DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

WORKING PAPER

The Value of Foreign Exchange in Zimbabwe:

Concepts and Estimates

by

William A. Masters

Working Paper AEE 2/90

DEPARTMENT OF AGRICULTURAL ECONOMICS & EXTENSION
FACULTY OF AGRICULTURE, UNIVERSITY OF ZIMBABWE
P.O. BOX MP 167, MOUNT PLEASANT, HARARE
ZIMBABWE

"The Value of Foreign Exchange in Zimbabwe: Concepts and Estimates"

by

William A Masters*

Working Paper AEE 2/90

Department of Agricultural Economics and Extension
Faculty of Agriculture
University of Zimbabwe
P. O. Box MP167
Mount Pleasant
Harare
ZIMBABWE

December, 1989

---

* William A. Masters is a Research Associate in the Department of Agricultural Economis and Extension, University of Zimbabwe, and a Ph.D candidate at the Food Research Institute, Stanford University.

This paper has been prepared as part of the author's Ph.D. studies for the Food Research Institute, Stanford University, with funding from the USIA Fulbright Programme, the SADCC/ICRISAT Sorghum and Millet Improvement Programme, and the Rockefeller Foundation. Much inspiration for this resarch was obtained from previous work in Zimbabwe by Mr K. Mlambo. Valuable comments on previous drafts were received from the staff of the Economics and Markets Branch in the Ministry of Lands, Agriculture and Rural Resettlement, and from Dr. Alberto Valdes, Prof. Scott R. Pearson, and Prof. Eric A. Monke.

CONTENTS

TABLES AND FIGURES

TABLES

FIGURES

SUMMARY

This paper discusses the value of foreign exchange in Zimbabwe, a central element in government's project appraisal and other planning efforts, and a major determinant of the level and distribution of income and incentives throughout the economy. To quantify changes over time in this value, the paper uses the real exchange rate (RER) approach, comparing changes in the prices of tradable and nontradable goods over time.

In the paper, the theory behind the RER approach is summarized, and the available data are presented. It is shown that, since the introduction of the current exchange control system after UDI, the prices of traded goods (imports and exports) in Zimbabwe have declined sharply, relative to the prices of building materials and other non-tradable goods. This decline has reduced the incentives to produce exports, worsened the shortage of forex, slowed growth in the economy, and reduced the incomes of all potential producers of exports, including many communal farmers.

To restore the earlier incentives to export, the value of forex would have to be about 50% above the current official exchange rate. This implies that the current exchange rate "taxes" exports by about 50% of current revenue. For the agricultural sector, the total amount is on the order of half a billion dollars, representing a net transfer out of agriculture far larger than the entire budget of the Ministry of Lands, Agriculture and Rural Resettlement.

In official project appraisals, a foreign exchange premium of 50% would compensate for the "exchange rate tax." However, this would affect only government-controlled investments. To assist private-sector exporters, special programmes such as the Export Revolving Fund and the Export Incentive Scheme are useful, but fail to reach communal-area farmers and other dispersed, relatively low-input, labour-intensive producers of exportables. To reach them, a macroeconomic policy to raise the real exchange rate is needed. Such a policy could improve both the level and distribution of income, through accelerated increases in the official exchange rate combined with reduced domestic inflationary pressures from opening up production bottlenecks and reducing excess credit creation.

A methodological appendix to the paper presents the major alternative approaches to estimating the value of foreign exchange. The theory and data requirements of each method are discussed, along with their applicability to Zimbabwe.

1. Introduction

The value of foreign exchange in Zimbabwe, defined as the increase in national income obtained from each extra pula, pound or U.S. dollar, has a strong influence on the costs and benefits of many activities. It is particularly important for the agricultural sector, which currently provides over a billion dollars annually in exports (almost half of Zimbabwe's total), using only around $100 million in imported inputs (less than 10% of total imports).[1]

If there is any difference between the official exchange rate and the value of forex for the economy, that difference (the forex "premium") will be an implicit tax on exporters and subsidy to importers. In this paper, data are presented estimating the current forex premium at about 50%, which represents a transfer out of the farm sector that is at least as big as the entire $350 million annual vote for the Ministry of Lands, Agriculture and Rural Resettlement.[2] In agriculture, as in other sectors, the exchange rate tax weighs heavily against the government's equity and growth objectives.

The government can compensate for this tax in its project appraisals and other public-sector plannning efforts, by valuing imports and exports at above their market prices. But a common forex premium should be used in all appraisals, for projects to be compared on an equal basis. Currently there is little agreement on that premium, which can range from zero, if the issue is ignored completely, to infinitely large, if only net forex earnings are considered important. The Ministry of Finance, Economic Planning and Development has recently

---

[1]. Calculated from 1987 data in CSO, Quarterly Digest of Statistics (March 1989), Tables 11.5 and 11.6, on which agricultural exports total about $900 million while imports of agricultural inputs (including a quarter of all fuel and vehicles) total about $100 million. This contrasts with total exports of $1 900 million, and total imports of $1 700 million. Figures for 1988 and 1989 will be much higher, as the 1987 harvest was generally poor. Note that agricultural exports include non-farm value added in processing and transport, which has not been subtracted from the value of exports of agricultural origin.

[2]. Note that most of this budget, well over $200 million annually, goes to subsidies on agricultural commodities and loans to marketing boards. The benefits from these subsidies are shared amongst consumers and producers, thus reducing the producers share of the MLARR budget. In addition, the benefits from subsidies are concentrated among those who market the most, which further reduces the small farmer s share. And finally, the largest subsidies are on beef and dairy, which are almost entirely produced on large commercial farms. The communal sub-sector s share of the MLARR budget is relatively small.

recommended a premium of 100%, judging that forex contributes twice as much to total Zimbabwean income as indicated by the official exchange rate (MFEPD, 1988). In contrast, the World Bank's most recent Industrial Sector Memorandum recommended a premium of 40% (World Bank, 1987).

To find agreement on an estimate of the value of foreign exchange, a common set of terms with which to discuss the issue is needed, along with a common set of data which with which to quantify those terms. This paper attempts to assist on both counts, by presenting the most useful concepts of the value of forex used in the economics literature, and applying them to the available data in Zimbabwe.[3] The paper concludes with a review of the causes and implications of the estimated forex premium. A methodological appendix is attached, detailing a number of alternative approaches and discussing the influence of the terms of trade on the value of foreign exchange.

2. The exchange rate and the value of foreign exchange

In Zimbabwe as in most other countries, exchange rates are typically defined as an amount of foreign currency per unit of domestic currency, for example Botswana pula per Zimbabwe dollar (p/Z$). This is usually what is meant by the "value of the Zimbabwe dollar," expressed in terms of foreign currency such as pulas. Thus, when the p/Z$ rate falls, the Zimbabwe dollar "depreciates" or is "devalued".

It is, however, equally possible to define the exchange rate the other way around, that is, as Z$/p. This is usually what is meant by the "value of forex," expressed in terms of the Zimbabwe dollar. Thus, when the p/Z$ rate falls and the Zimbabwe dollar depreciates, the Z$/p rate and the "value of forex" rises. In this paper, the "exchange rate" will generally be quoted as p/Z$, but the "value of forex" will be Z$/p.

Whether one is speaking of the p/Z$ "exchange rate," or the Z$/p "value of forex," the crucial distinctions are between the alternative ways in which the foreign exchange is used, leading to different definitions of the exchange rate and the value of forex.

---

[3]. No attempt is made here to discuss in detail the Zimbabwean system of foreign exchange allocation. This is done in many sources within Zimbabwe, and for foreign readers a concise summary is given by the International Monetary Fund's Exchange Arrangements and Exchange Restrictions Annual Report.

2.1 Prices, opportunity costs, and rents

The exchange rate is the relative price of foreign versus domestic currency, and is therefore a major influence on the relative prices of all foreign versus domestic goods. There are many other influences on the price of any one good, but the exchange rate remains a major aggregate or macroeconomic price acting on the economy as a whole. As such the exchange rate can, with some limitations, be considered as if it were the price of a single aggregate item: "foreign" versus "domestic" goods.

An item s market price, however, is not necessarily its true economic value.[4] Economic value is reckoned in terms of opportunity cost, which is the item s value (in the sense of total benefits minus total costs) in its next best alternative use. This concept applies most generally to the values of particular goods, but can also apply, with some limitations, to aggregate prices such as the exchange rate.

Each item has two opportunity costs: the value of resources required to produce it (the marginal cost of production, or its opportunity-cost "selling price"), and the benefits obtained from consuming it (the consumers' total willingness and ability to pay for the item, or its opportunity-cost "buying price"). In the case of the exchange rate, "producers" are net earners of foreign exchange, people making exports and import-substitutes, while "consumers" are net users of these items. The two opportunity costs are not fixed prices, but limits on prices: producers (exporters) would be happy to sell (export) for more than their opportunity costs, while consumers (importers) would be happy to pay less for their purchases (imports).

Each producer and consumer has a unique opportunity cost, determined by his or her particular situation and preferences. The opportunity costs of all producers make up the economy s opportunity-cost supply curve, while the opportunity costs of consumers make up the opportunity-cost demand curve. At each level of quantity produced and consumed, there is a distinct marginal opportunity cost for producers and consumers, along their supply and demand curves -- and the economy-wide opportunity cost is the higher of the two. At an economic equilibrium, the two curves meet and opportunity costs in production and consumption are equalized. This is what is usually meant by "the" opportunity cost of an item. Occasionally, however, a opportunity-cost buying price will be

---

[4]. This paper will consider only economic values, adding up material costs and benefits both for particular groups and for Zimbabwe as a whole ("national" income). Non-economic values such as national prestige are obviously important as well, but are not the domain of economists and will not be covered here.

distinguished from an opportunity-cost selling price, or the opportunity costs of different individuals may be compared.

Opportunity costs can either be private, considering only the costs and benefits for an individual producer or consumer, or they can be national, adding up costs and benefits for everyone in the country, consumers and producers alike. Sometimes, national oppportunity costs include the possibility of changing certain policies, such as removing price controls or the minimum wage. For the purposes of this paper, however, all laws and regulations are taken for granted unless otherwise stated. Thus, the value of foreign exchange needed for this paper is its national opportunity cost, given all current conditions.

The difference between market prices and opportunity costs is important because the difference between them, if any, is a transfer amongst Zimbabweans. That transfer can go to or from the government (as a tax or subsidy), or more often, to and from other producers and consumers (as a "rent"). In this paper, transfer through the exchange rate will be referred to as the "exchange rate tax," because the government sets the exchange rate. When the government sets the local-currency price of forex below its opportunity cost, the difference is transferred from the many current and potential net earners of forex (producers of exports and import-substitutes), to the smaller number of people who are net consumers of these goods at controlled prices. This exchange-rate tax is probably the largest such transfer in the Zimbabwean economy, but it is well hidden and easy to overlook.

2.2 The official exchange rate

The vast majority of forex transactions take place at the official exchange rate (OER), which is published every day in the newspapers. At the OER, the value of forex is about one dollar to the Botswana pula, or three dollars to the U.K. pound.[5] But at this rate people want to buy much more forex than they want to sell: Zimbabweans' opportunity-cost buying price is above the

---

[5]. Note that, from Zimbabwe s point of view, the exchange rates amongst convertible (or "hard") currencies are fixed. Thus, the p/Z$ rate will always be twice the US$/Z$ rate and three times the UK/Z$ rate, as long as the p/US$ rate stays at 2,0 and the p/UK rate stays at 3,0. There is very little scope for Zimbabwe to avoid this, since holders of any hard currency can easily switch into any other hard currency. In contrast, Zimbabwe could set exchange rates with non-convertible currencies, such as the Zambian kwacha or Kenyan shilling, bilaterally with those countries since holders of these currencies have no other option. But most trade is carried out in hard currencies, so bilateral exchange rates would have little significance for the economy as a whole.

official price, so there is excess demand and a severe shortage of foreign exchange.

To allocate scarce foreign exchange, official transactions are regulated by a strict system of export and import licenses. Exporters must obtain an export license and surrender all foreign exchange proceeds to the Reserve Bank, which converts it into Zimbabwe dollars at the OER. Then, those who wish to spend forex on imports must obtain an import license issued by the Reserve Bank, usually on the instructions of the Ministry of Trade and Commerce (for merchandise imports) or the Ministry of Industry and Technology (for industrial imports). These are given to particular firms for the import of particular items, mostly under regulations gazetted during the UDI period (1965-79).

In practice, most exporters would prefer to keep their foreign exchange rather than surrender it at the OER, while importers would be willing and able to pay much more than the OER. Zimbabwe's opportunity cost value of forex is therefore clearly above the official rate; there is an exchange rate tax on those who earn foreign exchange, and an associated subsidy to those who use it.

2.3 The parallel-market exchange rate

One indication of the magnitude of the exchange rate tax is given by the black- or parallel-market exchange rate (PER). This is the price at which individuals seeking to buy or sell foreign exchange unofficially must do so. But foreign exchange controls are exceptionally well enforced in Zimbabwe.[6] This makes the parallel market thin and allows a wide range of PER's to exist at one time. People who are more desperate to buy forex will pay more. In general, however, the black-market value of forex is about twice its official price, indicating a forex premium of around 100%. One pula costs two Zimbabwe dollars, one pound costs seven or eight dollars, etc.[7]

From the point of view of an individual who is willing to break the law, the PER is a potential opportunity-cost buying price of foreign exchange. But not only is the parallel market thin and

---

[6]. In 1988, there were 306 recorded offences of the exchange control laws, and 965 offenses of the associated customs and excise rules, for a total of 1271 violations of trade controls. In contrast, there were only 461 recorded cases of armed robbery. For details, see CSO, Quarterly Digest of Statistics (March 1989).

[7]. This can be seen in occasional newspaper reports on the issue, such as "Expats in Big Forex Racket: Claim" (The Chronicle, 8 November 1989, p. 7).

uncertain, it also contains three influences which consistently raise the value of foreign exchange above its economy-wide opportunity cost.

Firstly, there is a large transactions cost and a high risk factor, because Zimbabwe does impose heavy fines and even imprisonment on both buyers and sellers when they are caught. Thus finding a person with whom to exchange is not always easy, and both buyer and seller must be compensated for their risks. The resulting transactions costs and risk premium raise the price of forex both directly through the buyer paying a higher Z$/pula rate, and indirectly through driving away sellers which makes black-market forex more scarce.

Secondly, a large share of the parallel market consists of people buying items which are exceptionally scarce or expensive in Zimbabwe, such as motor spares or luxury goods. These would be a smaller proportion of total trade, and have a smaller influence on the economy-wide value of forex. But they dominate the black market, so their high local prices have a disproportionate influence on the black-market forex premium.

