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WHEN FOREIGN EXCHANGE IS UNDERVALUED

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HOMESTIC SAVING AND FOREIGN ASSISTANCE
WHEN FOREIGN EXCHANGE IS UNDERVALUED

Stephen R. Lewis, Jr.*

Introduction

This paper has a rather simple purpose: to examine the implications of currency overvaluation for the measurement of saving, investment, and the impact of foreign assistance in developing countries. While measurement problems are generally thought to be less interesting than the use of estimated figures for analytical manipulation, the measurement change suggested here is of such a magnitude for one country (Pakistan) that it changes the interpretation one can place on the impact of the large amount of foreign assistance that country received over a fifteen year period. The basic notion of the paper is that when domestic saving is estimated as a residual (by subtracting an estimate of foreign saving from an estimate of domestic investment), the exchange rate at which foreign saving is converted to domestic currency units is critically important in determining the relative size of foreign and domestic saving. Indeed, at the extreme, what appears to be a complementary relationship between foreign and domestic saving may be a complete statistical illusion due to the non-separable exchange rates used (implicitly) for investment and (explicitly) for foreign saving. The paper first discusses (Section I) the measurement and significance of domestic saving and investment and of foreign assistance (foreign saving). Section II examines the relationships of these variables as generally measured in the case of Pakistan.

* I am grateful to colleagues at Williams who offered helpful criticism and comment on an earlier version of this paper.

from 1954/55 to 1969/70. Section IV develops the general methods used for estimating investment and saving, and shows how these magnitudes are influenced by currency overvaluation. It treats government saving as a special case. Section V applies the correction factors to the Pakistan data. Section VI explores the implications of the adjustment and the differences between adjusted and unadjusted figures. There is also a discussion of the income distribution implications of currency overvaluation, and the problems of measuring "real" income and income growth when there is significant overvaluation and there are highly differential rates of protection to different sectors. Also explored briefly are the implications of the exercise for studies of saving rates generally and for the widely used two-gap analysis of aid and development in particular.

II. Saving, Investment, and Foreign Aid as Usually Measured in Less Developed Countries

In most of the Less Developed Countries (LDCs) the procedures for estimating saving (S) are first to make an estimate of domestic investment (I) and then to subtract from it an estimate of foreign saving (or foreign assistance or a balance of payments deficit) (F).

$$S = I - F \quad (1)$$

The investment estimates usually are not constructed with the kind of accuracy characteristic of high-income countries with more complete statistical systems, but rather they tend to be based on some combination of (i) house-
 hold or investment outlay surveys, (ii) estimated production and imports of capital goods, cement, and steel, (iii) estimated savings for trade and transport in the country, (iv) indirect taxes on imports, and domestic

production of capital goods, etc. As has often been pointed out, the investment estimation procedure tends to underestimate investment activity, since it seldom includes non-manufactured investment in agriculture and in small-scale industry, and often misses portions of domestic capital goods production that takes place in small-scale industry.¹ However, in addition

1. See Marada's (197) for example.

to missing the production of capital goods in small-scale domestic industry, the investment estimate is also bound to underestimate the value of imported capital goods, since foreign exchange is typically undervalued at the official exchange rate, to the extent that import controls exist, when foreign exchange is rationed, the import licenses (a scarce foreign exchange good, therefore, capital good) is a price below the opportunity cost of foreign exchange to the economy, that undervaluing investment.²

2. Note that even if there were no import controls, the value of investment would be undervalued if currency is sold at a discount, and if it is made by the government directly, since the capital outlay of the firm would only include the outlay on the undervalued capital goods.

Since domestic saving is estimated by subtracting an estimate of foreign saving from the estimate of investment, some exchange rate must be chosen to convert foreign saving into domestic currency, and the exchange rate will affect the estimate of foreign saving, and therefore the estimate of domestic saving. The exchange rate will also affect the estimate of investment, and therefore the estimate of domestic saving. The exchange rate will also affect the estimate of domestic saving, and therefore the estimate of domestic saving.

index from a base year.¹ The saving estimated by this residual is then used

1. The procedure has been followed for a number of Latin American countries (for another list see

as the saving for the economy as a whole, and it may be divided into sectoral saving estimates in those countries where other direct estimates of saving can be constructed for, e.g., the corporate or the government sectors.²

2. Mamalakis (1977) has pointed out a number of pitfalls that occur when such a procedure is followed, and has re-estimated investment and saving in Chile in such a way that the ultimate residual, household saving, was converted from primarily a deficit each year to a fairly substantial surplus each year.

Saving rates estimated by the above procedure (after dividing by GNP or a similar measure of income) are used quite consistently in aggregate analysis of economic growth and development in the LDCs. Measures of the marginal rate of saving (the change in saving divided by the change in GNP) are often used as a measure of "resource mobilization" in the country under study, or as a measure of the country's domestic effort at "self help." There has been a persistent argument in recent years that aid-giving nations should look at self-help measures to make sure that a country was using its domestic resources and commitment to its development seriously.³ In addition, there is the popular

¹ The procedure is described by the World Bank in *Country and Area Studies* (1977) for some of the LDCs.

two-gap analysis¹ which emphasizes that in an import-constrained economy

1. See especially Chenery and Strout / 7 /, and also Chenery and MacEwan / 6 /, Chenery and Bruno / 5 /, Adelman and Chenery / 1 /.

the rate of realized or actual domestic saving would be less than the potential rate of saving, due to the scarcity of complementary resources (imports) which can be provided by foreign aid or foreign saving. Thus, the provision of foreign assistance can help to mobilize domestic saving, and one measure of the success of an assistance program may be the level of marginal saving generated before and after the assistance program has begun. The correlation between increases in imports and increases in domestic saving can be taken as evidence of the complementarity of foreign and domestic saving, and the failure of imports to grow rapidly enough to provide complements to domestic saving may explain the failure of realized or actual domestic saving to grow rapidly.

The problem of raising domestic saving rates is approached in a variety of ways. Some policy prescriptions involve the rather simple process suggested above of providing complementary resources which will allow saving to increase voluntarily, and which involve increases in saving without corresponding decreases in consumption. Most prescriptions for raising rates of saving involve some sort of redistribution of income from a low to a high marginal saving sector of the economy. Increased general taxation to increase government saving is one such policy prescription.² Another involves

2. Increased taxation is also used as a measure of self-help, as in Strout and

the use of economic policies such as protection of domestic manufacturing which turns the terms of trade against the domestic agricultural sector, which policy will increase the rate of saving overall if the manufacturing sector has a higher rate of marginal saving than does the agricultural sector.¹

1. This is related to the popular model of economic growth most closely associated with the contributions of W. A. Lewis / 18 /.

