

A Complete Set of Shadow Prices for Pakistan: Illustrations for 1975-76

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A consistent set of economy-wide shadow prices for Pakistan is presented, based on input-output flows for the mid-1970s. This provides broad parameters for policy at the sectoral level, with indications as to which sectors should be encouraged under alternative assumptions concerning the behaviour of factor markets. Further, these parameters are useful as inputs for project evaluation. A number of agricultural and manufacturing sectors are identified as being socially profitable. Finally, the shadow prices will be taken as parameters in a tax reform exercise.

1. INTRODUCTION

A consistent set of shadow prices provides many advantages in designing economic policy. In a previous paper (Ahmad and Stern 1986) we have shown how shadow prices could be used in an analysis of tax reform to evaluate the changes in net demands arising from tax changes. They can also be used, for example, to examine possible reorientations of trade and industrial policy in that they help to identify sectors which should be encouraged or discouraged. And, of course, they provide an essential input into project appraisal. They are, therefore, a most important tool for planning.

The main purpose of this paper is to provide a consistent set of economy-wide shadow prices for Pakistan. Since shadow prices embody the full effects of extra supply of a good, their calculation requires a model of the economy. Data limitations usually dictate that such a model be rather simple and essentially based on input-output information. The shadow prices presented in this paper are the first

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to be based on such a data set – it was not available to earlier researchers such as Khan (1974), or Squire, Little and Durdag (1979). The information base also largely dictates the level of aggregation we can use, i.e. that of the input-output table. Hence, the shadow prices will be useful at the sectoral level in the analysis of policy and for tax reforms designed to shift from one broad class of goods to another. They will also be of value for broad classes of inputs in the analysis of particular investment projects. Our immediate motivation in calculating shadow prices was for the analysis of tax reform and their use in this context will be demonstrated in a subsequent paper. We shall comment briefly below on the implications of the shadow prices for the social value of expanding output in different sectors, i.e. which sectors should be encouraged and which discouraged. The method used in the estimation of shadow prices is described in Section 2. The estimates are based on the P.I.D.E. Input-Output Table of Pakistan's Economy: 1975-76. The data and calculation of shadow prices are described in Section 3. Section 4 concludes with reference to policy and further research.

2. PRINCIPLES FOR THE COMPUTATION OF SHADOW PRICES

The shadow price of a good is defined as the increase in social welfare which would arise if an extra unit of public supplies were to be made available. This definition requires us to calculate the full consequences of an extra unit, taking into account all the interactions of the economy, and then to evaluate the changes using some definition of social welfare. This is the definition that underlies the standard cost-benefit manuals (see e.g. Little and Mirrlees 1974 or Dasgupta, Marglin and Sen 1972) and it can easily be shown that this is essentially required for a cost-benefit test to correctly identify a social improvement – see Drèze and Stern (1987). Modelling the consequences of a small change in public supplies is, in principle, a formidable task and most methods of calculating shadow prices involve shortcuts in order to simplify. One of the best known procedures is that of Little and Mirrlees (1974) and this is the one followed here. We shall describe the method briefly below, indicating some of the most important assumptions involved in its justification.

Once shadow prices have been calculated they can be put to use in a much more disaggregated way than would be possible when using a fully articulated model of the economy. And they can also be adopted to incorporate different views about, for example, the functioning of labour markets more easily than would be possible in a completely specified general equilibrium model. Hence, whilst one loses something in the description of the economy there is much to be gained in terms of disaggregation and flexibility.

The Little-Mirrlees Model

This method is based on a set of guiding principles which stand in place of a fully articulated model. Firstly, shadow (or accounting) prices for traded goods

should be based on world or border prices, “border prices can be used as accounting prices for all traded goods, because they represent the opportunity costs or benefits of using or producing a traded good” (Little and Mirrlees, 1974, p. 68). The terms shadow and accounting prices will be used interchangeably in this paper. Secondly, “when considering the use of a non-traded good whose output will be consequentially expanded, then the accounting price is equal to the marginal social costs of production” (p. 70). In practice, when computing a system of accounting prices, this marginal social cost rule is generally used for all non-traded goods, and that is the method adopted here. The assumptions involved in using the rule across the board in this way are rather stringent and involve strong assumptions concerning the optimality of government policy (they are discussed formally in Drèze and Stern 1987).¹ For more disaggregated sectoral work one can be more refined, asking in particular how much of an extra input used comes from extra production and how much from extra consumption. Some sensitivity analysis to the marginal social cost assumptions is provided by calculating shadow prices under various alternative assumptions concerning which goods are traded and which are not. Thirdly, the method takes explicit account of the way in which a project affects the distribution of income between public and private sectors and across individuals: “Thus government consumption, government saving, private consumption and private savings may all be considered to have different social values” (p. 71) and “we put considerable weight on the use of shadow wages as a means of allowing for the effects of a project on equality” (p. 72) and “The profits from a project are, of course, weighted according to whom they accrue” (p. 72). The quotes are all from Little and Mirrlees § 5.2. The estimates of shadow prices thus incorporate judgments on income distribution most notably through the shadow wage. Further distributional considerations are introduced when the shadow prices are used in a reform analysis (see Ahmad and Stern 1986).