Thirdly, a major share of the parallel market consists of capital movements. In official transactions, these can be separated from trade to some extent, thus insulating the markets for goods and services from the inflow and outflow of capital. This distinction is discussed in more detail in the appendix. On the parallel market, the two markets are joined: a taxi operator in Bulawayo needing auto parts from Francistown must buy pula or rands from the same source as a farmer intending to emigrate to South Africa. And since there is continuing out-migration,[8] plus financial pressures for an outflow of capital, this further depreciates the PER.[9]

In conclusion, the simple fact that the parallel market is illegal makes black-market foreign exchange seem more valuable than it really is: the opportunity cost of forex is somewhat lower than suggested by the PER. The forex premium/exchange rate

---

[8]. Official migration statistics are given in CSO, Quarterly Bulletin of Statistics. For both 1987 and 1988, net outflow stood at around 1 400, down from the highs of 10 000 to 12 000 each year between 1978 and 1984.

[9]. An interesting and less often noted aspect of the parallel exchange rate is that it usually settles on a round number. Here, the pressure for an outflow of Zimbabwe dollars can be expected to lead sellers to round down, which further depreciates the currency. This effect was pointed out by Prof. Ulrich Koester of the University of Kiel.

tax, therefore, is somewhere between 0 (at the OER itself) and 100% (at the PER).

2.4 The real exchange rate

To estimate the level of the forex premium, a number of alternative methods have been developed. This paper will apply the most recent and most relevant of these approaches: the real exchange rate (RER) method.[10] This approach is summarized here, while the major alternative approaches are detailed in the methodological appendix.

The RER approach is based on the idea that there are two kinds of goods in the economy: tradable ones, such as wheat or refrigerators, which could be bought or sold elsewhere using foreign currency, and nontradable ones, such as ordinary vegetables or building sand, which cannot, usually because their transport costs are too high. The central insight of this idea is that the exchange rate influences the domestic prices of all tradables, both exports and imports, relative to the nontradables. When the exchange rate and the prices of tradables rise, the quantity of exports rises and the quantity of imports falls, yielding more foreign exchange. This shows how a country can improve its own balance of payments, without waiting for an inflow of foreign capital or an improvement in its terms of trade.

Since the "tradability" of a good usually depends on its transport costs relative to its domestic and foreign values, it is common for goods to change their status over time. In

---

[10]. This approach uses what is sometimes known as the "Australian model" of trade, in which the economy consists of three sectors: exportables, importables, and non-tradables. This model was initiated by Salter (1959), Swan (1960), and Corden (1960), and brought into the current policy analysis literature with Dornbusch (1974) and Sjaastad (1980). In the 1980s, it has been applied in numerous studies of a wide range of countries. These were pioneered by a series of analyses undertaken at the International Food Policy Research Institute (IFPRI), summarized in Valdes (1986). The IFPRI series includes Garcia (1981) on Colombia, Oyedije (1986) on Nigeria, Tshibaka (1986) on Zaire, and Bautista (1987) on the Philippines. More recently, there is a series of studies under way at the Kiel Institute of World Economics, including Weibelt (1989) and Herrmann, Sulaiman and Weibelt (1989). Work in Zimbabwe was pioneered by Mlambo (1989). Related research in the region includes a cross-country comparative study for Africa by Schafer (1988), and a series of studies at the World Bank summarized in Krueger, Schiff and Valdes (1988), incorporating Jansen (1988) on Zambia.

Zimbabwe for example, high-quality flowers are now strong export products. But even a small rise in transport costs, or a small reduction in European flower prices, would cause the trade to become unprofitable, and flowers would again become nontradable.

In addition, since nontradable goods use varying amounts of tradable inputs and may also be partial substitutes for tradable products, the degree of price transmission from tradables to nontradables varies amongst nontradable goods. For example, transport services are not tradable and have no tradable substitutes. But their costs consist largely of fuel and machinery, which are highly tradable -- so if the exchange rate rises, transport costs will rise as well. In contrast, ordinary vegetables such as tomatoes or spinach are normally not tradable, and their costs consist mostly of equally nontradable labour and land. Thus their price will be much less affected by the exchange rate.[11]

Despite the variability amongst different items, in general changes in the exchange rate will have a lower and more delayed impact on the prices of nontradables than tradables. Thus, a "real" exchange rate within the economy can be calculated as the relative price in local currency of these two types of goods. This is usually defined as the ratio of an index of tradables' prices (Pti) over an index of nontradables' prices (Pnti):[12]

$$RERi_t \equiv Pti_t / Pnti_t$$

Any changes in this RER index show year-to-year changes in the value of tradables in terms of nontradables. Since an incremental unit of tradables would save (or earn) a unit of foreign exchange, the RER can also be taken as the economy-wide value of foreign exchange in terms of domestic currency, as Z$/p. When the RER index rises, it becomes more profitable to produce

---

[11]. It is possible to measure the average amount of price transmission from tradables (especially imports) to nontradables. The IFPRI studies summarized in Valdes (1986) focus on this question, finding that a 10% rise in the average prices of importables would raise the prices of nontradables by an average of 6-8%. Similar results were reported for Zimbabwe in Mlambo (1989), for Peru in Valdes and Leon (1987), and for Peru and Malaysia in Herrmann, Sulaiman and Weibelt (1989). The amount of price transmission, however, depends very much on the items involved. Some nontradables would have a smaller, and others a higher, response to changing import prices.

[12]. Here the ≡ symbol is used to indicate an identity, showing that this equation is a definition, rather than a prediction.

exports and import-substitutes, and less desirable to consume them. Thus the quantity of exports rises, and the quantity of imports falls, improving the trade balance. This relationship is very strong, as has been repeatedly shown in studies throughout the world.[13]

The prices and opportunity costs of all tradable goods are much influenced by their value in trade: their foreign-currency price, after paying all marketing and transport costs, divided by the exchange rate. This price, although it applies directly only to items actually traded, is then transmitted to similar goods on the domestic market by substitution in both demand and supply. Thus changes in the border prices of traded goods change the prices and the opportunity costs of all tradables, whether or not they are actually traded.

Because the traded items foreign-currency prices are determined in foreign countries, where there are many other potential buyers and sellers of the good, it is usually impossible for Zimbabwe to affect that price.[14] Thus, from Zimbabwe s point of view, the local value of tradables can be influenced only through the exchange rate. The price or opportunity-cost value of any given tradable (Pt) in Zimbabwe dollars is roughly the good s foreign price (Pf) divided by the official exchange rate (OER, in terms of p/Z$):

$$Pt = Pf/OER$$

For nontradables, on the other hand, prices and opportunity costs are determined within the country, based on internal supply and demand. These are somewhat affected by the exchange rate, because all goods use some tradable inputs, or may be substitutes for tradables in production or consumption, but the influence is indirect and therefore smaller than it is for tradables. Most year-to-year changes in Pnt are due to changing domestic conditions.

In Zimbabwe, almost all tradable goods (and many nontradables as well) are subject to enforced price controls. Many agricultural

---

[13]. A particularly clear presentation in in Dornbusch and Leslie (1988).

[14]. Zimbabwe can sometimes obtain short-term concessionary trade arrangements, such as for beef to Europe, or sugar to the U.S., covering limited quantities only. To influence marginal prices Zimbabwe would need some control over the total quantities of a good being traded worldwide. But Zimbabwe is a small country, whose exports even in tobacco or other specialties are well under a tenth of world trade. Thus Zimbabwe s influence over prices is small.

products also receive large government subsidies. But changes in domestic prices, even for controlled goods, generally follow changes in border prices. Most price controls, including those on all imported agricultural chemicals and equipment, are calculated on a cost-plus basis. This gives sellers a fixed markup over border prices and other costs, ensuring that any changes in border prices are almost immediately passed on to the domestic market. Other price controls, including prices for fertilizers, seeds, and most farm products, are determined on a fixed-price basis. In these cases there may be delays in price adjustments, but eventually domestic prices have tended to follow their opportunity costs. Large deviations result in severe shortages or large stock build-ups, so that they rarely persist for more than two or three years. Thus, domestic prices for tradables have tended to follow border-price opportunity costs, and movements in the opportunity-cost RER index can be taken to reflect changes in incentives throughout the economy, at least over a two-to-three year time horizon.

To see annual changes in the RER, an index of the prices of tradables (Pti) is needed, divided in each year by an index of the opportunity costs of nontradables (Pnti), to make an index of the real exchange rate (RERi). In no country would we expect such an RERi to stay constant over time. It would inevitably be influenced by changing incomes, technology, the relative amounts of domestic resources such as labour, land, and capital, as well as changes in the other influences on the balance of payments such as the terms of trade, capital flows, trade policies, and so forth.

All of these changes will affect the opportunity cost of foreign exchange, but most of them can be expected to move only slowly. Much more rapid changes, of a much larger magnitude, will occur due to changing inflation in the domestic economy, relative to the nominal exchange rate. Because the prices of tradables are determined abroad, they will be less affected by domestic inflation, which will tend to push up the prices of nontradables more, thus lowering RERi. To find an absolute level for the desired real exchange rate, some year (or average of years) in which the relative price of tradables to nontradables was desirable can be targeted, and policies to restore that level of RERi can be implemented.[15]

Using a historical reference, the RER method shows what exchange rate would be necessary to reach the historical target relative

---

[15]. Alternatively, an econometric model of the RER could be built, to find the influence on the RERi of variables such as domestic income, the terms of trade, official borrowing, and the money supply. This approach is discussed in the methodological appendix; here, only the historical approach will be used.

price between tradables and nontradables. At those targeted relative costs and returns to the production of exports and import-substitutes, the economy would be drawn towards the trade balance which prevailed during the target period. In the context of Zimbabwe, the balance of trade itself is expected to remain around zero, with exports roughly equal to imports. What is desired is a simultaneous increase in both exports and imports, reducing the need for import controls and allowing broader access to imported equipment and production inputs.

3. Empirical estimates for Zimbabwe

In this section, the data available in Zimbabwe are reviewed, and the results discussed. The discussion begins with general macroeconomic conditions, then considers the various price indeces which can be used for the RER approach, and concludes by reviewing the resulting RER ratios. All growth rates, averages, and graphs presented here are calculated from the data tables given at the end of the paper.

3.1 Macroeconomic conditions

Table 1 presents basic macroeconomic data for the late UDI period (1975-80) and the recent post-Independence period (1980-88).

TABLE 1. SELECTED MACROECONOMIC INDICATORS, 1975-80 and 1980-88

Average Annual Changes:	Official Exch.Rate (SDR/Z$)	Money Supply (M2)	Nominal GDP	Government Deficit*
1975-80	-3,4%**	15,1%	10,8%	41,0%
1980-88	-14,9%	12,5%	16,1%	14,6%

Average Levels:	Interest on Gvt. Bonds	Low-income CPI	GDP Deflator	Gvt.Def. as % of GDP*
1975-80	7,9%	10,3%	10,7%	8,8%
1980-88	12,7%	14,3%	8,8%	6,5%

* Data are for 1976-80 and 1980-87 only.
** Not statistically significantly different from zero.
Source: Calculated from Table 2.

These data show that, in the late 1970s, the nominal exchange rate was roughly constant, the money supply expanded much faster than nominal GDP, and interest rates stayed well below inflation making real interest rates negative. This is a classic disequilibrium situation, influenced largely by explosive growth in the government deficit, which reached almost 11% of GDP in 1978, 1979, and 1980. Such a situation, common to many African countries at this time, leads inevitably to falling real incomes.

After Independence, the government deficit as a share of GDP was brought down, the dollar was devalued to catch up with past inflation, and real interest rates rose. Most importantly, growth in the money supply was reduced to less than the growth in nominal GDP, thus stopping the trend towards ever-higher inflation. Although the rate of inflation was not reduced, continued nominal devaluation kept pace with it, and real GDP growth was achieved. In many ways, Zimbabwe undertook an orthodox reform of the inherited disequilibrium situation, avoiding the worst of the structural adjustment crises which plagued many other African countries at this time.

Undoubtedly the most dramatic of the post-Independence macroeconomic changes is shown in Figure 1. Economy-wide average real wages, which had grown steadily at about 2% per year since the 1950s, were stalled in the late 1970s.[16] At Independence, new labour laws suddenly pushed economy-wide average real wages up 18% over the first three years of Independence.[17] These increases were appreciably above the long-term trend, and above any increases in productivity, so firms simply stopped hiring new workers. The total number of formal-sector employees rose by less than 1% in 1982, and then fell by over 1% in 1983.[18]

Soon, inflationary pressures from production bottlenecks, continued government deficits, and the wage increases themselves

---

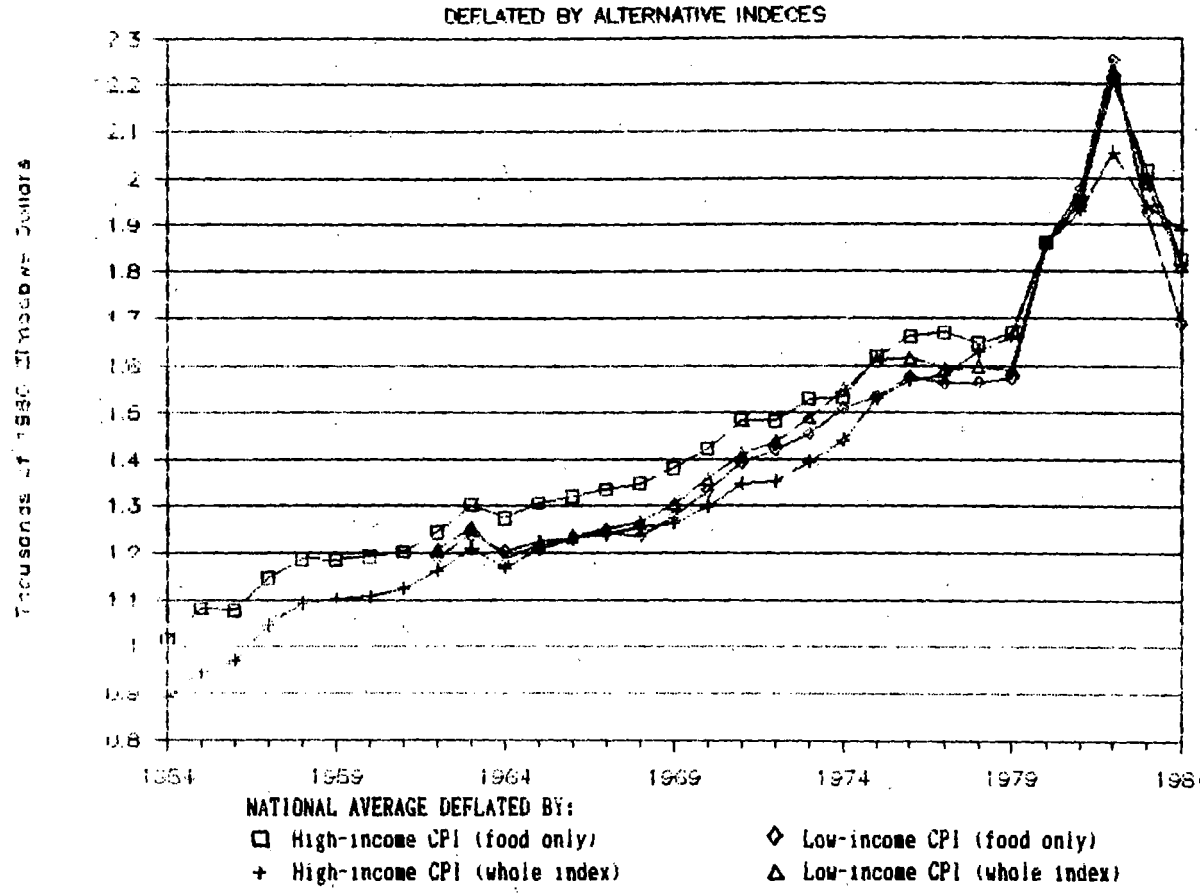
[16]. Agricultural wages did not follow the economy-wide picture. They rose in the 1950s, fell badly from 1963 to 1972, then picked up in the mid- to late-1970s -- but at Independence were still about even with their pre-UDI peak. The failure of agricultural wages to keep pace with increases in overall wages in the 1960s and early 1970s could be due to several factors. Firstly, the large-scale commercial (LSC) farm sector was the hardest hit by the inward-looking policies of UDI. Secondly, LSC farm workers were quite isolated from the rest of the labour market, with little mobility. Many commercial farmworkers have no other possible home in Zimbabwe, and their children may well continue to work on the same farm. And thirdly, although precise data are not available, there was probably continued in-migration throughout the 1960s of unskilled farmworkers from Malawi and elsewhere. This would have kept farm wages low, while rising productivity in urban jobs lifted industrial and other wages for more educated Zimbabweans.