This particular policy was used in Pakistan in the 1950's (according to both the official interpretation of the Government of Pakistan and the estimate of foreign and domestic economists).² One difficulty with using protection to

2. See Papanek / 33 /, Lewis / 14 /, or the Third Plan document / 27 /.

raise the saving rate is that the process of protection will distort resource allocation in general, and one can find oneself producing domestic saving at a cost of GNP in general, though the loss of GNP is more difficult to establish than the gain in saving. I shall return to this point, and the implications for re-estimating saving and income, below. First it is useful to look at the aggregate Pakistan data on saving and imports and foreign assistance for the past fifteen years.

III. Saving Rates in Pakistan

Saving rates in Pakistan have been computed in the conventional manner as explained above. One of the principal measures of success of the Second Plan period (1960-65) was taken to be the high (over 20 percent) marginal rate of saving (MRS) the country had achieved over the Plan period,

and there was a serious discussion of whether one could use the 20 percent rate as a parameter in designing the Third Plan. In the end, a rate approximating 20 percent was used for the Third Plan. Table I gives data on average and marginal rates of domestic saving, commodity imports (c.i.f.) and foreign saving (called "foreign resources" in Planning Commission documents) for the last year before the First Plan and for the last year of each of the three regular plan periods, in addition to the averages for the entire First, Second, and Third Plans, and the marginal rates between each of these periods, all expressed as a percent of GNP at current market prices.

One can see from the data in Table I that there was a respectable, if unspectacular MRS during the First Plan (13 percent), but that there was a substantial increase in the marginal rate of saving (to about 20 percent) during the Second Plan, whether one computed it from the end of the First to the end of the Second Plan, or from the First Plan average to the Second Plan average. The high marginal rate was, of course, reflected in a rise in the average rate from 7.6 percent in the First Plan to 11.4 percent in the Second Plan. There was also a sharp increase in the import rate from First to Second Plan, and this higher import rate was financed by both an increased flow of foreign assistance and an increase in export earnings. Pakistan had apparently been released from some of the import constraint that was generally acknowledged to be her problem at the end of the First Plan period,¹ and

1. See Haq /10 /, Papanek /33 /, and Power /34 / for such general agreement.

TABLE I: Average and Marginal Rates of Domestic Saving, Imports, and Foreign Saving in Pakistan (Percent of GNP at Current Market Price)

<u>1954/55</u>	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
6.7	8.8	12.6	9.2	7.6	11.4	8.6
13.1	23.6	3.0		19.7	3.8	
7.1	7.5	11.1	7.1	6.9	9.6	7.4
8.4	18.7	-0.3		15.7	3.5	
1.8	3.0	6.2	4.0	3.2	4.9	4.5
5.3	13.1	-0.04		8.8	3.9	

Source: Computed from Appendix Tables

she had responded by both a more rapid rate of GNP growth in the Second Plan and a higher rate of marginal saving in GNP. The increased flow of foreign assistance which had financed increased flows of imports had proved complementary to increased domestic saving, and domestic saving had responded positively as the import constraint had been eased in the economy.¹

-
1. An alternative way of expressing the complementary between changes in foreign assistance and changes in domestic saving would be to compute the additional foreign saving, or $\Delta S/\Delta F$. For the 1954/5 to 1959/60 period, each Rupee of assistance generated, resulted in, or was accompanied by Rs 2.50 of domestic saving. From 1959/60 to 1964, the ratio was 1.50/1. And, from the First Plan to the Second Plan, additional domestic saving was generated by additional foreign saving at a rate of 2.24/1.

Not only were the movements of domestic saving, foreign saving, and imports in the directions one would expect from the generally accepted view of their inter-relations, but the movements were of substantial magnitude as well.

The developments in the Third Plan period were of a very different character, but again seem to be consistent with the general view of an import-constrained economy. The marginal rate of foreign saving was much lower during the Third Plan than it had been during the Second Plan, and it was lower from the Second Plan average to the Third Plan average as well. The lower rate of foreign saving, combined with a higher debt servicing cost, led to a low marginal rate of commodity imports over the Third Plan, and from Second to Third Plan averages. The average rate of saving fell by about one-third, and the marginal rate of saving over the Third Plan, or from the Second to the Third Plan, was only three or four percent (as opposed to the 20 percent that

had been projected).¹ The close relationship between the marginal import

1. The projected marginal import rate had originally been 9.2% for the period 1964/5 to 1969/70, and 15.8% from the Second to the Third Plan (anticipated in the Third Five-Year Plan / 27 /).

rate and the marginal saving rate in both the Second and the Third Plan periods makes excellent sense in terms of the general view of Pakistan as an import-constrained economy.

IV. Estimating Investment and Saving

A. Country-Wide Saving Estimates and Foreign Aid

The customary procedure for estimating investment and saving estimates in the LDCs is of the following sort. First, one estimates domestic investment (I). Second, one estimates the receipts (E) and payments (M) from commodity and invisible imports. The difference between payments and receipts (F) is defined as foreign resources, or foreign saving (measured in local currency at the official exchange rate), and it can also be expressed as net capital flow into (or out of) the country. The estimate of domestic saving (S) is then derived using national accounts identities,

$$S = I - F \quad (1)$$

Domestic investment is generally measured in a manner that is approximated by the following procedure (which is based on the procedure used for recent Pakistan estimates).² One component of domestic investment is

2. See Evaluation Report / 26 /, and Report of the Consistency Committee / 28 /.

changes in inventories (I_c). A second is the domestic production of capital goods (X_k), which includes production of machinery and equipment (net of exports) and construction of both buildings and improvements on the land. The third major component of the investment estimate is the value of imported capital goods installed on site in the country. This latter component can itself be divided into several parts. First is the estimate of imports of capital goods, c.i.f. in the country's own currency (M_k). Second, the value of capital goods imports must be increased to account for import taxes (t) on the goods and for trade mark-ups (m) for capital goods imports which are re-sold domestically.¹ Third, there are costs of transportation and in-

