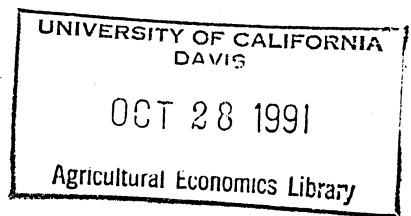# EXCHANGE RATE DISTORTIONS

IN INTERNATIONAL AGRICULTURAL TRADE

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Abstract

Many nations, particularly developing countries, overvalue their currencies. We measure the relative importance of exchange rate distortions for rice and wheat in five developing countries, 1982-1987, and find that exchange rate distortions have (in many cases) completely offset positive sectoral policy interventions, to the detriment of agricultural producers in developing countries.

EXCHANGE RATE DISTORTIONS
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World trade flows in major agricultural commodities are distorted by many types of policy interventions. These distortions can be grouped into three categories of policies: a) trade or border policies, such as tariffs, quotas, variable levies, and export subsidies, b) domestic or internal sectoral policies, such as support prices, deficiency payments, and input subsidies, and c) macroeconomic policies, such as income, interest rate and exchange rate policies (Gardner). Although multilateral trade negotiations under the GATT (General Agreement on Tariffs and Trade) typically focus only on the first of these types of distortions (border policies), domestic policies in agriculture did come under intense scrutiny during the recently stalled Uruguay round. GATT negotiations over internal and external agricultural policies led to a variety of proposals from various entities (the United States, European Community, Cairns Group, etc.), ranging from small deviations from the status quo to the elimination of all trade and domestic policies affecting the free trade of agricultural goods.

Most of the proposals discussed (and the research generated in support of the various proposals) considered only liberalization of distortions in border and domestic sectoral policies. Considerations about macroeconomic policies are not negotiated under the GATT framework since national policies are seldom designed exclusively for trade purposes. This last concern might be realistic for most higher income countries, but as some World Bank and IMF studies show, most developing countries implement distorting exchange rate policies (Shapouri and McNaig). These policies are particularly crucial in the case of rice since eighty percent of world imports and seventy percent of world rice exports are traded by "third world" countries. Consequently, the incorporation of exchange rate policies of major rice importing and exporting countries into

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empirical estimation becomes relevant when analyzing world rice trade. If distortions due to exchange rate fixation are relatively important (especially with respect to domestic or border policies), agreements reached under GATT negotiations might result in unexpected outcomes.

This paper provides a description of the extent in which world rice traders engage in exchange rate distortions and provides a measure of the relative importance of these distortions in five major developing country rice traders for the period 1982-1987. So as to gain some measure of comparison, the analysis is also done for wheat. We show that exchange rate distortions have in many cases completely offset positive sectoral policy interventions, to the detriment of agricultural producers in developing countries.

Background

Exchange rate distortions can be substantial in world rice markets. In an extensive review of policies affecting world rice trade in major importing and exporting countries, Childs identified Nigeria, Brazil, Pakistan and possibly India as countries where severe exchange rate distortions existed, although he provided little information on levels or measures of impacts of these distortions. A July 1990 USDA, FAS report analysed the sudden and dramatic emergence of Vietnam as a major rice exporter after more than 30 years of importer status. That surge appears to have been related to policy changes that may have included more realistic exchange rates reflecting world prices more accurately on domestic markets. Finally, Webb, Lopez and Penn reported that in certain countries, including Argentina, Brazil, Egypt, and Nigeria, an important portion of the policy distortion in rice, as measured by producer subsidy equivalents (PSE), was explained by exchange rate "adjustments". Our own calculations show that during 1987-1989, 15 of the top 20 major rice importing nations, representing over 46 percent of total world rice imports, had either

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undeniable or questionable exchange rate distorting policies.[1] On the export side, 10 of the 15 major rice exporters, (representing nearly 28 percent of total world rice exports) were applying various levels of distorting exchange rates (during 1987-1989).