[17]. Agricultural average real wages were boosted by an even more amazing 60%.

[18]. See CSO, Quarterly Digest of Statistics (March 1989), Table 7.1 for details.

worked their way through the price control system (which can only delay inflation, not stop it), and reduced the economy-wide average real wage back below its 1980 level. This was well below its long-run trend level, and in 1985, after this fall in real wages, total employment grew by 2,5% to surpass for the first time its previous 1975 peak. Although more recent data on wages are not available, aggregate demand for labour does not seem to have increased faster than the labour force, so real wages are unlikely to have recovered back to the long-term trend.

FIGURE 1. REAL NATIONAL AVERAGE WAGES, 1954-84



3.2 Price indeces

The effects of these macroeconomic trends on exchange rates can be seen through the changes in various price indeces, shown in Figure 2 and Table 3. These indeces may focus on the prices of tradables, all goods together, or nontradables.

To show the prices of tradables (converted at the official exchange rate), a trade unit value (TUV) index can be used, defined as the simple average of export unit values and import unit values. These are published by the CSO beginning with 1964. Both unit values are calculated on a point-of-despatch basis. Thus, they include correct transport costs for exports, but not for imports: this index should rise more when transport costs

rise, and fall more when they fall. The TUV index also does not include changes in trade policy which would increase or decrease the markup between border and domestic prices: it should rise more when more export incentives are paid, or more import duties are charged. These did not changed very much during this period, however.[19]

To show domestic prices of all goods, both tradables and nontradables, consumer price indeces (CPI, for either low- or high-income consumers), or the GDP deflator can be used. The CPIs consist of a basket of goods designed to reflect an "average" urban family's annual budget, with weights that are revised every few years as discussed in the notes to Table 3. The GDP deflator, in contrast, includes the prices of all goods and services in the economy, weighted by their importance every year. Both types of indeces are shown on Table 3. The two CPIs and their food-price components tend to move very much together, although food in the low-income CPI has moved up the fastest in recent years, while the whole high-income CPI has risen the least.

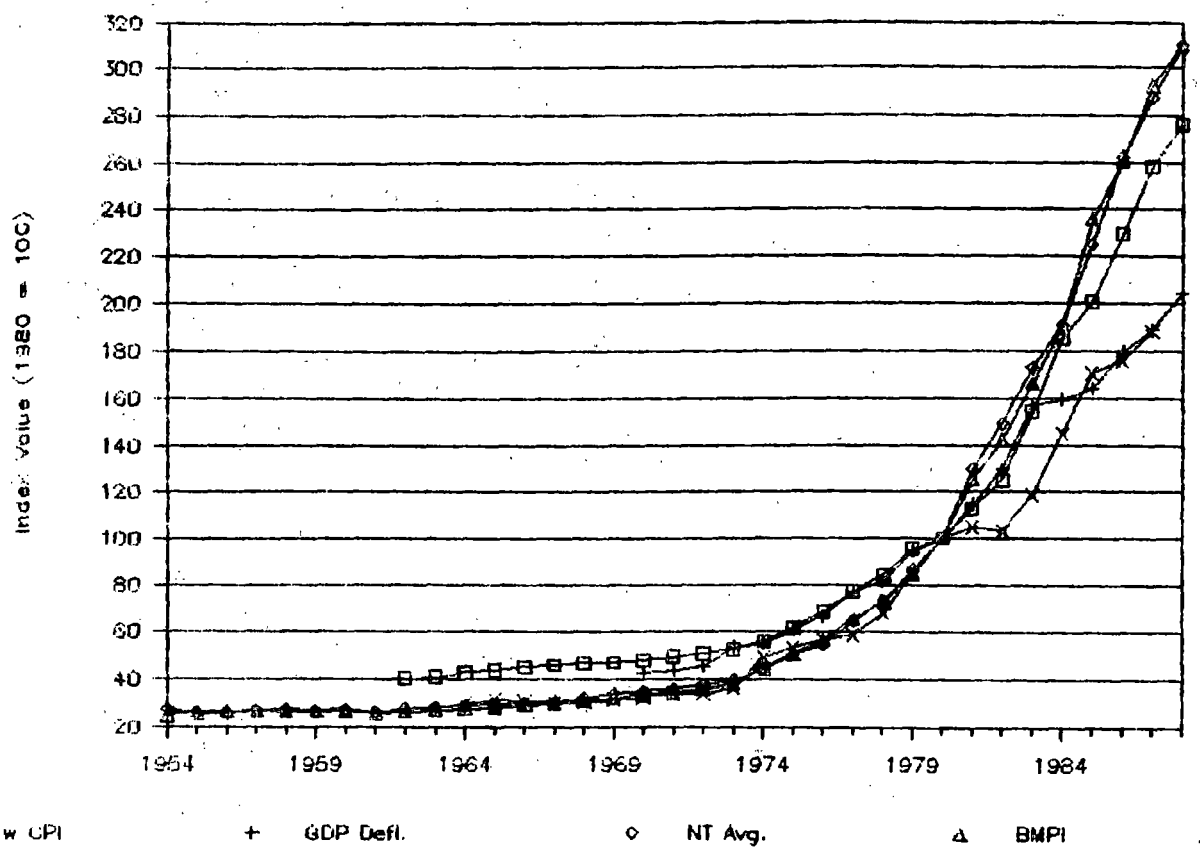
To show the domestic prices of nontradables, we would like goods which have few nontradable inputs or substitutes, and are relatively unaffected by price controls. It would be ideal, for example, to use wholesale prices for fresh vegetables, rental rates for rooms and houses, and the wages of temporary workers not subject to minimum wages. However, no consistent long-term series of such prices are available. The most appropriate data are probably the prices for certain building materials, particularly bricks, building aggregates, and timber and wood. Small quantities of all of these are traded with neighbouring countries, and cement is covered by usually-enforced price controls, but in general these three items can be expected to give a good picture of nontradables prices.

This three-good nontradable index is calculated in Table 3 and shown in Figure 2, where it is seen to stay very close to the whole building materials price index (BMPI). This is in part because the three "nontradable" items account for over 50% of the whole BMPI (which is designed to monitor the price of materials for a standard three-bedroomed home), but also because these goods are complements to one another in the same sector, so their prices can be expected to move together. Thus, whether the three-good nontradables average price index or the whole BMPI is used is of little importance.

---

[19]. What did change was the scarcity value or quota rent on import licenses. But because the quantity of imports under scarce import licenses is fixed, changes in their domestic prices do not serve as an incentive to import more or less, so should not be included in our TUV index.

FIGURE 2. **ALTERNATIVE PRICE INDECES, 1954-88**



Here, the low-income CPI can be seen as rising at an intermediate rate, between the slowest-rising indeces, the GDP deflator and the trade unit value; and the fastest-rising ones, the BMPI and the nontradable average. Clearly, the slowest-rising indeces are either dominated by trade (the TUV) or by government (in 1988, total government spending of around $4,6 billion accounted for over half of GDP, heavily influencing the GDP deflator).

It might be argued that the faster rise in building materials' prices, both the whole BMPI and its major nontradable components, is due to some particular feature of the construction industry not shared by other nontradables. While there are some recent trends which have a particular impact on the construction industry, such as high rural-urban migration, most influences on the BMPI are shared by other nontradables. These include overall consumer demand, the costs of labour, and rents for land and housing.

Evidence that the construction-materials price rises have been shared by other nontradables can be gleaned from breaking down the GDP deflator into industries of origin. This is simply

nominal GDP over real GDP in each sector, the results of which are shown in Table 5. The industries with the fastest price rises all produce mostly nontradables: electricity and water (a public-sector activity with limited trade), construction (a mostly private-sector nontradable), domestic services (a private-sector nontradable much influenced by minimum wage laws), distribution and financial services (both private-sector nontradables).

The industries with the slowest price rises are public administration (largely government salaries), and mining (most of whose output is exported). Real estate is also a slow-riser, perhaps due to rent controls in urban areas -- since GDP figures consist almost entirely of officially-reported data, the rising value of lodgers' rooms or rural and peri-urban housing would not affect the GDP deflator. Education and health are the next slowest-risers, both of which are largely in the public sector. The transport and communications sector largely follows petrol prices, having kept up high price levels until the recent decline in oil costs.

The two largest sectors, manufacturing (27% of GDP in 1988) and agriculture (15% of GDP) had intermediate price rises, with manufacturing somewhat above agriculture. The manufacturing sector produces mostly import-substitutes, products that are protected by import quotas through the import license allocation system. Thus their domestic prices tend to move with domestic inflation -- subject to the effects of price controls -- since the will be no additional imports to absorb increases in demand. In contrast, agriculture produces mostly products which are exported at the official exchange rate. They receive no quota protection, and domestic prices reflect only changes in the exchange rate or foreign prices.

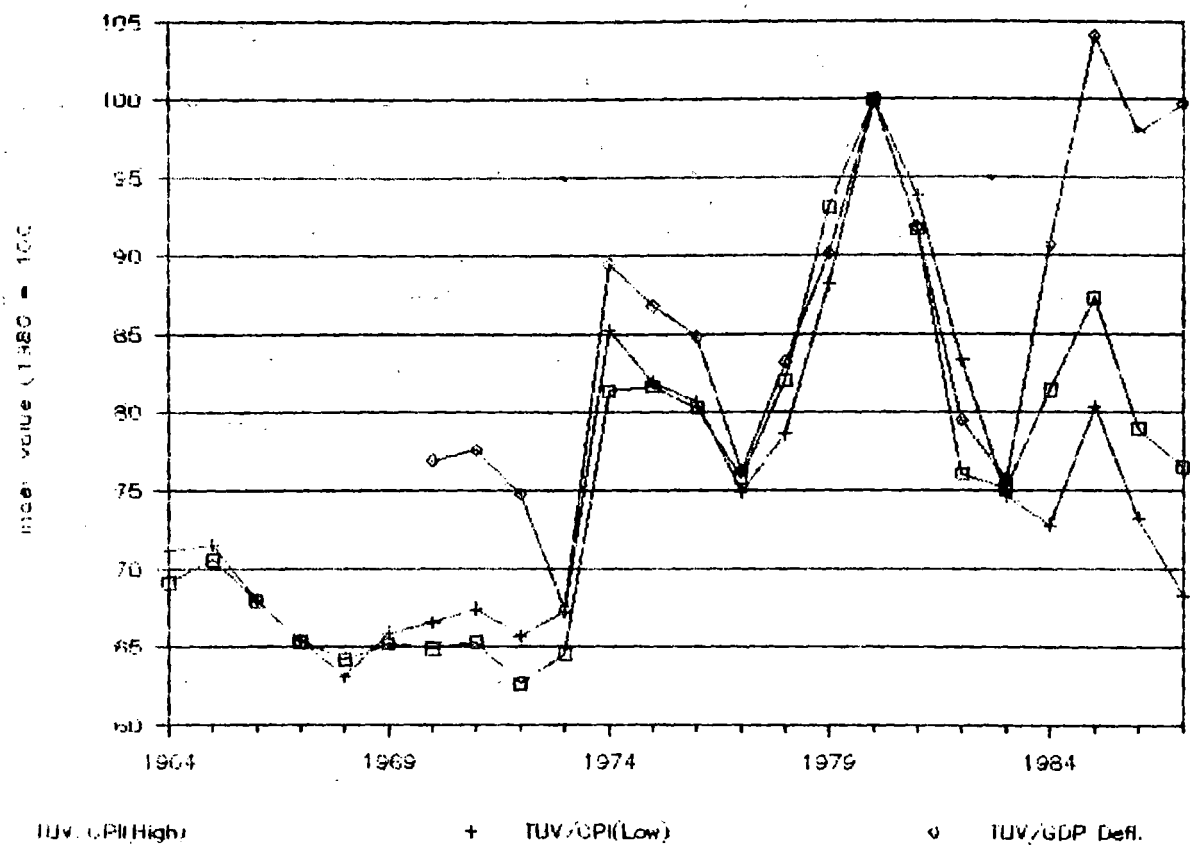
3.3 Real exchange rate indeces

To measure changes in relative prices, the price indeces discussed above can be combined into various real exchange rate ratios. These are calculated in Table 4. Since the ratios all reflect types of exchange rates, changes will be discussed in terms of the value of foreign currency: a rising index implies a rising value of forex (a depreciation of the Zimbabwe dollar), while a falling ratio implies a falling value of forex (an appreciation of the dollar).

In addition to RER indeces, some purchasing-power parity (PPP) indeces have been included for comparison. These measure changes in overall price levels in Zimbabwe relative to border prices, as discussed in the appendix. The PPP ratios in Figure 3 show slight decreases in the value of traded goods relative to local ones in the first three years of UDI, followed by stability until 1973. Then, the value of traded goods rocketed upwards in 1974, and again in 1978-80. These rises are associated primarily with

the world oil price rises of 1973-74 and 1978-79, which were quickly transmitted to the prices of many other goods on international markets. After Independence, all the PPP indeces fell for three years, then rose after the nominal exchange rate devaluations of 1982 and 1983 (shown in Table 2). From 1985, however, they fell again.