-
1. Estimates of m may come from several sources. If all imported capital goods were imported directly by investors, m would be zero, and any comprehensive survey of investment would show it to be zero. If all imported capital goods were re-sold from commercial importers to investors, the estimate of m which would appear in a comprehensive investment survey would be a reasonable estimate of the scarcity mark-up on capital goods. In a case where some capital goods are imported directly by investors and some are re-sold, m (as estimated by an investment survey) would only be a partial estimate of a scarcity mark-up. In cases where investment surveys are not used regularly, which would characterize most low-income countries, the meaning and the source of m would be ambiguous at best and could be quite misleading at worst.

stallation of the imported capital goods at the site of the investment project (D_{Mk}).² Thus the investment estimate may be written:

$$I = I_c + X_k + D_{Mk} + M_k(1+t)(1+m) \quad (4)$$

-
2. Note that D_{Mk} is a function of the quantity and not the value of imported capital goods, so that changes in the valuation of M_k due to different taxes or exchange rates will not affect the value of D_{Mk} .
-

Now suppose the government of the country is using a variety of trade-restricting devices including tariffs, import quotas, and exchange controls, which have the effect of raising the shadow price of imports above the official price by q percent (and presume that one could find a reasonably widely-agreed-upon value for q).¹ The overvaluation of the domestic currency at the official exchange rate could be a consequence of a series of individual decisions about protection or taxation of exports; or, the individual decisions on quotas and tariffs may be the consequence of currency overvaluation and balance of payments difficulties related to a change in external terms of trade or to domestic aggregate economic policy; or, more probably, ^{currency overvaluation and protection are due} to a complex interaction of several political-economic forces. In any case, one can pose the question: How does the undervaluation of foreign exchange affect the estimates of investment, foreign saving and domestic saving?

Begin with the investment estimate.² It is reasonable to assume (in the absence of comprehensive price controls, which are not particularly successful in LDCs) that the domestic market prices of goods represent the scarcity prices of those goods in the economy (the structure of demand, economic policy and the exchange rate all remaining constant), so that the valuation of inventories, domestic production of capital goods, and the

-
1. In Pakistan there is at least a range of values that would be agreed upon by a wide spectrum of economists.
 2. One might not wish to change the investment estimates if one believed that the domestic price structure for goods and services was optimally determined by existing government policy and that there were no scarcity markups from the institutional mechanics of exchange control that were uncaptured. This seems unlikely in most countries.

domestic installation and transportation costs of imported capital goods would not be greatly affected by the re-evaluation, especially in an economy that used import quotas in addition to tariffs to maintain its domestic price and production structure and trade pattern.¹ Therefore, the chief

1. See the argument in Pal / 31 /, Lewis / 14 /, and Lewis and Guisinger / 16 / to this effect.

adjustment to be made to the investment estimate is the valuation of imported capital goods. Presumably, the c.i.f. value of imported capital goods at the official exchange rate should be increased to reflect the value of imported capital goods at the higher-than-measured opportunity cost of foreign exchange to the country. This could be accomplished by inflating capital goods estimates by q , the percent by which the price of foreign exchange 'ought' to be raised.² The corrected estimate of investment is then

2. This assumes import taxes are being used to soak up profits going to import licensees as shown in Pal / 31 /. If the government is using tariffs and taxes to consciously raise the price of capital goods relative to all other goods and services, then one would wish to substitute q for m , in expression (2), and retain t in the corrected estimates as written in (3). This would be an unusual case, however, since governments generally try to keep relative prices of capital goods low.

written:

$$\hat{I} = I_C + X_k + DM_k + M_k(1 + q) \quad (3)$$

In order to see the relationship between I and \hat{I} , one can subtract equation (2) from equation (3) and rearrange terms to show that:

$$\hat{I} = I + M_k(q - t - m - tm) \quad (4)$$

If there were no tariffs and no trade markups on capital goods, and if the

official exchange rate represented an equilibrium exchange rate, the expression in brackets in (4) would be reduced to zero, and the adjusted investment estimate would be equal to the unadjusted measure. As the degree of currency overvaluation (q) increases relative to the tariffs and markups on capital goods¹ the expression in brackets will increase, which

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1. Note that the only markups (m) included here are those that find their way into the investment estimate. See footnote 1 page 10 for further discussion.
-

would increase the adjusted estimate of investment relative to the conventional estimate.²

2. If the tariffs and markups on imported capital goods exceeded the degree of undervaluation of foreign exchange by the official exchange rate, the expression in brackets would be negative, and the adjusted investment estimate would be lower than the conventional estimate. This would be a most unusual case, however, particularly for less-developed countries.
-

The adjustment in the value of foreign saving is straightforward (if one agrees on the value of q) since both receipts and payments for both commodities and invisibles should be increased by q percent, which would increase the value of F by q percent as well. One can define

$$\hat{F} = F (1 + q) \quad (5)$$

If we define \hat{S} in a manner parallel to the definition of S , we have:

$$\hat{S} = \hat{J} - \hat{F} = I_c + X_k + D_{mk} + M_k(1+q) - F(1+q) \quad (6)$$

$$\hat{S} = I + Mk(q - t - m - tm) - F(1 + q) \quad (6a)$$

Alternatively, one could express \hat{S} in terms of S , so that

$$\hat{S} = S - qF + M_k(q - t - m - tm) \quad (7)$$

Currency overvaluation does not unambiguously raise conventional domestic saving estimates above "real" saving, however, even though conventional methods will underestimate foreign saving. The net adjustment to be made depends on the extent to which the investment part of the correction exceeds the foreign saving correction.