Many developing countries operate fixed or pegged (as opposed to floating or flexible) exchange rate regimes in which currency values are determined by decree rather than by market forces. Many of these fixed exchange rates are "overvalued" in lesser developed countries (LDCs). That is, monetary authorities arbitrarily place too high a dollar price on the purchase of the currency, with the result that outsiders who might otherwise import LDC goods are hindered from doing so because of the need to purchase the overpriced currency prior to purchasing the goods. While overvalued exchange rates hurt LDC domestic producers and exporters, other-country exporters and LDC importers benefit, since LDC citizens surrender less domestic currency for the purchase of foreign goods than they otherwise would if "correct" exchange rates prevailed. An overvalued exchange rate thus supports an "import substitution" policy (Myint, p. 229), to the detriment of domestic producers, while an undervalued exchange rate acts as a subsidy to domestic producers.

Currency overvaluation reinforces a second prominent characteristic of many LDCs, the imposition of policies which directly or implicitly tax the agricultural sector. Much of the justification for this practice lies in the fact that in the early stages of development, agriculture is the largest, most prominent and most profitable sector in the country. Revenues generated from taxation of the agricultural surplus can be used for infrastructure development, for government budget support, or as a source of investment funds for a fledgling industrial sector. Currency overvaluation and sectoral taxation thus potentially provide a double shock to agriculture in many LDCs, and are particularly severe in countries where the agricultural sector has not yet

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attained reasonable output levels (Timmer).

The combination of exchange rate policies (over- or undervaluation) and external and internal sectoral policies (taxation or subsidization) generates six possible outcomes with respect to the agricultural sector. These outcomes are shown in Figure 1, where the sectoral subsidy or tax (per bushel) is plotted horizontally, with the exchange rate subsidy or tax (also per bushel) plotted vertically. As discussed earlier, currency overvaluation and sectoral taxation are both harmful to domestic producers, and appear as a double tax in quadrant III. On the other hand, the alternative set of reinforcing (complementary) policies, currency undervaluation and sectoral subsidization serve to provide a double boost to the agricultural sector (quadrant I). The opposite of these complementary policies is offsetting or contradictory policies, either overvaluation in conjunction with sectoral subsidization (quadrant IV) or undervaluation in conjunction with sectoral taxation (quadrant II). These two sets of offsetting policies each generate either net benefits or net costs to the sector, depending on the magnitudes of the effects. That is, currency