FIGURE 3. **PURCHASING POWER PARITY INDECES 1964-87**

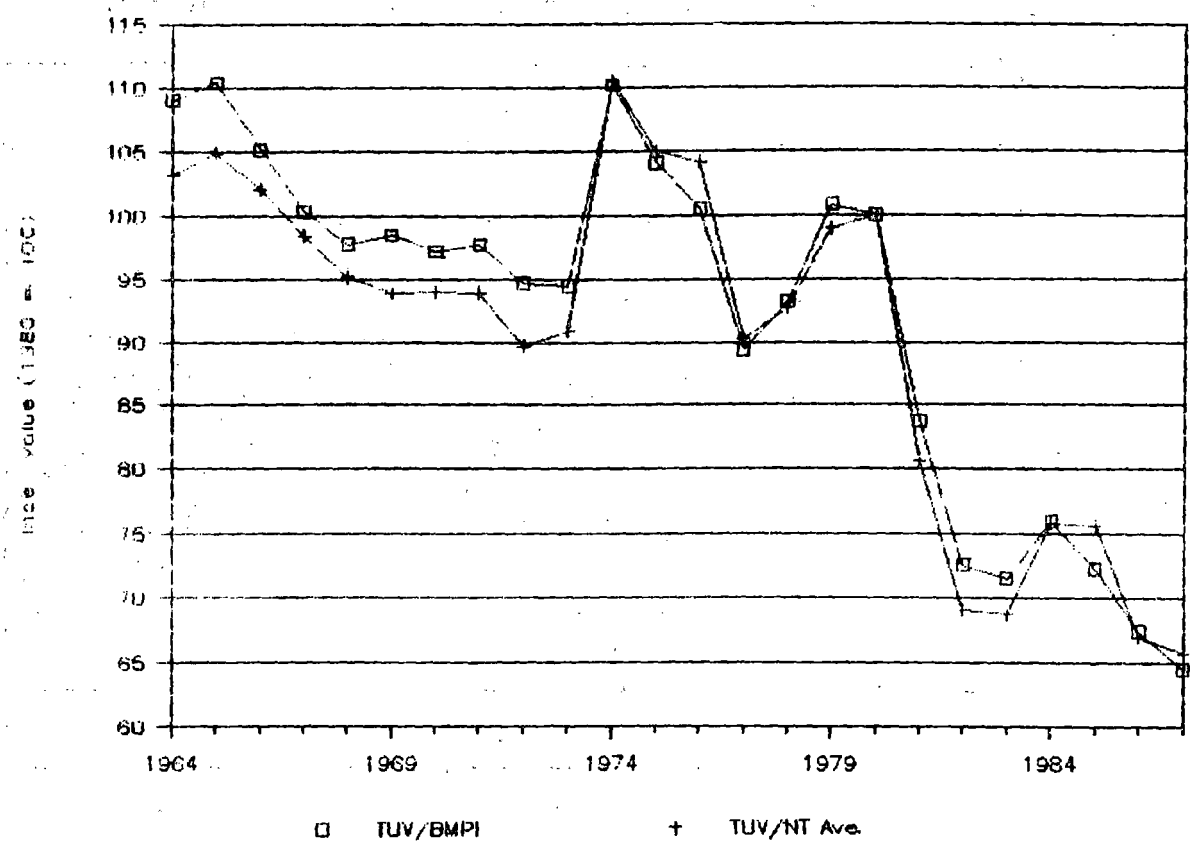


Of the PPP indeces, the two CPI-based ratios generally move together. The only divergence between them began in 1984, when the low-income CPI moved up relative to the high-income CPI. The GDP deflator-based ratio, however, moved in the opposite direction in 1973 and 1987, and as the GDP deflator showed much slower increases in the mid-1980s, the corresponding PPP index rises much higher at that time. The major reason for this is probably the much slower price increases in government than in the private sector, which have kept the GDP deflator below the CPIs.

The RER indeces are shown on Figure 4. Here, the oil price shocks give the same upward jumps in 1974 and 1978-79, but the general trend has been downwards since UDI, keeping a rough constancy around an index level just below 1.0. After 1980,

however, the RER indeces fell by about 30% in the first three years. This decline was temporarily reversed by the accelerated depreciation of 1982-83, but a further 15% fall after 1984 brought the RER indeces to a third below their average pre-Independence level.

FIGURE 4. **REAL EXCHANGE RATE INDECES, 1964-1987**



The post-Independence fall of about one-third in the value of forex represents the combined effect of many forces, including the continued budget deficits and capital inflows, the minimum wage laws discussed earlier, the price-raising effect of shortages and bottlenecks in the tradables sector, and a general burst of catch-up growth following the end of the war. But whatever its causes, this fall in the RER has twisted incentives away from the production of tradables and towards nontradables. In practical terms, it has become more profitable to invest in dry-cleaning or take-aways than in factories and farms; more desirable to be a builder or a mechanic than a leather-worker or tailor producing for export. This has reduced the availability of exports and increased the demand for imports, as compared with what it would otherwise have been.

The effects of this change in relative prices is not exactly the same for exports and imports. As mentioned above, the foreign exchange allocation system serves as a quota on essentially all imports except petrol. This creates shortages, which allow the uncontrolled prices of import-substitutes to rise freely with domestic inflationary pressures, like nontradables. In some cases, the controlled price may be raised to help alleviate these shortages. Or, a black market may arise. Sometimes, both will happen. In the case of rice, for example, there is both a controlled price that is above the border price, and a substantial parallel market at an even-higher price.

These higher domestic prices, or quota rents, on importable goods have helped their producers to escape the exchange rate tax against tradables. But since the quantity of the good actually imported remains fixed by the import licenses, the high prices obtained by the producers of importables do not reduce the demand for forex. In addition, importables are often highly import-intensive, since they include manufactures, chemicals, and other industrial goods. To the extent that the producers of these goods have succeeded in obtaining import licenses for their inputs, this has also helped them to offset the exchange rate tax.

Producers of exportables, in contrast, have no such escapes. Their product prices are fixed by foreign prices divided by the official exchange rate, while the prices of their nontradable input prices and non-price-controlled importable inputs are raised by the exchange rate tax. Those exporters who receive considerable import licenses, through regular channels or through the special Export Revolving Fund (ERF), or who receive compensation in Zimbabwe dollars through the Export Incentive Scheme (EIS), have all been penalized less than other exporters. But these privileged exporters are hardly ever the small, dispersed "emergent" producers of such low-input, labour intensive exports as communal-area cotton or light manufactures. Such activities are highly economically efficient, although they are perhaps not very technically sophisticated or prestigious, and they contribute strongly towards improved income distribution and employment. Penalizing them is therefore extremely costly, in terms of both equity and overall economic growth.

4. Implications for policy

To compensate the producers of tradables for recent changes in the real exchange rate, a value of forex about 50% above its 1987 levels would be needed. And although consistent data before 1964 are not available, one might go even further back to target the pre-UDI 1964-65 level, a further 5-10% above the UDI average. This suggests that, in 1987, the forex premium should have been at least 50%. In 1988 and early 1989, there has been continued nominal depreciation of the Zimbabwe dollar. But there was also

an increase in the money supply in 1988, and continued shortages of important production inputs and consumer goods. Thus the RER index has probably not improved, and the forex premium remains at least at its 1987 level.

A target forex premium of 50% is somewhat below the 100% premium recommended by the Ministry of Finance, Economic Planning and Development, and slightly above the 40% suggested by the World Bank. It is not exceptionally large by the standards of other countries with similar foreign-exchange control systems, but it is sufficient to affect decision-making and incomes throughout the economy. In the agricultural sector alone, it represents a tax against farmers on the order of half a billion dollars, about 40% of agricultural GDP. This very much reduces farmer incomes and their ability to invest in productivity-enhancing improvements, and is a strong disincentive against production for export.

To compensate for this tax, the first step is to apply the forex premium to official project appraisals and government planning efforts. This is certainly important, since it allows government decision-making to reflect national, rather than purely private, costs and benefits. But such appraisals govern only a minority of all investment and economic management decisions. In order to induce the whole private sector to participate in expanding the availability of forex, this higher value of forex would have to be spread throughout the entire economy.

Foreign-currency incentive programmes such as the ERF can help to offset the exchange rate tax, but they only assist exporters in proportion to their use of importable inputs. Local-currency incentive programmes such as the EIS could reach everyone, but it is difficult for small and/or remote producers to apply for the subsidy payments, and producers of most exports sold through the marketing boards are not eligible. Thus, the compensation mechanisms are limited in their scope: a few exporters get very large subsidies, while many get nothing at all. In particular, special programmes cannot reach the small, low-input, labour-intensive potential exporter who is most penalized by the current system.

To spread the benefits of export production most widely, the easiest policy is one of accelerated increases in the exchange rate, to raise the value of exportables and importables throughout the economy. Then, this higher Zimbabwe dollar value of exports and cost of imports could be passed on to producers and consumers, through the price control system. Progressive depreciation of the currency under the current crawling peg system has been an established element of government policy ever since 1981. The problem of exchange rate policy is really one of the rate of depreciation.

The analysis presented here suggests that merely keeping pace with differential inflation is not enough. The accelerated depreciation of 1982-1984 was subsequently slowed down, but the results presented in this paper suggest it should have continued, since the real exchange rate improvement it achieved in 1984 was relatively small and short-lived. To obtain stronger and longer-lasting improvements, and escape from the current forex-shortage/low-employment trap, a return to accelerated depreciation would be needed. Ultimately, a 50% catch-up in real relative prices would be desirable. However, this does not mean that a 50% nominal devaluation is called for.

Many analysts throughout the world have found strong links between devaluation and inflation, particularly in the short run. This occurs largely because most goods are tradable, and their prices are raised directly by a devaluation. But it occurs also because price rises in one sector are partly transmitted to other sectors, so nontradables' prices will rise as well.

The degree to which a nominal devaluation yields a real exchange rate improvement depends very much on the inflationary pressures which created the real exchange rate decline in the first place. The stronger these pressures, the less improvement in the RER will be felt. But in the Zimbabwean context, several of the immediate post-war pressures have receded. In particular, capital inflows have slowed, and real wages are back to or below their long-term trend. To the extent that the remaining inflationary pressures -- particularly the government budget deficit and production bottlenecks -- are also reduced, nominal depreciation can be expected to yield significant real exchange rate improvements. In addition, low growth in the money supply would have to be maintained, to prevent the once-only price rise caused by devaluation from becoming continuous inflation.

Reducing inflationary pressures is already a major objective of the government. These efforts could themselves be assisted by accelerated depreciation. Firstly, depreciation could be used to help reduce the budget deficit, by increasing the Zimbabwe dollar revenue of the public sector through higher earnings in the exporting parastatals. Secondly, depreciation could help ease production bottlenecks, if it were accompanied by channeling foreign exchange into productive equipment, spares, and inputs. But because of the currently high levels of the government deficit and severe bottlenecks in production, devaluation in Zimbabwe is probably best undertaken slowly, in time with improvements elsewhere in the economy.

Arguments about exchange rate policy often focus on its efficiency aspect, in terms of overall growth in national income. But in many countries, exchange rate policy is at least as important for employment and income distribution. In Zimbabwe, most people -- and most poor people -- are farmers. Farms are by

nature net producers of tradables: they turn nontradable land and labour into highly tradable crops and livestock. And in Zimbabwe, these are mostly exportables, or substitutes for exportables. Thus the farm sector as a whole, but particularly communal-area farmers producing cotton, maize and oilseeds with few imported inputs, would benefit from real depreciation -- to the extent that the higher revenue for their products was passed on to them.

The costs of a real depreciation would be borne by those who are net consumers of foreign exchange, mostly in urban areas. This includes significant numbers of unemployed or underemployed poor, but the impact on them would be limited by the fact that their budgets are dominated by housing and low-valued foods, with relatively little tradable goods. Also, in Zimbabwe most urban people retain close ties with their rural homes, so that many of the urban poor would be able to share in the benefits of increased farm incomes. Those communal area residents who are net consumers of farm products (getting the extra money from off-farm earnings, including work on neighbours' farms or remittances from relatives) would not be very much affected, because the goods they too mostly consume nontradables, or tradables which are not much protected by price controls.

The greatest losses would be felt by those at relatively high income levels, particularly in government and in industries which are unable to produce for tradables. But these losses would occur only in the short run; over time, as higher export earnings allow faster growth in the economy as a whole, all sectors would benefit.

In terms of the real wage, early gains from the high minimum wage introduced at Independence have already been reversed, and real wages are unlikely to rise significantly again until employment and productivity can rise. Total employment is still dominated by the farm sector with over two-thirds of workers, so returns there will inevitably dominate average real wages especially among the poorest. In the minority of non-farm jobs, growth is likely to be concentrated in the exportables sector, if only because the other sectors have already enjoyed a decade-long boom. Further real growth in the nontradables and import-substitution sectors now requires complementary growth in the tradables sector, both to relax production bottlenecks caused by forex shortages, and to increase demand through growth in overall real incomes.

In summary, a policy of accelerated depreciation would serve equity objectives as much as efficiency ones. The current system of extremely scarce import licenses benefits only the few people who actually get these goods; the relatively low price of imported tractors, for example, is of little help to communal farmers -- while their extreme scarcity makes their low price of

little use to most commercial farmers. Income transfers such as subsidized tractors for a few might have been an objective of the UDI regime which created the current system, but they are no longer necessary elements of the Zimbabwean economy. A higher value of forex would help to reduce the shortage of foreign exchange and clear out production bottlenecks, raising incomes and employment prospects throughout the economy. But most importantly, it would remove the exchange rate tax from producers of tradables -- a tax which has been particularly severe on farmers, especially the low-input, labour-intensive producers in communal areas.

5. Conclusions

This paper has reviewed the concept of the real exchange rate, and presented the results of its application to Zimbabwe. These are shown to have powerful implications for the impact of government policy on growth and equity. Exchange rate policy has been shown to be a considerable drag on the farm sector, far outweighing (in dollar terms) all of the government's sectoral and commodity policies funded through the budget of the Ministry of Lands, Agriculture and Rural Resettlement and its associated parastatals (marketing boards, AFC and ARDA).