If tariffs and markups capture all of the effects of currency overvaluation in the investment estimate (i. e., if $(1+t)(1+m) = (1+q)$ then there is no correction made in the investment part of equation (7), and domestic saving is overestimated by qF when conventional estimating techniques are used (which is the same amount by which foreign saving is underestimated). In most cases, values of q , t , and m will lie within the range

$$0 < (1+t)(1+m) < (1+q) \quad (8)$$

When t and m are both zero, none of the undervaluation of imported capital goods is recaptured by the conventional investment estimate. In such a case, domestic saving is overvalued as conventionally measured if

$$F > M_k \quad (9)$$

that is, if the value of foreign saving is greater than the value of capital goods imports. Empirically, most countries will fall between these two extremes, and the rather harsh condition in expression (9) is softened greatly by any increase in the extent to which investment estimates include tariffs and capture markups on imported capital goods. For example, if the conventional estimating procedure included in tariffs and markups a percentage increase in the value of imported capital goods that accounted for

half of the amount of q , the condition under which \hat{S} would be less than S would be reduced to

$$2F > M_k \quad (10)$$

In both expressions (9) and (10), of course, once the condition has been met, any increase in q or in F will increase the degree of understatement of the value of foreign saving and the degree of overstatement of the value of domestic saving as conventionally measured. In other words, with a given q , an increase in foreign saving that financed all of the real costs of an increased investment program would generate an apparent increase in domestic saving simply because of the bias in the estimating procedure, whether or not there was a real increase in domestic saving (as adjusted for the overvaluation of the domestic currency).

In their major article in the literature on the "two-gap" model of aid and development, Chenery and Strout / 7 / present data for fifty countries for 1962. These data were supplemented by the addition of imports of machinery and equipment as a reasonable estimate of capital goods imports for forty-nine of those countries (data for Algeria were not available) from the Yearbook of International Trade Statistics / 38 /. Of the forty-four remaining countries for which F was positive, nineteen met condition (9) and thirty-three met condition (10). Thus, the phenomenon pointed out above could easily have applied to three-fourths of the developing countries covered by Chenery and Strout. The complete adjustment for Pakistan is given in Section V.

B. Government Saving, Foreign Aid and Overvaluation

There is an adjustment that should be made to estimates of government saving when currencies are overvalued, especially in the presence of foreign assistance. While governments can adopt a variety of devices to raise domestic saving, the most obvious and direct method of raising domestic saving is to increase taxation without increasing current government expenditures, and to thus increase government saving. The practice of currency overvaluation by the official exchange rate combined with the use of import taxes to raise the price of imports to importers in order to capture some of the windfall gain that would otherwise go to the import recipients introduces an interesting bias into the government accounts. Suppose a government receives a loan of \$1 million in commodities which, when sold in domestic markets will be worth Rs. 9.5 million. In one case the government maintains an official price of foreign exchange of Rs. 4.75/\$1 in the face of excess demand at that price. It levies a one hundred percent import tax on the commodities. The government accounts show borrowing (presumably to finance the capital budget) of Rs. 4.75 million and an addition to the revenue surplus (or government saving) of Rs. 4.75 million. The private sector must pay Rs. 9.50 million for the goods in domestic currency. In a second case, the government is not holding down the official price of foreign exchange, and the exchange rate is Rs. 9.50/\$1. In this case, it cannot tax the imports of the goods if the full \$1 million in commodities is to be purchased domestically. As a result, the government accounts show no increase in revenue surplus and borrowing (to finance the capital budget again) of Rs. 9.50 million, which is equivalent to the outlay by the private sector for the

goods. With no difference in real terms between the two situations, the government in case one will show rising government saving and will get good marks from a foreign assistance agency as foreign aid flows increase, while the government in the second case, which is pursuing a less distorting approach to the pricing of foreign exchange, will have to resort to some additional ("real?") taxation of the private sector in order to appear to perform as well.

In order to correct government saving for the effects of undervaluing foreign saving and then recapturing a part of the value for the government accounts, I calculated the average rate of import duty collected on commodity imports, and multiplied that by the value of foreign saving. This implicitness assumes that either (i) imports financed by foreign aid have the same rates of duty as the non-aid-financed imports, or, more likely, (ii) the commodity composition of imports with and without aid is not too different, so that even though some commodities are entirely imported under aid, the resources that would have been used to purchase the particular commodities will be used to purchase others instead. This procedure may lead to some over- or understatement of the import tax collections that can be attributed to foreign assistance, but can probably be argued either way for a particular country or time period within a country. The main question I was interested in was the order of magnitude of the correction and how it might affect the evaluation of performance in Pakistan.

V. Adjusting Pakistan's Saving Data

The method of adjustment just outlined was applied to the data for Pakistan for the period covered in Table I. Obviously, in order to make the corrections to the saving estimates one needs a combination of information and bravado, especially in choosing a value for q -- the percent by which the price of foreign exchange "ought" to be raised in order to reflect the opportunity cost of foreign exchange to the economy. The data on detailed investment estimates are given in several of the Planning Commission publications,¹

1. See Evaluation Report /29 /, Report of Consistency Committee /28 /.

so that one has a sense of the orders of magnitude of the tariff and markup rates that are already captured by the investment estimating procedure. Data on imports of machinery and equipment are readily available from several sources. Average rates of import taxes on capital goods can be compiled from several published and unpublished sources.

The guesstimating procedure focuses on (i) the estimate to make for m and (ii) the estimate to use for q . The Planning Commission investment estimates show a markup for trade and transportation for imported capital goods in the 1960's of about fifty percent. I used a figure of fifteen percent for m (trade markups) in these calculations, and did not change it from year to year.² I have used a figure of 100 percent for q , which may sound ex-

2. It is clear that one wishes to remove local transport costs from the adjustment of the savings estimate, so the fifty percent needs to be subdivided in any case. Pal's data /31 /, /32 / suggest a rate of trade,

or scarcity, markup of over 50% on imported capital goods which are commercially imported for re-sale. Data on import licensing suggest that about one-third of raw materials and capital goods were imported commercially, and the proportion of capital goods alone was certainly somewhat smaller. Therefore, an estimate of trade markups as a percentage of all imported capital goods of 15% is not unreasonable, since it represents a markup of over fifty percent on less than one-third of imported capital goods. There was no empirical basis on which to base a changed adjustment factor from year to year. Note that if the estimate for m is too low (i. e., if transport markups were less than 35% and m was greater than 15%), the downward correction for S is too small, and \hat{S} is "really" less than the figure given in Table II.