Undervaluation

II   I

Sectoral   Sectoral
Taxation   Subsidization

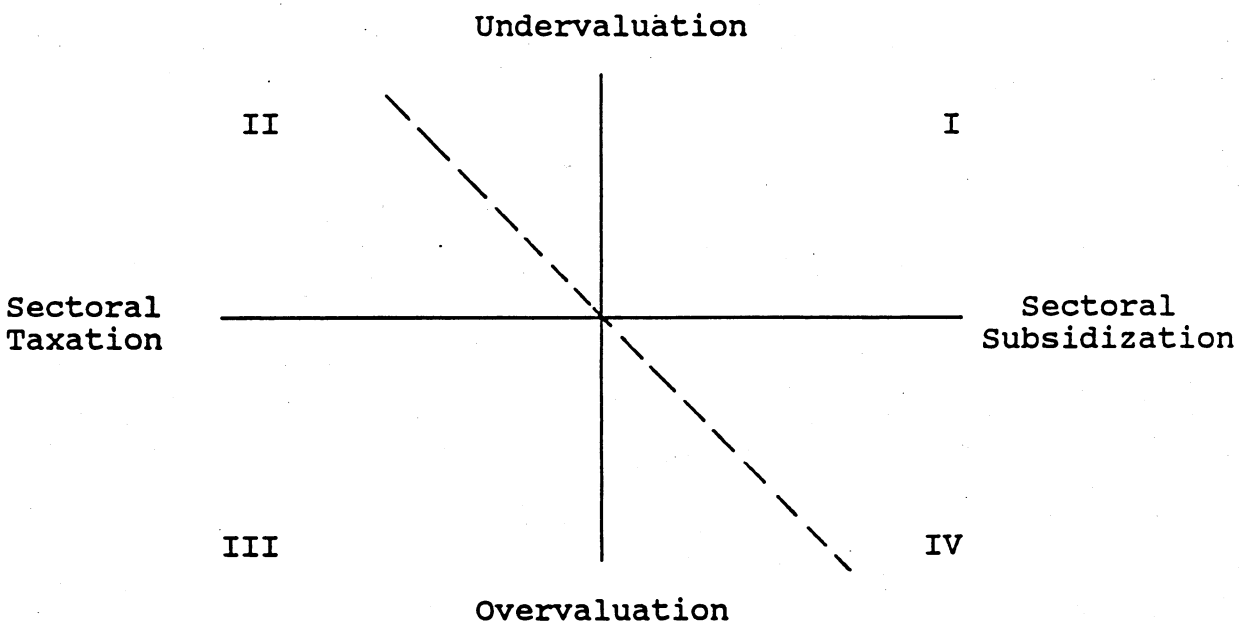III   IV

Overvaluation

Figure 1. Net Gains and Losses With Sectoral and Exchange Rate Policies

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overvaluation may more than offset domestic policies aimed at subsidizing the sector, resulting in a net loss to the sector. The negative 45° line passing through the origin represents the net zero effect of offsetting policies. Those policies reflecting net gains to producers are above the line, those reflecting net losses are below the line.

Methodology and Results

Five major developing country rice traders were selected: Brazil, Nigeria and Bangladesh (importers), and Pakistan and Egypt (exporters). Country selection was limited to those countries (a) for whom rice price data (in local currency) were published in the Webb, et al. PSE/CSE study and (b) who were judged to have been applying distorting exchange rate policies during 1982-1987, the period of the PSE/CSE study. All of these countries have large rice consuming populations together with important resources and potential to further develop their rice production. For each country the following data from the Webb, et al. report was used: (1) the domestic producer price per ton (PP), (2) the "reference" world market price per ton (WP, different for each country), and (3) the amount of the "exchange rate adjustment". This last term was the estimate of the total sectoral gain or loss resulting from an official exchange rate deviating from the exchange rate level where it "should have been".

For the countries selected, a sectoral policy gap (SPG) was calculated as the difference between the producer price and the world price, expressed as a percent of the producer price: $100 * (PP - WP) / PP$.[2] A positive sign reflects a subsidy, a negative sign a tax. An exchange rate gap (ERG) was also calculated by dividing the exchange rate adjustment figure by the quantity produced, also normalized on the producer price. Thus a negative (positive) ERG indicates an overvaluation (undervaluation) "percent price per ton". Expressing the gaps as percentages allows for comparisons between countries.

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SPGs and ERGs were calculated for rice and wheat in the five countries mentioned above for the six year period, 1982-1987. The pairwise SPG/ERG data points are listed in Table 1 and are plotted in Figure 2. Overvaluation clearly dominated in all five countries. Only one observation (Brazil 1983 rice) reflected an undervalued exchange rate (favorable to domestic producers), while two Nigerian observations, both in 1987, reflected a neutral exchange rate policy. Favorable sectoral policies, on the other hand, were over 60 percent more prevalent than unfavorable policies, 36 to 22, with one neutral SPG observation. Nigeria, Egypt and Brazil accounted for 31 of the 36 positive SPG observations. All of Bangladesh's 5 positive SPG observations occurred in the more recent years and served to override the small overvaluation of the taka in four of those five observations (all rice), thereby generating net gains for Bangladeshi rice producers. Of the 10 positive Egyptian SPG points, only two reflected net gains when exchange rate overvaluation was taken into account. This result contrasts markedly with Brazil and Nigeria, where two-thirds and one-half of their positive SPG observations, respectively, resulted in net gains overall. Nigeria, in particular, required strong sectoral policies to offset its history of serious overvaluation of the naira.

Of the 59 observations, over one-third (20) fell into the net gain category. These net gains include 8 Brazilian data points, 6 from Nigeria, 4 from Bangladesh, and 2 from Egypt. Six of the 8 Brazilian net gain data points were in wheat, while Nigerian, Bangladeshi and Egyptian net protection policies tended to favor rice. The net gains in Brazil's wheat sector are mostly the result of increasingly positive sectoral policy intervention in the latter half of the 1980s. Nigerian net protection gains, on the other hand, are due to a steady devaluation of the naira during the late 1980s. In strikingly opposite fashion, the Egyptian pound became increasingly overvalued during that same time period. One other item worth noting is that nearly half (16)

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TABLE 1. SECTORAL POLICY AND EXCHANGE RATE GAPS FOR FIVE COUNTRIES, 1982-1987