Analysis of the role of foreign exchange in the Zimbabwean economy, and in the agricultural sector in particular, should not stop here. Much more detailed examination of the real exchange rate is possible, through an analysis of its individual influences, and the construction of an econometric model to predict the separate effect of several macroeconomic variables. Alternatively, elasticity-based approaches could be implemented, to predict how exports and imports might respond to policy changes. Some possible methods are outlined in the appendix to this paper. In addition, the differential impact of the exchange rate tax within the agricultural sector could be analysed, to show how different crops and farming systems are affected. This is the topic of the larger project under which this paper was written.

Further analysis, however, is unlikely to change the main thrust of the basic results presented here. A significant exchange rate tax is currently being imposed in Zimbabwe, negatively affecting both the level and distribution of national income. But changing this is very difficult, as Zimbabwe's net users of foreign exchange -- including most urban industries -- benefit from the situation. To the extent that they are slow in switching into less import-dependent activities, they will undeniably lose in the short run from improvements in the real exchange rate. Thus trade policy reform poses a major challenge for government, with great obstacles as well as great potential rewards.

\RER\macindic.wk1

TABLE 2. MACROECONOMIC INDICATORS FOR ZIMBABWE, 1975-88

(all data are for year-end unless otherwise stated)

	NOMINAL EXCHANGE RATES				MONEY SUPPLY (Z$ million)		INTEREST RATES		PUBLIC FINANCE (Z$ m.)			GROSS DOMESTIC PRODUCT	INFLATION (1980=100)	
	SDR/Z$		US$/Z$				GOVT. BONDS	12-Mo. C.ofD.	GOVT. DEFICIT	NET BORROWING DOMESTIC	FOREIGN		GDP Deflator	CPI (Low-Inc.)
	(end)	(avg.)	(end)	(avg.)	(M1)	(M2)						(Z$ m.)		
	(2)	(2)	(2)	(2)	(1)	(1)	(2)	(1)	(2)	(2)	(2)	(2)	(2,1)	(1)
1975	1.37	1.45	1.60	1.76	324.1	440.6	6.5%	5.3%				1,998	61.2	62.1
1976	1.39	1.38	1.62	1.60	351.9	518.0	6.5%	5.2%	118.3	122.7	-0.9	2,166	67.0	68.9
1977	1.27	1.36	1.55	1.59	374.5	552.1	7.6%	4.5%	95.4	98.0	-0.3	2,194	77.2	76.0
1978	1.14	1.18	1.48	1.48	415.0	625.8	8.8%	4.6%	253.5	129.5	124.0	2,360	81.6	83.4
1979	1.13	1.14	1.48	1.47	463.2	709.5	8.8%	4.9%	293.4	172.0	121.4	2,825	94.9	94.9
1980	1.24	1.20	1.59	1.55	632.8	951.9	8.9%	5.2%	376.0	297.1	78.9	3,443	100.0	100.0
1981	1.20	1.23	1.39	1.45	678.7	1034.8	11.5%	14.6%	261.6	115.6	146.0	4,433	114.5	113.2
1982	0.99	1.20	1.09	1.32	770.4	1236.0	13.0%	10.6%	545.3	413.5	131.8	5,149	129.8	125.2
1983	0.86	0.93	0.90	0.99	740.3	1267.9	13.1%	14.5%	393.7	244.4	43.5	5,980	156.9	154.1
1984	0.68	0.78	0.67	0.80	881.9	1553.2	13.3%	9.8%	647.4	324.9	322.1	6,695	159.6	185.2
1985	0.55	0.61	0.61	0.62	972.4	1618.7	13.3%	10.3%	512.5	295.0	487.9	7,609	164.0	200.9
1986	0.49	0.51	0.60	0.60	1062.3	1838.4	13.2%	10.8%	607.7	322.1	285.6	8,879	179.6	229.7
1987	0.42		0.60	0.60	1204.7	2064.1	13.9%	10.0%	1014.8	847.3	167.4		189.0	258.3
1988	0.38		0.51	0.56	1572.5	2562.3	14.0%	10.8%					204.8	276.6

Annual Growth Rates:	Exchange Rate SDR/Z$ (end of year)	Exchange Rate US$/Z$ (end of year)	Money Supply M1	Money Supply M2	Govt. Deficit	Nominal GDP	GDP Deflator	CPI (Low-Inc.)
1975-80	-3.4%	-1.0%	13.0%	15.1%	41.0%	10.8%	10.7%	10.3%
t-stat.:	-2.15	-1.10	6.5	9.4	4.5	6.1	17.7	25.8
1980-88	-14.9%	-13.4%	11.0%	12.5%	14.6%	16.1%	8.8%	14.3%
t-stat.:	-23.5	-8.73	11.5	21.8	3.7	19.9	11.1	25.3

Notes: All growth rates calculated by least-squares method.
Gvt. Deficit growth rate is calculated for 1976-80 and 1980-87 only.
GDP growth rate is calculated for 1980-86 only.
Rate for 12-month Certificates of Deposit is the highest prevailing rate.
For 1985, the 6-month Certificate or Deposit rate is given.
Government bond yield is the period-to-maturity rate on 25-year bonds (known as "stock" in Zimbabwe.)
CPI (Low income) is an annual average. Entry for 1988 is through November only.
Government finance statistics change in 1985, when end of fiscal year moved from 31 December to 31 June.
GDP Deflator calculated from (2) for 1975-80, and from (1) for 1981-88.

Sources: (1) CSO, Quarterly Digest of Statistics (March 1989 and March 1981, plus Supplement April 1981)
(2) IMF, International Financial Statistics (Yearbook 1987 and May 1989).

\RER\rer-data.wk1

TABLE 3. WAGES AND PRICE INDECES FOR ZIMBABWE, 1954-1988

	DOMESTIC PRICES																BORDER PRICES		
	Average Earnings per Employee (Z$)						Urban Consumer Price Index					Building Materials Price Index					Trade Unit Value Index		
	Agric. & Forestry			National			Low Income		High Income										
	Black	Other	Nat'l.	Black	Other	Nat'l.	Food	Total	Food	Total	GDP Deflator	Bricks	Cement	Timber	N.T. Avg.	Whole Index	Imports	Exports	Avg.
1954	98	1666	119	130	1768	300			29.5	33.6		33.5	29.7	19.5	27.6	25.1			
1955	102	1752	125	140	1850	323			29.8	34.1		27.0	29.3	21.4	25.9	26.3			
1956	106	1992	132	150	1976	346			32.1	35.6		27.4	28.5	22.4	26.1	26.6			
1957	110	1992	138	164	2112	384			33.5	36.7		29.8	28.2	22.2	26.8	26.7			
1958	116	1950	144	176	2182	415			34.9	38.0		34.1	27.1	20.9	27.4	26.6			
1959	118	2250	154	182	2206	430			36.3	39.0		31.6	27.7	21.2	26.8	26.4			
1960	120	2312	158	188	2268	443			37.1	40.0		33.4	28.0	20.8	27.4	26.7			
1961	122	2300	160	204	2308	463			38.5	41.1		29.9	27.9	20.4	26.1	25.9			
1962	111	2294	162	212	2372	489	41.0	40.5	39.3	42.0		31.7	31.1	20.3	27.7	26.5			
1963	122	2500	175	227	2437	513	41.4	40.8	39.4	42.4		33.3	31.3	20.7	28.4	27.0			
1964	123	2620	174	238	2492	509	42.3	42.9	40.0	43.6		34.3	31.5	21.7	29.2	27.6	24.6	35.6	30.1
1965	123	2729	177	249	2577	536	43.7	43.9	41.0	44.3		34.3	32.7	22.4	29.8	28.3	25.5	37.1	31.3
1966	125	2540	175	259	2666	560	45.5	45.3	42.4	45.5		34.6	33.0	23.1	30.3	29.4	28.1	33.7	30.9
1967	123	2592	177	269	2715	575	46.3	45.9	43.1	46.4		35.0	33.4	24.0	30.8	30.2	28.0	32.6	30.3
1968	123	2562	173	278	2823	595	48.2	47.0	44.1	47.4		36.0	34.4	25.4	32.0	31.1	27.6	33.3	30.4
1969	123	2643	171	287	2973	616	48.2	47.2	44.6	48.7		38.8	35.7	26.9	33.8	32.2	28.1	35.4	31.7
1970	127	2658	179	305	3114	654	49.1	48.2	46.0	50.4	42.5	39.9	36.4	28.0	34.8	33.6	29.4	36.1	32.7
1971	131	2740	181	324	3357	700	50.3	49.6	47.2	51.9	43.7	41.6	37.1	29.6	36.1	34.7	31.3	36.5	33.9
1972	133	2863	183	337	3628	733	51.7	51.1	49.5	54.2	45.4	44.1	37.8	31.6	37.9	35.8	30.6	37.3	34.0
1973	142	3160	198	359	3901	783	53.9	52.6	51.2	56.1	53.8	44.8	40.1	34.6	39.8	38.3	31.9	40.6	36.2
1974	159	3683	220	402	4525	869	57.6	56.1	56.7	60.4	54.9	45.7	44.4	43.3	44.5	44.6	43.5	54.8	49.1
1975	180	4817	256	464	5093	995	64.8	61.7	61.4	65.0	61.2	46.9	53.1	49.8	50.6	51.0	48.0	58.2	53.1
1976	209	5000	290	524	5618	1113	70.5	68.8	66.9	70.9	67.0	52.9	58.3	52.6	54.6	56.6	54.4	59.4	56.9
1977	232	5450	322	588	6156	1228	78.6	77.1	73.5	77.7	77.2	67.2	67.5	61.0	65.2	65.9	55.0	62.8	58.9
1978			352			1352	86.5	84.6	82.1	82.8	81.6	74.2	78.8	66.6	73.2	72.9	68.8	67.1	68.0
1979			411			1525	97.0	95.8	91.3	91.8	94.9	86.7	90.9	81.5	86.4	84.8	93.6	77.4	85.5
1980			458			1862	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981			744			2213	112.0	113.1	113.4	114.6	114.5	136.6	123.2	130.5	130.1	125.5	99.5	110.6	105.1
1982			919			2789	123.8	125.2	126.3	135.7	129.8	159.2	147.1	141.9	149.4	142.2	99.1	107.3	103.2
1983			1061			3068	159.1	154.1	152.1	158.0	156.9	188.9	169.3	160.5	172.9	166.2	116.4	121.3	118.9
1984			1177			3359	198.8	185.2	183.8	177.7	159.6	209.1	185.2	177.9	190.7	190.5	131.2	158.3	144.8
1985							212.3	200.9	200.6	195.3	164.0	259.0	197.5	220.0	225.5	236.1	152.7	188.5	170.6
1986							240.1	229.7	225.1	222.8	179.6	300.9	228.3	258.3	262.5	260.8	159.7	192.0	175.9
1987							276.0	258.3	261.0	246.4	189.0	325.4	247.7	288.3	287.1	292.4	183.0	194.0	188.5
1988							299.2	276.6	284.6	263.6	204.8	347.8	276.3	305.1	309.7	309.9			

Notes: All indeces have been linked to 1980=100.
Building material price index series changes in 1965, to include building aggregates along with cement, and to include delivery charges to site in Bricks and Cement.
Ave. earnings per employee series changes in 1974 and again in 1978 when racial classification is abandoned.
Low-income CPI weights were revised in 1962, 1965, 1970, 1973, and 1981.
High-income CPI weights were revised in 1962, 1969, 1973, 1976, and 1978.
All CPI data for 1988 are 11-month averages through November only.
GDP deflator is from IMF, International Financial Statistics for 1970-80, and calculated from CSO, Quarterly Digest of Statitics for 1981-88.

Sources: CSO, Monthly Digest of Statistics (Jan. 1969, Mar. 1981) and Supplement (Apr. 1981).
CSO, Quarterly Digest of Statistics (Mar. 1989).
IMF, International Financial Statistics (1987).

TABLE 4. REAL WAGE RATES AND RELATIVE-PRICE EXCHANGE RATE INDECES FOR ZIMBABWE, 1954-1988

	REAL WAGE RATES (Constant 1980 dollars)								REAL EXCHANGE RATE INDECES		PURCHASING POW PARITY INDECE	
	Agricultural Wages/				Nat'l. Average Wages/				TUV/	TUV/	TUV/	TUV/
	CPI(high) Black	CPI(high) Nat'l.	CPI(low) Black	CPI(low) Nat'l.	CPI(high) Food	CPI(high) Total	CPI(low) Food	CPI(low) Total	BMPI	NT Avg.	CPI-hi	CPI-lo
1954	292	356			1016	893						
1955	299	365			1082	946						
1956	298	372			1078	971						
1957	300	377			1147	1047						
1958	306	378			1188	1093						
1959	302	395			1186	1103						
1960	300	396			1194	1107						
1961	297	389			1203	1126						
1962	264	386	271	401	1245	1164	1192	1208				
1963	288	412	295	428	1302	1209	1239	1255				
1964	282	399	291	406	1274	1168	1203	1188	109.1	103.3	69.1	71.2
1965	277	400	281	404	1307	1208	1225	1219	110.4	105.0	70.6	71.6
1966	275	385	275	387	1320	1232	1232	1236	105.2	102.1	67.9	68.0
1967	265	381	266	384	1335	1240	1242	1252	100.4	98.4	65.3	65.4
1968	260	366	255	368	1348	1256	1235	1266	97.8	95.2	64.2	63.1
1969	253	352	255	363	1381	1264	1278	1304	98.5	94.0	65.2	65.9
1970	252	355	258	371	1422	1298	1332	1358	97.2	94.1	64.9	66.6
1971	252	348	261	364	1483	1348	1392	1410	97.8	94.0	65.3	67.5
1972	245	338	257	359	1481	1354	1419	1437	94.7	89.7	62.7	65.7
1973	253	352	264	376	1529	1395	1453	1488	94.5	91.0	64.5	67.3
1974	263	364	276	392	1533	1439	1508	1549	110.2	110.6	81.4	85.3
1975	277	394	278	415	1620	1530	1535	1612	104.2	105.0	81.7	81.9
1976	295	409	296	421	1663	1570	1577	1616	100.6	104.2	80.3	80.7
1977	299	415	295	418	1671	1581	1563	1594	89.4	90.3	75.8	74.9
1978		425		416	1647	1632	1564	1598	93.3	92.8	82.1	78.6
1979		448		429	1670	1661	1573	1592	100.8	99.0	93.1	88.2
1980		458		458	1862	1862	1862	1862	100.0	100.0	100.0	100.0
1981		650		658	1952	1931	1976	1957	83.7	80.7	91.7	93.8
1982		677		734	2208	2055	2253	2227	72.6	69.1	76.1	83.4
1983		671		688	2017	1942	1928	1991	71.5	68.7	75.2	74.7
1984		662		635	1828	1890	1690	1814	76.0	75.9	81.5	72.8
1985									72.3	75.7	87.4	80.4
1986									67.4	67.0	78.9	73.2
1987									64.5	65.6	76.5	68.3
1988												

Source: Calculated from Table 3.