tremely high, but which I believe is justified if one is trying to correct for the difference between the official price of foreign exchange and the opportunity cost of imports in the country. The best defense of this figure is found in the data provided by Pal /31 /, /32 /, and updated and extended by Alamgir / 2 /, on the relationship between the domestic prices of imported goods and their c.i.f. prices at the official exchange rate. In 1964/65, during the most liberal period of imports in Pakistan since the Korean War, Pal's data showed that for the average of imported consumer, intermediate, and investment goods included in his price survey, the differential between c.i.f. prices and domestic wholesale prices was 123 percent. A year earlier it had been 134 percent, and in Alamgir's study two years later, markups were higher and so were all rates of import duty, so the domestic prices of imports were around 150 percent of their c.i.f. price. On the export side, the price of foreign exchange received by exporters of over one-half of commodity exports had been raised by the export bonus scheme by twenty-five to sixty percent above the official price, depending on the commodity and the year.¹ All this

1. This is discussed by Islam /12 /, or Lewis and Guisinger /16 /.

was despite the fact that the dollar value of imports greatly exceeded the dollar value of exports throughout the period, and especially in the 1960's. Finally, there is a recent study¹ of the relation of imported to domestic

1. A.I.A. Islam /11 / as quoted by Norton /21 /.

prices which extends the price data back into the 1950's, which finds the value of q to vary between 74 and 121 for imports over the fifteen years included here.

The application of the correction figures to the saving data for Pakistan is shown in Table II. The results are fairly striking. As one would expect, since foreign saving was fairly large throughout the period and since the currency was substantially overvalued, there is a marked effect on the average rate of domestic saving after applying the correction figure. The pattern of average and marginal saving rates parallels that estimated by the official estimates of saving, but there is a substantial difference in magnitudes for the saving figures adjusted for currency overvaluation. There is a rise in the average saving rate from the First to the Second Plan and a fall in the Third Plan in both the adjusted and the unadjusted series. The marginal saving rate was higher (both adjusted and unadjusted) when there was an increase in the inflow of foreign aid and an increase in the flow of imports, and the marginal saving rate in the Third Plan period was very low which corresponded to a low marginal import rate. The main item of interest here is the reduction in the marginal saving rates that accompanied the large inflows of foreign saving, from something out of the ordinary to

TABLE II: Adjustment of Domestic Saving in Pakistan to Account for Currency Overvaluation (Rs. Million, Current Prices)

	<u>1954/55</u>	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
Undervaluation of Domestic Investment	376	546	1,015	788	1,667	3,824	4,006
Undervaluation of Foreign Saving	400	965	3,015	3,003	4,543	10,220	14,857
GDS Unadjusted	1,463	2,875	6,085	6,900	10,326	23,530	28,121
GDS Adjusted	1,439	2,456	4,085	4,685	7,950	17,134	17,290
	6.7	8.8	12.6	9.2	7.6	11.4	8.6
	6.7	7.7	9.0	6.5	5.8	8.7	5.2
	13.1	23.6	3.0		19.7	3.8	
	10.0	12.0	2.2		15.6	1.3	

Source: Computed from Appendix Tables

Undervaluation of Domestic Investment calculated by: $M_k (q - (t + m + tn))$

Undervaluation of Foreign Saving and overvaluation of GNP calculated by: qf

See text for definitions.

something not so extraordinary. Now, it should be pointed out that many countries even using unadjusted domestic saving rates do not show increases in their saving rates when they receive greater amounts of foreign aid (i. e. they allow foreign saving to substitute for domestic saving) and Pakistan, even after a rather substantial revaluation of domestic saving, showed marginal rates of saving higher than the previous average rates during periods when aid was increasing. Pakistan should get good marks, but not quite so good as the unadjusted figures suggest. The only question is in the Third Plan. The average rate of foreign capital inflow in the Third Plan will be a slightly smaller percentage of GNP than it was in the Second Plan, and the absolute amount has increased substantially. However, the average rate of domestic saving has fallen off sharply, and the marginal rate is much lower. The performance in the Third Plan on the domestic saving side has not been particularly good, and it seems difficult to blame this on the level of foreign resources made available. From the Second to the Third Plan, one rupee of additional foreign saving "generated" just under one rupee of domestic saving. While the details of the investment estimates are not publically available at this time, one might suspect that there is a greater degree of under-estimation of domestic investment activity (and, therefore, domestic saving) than was the case in earlier years. If there is not some understatement in the investment estimate, it would appear that economic management in the Third Plan has developed serious problems and must be re-examined.¹

1. There is always a danger of using an inappropriate time period. The first two years of the Third Plan were marked by a war with India and a serious crop failure. For comparative purposes I calculated marginal

(continuation of footnote 1 from p. 21):

and average saving rates (adjusted and unadjusted) and import and foreign assistance rates for the last three years of the First, Second and Third Plan periods and marginal rates between the three-year average, with the following results:

	<u>1957/60</u>		<u>1962/65</u>		<u>1967/70</u>
S/Y	7.9		12.2		9.3
$\Delta S / \Delta Y$		21.7		4.6	
\hat{S} / \hat{Y}	6.2		9.2		6.5
$\Delta \hat{S} / \Delta \hat{Y}$		16.4		2.3	
M/Y	6.6		10.3		7.0
$\Delta M / \Delta Y$		18.3		1.5	
F/Y	3.2		5.5		4.2
$\Delta F / \Delta Y$		10.7		1.9	

The same general pattern emerges, though the absolute value of the official and the corrected saving rates are higher in every case using the last three years of the plans instead of the plan average. Most significant in terms of policy evaluation, however, would seem to be two facts. First, even discarding the results of the first two years of the Third Plan, the marginal saving rate from official figures is quite low. Second, and a more positive note, an additional rupee of foreign assistance (from 1962/5 to 1967/70) "generated" Rs. 2.48 in domestic saving, which makes performance look much better than is the case using Plan averages that include the war and its aftermath.

