a common currency. It turns out that, owing to the rigidly fixed exchange rate that was not always sufficiently backed by macroeconomic restraint, RER misalignment in the CFA zone grew on average during the 1980s. The 50 percent devaluation of the CFA franc on January 1st 1994, however, had a strong enough impact on most CFA zone members to reverse the overall trend. Notable exceptions from this general pattern were the oil-producing countries of the region (Cameroon, Congo, and Gabon), where the effect of the nominal devaluation was offset by expansionary macro policies.

Table 6 — Model-based Estimates of Real Exchange Rate Misalignment, 1975–98 (percent)[a]

Country \ Misalignment	1975–84	1985–89	1990–98	Trend[b]
CFA Zone				
Benin	18.1	16.3	8.5	+
Burkina Faso	20.8	22.0	13.1	+
Cameroon	35.8	40.1	42.2	–
Central African Rep.	20.3	22.7	19.2	0
Chad	18.8	20.4	12.2	+
Congo, Rep.	28.4	33.1	32.8	–
Côte d'Ivoire	12.8	11.6	8.1	+
Gabon	28.1	35.0	33.2	–
Mali	42.1	44.6	33.7	+
Niger	23.1	20.6	14.1	+
Senegal	29.2	35.4	26.5	+
Togo	33.4	36.6	32.8	0
Average	**25.9**	**28.2**	**23.0**	**+**
Other SSA				
Botswana	8.1	9.0	5.3	+
Burundi	34.6	22.1	26.5	+
Ethiopia	17.8	30.1	29.4	–
Gambia	41.3	20.6	38.8	0
Ghana	290.8	56.3	22.1	+
Kenya	20.3	16.1	18.5	0
Lesotho	22.8	25.2	23.0	0
Madagascar	41.8	26.5	18.0	+
Malawi	38.0	19.2	16.5	+
Mauritania	42.1	49.5	38.1	0
Mauritius	18.3	23.1	19.5	0
Nigeria	38.2	44.6	45.1	–
Rwanda	26.2	31.4	36.8	–
Sierra Leone	41.5	62.3	79.1	–
South Africa	18.8	24.5	20.2	0
Swaziland	30.1	20.8	18.3	+
Tanzania	60.2	61.1	22.0	+
Uganda	146.4	n.a.	13.5	+
Zambia	32.4	40.8	26.5	+
Zimbabwe	20.6	14.2	16.1	+
Average	**49.5**	**31.4**	**26.7**	**+**

[a] RER misalignment is calculated using equation (6). – [b] "+" indicates an improvement over time, "–" indicates a deterioration, and "0" a missing trend.

Source: Own calculations based on IMF (2001) and World Bank (2000).

For the rest of SSA, average RER misalignment decreased continuously over the period 1975–98. The gap that existed between the two country groups until the early 1980s has almost disappeared.[6] Comparing the model-based estimates for individual countries with the respective black market premia reveals a high degree of correspondence. Only in 5 out of 20 cases where both measures were calculated (Burundi, Rwanda, Sierra Leone, Swaziland, and Zambia) they produce conflicting results with respect to the evolution of indirect incentives.

IV. CONCLUDING REMARKS

This paper has investigated empirically the evolution of the direct and indirect prices incentives for agriculture in Sub-Saharan Africa (SSA) over the period 1975–98. As for the direct interventions in agricultural markets, the most robust finding is that the tax burden laid on export crops has been lowered but remains at a substantial level throughout the region. The pattern that emerges for food crops does not display any such regularity. Producers of rice and maize, SSAs two main tradable food crops, have always been taxed in some countries and subsidized in others, with no discernible trend over time. Input pricing policies, which in Asia dominate the measures directed at output markets, do not seem to

---

6 It has to be noted that this gap did not reflect systematic differences between CFA and non-CFA countries, but that the high average misalignment in non-CFA countries was mainly caused by very poor performers such as Ghana and Uganda.

play a major role in SSA according to the limited evidence that can be established.

The two different proxies – the black market premium and a model-based indicator – that have been employed to measure the indirect effect of general economic policies on agriculture both suggest that, on average, macroeconomic disequilibria have become somewhat less severe. Dramatic improvements have, however, been confined to a few cases such as Uganda and Ghana, while in the majority of countries changes have only been moderate, and in some the situation has even deteriorated.

Overall, an answer to the question posed in the title of the paper then could be that not all but a significant part of the bias against agriculture in SSA has indeed survived two decades of structural adjustment.

REFERENCES

Collier, P., and J.W. Gunning (1999). Explaining African Economic Performance. *Journal of Economic Literature* 37: 64–111.

Cottani, W., D.F. Cavallo, and M.S. Khan (1990). Real Exchange Rate Behavior and Economic Performance in LDCs. *Economic Development and Cultural Change* 39: 61–76.

Edwards, S. (1989). *Real Exchange Rates, Devaluation, and Adjustment: Exchange Rate Policy in Developing Countries*. Cambridge, MA.

FAO (2001). FAOSTAT Agricultural Data. Rome (http://apps.fao.org).

Ghurra, D., and T. Grennes (1993). The Real Exchange Rate and Macroeconomic Performance in Sub-Saharan Africa. *Journal of Development Economics* 42: 155–174.

IMF (2001). International Financial Statistics CD-ROM. Washington, D.C.

Kherallah, M., C. Delgado, E. Gabri-Madhin, N. Minot, and M. Johnson (2000). The Road Half Travelled: Agricultural Market Reform in Sub-Saharan Africa. International Food Policy Research Institute, Food Policy Report No. 10. Washington, D.C.

Krueger, A.O., M. Schiff, and A. Valdés (1992). *The Political Economy of Agricultural Pricing Policies: A World Bank Comparative Study*. Baltimore.

Minot, N., M. Kherallah, and P. Berry (2000). Fertilizer Market Reform and the Determinants of Fertilizer Use in Benin and Malawi. International Food Policy Research Institute. Markets and Structural Studies Division Discussion Paper 40. Washington, D.C.

Thiele, R. (2000). Estimating the Aggregate Agricultural Supply Response. A Survey of Techniques and Results for Developing Countries. Kiel Institute for World Economics, Working Paper 1016. Kiel.

Westlake, M.S. (1987). The Measurement of Agricultural Price Distortion in Developing Countries. *The Journal of Development Studies* 23: 367–381.

Wiebelt, M., R. Herrmann, P. Schenck, and R. Thiele (1992). *Discrimination against Agriculture in Developing Countries*? Kiel Institute for World Econmics, Kiel Studies 243. Tuebingen.

World Bank (var. issues). *African Development Indicators*. Washington, D.C.

World Bank (1997). *Adjustment Lending in Sub-Saharan Africa: An Update*. Washington, D.C.

World Bank (2000). *World Development Indicators 1999*. Washington, D.C.