\RER\gdp-defl.wk1 (p. 2)

TABLE 5. GDP DEFLATORS AND PROPORTIONS OF GDP BY SECTOR, 1977-1988

GDP DEFLATORS (1980 = 100)	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Electricity & water	96.6	88.6	110.9	100.0	111.4	115.9	286.8	202.9	182.3	258.5	260.2	261.5
Construction	77.1	73.6	103.4	100.0	131.4	188.1	277.4	238.4	240.6	244.9	209.4	224.0
Domestic services	72.2	75.4	81.5	100.0	114.3	139.3	146.7	147.5	160.0	215.0	221.5	260.0
Distrib., hotels & restaurants	71.8	108.2	125.4	100.0	132.2	164.3	199.7	202.7	201.3	198.6	213.0	233.5
Finance & insurance	53.1	61.4	79.4	100.0	106.3	109.6	135.5	149.2	183.4	202.2	209.7	231.7
Manufacturing	70.4	81.9	89.7	100.0	115.3	127.8	169.1	182.3	165.0	185.0	206.7	221.2
Agriculture & forestry	82.9	65.1	72.3	100.0	124.3	140.0	135.0	150.8	163.7	194.6	201.5	207.4
Transport & communications	100.6	106.6	108.7	100.0	138.5	161.5	179.9	192.0	181.9	211.1	167.2	177.7
Education	55.5	67.7	77.2	100.0	91.1	108.8	110.6	124.2	145.3	162.7	167.4	197.7
Health	72.1	79.4	88.2	100.0	107.9	120.5	121.3	124.7	147.4	164.0	170.4	186.3
Other services n.e.s.	69.3	73.6	82.4	100.0	117.7	135.8	147.4	159.4	178.3	147.0	158.3	166.1
Real estate	71.2	83.3	91.7	100.0	127.9	127.9	134.1	136.4	154.5	146.7	160.0	168.9
Mining & quarrying	48.2	53.4	77.4	100.0	90.6	76.4	140.4	110.0	127.8	127.0	144.7	181.8
Public administration	83.3	86.3	97.5	100.0	91.2	110.2	117.8	122.0	128.0	139.5	150.3	155.2
Less imputed banking charges	71.4	79.3	91.1	100.0	114.2	129.2	157.3	160.0	164.0	176.5	187.5	203.3
TOTAL GDP	71.7	78.7	91.0	100.0	114.5	129.8	156.9	159.6	164.0	179.6	188.4	204.8

PROPORTION OF GDP AT CURRENT PRICES	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Manufacturing	22.2%	22.8%	23.6%	24.9%	25.1%	24.1%	26.5%	26.1%	23.9%	24.8%	27.0%	26.5%
Agriculture & forestry	16.1%	12.8%	12.1%	14.0%	15.8%	14.4%	10.0%	13.2%	16.1%	16.1%	13.1%	14.5%
Distrib., hotels & restaurants	11.7%	15.8%	16.0%	14.0%	14.9%	15.9%	14.4%	13.1%	12.5%	11.9%	12.4%	12.4%
Education	3.7%	3.8%	3.7%	5.2%	5.3%	6.6%	6.3%	7.4%	8.4%	8.8%	8.9%	9.1%
Public administration	9.8%	10.6%	10.2%	9.0%	7.6%	7.9%	7.3%	7.9%	7.6%	7.4%	6.0%	7.4%
Transport & communications	8.0%	7.9%	7.1%	6.5%	7.6%	7.8%	7.4%	7.7%	6.9%	7.4%	5.4%	5.1%
Mining & quarrying	7.2%	6.9%	8.5%	8.8%	6.2%	4.7%	7.2%	5.7%	5.9%	5.3%	6.0%	6.4%
Other services n.e.s.	5.5%	5.3%	5.1%	5.4%	5.4%	5.9%	5.8%	6.1%	6.7%	5.2%	5.2%	5.1%
Finance & insurance	4.9%	4.7%	4.6%	4.9%	4.6%	4.9%	5.1%	5.0%	5.5%	5.3%	5.6%	5.6%
Electricity & water	2.7%	2.7%	2.7%	2.2%	1.9%	1.6%	3.6%	2.5%	2.3%	3.5%	4.4%	4.5%
Construction	4.1%	3.0%	3.5%	2.8%	3.4%	4.1%	4.7%	3.6%	2.5%	2.4%	2.4%	2.0%
Health	2.4%	2.4%	2.3%	2.2%	2.0%	2.3%	2.0%	2.1%	2.3%	2.4%	2.3%	2.3%
Domestic services	2.5%	2.3%	2.0%	2.0%	1.8%	1.8%	1.6%	1.5%	1.5%	1.9%	2.0%	1.9%
Real estate	2.3%	2.0%	1.7%	1.3%	1.4%	1.2%	1.1%	1.1%	1.1%	0.8%	1.0%	0.9%
Less imputed banking charges	-3.1%	-3.1%	-3.1%	-3.3%	-3.0%	-3.1%	-3.2%	-3.0%	-3.3%	-3.3%	-3.7%	-3.7%
TOTAL GDP (current 2$ m.)	2069	2255	2650	3224	4049	4657	5432	5649	6227	6957	7271	8295

Note: All data sorted by 1985-88 averages.

Source: Calculated from CSO, Quarterly Digest of Statistics (March 1989).

APPENDIX: ALTERNATIVE EXCHANGE RATE CONCEPTS AND METHODS

The historical real exchange rate approach as used in this paper is not the only available method to estimate the value of foreign exchange. For those interested in pursuing the exchange-rate issue in greater depth, this appendix reviews the most relevant aspects of exchange rate theory. Much of this material is available in the references cited here, but is condensed and applied to the Zimbabwean case for the convenience of the reader.

A1. Alternative exchange rate concepts

The starting place for any discussion of the exchange rate must be a definition of terms. In addition to the concepts used in the body of this paper, several other concepts will be useful. These are briefly outlined here.

A1.1 The nominal effective exchange rate

From the point of view of the economy as a whole, foreign exchange is not just pula, or pounds, or U.S. dollars. It is all of these, in proportion to their use in imports and exports. And since the exchange rates between these currencies change every day, economists sometimes calculate a nominal effective exchange rate (NEER), by adding up the exchange rates with all major currencies, multiplying each one by its share in trade. In the Zimbabwean case, the official exchange rate is already being set in reference to a basket of foreign currencies, in effect targeting a particular NEER. But this remains a nominal rate which applies only to money, without being corrected for inflation. It does not correspond to the costs of real goods, and therefore cannot be the basis for a measure of opportunity costs.

A1.2 The real effective exchange rate

In the simplest definition of "real effective" exchange rate, "effective" is used in the above sense as a trade-weighted basket of currencies, while the term "real" is used in the sense of being deflated by some index of domestic inflation. Thus, a "real effective exchange rate" (REER) is calculated as a weighted average of several nominal exchange rates, deflated by relative inflation in each currency. This calculation is similar in nature to the purchasing power parity approach discussed below, in section A2.5. It is easy to implement this method, so it is often encountered. For the major OECD countries, REERs are published regularly by the International Monetary Fund in International Financial Statistics (IFS). In Zimbabwe, an unpublished REER index is calculated by the Reserve Bank.

A1.3 The real effective exchange rate again

An alternative definition of the real effective rate is as a measure of the private opportunity costs of foreign exchange, for the producers of particular exports or import-substitutes. This is calculated by including all of the transfers, both government subsidies and private rents, associated with producing or consuming each type of product.

In Zimbabwe, many exporters (who sell foreign exchange to the Reserve Bank) receive a subsidy for doing so. These exporters' private opportunity cost of foreign exchange (REERx) is really the value of forex at the OER (in the sense of Z$/p), plus that percentage subsidy (s). But this subsidy differs for different goods, so for each item there is:

$$REERx_i \equiv OER + s_i$$

The export subsidy (s_i) is obtained, as in many other countries, from three main sources: a foreign-exchange Export Revolving Fund (ERF) to provide import licenses for the import content of all confirmed export orders (provided it does not exceed 60% of the export value); an ERF Bonus Scheme, to provide import licenses for general use up to 25% of incremental export earnings; and a local-currency Export Incentive Scheme giving tax-free Zimbabwe-dollar bounties equal to 9% of export earnings.[1] In addition, some exporters may be able to engage in under-invoicing, an illegal but easy practice in which an exporter remits to the Reserve Bank only a portion of actual export earnings, and uses the rest as foreign currency.

At the same time, importers (who buy forex), must usually pay customs duties and a surtax, plus occasional fees and other taxes. Illustrative examples for agricultural inputs are given in the table below.

TABLE A1. IMPORT TAXES ON SELECTED AGRICULTURAL INPUTS, 1989

	Tyres	Chemicals & Fertilizers	Machinery & Spares
Duty	25c/kg		
Surtax	20%	20%	5%
Total Tariff (t_j)	20%+25c/kg	20%	5%

Source: Commercial Farmers' Union.

As above, the total tariff on each item (t_j) can be added to the OER to get importers' opportunity cost of forex ($REERm_j$). But importers must also obtain import licences, which are scarce and therefore valuable. They give importers the right to import a good at a cost which is still below what other buyers would be willing and able to pay. The lucky importer can then either resell the item (quickly, or sometimes much later), or use it to make something else for resale. In most cases, these sales are

---

[1]. These programmes are summarized by the Reserve Bank (1988).

covered by enforced price controls, so the transfer is passed on to the buyers, who have received the item for less than they would be willing and able to pay.

In either case, import licenses attract a rent, which is captured by the recipients of those licenses (if price controls are not enforced) or by those who buy from them (if they are). The only imported items which do not attract such a rent are those for which there is no shortage of import licenses, which is essentially only petroleum products imported by the parastatal NOCZIM. For most imports, however, some rent (r_j) should also be included, yielding:

$$REERm_j \equiv OER + t_j + r_j$$

The REER's are calculated from the point of view of an exporter or importer, but since there is at least some substitutability between goods, the trader's price soon extends to all similar goods whether the item itself is actually exported or not. Thus, the REER's apply not only to traded goods, but also to tradable items which are similar but may not, in fact, be imported or exported.

For example, some Zimbabwean furniture is exported, and a subsidy (s_i) is available to exporters from the Export Revoilving Fund and the Export Incentive Scheme. This leads furniture manufacturers to sell more abroad and less locally: the local price of furniture rises to the Botswana price converted at the OER, plus the subsidy received by the exporter. This situation also holds in the markets for other Zimbabwean products, such as tyres, televisions and refrigerators, which are occasionally found in neighbouring countries "cheaper" (at the official exchange rate) than they are within Zimbabwe.

For imports, a similar situation applies. Import tariffs, plus the quota rents on import licenses, raise the cost of imports, which then extend to substitute items that may be produced domestically. The amount of the import tariff (t_j) is received by the government on the quantities actually imported, while the domestic producers of similar items receive that amount as a portion of their total rent. The remaining import-licence rent (r_j) is collected by both importers and domestic producers, or is passed on to the consumers of their goods.

An example for importables would be paper supplies. There is considerable domestic production, which is protected by the tariffs at the level of OER+t_j. But domestic supply at this price is limited, so both domestic and imported paper is usually valued at the even higher price of OER+t_j+r_j. The rent (r_j) is shared amongst all sellers and buyers of paper, while the tariff (t_j) is captured by the government only on the quantities actually imported, and by domestic buyers and sellers on the

domestically-produced quatities. All these transfers, including both tariffs and rents, are paid by the consumers of paper products. Additional costs are paid, however, by the producers of other goods, who face higher input costs and lower product demand because of the restrictions on trade in paper.

There are several striking features of this exchange rate system. Firstly, it gives much lower benefits to the producers of exports (s_i) than to the producers of import-substitutes (t_j+r_j). This gives a strong import-substitution or inward-looking bias to the trade policy, tending to close off the economy, reducing the amount of trade. Before UDI when these policies were instituted, exports accounted for more than half of national income; by the mid-1980s they fell to less than a quarter.[2] Similar import-substitution policies are common throughout the world, and are often quite successful for a few years, while producers find the easiest ways to make import-substitutes, and exporters have not yet switched out of exporting into other activities.

As time goes on under an import-substitution trade regime, the easiest opportunities to replace imports are used up, and more and more exporters have switched to producing for the domestic market. This creates a shortage of foreign exchange, raising costs and making bottlenecks throughout the economy. These bottlenecks slow down growth and increase unemployment, as has been shown in numerous studies of trade policy throughout the world.[3] In the Zimbabwean case, the import-substitution policy was introduced by the Smith regime in response to the sanctions provoked by UDI, and was in fact reasonably successful, from the government's point of view, for about a decade. But it became very costly in the late 1970s, and was probably a major contributor to the declining income of Rhodesians towards the end of the war.

A second striking feature of Zimbabwe's trade policy is the existence of a wide variety of exchange rates for different

---

[2]. These data are presented in Mlambo (1989), and in the CSO, Quarterly Digest of Statistics.

[3]. The pioneering studies in this area were three sets of large-scale, multi-country case studies in the late 1960s. These focused on industry, using the theory of effective protection developed earlier and brought together by Corden (1971). These studies are summarized in Little, Scitovsky and Scott (1970), Balassa and Associates (1971), Bhagwati (1978), and Krueger (1978). The concept of effective protection was applied to the agricultural sector somewhat later, in numerous studies as summarized in Scandizzo and Bruce (1980).

goods. This changes incentives amongst them, affecting the mix of goods produced and consumed. For example, Zimbabwe's current set of export subsidies rewards new exports at the expense of old ones through the ERF's bonus scheme, thus inducing exporters tend to shift out of the older exports (such as furniture) into new ones (such as horticulture). In addition, only exporters who successfully apply to the government for these benefits can receive them. Ordinary farmers and other small-scale producers are generally not assisted.

Thirdly, it is notable that the highest subsidies on importables are very high, higher even than the black-market foreign exchange premium. This suggests that trade policy is not just influencing the supply and demand of foreign exchange, but is also distributing excess profits (in the form of rents on import licenses) to particular firms and industries. In general, goods produced by large industrial firms, such as bicycles and motor cars, receive the highest rents. These rents are captured by the firms themselves and the few consumers who receive the goods at their controlled prices, while the rents are paid by all other consumers and potential consumers of these goods, along with the producers of all other goods. The recipients of these rents are few and relatively well-off, while the payers of the rents are many and poorer, so these transfers have a strongly negative effect on income distribution.