It is interesting to re-examine the notion of complementarity of domestic and foreign saving and the "productivity" of aid in promoting saving using data that have been corrected for the effects of currency over-valuation. The results are reasonably dramatic:

	<u>1954/5 to 1959/60</u>	<u>1959/60 to 1961/65</u>	<u>1964/65 to 1969/70</u>	<u>First to Second Plan</u>	<u>Second to Third Plan</u>	<u>1962/65 to 1967/70</u>
$\Delta S / \Delta F$	2.50	1.57	negative	2.24	.99	2.48
$\Delta \hat{S} / \Delta \hat{F}$.90	.40	negative	.81	.02	.61

The period 1964/65 to 1969/70 is unusual because it represents data for only two single years, and 1964/65 represented an unusually high point in foreign assistance so that ΔF over 1964/5 to 1969/70 is just barely negative, while ΔS is positive. For the other periods, however, foreign and domestic saving are complementary to one another, but the order of magnitude of the "power" of

foreign saving in "generating" domestic saving is altered radically in all cases: instead of an additional rupee in foreign assistance "generating" a considerably more than an additional rupee of domestic saving, it "generates" considerably less. The size of these changes suggests that a re-examination of a number of policy generalizations used by development assistance agencies is in order.¹

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1. In their article on aid and development in Greece, Adelman and Chenery argue that "the principal source of the high productivity of external resources in this situation has been the great increase in domestic savings that has been made possible by more rapid growth." And "This increased savings potential is the main source of the high productivity of external resources in a country which is able to capture [through domestic saving] a substantial fraction of the increase in GNP for further investment as Greece has done." / 1 /
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A second adjustment to saving data suggested in the last section relates to government saving. Table III gives the corrected and the original data for government saving on an average and marginal basis relative to GNP. The correction results, of course, in lower average and marginal rates of government saving, but the rate of government saving is still positive for the most recent periods, and for all periods the marginal rate is above the average rate. Again, even with the corrected figures, the government of Pakistan should get reasonable marks for performance along "self-help" lines, but the performance is not as good after correction as it was before. Also, I suspect that the use of the average rate of import tax probably overstates the amount of import tax revenue that can be attributable to aid in Pakistan, largely because of untaxed PL 480 wheat imports, so that the data as corrected in Table III probably give a relatively bad picture of government performance.

TABLE III. Effects of Partial Adjustment of Government Saving for Undervaluation of Foreign Saving

	<u>1959/60</u>	<u>1964/65</u>	<u>1969/70</u>	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
Average tax on imports	22.2%	26.1%	37.6%	27.3%	25.9%	36.7%
Gov't. Saving/ GNP	0.1	2.3	3.3	0.1	1.9	2.4
Adjusted Gov't Saving/Adjusted GNP	-0.6	0.7	1.9	-0.7	0.7	0.8
Marginal rate of Gov't. saving	7.0	5.1		6.0	3.2	
Adjusted marginal rate	3.8	3.9		4.1	0.9	

Source: Appendix Tables

Adjustment was made by deducting the average rate of tax on imports times foreign saving inflow from the government revenue surplus. The revenue surplus was taken to equal government saving. There was no adjustment of government expenditures for undervaluation of foreign exchange used by government agencies.

VI. Some Questions and Implications

There are a number of problems raised by and related to the analysis and calculations given above. First, if one starts re-computing a part of the national accounts, what happens to the balance in the accounts, and what further adjustments may be needed? Second, when one starts re-computing income and the growth of income on the basis of a set of relative prices other than existing domestic prices or base year domestic prices, are there significant patterns to the correction process that fit in to the analysis of domestic saving and aid? Finally, what are the implications of the corrections suggested above for the two-gap analysis of aid and development?

A first question is raised, but by no means answered, by the analysis and comments above is the whole problem of valuing national income when there are distortions in (for the present case) the prices of tradable goods. The very partial measure suggested above neglects the impact the adjustment would have on the rest of the national accounts. If total saving is "really" less than its measured amount, some sector of the economy will have less saving than it did under conventional methods of measurement. There are a variety of ways in which the measured saving of a sector could be reduced. Since saving is conventionally defined as income minus consumption, saving could be reduced by a downward adjustment in measured income, and upward adjustment in measured consumption, or a combination of adjustments in each variable. In the case of the government saving estimates given above, there was only a downward adjustment in government income (tax receipts) with no change in the estimate of government consumption expenditures. Since the

government has access to foreign exchange at the official exchange rate, the value of government consumption expenditures should be higher than they are presently measured to be, and government saving when measured correctly would be still lower than the figures suggested in Table III suggest.

If one were to reevaluate national income at "world" prices in order to eliminate from the national income accounts that part of value added "due to" protection and currency overvaluation, one would reduce the value added in some sectors of the economy, and increase value added in other sectors (those that were discriminated against by the protection system, or had negative protection).¹ In most LDCs the sectors receiving the highest degree of

1. Maurice F. G. Scott has written a very provocative paper /35/ undertaking just such a re-estimation for Pakistan using data on protection from Lewis and Guisinger /16/. The paper will be referred to again below, as it contains numerous points relevant to the present paper. Mirrlees and Khan are also attempting re-estimations on the production side of the national accounts, as explained in /20/.

protection appear to be manufacturing sectors, and Pakistan is a particularly extreme example. Lewis and Guisinger /16/ suggest that value added in large-scale manufacturing should be reduced by perhaps two-thirds to three-fourths if one valued tradable inputs and output at world, rather than domestic, prices. If one assumed (for the sake of illustration only) that the protection was received proportionately by all factors of production, one would reduce all factor payments proportionately. Gross profits would, then, drop by two-thirds to three-fourths. Since the rate of saving has been estimated to be between two-thirds and three-fourths of gross profits after taxes for large-scale manufacturing, the effect of adjusting "real" income for protection would eliminate

an amount of income equal to all corporate saving in Pakistan (for the late 1950's and early 1960's). It may be too much of a coincidence, but attributing all corporate saving to protection and making adjustments in the level of government saving as mentioned above would account for most of the overall adjustment in saving that was made in Section V and Table II.¹ This is

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1. See Lewis / 15 / Chapter III for discussion attempting to reconcile estimates of corporate saving as given by Haq and Baqai / 9 /, Bergan / 3 /, and Papanek / 33 / and the aggregate estimate of saving made by Bergan from expenditure survey data.
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consistent with a view that incomes (and hence saving) in agriculture and in sectors producing non-tradable goods would not be greatly affected by the adjustment for protection and currency overvaluation.²

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2. See Scott's paper / 35 / for discussion and evidence supporting this particular point.
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These comments suggest that the reduction in domestic saving (that comes about when foreign saving is more properly valued) will come from the sectors that benefit most from the foreign saving and the domestic currency overvaluation: government and protected manufacturers. This at least has the additional virtue that it is an intuitively appealing result as well.³

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3. Note that in all the discussion world price values have been adjusted upward to domestic prices. Scott / 35 / and Tibor Scitovsky (in a seminar in March 1968) argued that one should take domestic final goods prices as the appropriate weights for expenditures, since they presumably represent social valuations placed on the goods and services consumed and invested by society. Even here, of course, there is a further complication since the income distribution and the structure of demand would probably be different in the absence of protection than they are observed to be presently.