		1982	1983	1984	1985	1986	1987
BANGLADESH							
RICE	SECTORAL POLICY GAP	-.55	-.03	.07	.10	.23	.38
	EXCHANGE RATE GAP	-.16	-.03	-.07	-.08	-.06	-.03
WHEAT	SECTORAL POLICY GAP	-.34	-.24	-.30	-.27	-.19	.04
	EXCHANGE RATE GAP	-.13	-.03	-.10	-.11	-.10	-.06
BRAZIL							
RICE	SECTORAL POLICY GAP	.03	-.30	-.22	.34	.17	-.19
	EXCHANGE RATE GAP	-.12	.04	-.01	-.01	-.05	-.12
WHEAT	SECTORAL POLICY GAP	.29	.05	.23	.37	.53	.45
	EXCHANGE RATE GAP	-.15	-.04	-.05	-.03	-.09	-.09
EGYPT							
RICE	SECTORAL POLICY GAP	.10	.13	.24	.51	.38	.25
	EXCHANGE RATE GAP	-.09	-.25	-.41	-.36	-.72	-1.13
WHEAT	SECTORAL POLICY GAP	-.29	-.10	.03	.19	.31	.52
	EXCHANGE RATE GAP	-.13	-.28	-.43	-.48	-.70	-.67
NIGERIA							
RICE	SECTORAL POLICY GAP	.65	.62	.61	.77	.66	.15
	EXCHANGE RATE GAP	-.53	-.74	-1.30	-.63	-.54	.00
WHEAT	SECTORAL POLICY GAP	.54	.51	.65	.65	.76	.56
	EXCHANGE RATE GAP	-.71	-.95	-1.17	-.98	-.38	.00
PAKISTAN							
RICE	SECTORAL POLICY GAP	-.14	-.19	-.09	.00	-.10	N.A.
	EXCHANGE RATE GAP	-.20	-.26	-.19	-.20	-.19	N.A.
WHEAT	SECTORAL POLICY GAP	-.33	-.76	-.48	-.19	-.55	-.23
	EXCHANGE RATE GAP	-.15	-.17	-.18	-.13	-.20	-.13

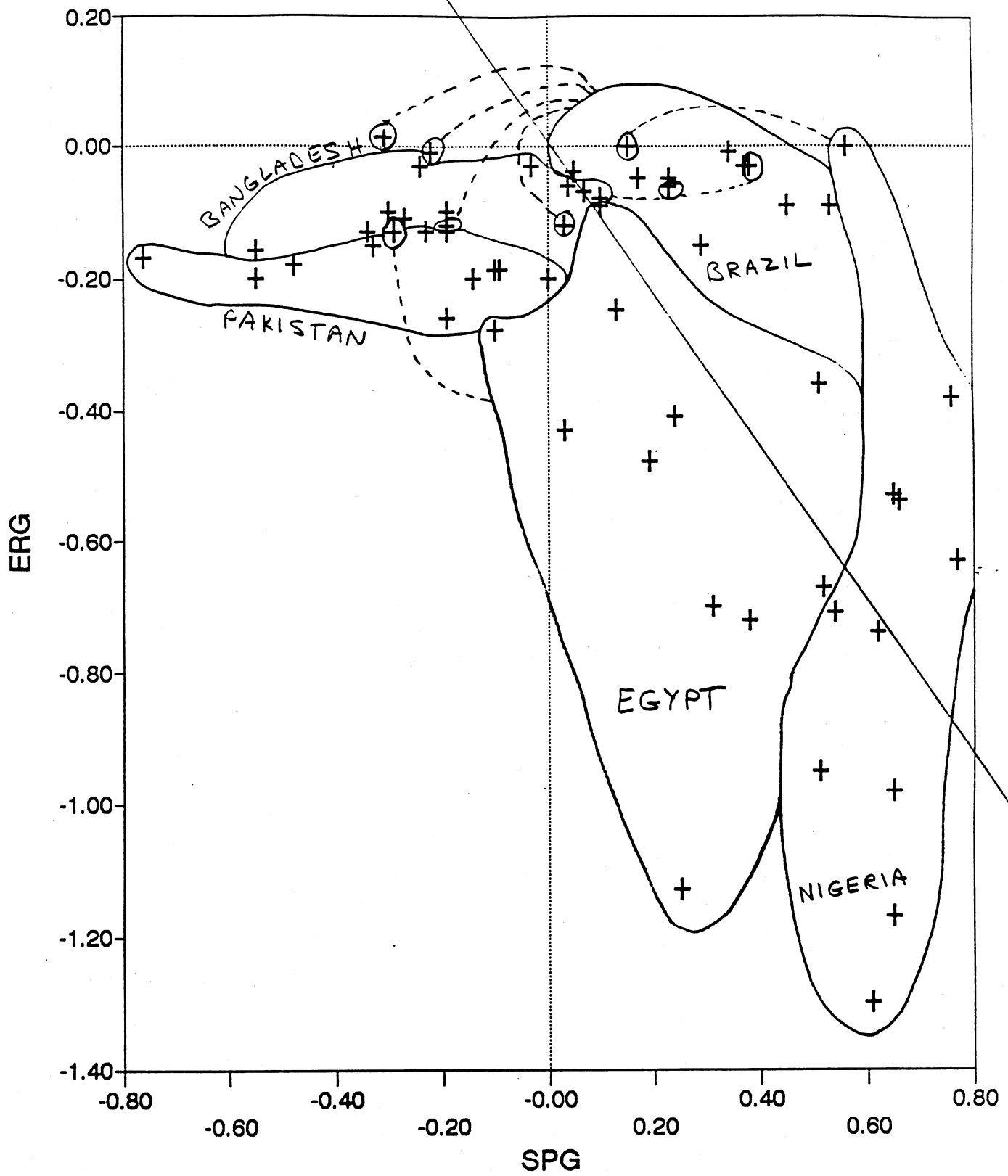N.A. = not available (not calculated)