A1.4 The shadow exchange rate

Because each good has a different REER, the REER concept does not directly provide a useful measure of the nation-wide opportunity-cost value of foreign exchange. However, in the 1960s and 1970s the concept of the shadow exchange rate (SER) was developed, for the purposes of project appraisal. The SER is usually defined as the contribution to national income[4] made by an additional unit of foreign exchange earned, saved, or consumed: if this increment then affects the entire market for forex, the SER can be estimated as a weighted average of the gap between the REER's and the OER, in which each good's real effective exchange rate ($REER_i$) is multiplied by its share of national trade (w_i), and the absolute value of its price elasticity of export supply or

---

[4]. Like other shadow prices in project appraisal, the SER can also be defined in terms of net savings or government income, recommended in the "OECD manual" of Little and Mirrlees (1969), or in terms of total consumption, recommended in the "UNIDO Guidelines" of Dasgupta, Marglin and Sen (1972). But the definition of shadow price in terms of ordinary currency (i.e., national income) is the most straightforward method, since ordinary prices are defined the same way. This is the approach recommended by Harberger (1972), and which is most commonly used today.

import demand (e_i):[5]

$$SER \equiv \frac{\Sigma_i (w_i e_i REER_i)}{\Sigma_i (w_i e_i) OER}$$

$$\Sigma_i w_i \equiv 1$$

Clearly, the importance of each REER in the overall SER is proportional to each item's share of trade (w_i) and export- or import-price elasticity (e_i). The higher the elasticity (that is, the more responsive would be imports or exports to a change in price), the more important is the level of the subsidy, tariff, or rent which raises the good's REER above the general OER. For goods whose price elasticity is close to zero, because they face either strict rationing in consumption (currently, for example, motor-cars) or severe bottlenecks in production (currently cement), a high REER will have little effect on the SER. But for goods with substantial price elasticities and large weights (such as cotton), the REER will have a significant effect.

A major problem with the SER approach lies in estimating all the necessary $REER_i$'s and e_i's. In the Zimbabwean context, the most important imported goods have been subject to enforced price controls for over twenty years, so that their levels of rent (for the $REER_i$'s) and trade elasticities (for the e_i's) could never reliably be estimated. This problem is shared by the closely-related "elasticities" approach, discussed in section 2.3.1 below.

A2. Equilibrium exchange rate concepts

To understand what lies behind the market for foreign exchange, some model of its demand and supply is needed, resulting in a concept of an equilibrium exchange rate. The first step in modeling the equilibrium exchange rate is to note that there are two fundamentally distinct markets for foreign exchange. One, the market for trade in real goods and services, responds primarily to the relative prices of these goods. The other market is for financial assets, which is influenced primarily by the relative returns to capital in different currencies. In the balance of payments accounts, the former is known as the "current account," while the latter is the "capital" account. By definition, all foreign exchange transactions are included in one or the other account; therefore, the sum of the balance on the current account (BCUR) and the balance on the capital account (BCAP) must be equal to the change in the government's net reserves of foreign currency (^RES), if any.

$$BCUR + BCAP \equiv \hat{}RES$$

---

5. This equation is adapted from Harberger (1972), p. 125.

Since government reserves do not usually change very much relative to total trade, at least over a five to ten year time horizon, any outflow of foreign exchange on the current account (a "current account deficit", or excess of imports over exports) must be balanced by an inflow on the capital account (a "capital account surplus", or accumulation of foreign debt).

$$BCUR \approx -BCAP$$

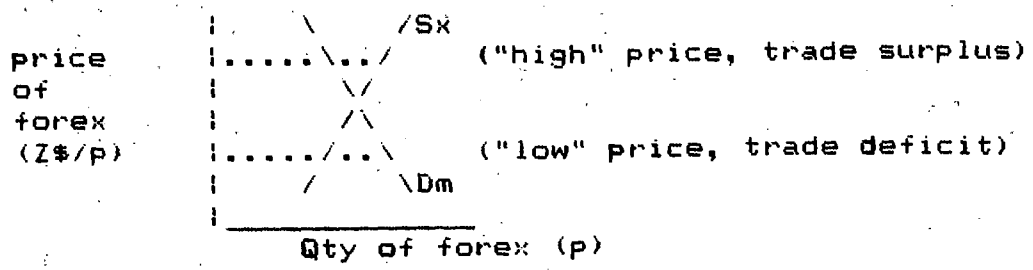
For example, the United States is currently running an annual trade deficit of around US$150 billion (BCUR = -150), which is financed by a capital account surplus of the same magnitude (BCAP = +150). To offset these flows, someone else must be in the opposite situation; currently, Japan and West Germany provide many of the goods in the U.S. trade deficit, while also providing many of the loans to pay for them. Zimbabwe is currently running a merchandise trade surplus on the order of Z$100 to 200 million plus gold exports of over Z$400 million, which are offset by a deficit on "invisible" trade (mostly services such as transport) and other payments (mostly interest on foreign debt), with small capital inflows (mostly government borrowing). But Zimbabwe's trade position has been highly variable from year to year, with net balances not far from zero.

Because the balance of payments is an identity and always holds true simply by definition of the terms involved, it is rarely possible to say that changes on one account "cause" changes on the other: the current and capital accounts are like siamese twins, and go everywhere together. Any country, at any point in time, could fulfill the identity at a wide range of levels, from large negative balances on both sides (e.g., the U.S.), to large positive ones (e.g., Japan), to relatively small ones which are sometimes positive, and sometimes negative (e.g., Zimbabwe). What determines the level of the balance is the interaction between forces affecting the current account, and forces affecting the capital account.

A2.1 Demand and supply on the current account

Influence on the current account is dominated by the exchange rate, because it is the relative price of foreign versus local goods. If the pula/Z$ exchange rate goes down, the Z$ price of forex goes up, raising the cost of imports and the value of exports relative to other goods. This tends to reduce the consumption of imports and increase the production of exports, putting pressure on the current account balance to improve (increase a surplus, or reduce a deficit). This is shown in Figure A1 below.

Figure A1: Demand and supply of forex on the current account



Sx = Supply of foreign exchange through exports
Dm = Demand for foreign exchange through imports

These curves are not permanently fixed in place. Their position is influenced by such factors as domestic income (if this rises, Dm will shift out and Sx will shift in as more goods are demanded locally); the terms of trade (if export prices rise, Sx will shift out, while if import prices rise, Dm will shift in); the country's import policies (if tariffs, quotas, and the allocation of import licenses becomes more restrictive, Dm will shift in); the country's export policies (if incentives are expanded, Sx will shift out); and the available technology (if this improves, Sx will shift out). However, none of these things changes very quickly or easily. What changes most often is Zimbabwean inflation, relative to the price of foreign exchange on the vertical axis. If Zimbabwean inflation rises faster than the nominal price of forex on the vertical axis, the whole Dm and Sx cross will shift up, reducing the trade surplus or making a bigger deficit. The same effect would occur if the nominal price of forex falls, relative to Zimbabwean inflation.

How much the trade balance responds to a change in the exchange rate depends on the slopes of the curves, which are influenced by such factors as the mobility of labour in the economy, the responsiveness of the financial system, and the availability of intermediate inputs such as capital goods and equipment spares. The more mobility and flexibility there is in the economy, the flatter will be the curves, and the less adjustment in the exchange rate will be needed to achieve a given change in the trade balance.

In most countries, there is little reason to expect the balance of trade to be zero; as long as the country is willing and able to borrow or lend foreign exchange, it is perfectly reasonable to have a trade deficit or surplus, and to use an inflow or outflow of capital to offset the current account deficit or surplus. However, the link between the current and capital account imposes a limit to the country's options.

A2.2 Demand and supply on the capital account

In contrast to the current account, capital flows consist largely of loans, from one currency into another. Many capital flows, especially in Zimbabwe, are relatively fixed, such as foreign aid or migrants' assets. But these are fairly small. A larger portion is the Zimbabwe government's own foreign borrowing, plus the net borrowing and lending of companies and individuals. Government borrowing is a function of the budget deficit, minus local borrowing and money supply growth. These variables are fixed by government policy. The most flexible part of capital flows, in general, is private lending. This responds to the returns available in different countries: the real interest rates currently available in each currency, adjusted for any expected changes in that rate over the life of the loan, the relative risks of default, and regulations on capital movements.

Of these influences, risks and regulations are hard to change and stay relatively constant; what is most flexible is the expected real interest rate differential between Zimbabwe and foreign countries. This is the expected real interest rate in Zimbabwe (the expected nominal interest rate corrected for inflation), relative to the expected real interest rate in foreign currencies. Mathematically, there is:

$$r_{real}^{zim} = \frac{(1+r^{zim})}{(1+i^{zim})} - 1$$

and:

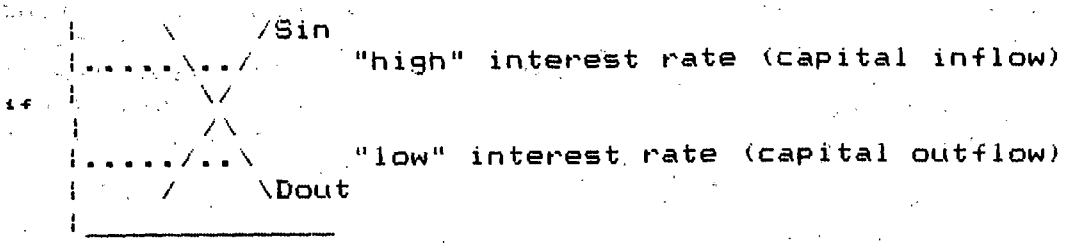
$$r_{real}^{For} = \frac{(1+r^{For})}{(1+i^{For})} - 1$$

where r is the expected interest rate and i is the expected inflation rate in both Zimbabwe dollars (^{zim}) and foreign currency (^{For}). The expected interest rate differential (r_{dif}) is thus:

$$r_{dif} = \frac{(1+r_{real}^{zim})}{(1+r_{real}^{For})} - 1$$

The link between the interest rate differential and capital flows is shown in the following diagram:

Figure A2: Demand and supply of forex on the capital account



Sin = Supply of foreign exchange from capital inflows
Dout = Demand for foreign exchange in capital outflows

Like the current account demand and supply curves, these curves are not fixed in place. Their position is influenced by such factors as flows of foreign aid and government borrowing (increases will shift out Sin), perceived risks of default (increased risks will shift back Sin and shift out Dout), rules about capital transactions, and a sense of trust and security in the country. In addition, the slopes of the curves are influenced by the flexibility of the financial system and the ease of making transactions (again, more flexible conditions yield a flatter curve).

As noted earlier, although the current account balance must be equal and opposite to the capital account balance, this can occur at any level of balances. There is simply a strong positive relationship between the price of forex (along with other influences on the trade balance) and the interest rate (along with other influences on capital flows): upward pressure on one of them puts upward pressure on the other.

In this context, it is clear that an "equilibrium" exchange rate can only be defined as a rate at which the resulting trade and capital flow balance is "sustainable" or "desirable": that is, where the country's capital-account borrowing (lending) can reliably be paid back (recovered) out of future trade surpluses (deficits) at the country's normal savings rate. Some countries will want to borrow very little, while others will borrow a lot; and the more that is borrowed, the higher the interest rate which must be paid to finance the loans.

Most countries move through long cycles of trade-deficits-with-capital-borrowing (when they have little domestic capital and interest rates are high), to trade-surpluses-with-capital-lending (when they have a lot of domestic capital and interest rates are low). But countries are never locked in to a particular situation; they can always move themselves, at some cost in terms of the exchange rate and/or the interest rate, to a higher or lower balance position. These costs can be considerable, however: holding a "high" exchange rate to make imports cheap will also make a "high" interest rate, which will reduce domestic

consumption of goods and services.[6]

In summary, the "equilibrium" exchange rate is inevitably a subjective notion. It is better to speak of a "target" exchange rate (or current account balance), and its associated "target" interest rate (or capital account balance). Considering the capital account to be fixed, then the target exchange rate is that which will allow the current-account balance to reach that target without forcing the government to limit the number of import licenses. This will also be the SER seen earlier, or the marginal national opportunity cost of foreign exchange at the current level of balances. In other words, it is the exchange rate at which Zimbabwe, all other things constant, would expand the supply of exports and reduce demand for imports enough to end the shortage of foreign exchange for current-account transactions. At this rate, anybody would be able to order foreign goods and services through commercial banks, as people do in countries with "convertible" currencies. Only the constraints on capital flows would remain.

Two distinct types of methods have been devised to find the level of such a target equilibrium exchange rate. These are elasticities approaches, in which the responsiveness of exports and imports to exchange rate changes is measured, and index number approaches, in which changes in overall average price levels over time are measured. Using index numbers, there are again two possibilities: one can either compare relative prices in Zimbabwe with prices elsewhere using the purchasing power

---

[6]. The reduction in consumption which follows from a rise in interest rates can be seen through the national income identity, in which total national production (GNP) by definition always equals the sum of consumption (C), investment (I), government expenditure (G), and exports minus imports (X-M).

$$GNP \equiv C + I + G + X-M$$

A further identity is that all investment (I) must be financed by savings, either domestic (Sd) or from foreign sources (Sf), where Sf is simply net capital inflows from abroad. Since Sf always offsets X-M, we can rewrite the identity as:

$$GNP \equiv C + Sd + G$$

Therefore, for a given level of national product (GNP) and government spending (G), an increase in interest rates which attracts savings (increasing Sd) will thereby reduce consumption (C); other adjustments, changing G and GNP themselves, may also follow. The desired levels of these variables, associated with a particular interest rate and level of savings, is sometimes known as "internal balance." This contrasts with the desired level of trade and capital flows, which is known as "external balance." Thus, finding a desired combination of interest and exchange rates is sometimes known as finding a desired internal and external balance.

parity approach, or compare relative prices within Zimbabwe using the real exchange rate approach.

A2.3 The elasticities approach

The elasticities approach to a target equilibrium exchange rate is closely related to the shadow exchange rate (SER) method described earlier. Like the SER, the elasticities approach begins by noting that an additional unit of foreign exchange can be obtained either from more exports, or from saving imports. But instead of beginning with the forex and calculating its Z$ value, the elasticities approach begins with the domestic economy, and asks how much of a change in the official exchange rate (OER) would be needed to induce a change in exports and imports sufficient to reach the a target change in the current account balance.