The next question of some interest may be the following: what happens when one adjusts income in each period for protection and overvaluation?¹

1. This is the question in which Scott was principally interested, but I believe the interpretation given here goes a bit farther than he has gone to date.

First, one will get a different picture of the structure of production in each period than one had with the conventional methods. Second, one will get a different rate of growth and composition of growth than one had from conventional measures. Usual deflation measures adjust growth rates for absolute changes in price levels, and have index number difficulties when there are changes in relative prices among sectors. Nevertheless, they establish a criterion of "real" growth through some process of deflation to constant domestic prices. The change Scott suggests is a further deflation to account for differences between world and domestic relative price structures for tradable goods, which adds another dimension to "real" growth. Indeed, one could pose the question of re-evaluating income growth as: how real is real growth?

If one adjusts national income by industry of origin in Pakistan, or, one suspects, any number of LDSs, one would reduce income originating in manufacturing and increase income originating in agriculture relative to services and to other non-tradable activities / 16 /, / 35 /. One would also be likely to find a decrease in the rate of growth of domestic output, since, in general, manufacturing will have been the fastest growing sector, agriculture slowest, and services in between, and the adjustment process will lower the rate for the fastest growing, and raise the rate for the slowest growing sector.

The adjustment in Pakistan's case, made by Scott, appears to reduce the rate of growth of "real" GNP by about one percentage point per year from the late 1950's to the mid-1960's (from about 5 percent to about 4 percent per year), which is in effect taking away the contribution of large-scale manufacturing as it has been conventionally measured.

The adjustment to "real" growth has another dimension of some interest in cases when the apparently rapidly-growing sector is an import-substituting, protected, manufacturing sector. This is a frequent case in LDCs and there is a widely experienced pattern in such cases where a balance of payments crisis leads to heavy protection of and high profitability in the manufacturing sector, which encourages heavy investment and rapid growth of output behind the protective wall. The turning point in the cycle comes as the protected sector fails to save or earn (net) enough foreign exchange to offset the effects of its growing domestic factor payments, which finally results in increasing pressure on the balance of payments, excess capacity in manufacturing as imported raw materials become increasingly scarce, deceleration in measured industrial (and overall) growth rates, deceleration of investment activity, falling saving rates, and in some cases inflation as well.¹

1. See Power / 34/ and Sheahan / 36 /, inter alia, for descriptions of such patterns and analysis of problems of unsuccessful import substitution behind protective walls.

This widely recognized phenomenon and the widely accepted analysis of the problems of unsuccessful import substituting industrialization relate to the two-gap analysis of trade and growth and the analysis of saving measure-

ment and currency overvaluation. Growth during the rapid industrialization and protected import substitution phase of the import substitution "cycle" proceeds with a moderately rising saving and investment rate and a relative absence of inflation and balance of payments problems. As the turning point in the cycle is reached (the late 1950's in Pakistan) the rising needs for subsidy by the protected sector produce a set of "requirements" for imports and a supply of exports that leads to balance of payments difficulty and excess capacity in the "inefficient" import substituting sector. As the growth of manufacturing is constrained by the balance of payments, the saving that this sector had been generating is also constrained, leading to the declining marginal rate of saving identified in the two-gap analysis as evidence of trade-constrained growth (1954 to 1958 in Pakistan).

The relationships between foreign and domestic saving in the two-gap analysis are of particular interest here, since two basic articles in the two-gap literature used Pakistan as an example. Chenery and MacEwan / 6 / identified the marginal rate of saving, the absorptive capacity for investment, and the efficiency of capital use as the measures of development policy in a country that are most significant for the two-gap analysis. They state that "it is clear that the ability of a country to save and reinvest substantial proportion of its increase in income is one of the most important reasons why external assistance can be highly productive." / 6 /, p. 233-4, or as Chenery and Strout argue, "the predominant need is to convert the unrealized saving into additional investment which will substitute for imports or increase exports." / 7 /, p. 722. In a country which is constrained by import supplies,

aid provides the resources that are complementary to domestic resources and allows both GNP and saving rates to increase. Countries facing trade-constrained growth are likely to encounter "import shortages, substantial excess capacity, and in some cases falling saving rates." / 7 , p. 710/.

But, import shortages in the form of excess demand for imports at existing exchange rates, and certain forms of excess capacity are often associated with plain, old-fashioned, currency overvaluation, and a fall in the measured marginal rate of saving can come about because of a more rapid rise in the price of domestically produced capital goods relative to imported capital goods, with a resultant increase in undervaluation of total domestic investment relative to domestic income, and a concomitant decrease in domestic saving (given our usual measurement procedures).

Investment in trade-improving sectors (exports and further import substitutes) seems to require a higher capital/output ratio than the rest of the economy because currency overvaluation and low tariffs on goods not-yet-heavily-import-substituted-in provide these sectors with lower protection and lower value added per unit of capital relative to the existing, highly-protected industries.¹ If, under these circumstances, a country can attract foreign

1. Chenery and MacEwan assume that "production for trade improvement requires a higher capital-output ratio [than regular production]..." [6 , p. 216]. Note that if capital output ratios were computed at world prices for both capital goods and final and intermediate tradable goods, this discrepancy would disappear. It is the higher protection which produces a higher value added in domestic than in world prices that is responsible for part, if not all of the apparently lower capital/output ratios in the early import-substituting (protected) industries. This measurement change could well alter the ranking of industries as compared with conventional measurement procedures.

capital or foreign assistance which aids in accelerating investment and the GNP growth rates again (which happened in Pakistan in the late 1950's and early 1960's) there will be an increase in the rate of domestic saving (a) because the overvalued currency undervalues foreign saving and (b) because the protected industries and the government will again begin reaping the benefits of currency overvaluation and protection and will show higher saving rates. However, one is left with the uneasy feeling that this evidence of consistency of observed performance with the two-gap model may be only (or less than) half the truth: part of the explanation of the observed statistical consistency is simply a systematic bias in the data, which while purporting to measure real changes are in fact masking some of them.