Figure 2. SPG and ERG Plots for Five Countries, 1982-1987.

of the 36 positive SPGs were offset by exchange rate overvaluation of a greater magnitude, with 14 of these occurring in Nigeria and Egypt.

Pakistan is the only country in this sample to have consistently taxed both rice and wheat producers through both types of policies. Wheat has clearly received the harsher treatment, especially on the sectoral policy side, where taxes in excess of forty percent had been imposed on three occasions. Pakistan's rice policies were fairly consistent during 1982-1986, with SPGs ranging from zero to -19 percent and ERGs ranging from -19 to -26 percent. Combined, these policies have amounted to taxation rates of between 20 and 93 percent over the sample period. That is, Pakistani farmers have been receiving only fifty to eighty percent of the prices they should have been receiving if neutral sectoral and exchange rate policies had been in effect. Bangladesh has reflected the next least favorable policy climate. Overvaluation has been low, but sectoral taxation has been relatively high, especially in wheat, where the SPG range is from +4 to -34 percent. Rice sectoral taxation has been lower, especially in recent years, with a 55 percent tax in 1982 dropping dramatically to 3 percent the following year, and rising to a 38 percent subsidy by 1987.

A few graphs help to portray these results even more dramatically. Four representative country-commodity patterns are shown in Figures 3-a through 3-d. Three series of data points are plotted over time on each figure: the producer price in U.S. dollars, converted from local currency at official (overvalued) exchange rates; the world reference price in U.S. dollars, also converted at official exchange rates; and the world reference price in dollars converted at estimated "correct" exchange rates.[3] Figure 3-a shows the "classic" developing country case of sectoral taxation and overvaluation in Pakistani wheat. The dollar price the producers are receiving is the lower plot, the price they would receive without the sectoral policy intervention (the tax) is the middle plot, and the price they would receive if the exchange rate were "correct" is
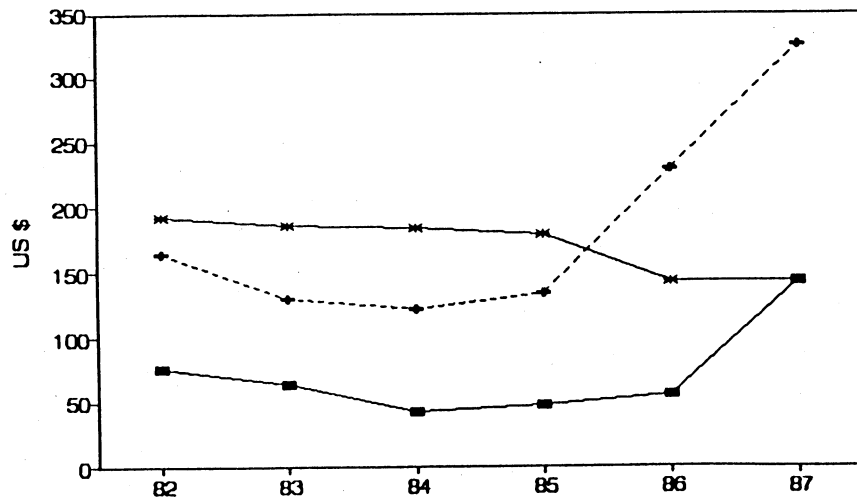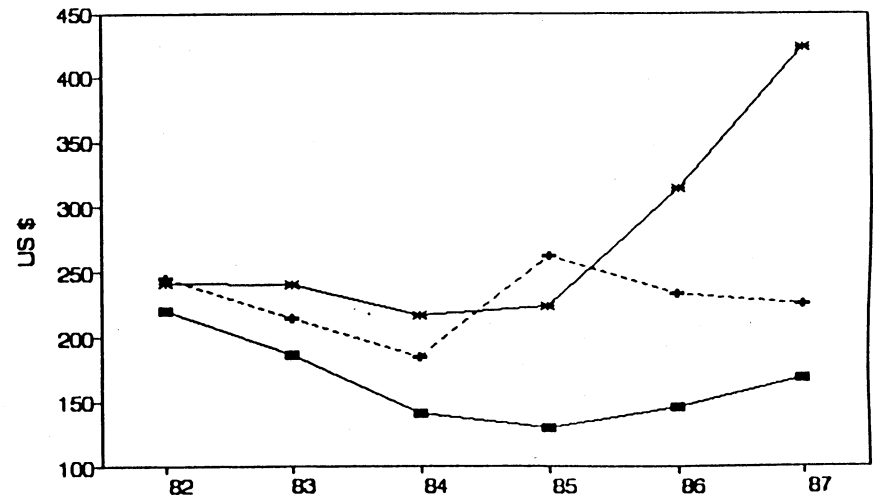
(a) Pakistan Wheat
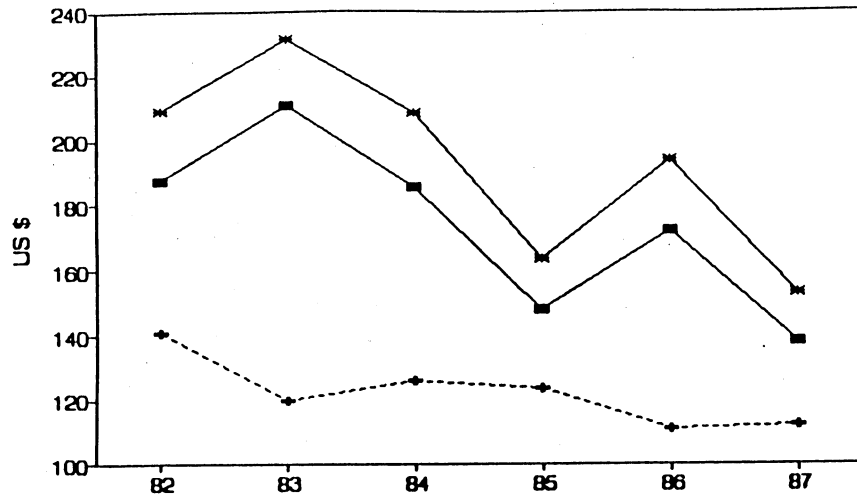
(b) Bangladesh Rice
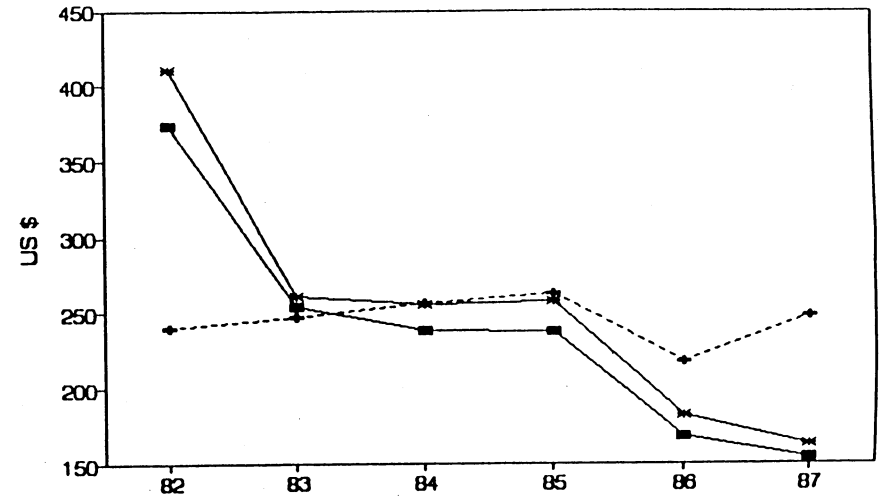
(c) Nigeria Wheat