In terms of Zimbabwe dollars, the change in foreign exchange availability which can be expected from a given change in the exchange rate depends on the current levels of exports (X) and imports (M) and the elasticities of export supply (e_x) and import demand (e_m), according to the following identity, where the apostrophe (') indicates a percentage change in the variable, and as before the ^ indicates an absolute change.:[7]

$$\hat{}BCUR \equiv (OER')[X(1+e_x) + M(e_m-1)]$$

A given percent change in the exchange rate will yield a change in the supply of foreign exchange which is proportional to the current levels of trade (X and M), and the flexibility of the economy in changing between domestic consumption and trade (measured by e_x and e_m). The SER is simply an alternative

---

[7]. This identity is adapted from Schafer (1989), and can be derived as follows. Firstly, note that any changes in forex earnings as measured in forex [OER(^BCA)] can come from either changes in the forex value of old trade [^OER(X-M)], or changes in trade measured at the new forex value [OER(^X+^M)].

$$OER(\hat{}BCUR) \equiv \hat{}OER(X-M) + OER(\hat{}X+\hat{}M) \quad (1)$$

To find the Z$ equivalent of the change in forex availability, we divide equation (1) by the OER, and then grouping the X and M terms, we get:

$$\hat{}BCUR \equiv (OER')X + \hat{}X - (OER')M + \hat{}M \quad (2)$$

Separating out the percentage change in the exchange rate from the other terms on the right hand side, we get:

$$\equiv (OER')[X + \hat{}X(1/OER') - M + \hat{}M(1/OER')] \quad (3)$$

Separating out the X and M terms, we get:

$$\equiv (OER')\{X(1+[\hat{}X/OER']) + M(1+[\hat{}M/OER'])\} \quad (4)$$

Now, the terms in square brackets are the percentage change in exports and imports which can be expected from a percent change in their price, or e_x and e_m respectively. Equation (4) is therefore the identity given in the text.

version of this same equation, in which the target current-account balance is assumed to be unchanged. Similarly to the SER, if the values of the elasticities were known, the change in the exchange rate needed to obtain the desired change in the current account balance could be calculated. This new exchange rate would then be the target equilibrium exchange rate.

The elasticities could be estimated directly, if there were a history of changing exchange rates against which to compare changes in exports and imports. But often there is either too little change in the exchange rate, or too many other factors intervening in determining year-to-year trade volumes (because the export supply and import demand curves are shifting from side to side) so that it is sometimes easier to break down the trade elasticities into their components: the domestic elasticities of supply (es) and demand (ed) for the exports ($_x$) and imports ($_m$) involved. This yields:

$$e_x \equiv \frac{es_x(ed_x+1)}{ed_x-es_x} \qquad e_m \equiv \frac{ed_m(es_m+1)}{es_m-ed_m}$$

In many countries, it is possible to estimate these domestic elasticities, and thereby calculate an estimate for the overall elasticity of foreign exchange supply. In other cases, it may be possible to borrow elasticities from similar countries. For example, elasticities from one large South American country might be used in studies of another, or elasticities from one small East Asian country might be applied to a small Caribbean country.

In Zimbabwe, however, it is very difficult to estimate elasticities directly, due to the price controls and administrative allocation systems which have been in place since the late 1960s. These controls have limited the amount of change in relative prices against which to measure changes in production and consumption. In addition, bottlenecks and rationing elsewhere in the economy have limited responsiveness to what price changes have taken place, making the calculation of elasticities even more difficult. At the same time, borrowing elasticities would be risky, because of the absence of suitably comparable countries with more available data. In consequence, there have been very few attempts to use the elasticities or the SER approach in Zimbabwe, although both are widely used elsewhere.

Instead of using elasticities to measure the responsiveness of exports and imports to exchange rate changes, it is possible to view the exchange rate as influencing a wide range of prices in the economy, which can all be aggregated together into index numbers. Changes over time in these index numbers can then be used to see the impact of exchange rate changes in the economy. Each individual component of the index will be influenced by

supply and demand in the market for that particular good, but the influence of the exchange rate will still be visible on the aggregate over many goods.

A2.4 The purchasing-power parity approach

The earliest index-number method is derived from the hypothesis that the prices of things in various countries tend to be equalized: in other words, that purchasing-power parity (PPP) between various currencies tends to be maintained. This aggregate version of the classical "law of one price" (which states that the prices of individual goods tend to be equalized), implies that percentage changes in any price index such as a consumer price index (CPI) calculated in both in foreign currency (CPI_f) and in domestic currency (CPI_d), when converted into foreign currency (at OER), would remain equal over time ($_t$):

$$CPI_{f,t} = OER_t * CPI_{d,t}$$

Several empirical studies have been undertaken to see whether purchasing power parity is, in fact, maintained over time between various countries, and for various goods.[a] Almost all results have shown that purchasing power parity is in general not maintained; only for a few primary commodities, which are virtually identitical everywhere and are easily traded, do prices in various countries actually move together.

One reason for deviations from purchasing-power parity could be that countries have disequilibrium exchange rates sustained through rationing and imbalances of various kinds. In this case, the year-to-year changes in their target equilibrium rate could be estimated using the above equation. The equation could be solved in each year, to find the level of a purchasing power parity rate index (PPPi) which would maintain constant parity between the two price indeces:

$$CPI_{f,t} \equiv (PPP_t)(CPI_{d,t})$$

This equation determines the year-to-year percentage changes in the PPP index. The absolute level of a target parity-maintaining equilibrium exchange rate (PPPe) in any one year would depend on the desired level of the balance of trade and also on the other factors influencing the trade balance, as discussed earlier. To find the current target level, there are two basic options.

The easiest option is to choose some past year s exchange rate (or, as in this paper, an average of several past years) as the target rate, and simply assume that all the influences on the current account balance other than the exchange rate are more or

---

[a]. These results are reviewed and summarized in Schafer (1989).

less unchanged since then. In this case the PPP index is re-scaled to equal the nominal exchange rate in that year, thereby re-defining PPPi to equal PPPe.

A more difficult option is to formulate a model of the influences on the balance of trade and the PPP index, including variables such as per capita income, the terms of trade, foreign aid or other fixed capital flows, government borrowing from abroad, and growth of the money supply. The model is then estimated econometrically to determine the influence of each variable on the index. To find the target PPPe level of the index, the influence of any disequilibrium variables ("excess" borrowings and "excess" money supply growth) is removed. But there are several problems with such models.

Firstly, the estimated coefficients of such models are quite error-prone, because the explanatory variables all tend to move together (there is multicollinearity amongst them). Secondly, the choice of model specification is is fairly arbitrary, since there are many influences on the foreign exchange market which are inevitably missing from the model. And finally, the judgment about which variables contribute to disequilibrium conditions, and which are the fundamental elements of the economy, is also arbitrary. These problems make formal modeling much better suited to comparative studies of a large number of countries, than to single-country studies such as this one. Most country studies simply refer to a historical level of the PPP index as the target level, and assume that the major influences on the desired trade balance other than the exchange rate are held constant.

Whether an econometric model or a historical reference is used, however, there are many possible criticisms of the PPP method. They can all be boiled down to the problem that the goods in the domestic and foreign indeces are, in fact, not the same. There are both subjective and objective differences amongst goods from different countries, such that there is ample scope for changes in relative prices. The other side of this coin is that some goods are never traded, and because those goods which are traded are not strictly identical, the prices of the non-traded goods are not equalized. Consequently, the PPP exchange rate fails to detect the shifts in domestic relative prices between imports, exports, and other goods. It is only useful when the overall level of domestic prices has become very different from foreign prices, as has happened in many Latin American countries. Zimbabwe, however, is a dramatic example of the limitations of the PPP approach, as was shown in Fiugure 4a and 4b where these indeces are compared.

A2.5 The real exchange rate approach

Although the PPP method is sometimes described as calculating a "real" (that is, corrected for inflation) exchange rate, it might better be called a type of nominal exchange rate, since it measures a price between two currencies for what is, at least in principle, essentially the same set of goods. The real exchange rate (RER) as discussed in the first part of this paper is more truly a "real" rate, since it measures the relative price of two kinds of goods, in the same currency.

In this paper, the RER approach is implemented only on a historical basis, with reference to the pre-Independence level of relative prices. It would also be possible, however, to build a model of the determinants of the real exchange rate. This would include national income, the terms of trade, capital flows, the levels of capital investment and knowledge (or technology) in the country, and several other factors. These would be the "equilibrium" influences on the RER. Additional "disequilibrium" influences on the RER, however, would be changes in government policy such as trade restrictions, official borrowing, growth in the money supply, and minimum wage laws. Similarly to the PPP approach, the coefficients on each variable in such a model would be estimated econometrically, and the value of the RER in the absence of the "disequilibrium" factors would be predicted. The problems of multicollinearity, omitted variables, and arbitrary definition of the disequilibrium influences mentioned in the PPP case all persist, however, and are at their most severe in a country such as Zimbabwe, where price adjustments have been extremely complex.[9]

---

[9]. An excellent multi-country comparative study for Africa using the modelling approach is Schafer (1989), using variants of both PPP and RER indeces. Zimbabwe was not included in that study, however, perhaps because of a relative lack of data.

REFERENCES CITED

Balassa, Bela and Associates (1971), The Structure of Protection in Developing Countries. Baltimore: Johns Hopkins University Press.

Bautista, Romeo M. (1987), "Production Incentives in Philippine Agriculture: Effects of Trade and Exchange Rate Policies." International Food Policy Research Institute Research Report No. 59. Washington, DC: IFPRI.

Bhagwati, Jagdish (1978), The Anatomy and Consequences of Exchange Control Regimes. Cambridge, MA: Ballinger.

Central Statistical Office (various years), Quarterly Digest of Statistics and Monthly Digest of Statistics. Harare: CSO.

Corden, W. Max (1960), "The Geometric Representation of Policies to Attain Internal and External Balance." Review of Economic Studies 28: 1-22.

Corden, W. Max (1971), The Theory of Protection. Oxford: Clarendon.

Dasgupta, Partha, Stephen Marglin, and Amartya Sen (1972), UNIDO Guidelines for Project Evaluations. New York: United Nations.

Dornbusch, Rudiger (1974), "Tariffs and Non-traded Goods." Journal of International Economics, vol. 4: 177-85.

Dornbusch, Rudiger and F. Leslie C.H. Helmers, eds. (1988), The Open Economy: Tools for Policymakers in Developing Countries. New York: Oxford University Press.

Garcia, Jorge Garcia (1981), "The Effects of Exchange Rates and Commercial Policy on Agricultural Incentives in Colombia: 1953-1978." International Food Policy Research Institute Research Report No. 24. Washington, DC: IFPRI.

Harberger, Arnold C. (1972), Project Evaluation. Chicago: University of Chicago Press.

Herrmann, Roland, Nasarudin Sulaiman, and Manfred Weibelt (1989), "How Non-Agricultural Import Protection Taxes Agricultural Exports: A "True Protection" Analysis for Peru and Malaysia." Kiel Institute of World Economics Working Paper No. 394. Kiel: Institute of World Economics.

International Monetary Fund (1986), Exchange Arrangements and Exchange Restrictions, Annual Report 1986. Washington, DC: IMF.

----- (1987), International Financial Statistics. Washington, DC: IMF.

Jansen, Doris (1988), "Trade, Exchange Rate, and Agricultural Pricing Policies in Zambia." World Bank Comparative Studies in the Political Economy of Agricultural Pricing Policy, Washington, DC: The World Bank.

Krueger, Anne O. (1978), Liberalization Attempts and Consequences. Cambridge, MA: Ballinger.

Krueger, Anne O., Maurice Schiff and Alberto Valdes (1988), "Agricultural Incentives in Developing Countries: Measuring the Effects of Sectoral and Economywide Policies." World Bank Economic Review 2(3): 255-71.

Little, Ian M.D., Tibor Scitovsky and Maurice Scott (1970), Industry and Trade in Some Developing Countries: A Comparative Study. New York: Oxford University Press.

Little, Ian M.D. and James A. Mirrlees (1969), Manual of Industrial Project Analysis in Developing Countries. Paris: OECD. Revised and republished in 1974 as Project Appraisal and Planning for Developing Countries. New York: Basic Books.

Ministry of Finance, Economic Planning and Development (National Planning Agency), Government of Zimbabwe (1988). Minute on Economic Appraisal of Irrigation Projects to the Secretary of Lands, Agriculture and Rural Resettlement, 27 October 1988.

Mlambo, Kuphukile (1989), "Exchange Rate Overvaluation and Agricultural Performance in Zimbabwe: 1965-85," in Godfrey Mudimu and Richard H. Bernsten, eds., Household and National Food Security in Southern Africa. Proceedings of the Fourth Annual Conference on Food Security Research in Southern Africa, 31 Oct. - 3 Nov. 1988. UZ/MSU Food Security Research Project, Dept. of Agric. Econ. and Ext., Univ. of Zimbabwe, Harare.

Oyejide, T.A. (1986), "The Effects of Trade and Exchange Rate Policies on Agriculture in Nigeria." International Food Policy Research Institute Research Report No. 55. Washington, DC: IFPRI.

Reserve Bank of Zimbabwe (1988), Quarterly Economic and Statistical Review 9(4), December.

Salter, W.E.G. (1959), "Internal and External Balance: The Role of Price and Expenditure Effects." Economic Record 35:226-38.

Scandizzo, Pasquale L. and Colin Bruce (1980), "Methodologies for Measuring Agricultural Price Intervention Effects." World Bank Staff Working Paper No. 394. Washington, DC: The World Bank.

Schafer, Hartwig (1989), Real Exchange Rates and Economic Performance: The Case Sub-Saharan Africa. Unpublished Ph.D. Dissertation, Department of Economics and Business, North Carolina State University at Raleigh.

Sjaastad, Larry A. (1980), "Commercial Policy, True Tariffs, and Relative Prices," in John Black and Brian Hindley, eds., Current Issues in Commercial Policy and Diplomacy. New York: St. Martin's Press.

Swan, W. (1960), "Economic Control in a Dependent Economy." Economic Record 36.

Tshibaka, T.B. (1986), "The Effects of Trade and Exchange Rate Policies on Agriculture in Zaire." International Food Policy Research Institute Research Report No. 56. Washington, DC: IFPRI.

Valdes, Alberto (1986), "Exchange Rates and Trade Policy: Help or Hindrance to Agricultural Growth?" in Allen Maunder and Ulf Renborg, eds., Agriculture in a Turbulent World Economy. Proceedings of the Nineteenth International Conference of Agricultural Economists, 26 August - 4 September, Malaga, Spain. Oxford: Gower.

Valdes, Alberto and Javier Leon (1987), "Politica Comercial, Industrializacion y su Sesgo Antiexportador: Peru 1940 - 1983." Cuadernos de Economia vol. 24 no. 71 (April): 3-28. Also IFPRI Reprint No. 106. Washington, DC: IFPRI.

Wiebelt, Manfred (1989), "How Does Industrial Protection Affect the Agricultural Sector? A Quantitative General Equilibrium Analysis for Peninsular Malaysia." Kiel Institute of World Economics Working Paper No. 380. Kiel: Institute of World Economics.

World Bank (1987), Zimbabwe: An Industrial Sector Memorandum. Industrial Development and Finance Division, Eastern and Southern Africa Region. Washington, DC: The World Bank.

World Bank (1988), Price Prospects for the Major Primary Commodities. Three volumes. International Commodity Markets Division, International Economics Department. Washington, DC: The World Bank.