What is needed in order to test the two-gap hypothesis in particular countries and on cross-section data is a set of data corrected for the systematic bias that an overvalued currency and a concomitant system of protection introduces into the aggregate national accounts. In defense of the two-gap model, it should be pointed out that even the rather substantial corrections to the aggregate data made in the case of Pakistan did not result in a change in the direction of movement of foreign saving, domestic saving, and imports, but they did result in a fairly large change in the orders of magnitude of response. What is needed is further work on the national accounts data of a number of countries, since the bias in measurement referred to here is systematic, and will affect countries in systematic ways. It is my hope that some re-estimation will be attempted in other countries to see the extent to which the phenomenon discussed is more widely spread.¹ The adjustments

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1. (footnote from preceding page): The data referred to earlier for fifty countries taken from Chenery and Strout / 7 / and the Yearbook of International Trade Statistics / 38 / suggest that there is real potential for overvaluation of domestic saving in a majority of those LDCs. Of the fifty countries, for 1962 trend data (see Chenery and Strout / 7 /) ten countries had F/S as conventionally measured of over .75, another six had F/S between .5 and .75, and fourteen more had values of F/S between .25 and .5. These data indicate the likelihood that if the correction outlined in this paper were used on these countries then there would be a downward correction of some magnitude in domestic saving estimates for a majority of countries, in particular those with relatively large capital inflows.
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have significance not only for such analysis as the two-gap approach but also for a whole range of studies of saving functions that have been carried out within countries over time and between countries using cross-section data.

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Notes to Table A - Sources of Data

1. GNP at Market Price (Y)
 - 1954/55 to 1958/59 - CSO Statistical Bulletin /22/, adjusted for indirect taxes based on unpublished data from the Central Board of Revenue.
 - 1959/60 to 1964/65 - Evaluation /26/
 - 1965/66 to 1968/69 - Planning Commission /30/
 - 1969/70 - Projection of 6-1/2 percent above 1968/69, based on estimates in /30/

2. Foreign Resources (F)
 - 1954/55 - Third Plan /27/ adjusted for price changes to current prices.
 - 1955/56 to 1958/59 - Second Plan /25/
 - 1959/60 to 1964/65 - Evaluation /26/
 - 1965/66 to 1968/69 - Planning Commission /30/
 - 1969/70 - Projection of 7-1/2 percent above 1968/69, based on /30/.

3. Domestic Saving (S)
 - 1954/55 - Third Plan /27/ adjusted for price changes to current prices.
 - 1955/56 to 1958/59 - Saving rate from Lewis and Khan /17/ applied to GNP estimate, since investment and saving estimates consistent with new GNP estimates have never been made. See /13/ for explanation.
 - 1959/60 to 1964/65 - Evaluation /26/
 - 1965/66 to 1968/69 - Planning Commission /30/ adjusted for changes in stocks, which were neglected in original estimates.
 - 1969/70 - Projection based on estimates of I and F from /30/.

4. Imports of Capital Goods (M_k)
 - 1954/55 to 1964/65 - Economic Survey /24/. Definition is machinery except electric, electrical machinery and equipment, and transport equipment - 1954/55 adjusted to post-1955 exchange rate.
 - 1965/66 to 1968/69 - Monthly Indicators /39/ August 1969, based on data from Central Statistical Office.
 - 1969/70 - 5 percent above 1968/69 based on /30/.

5. Surplus on Government Account (T-G)
 - 1954/55 to 1958/59 - Budget in Brief /23/, Central, East, and West Pakistan Revenue Budgets.
 - 1959/60 - Third Plan /27/.
 - 1960/61 to 1964/65 - Evaluation /26/.
 - 1965/66 to 1968/69 - Planning Commission /30/.
 - 1969/70 - Projection based on /30/.

6. Commodity Imports (M)
Same as Imports of Capital Goods.
7. Commodity Exports (E)
Same as Imports of Capital Goods.
8. q is always 1.0.
9. m is always 0.15.
10. Tax Rate on Capital Goods (t)
1954/55 to 1965/66 - Collections of tax on capital goods imports
(from Central Board of Revenue data) divided by imports of
capital goods (M_k).
1966/67 to 1969/70 - Projection based on unpublished analysis
by the author of tariff and tax rate changes in budget docu-
ments.

TABLE A - DATA AND SOURCES

	<u>1954/5</u>	<u>1955/6</u>	<u>1956/7</u>	<u>1957/8</u>	<u>1958/9</u>	<u>1959/60</u>	<u>1960/61</u>	<u>1961/62</u>
Y	21,920	23,497	27,453	29,327	29,034	32,680	36,234	38,090
F	400	670	945	938	1,025	965	1,380	1,505
S	1,463	2,538	1,126	1,906	2,381	2,875	3,225	4,205
Mk	558	262	409	511	461	778	831	1,032
T-G	0	39	31	37	7	30	521	750
M	1,558	1,325	2,335	2,050	1,578	2,461	3,188	3,109
E	1,760	1,784	1,608	1,422	1,325	1,843	1,800	1,843
e	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
m	.15	.15	.15	.15	.15	.15	.15	.15
t	.153	.161	.126	.128	.173	.129	.208	.224
\hat{Y}	21,520	22,827	26,508	28,389	28,009	31,715	34,854	36,585
\hat{F}	800	1,340	1,890	1,876	2,050	1,930	2,760	3,010
\hat{S}	1,439	2,042	469	1,327	1,656	2,456	2,353	3,311

	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70
Y	40,397	43,575	48,291	52,513	61,946	66,956	70,490	75,072
F	1,825	2,495	3,015	2,453	3,570	3,041	2,790	3,003
S	4,885	5,130	6,085	4,082	4,216	6,813	6,110	6,900
Mk	1,429	1,541	1,801	1,714	1,731	1,774	1,807	1,897
T-G	792	817	1,124	-159	1,363	1,736	2,367	2,500
M	3,819	4,430	5,374	4,208	5,192	4,655	4,865	5,300
E	2,247	2,299	2,401	2,718	2,913	3,348	3,305	3,797
q	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
m	.15	.15	.15	.15	.15	.15	.15	.15
t	.224	.254	.249	.301	.310	.370	.370	.378
Y	38,572	41,080	45,276	50,060	58,376	63,915	67,700	72,069
F	3,550	4,990	6,030	4,906	7,140	6,082	5,580	6,006
S	3,890	3,495	4,085	2,493	1,500	4,525	4,087	4,685