(d) Egypt Rice

Producer Price Received in U.S. Dollars

Reference World Price in U.S. Dollars at Official Exchange Rate

Reference World Price in U.S. dollars at Corrected Exchange Rate

Figure 3. Producer Prices and Reference Prices (Offical and Corrected)

the upper plot. The SPG is the difference between the producer price and the official world reference price. The ERG is the difference between the official world reference price and the "corrected" world reference price. Although the ERG has remained fairly constant, the SPG has been narrowing in recent years, except for an increase in 1986.

Figure 3-b shows how the "classic" case is being reversed in Bangladeshi rice. In 1982 the producer price was well below both the official and the corrected world reference prices. Both gaps closed enormously in 1983, and although the ERG widened somewhat in ensuing years, the change was not enough to offset favorable sectoral policy intervention, such that Bangladeshi farmers in later years were receiving more than the world price. Nigerian wheat in Figure 3-c reflects an even more positive producer perspective. What had begun as overvaluation and sectoral subsidization has grown into a neutral exchange rate policy and increased subsidization, making producers much better off than in earlier years. Finally, Figure 3-d shows that Egyptian rice producers are increasingly suffering from an overvaluation gap which is widening and sectoral subsidization which has diminished somewhat from its peak in 1985.

Conclusions

This paper has served as an introduction to the impacts of exchange rate policy distortions on agricultural producers in developing countries. In two of the five countries under consideration, Egypt and Nigeria, the magnitudes of exchange rate overvaluation served to offset positive sectoral policy intervention in most of the years under consideration, leaving agricultural producers worse off than if exchange rate and sectoral policy neutrality had been the rule. On the other hand four of the five countries, in at least a few years each, saw positive sectoral policy intervention outweigh the impacts of well-entrenched overvaluation programs. Clearly, exchange rate regimes are not neutral with respect to agricultural producers in many countries.

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There are at least two spheres in which exchange rate distortions need to be explicitly considered in policy formulation. The first was mentioned in the introduction, in multilateral trade negotiations designed to remove external and internal barriers to the free flow of goods and services. The price gaps generated by chronic exchange rate overvaluation in important trading nations seem to be large enough to introduce important changes in production and trade patterns. These policies may distort impact analyses of trade liberalization if research does not take these distortions into account. Second, domestic sectoral policies in a number of importing and exporting countries are set based on a variety of assumed values for export demand elasticities. Exchange rate fixation in important trading nations results in highly variable price transmission elasticities, which are critical in the estimation of export demand elasticites (Devados, Meyers and Helmar; Gardiner and Dixit). Again, ill-advised policies result if exchange rate policy analysis is omitted.

Exchange rate overvaluation is a fundamental problem in many developing countries. Structural adjustment programs in these countries have targeted distorted exchange rates as major problems in need of correction. Recognition of exchange rate distortions is essential to correct analysis in trade and sectoral policy design and implementation.

ENDNOTES

1. Contact the authors for information on the derivation of these numbers.

2. The numerator of the percent PSE calculation in Webb, et al. includes a price term identical to PP-WP and an exchange rate adjustment, in addition to other direct and indirect "payments". Our calculation of SPG utilizes only the price term and ignores direct and indirect transfers.

3. "Corrected" exchange rates are nominal exchange rates adjusted for inflation differentials between each country and the United States.

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