The method requires the classification of goods as being importable, exportable, or non-traded at the margin. If it is assumed that extra supplies of a good are met through imports, then the sector is treated as “importable”, and similarly for the other possibilities. Notice that the classification therefore depends in part on government policy – if there is a quota on a good which can be imported but the quota will not be changed, then we must treat the good as non-traded. One also has to consider how world markets and domestic production and consumption activities are likely to change over the future. Hence, one should never be completely confident about the appropriateness of one particular set of classifications and, accordingly, we shall investigate a number of them in this paper.

¹One hopes, however, that in the terms of broad sectoral accounting prices calculated here, they are not overly misleading and they do have the advantage of not requiring detailed demand information.

The numeraire, or the unit of account for cost-benefit calculations for the Little-Mirrlees method is uncommitted foreign exchange in the hands of the government. Hence all domestic values are converted to a foreign exchange equivalent and incomes committed to particular uses (e.g. the consumptions of certain groups) are evaluated relative to uncommitted government income. We are now ready to describe the evaluation of traded and non-traded goods respectively. The calculation of shadow prices for goods which are traded at prices which may be treated as fixed on the world market is, in principle, straightforward. If the good is imported then its shadow price is the c.i.f. price, plus transport and distribution costs at shadow prices. Note, that taxes are excluded. If a good is exported, the shadow price is the f.o.b. price less transport and distribution costs at shadow prices. Where prices are not fixed one uses marginal revenues or marginal costs.

For practical estimation of economy-wide shadow prices, inter-industry transaction matrices or input-output tables are required. The most commonly used conventions for evaluating input-output tables are at (i) producer, or (ii) purchaser prices. Where purchaser prices are used, as for the Pakistan input-output table, inputs into industry j include trade and transport margins. The cost of getting the output of industry j to the point of purchase is included as a cost for the i th industry. Thus using purchaser prices, the value of importable inputs includes both the import price and the margins incurred in getting the good to the using industry. The shadow price of an exportable reduces to its f.o.b. value and we can regard the shadow prices of exportables as exogenous. The shadow price of an importable, however, will depend on the shadow values of the trade and transport margins which are endogenously determined.

The shadow price for non-tradeables proposed by Little and Mirrlees is the marginal cost of an extra unit, valuing the inputs at shadow prices. The calculation of the marginal cost of non-traded goods at shadow prices therefore requires us to know the input requirements and the shadow prices of these inputs. The inputs will be traded goods, non-traded goods and factors. Thus to calculate the shadow price of one non-traded good we must know the shadow prices of the other non-traded goods. One also needs to know the shadow prices of factors; we return to these below.

The calculation of the shadow prices of non-traded goods then proceeds by decomposing the cost of a good into its constituent elements of taxes, payments for traded goods, and payments for each factor involved. The appropriate shadow prices are then applied to each element (zero in the case of taxes). This is possible using an input-output table provided (i) we can classify goods as traded or non-traded; (ii) we are prepared to make the assumption that the coefficient matrix, A , represents marginal requirements (at the relevant level of production); and (iii) we are able to decompose value added into constituent payments to factors. This calculation

will obviously present certain difficulties in practice. The classification of goods into traded and non-traded is both important and problematic. For example, under any commodity grouping there will usually be an element of traded and non-traded goods, and varying degrees of violence to reality are involved in classifying a given sector as traded or non-traded. And even though a good may be tradeable, there may be an immovable quota which implies that the *marginal* unit must come from domestic production. We therefore consider more than one classification in traded and non-traded types of goods. These questions are discussed further in the next section in which we present the empirical work.

We can now express the rules we have described in terms of a set of equations for the endogenous shadow prices. We shall, for the moment, continue to regard the shadow prices of factors as exogenous so the endogenous shadow prices are for non-traded and importable goods. It is convenient to express all the shadow prices as proportions of market prices (here purchaser prices). The ratio of a shadow price to the market price is often called the accounting ratio. All the shadow prices in the formulae below are accounting ratios: essentially we choose units of commodities such that purchaser prices are unity.

We write \bar{p}^1 for the row vector $[p_1^N, \dots, p_n^N, p_1^a, \dots, p_L^a]$ of shadow prices for non-tradeables and importables, A^{NM} for the matrix of coefficients which describe non-tradeable and importable inputs per unit of non-tradeable activities and trade and transport inputs into importables, \bar{p}^2 for the row vector of shadow prices of exportables and factors, and A^{XN} for the matrix of coefficients of exportable inputs and factors into non-traded activities – see Table 1. We then have

$$\bar{p}^1 = \bar{p} A^{NM} + \bar{p}^2 A^{XN} \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

We can therefore solve for the endogenous shadow prices

$$\bar{p}^1 = \bar{p} (I - A^{NM})^{-1} \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

where

$$\bar{p} = \bar{p}^2 A^{XN} \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Factors constitute the final element in the computations of shadow prices. We have to calculate the opportunity cost, defined in terms of social welfare, of the employment of and payment to each type of factor. If the employment of an extra unit of a factor does not involve a payment to it over and above its earnings elsewhere, then the opportunity cost is the foregone output elsewhere. If those earnings represent its marginal product at market prices then the shadow value of the factor

only marginal changes. If a change in demand leads to a change in imports (exports) then the good is treated as imported (exported) on the margin. If the change leads to an adjustment in home production then the good is treated as non-traded.

One can make different sets of plausible assumptions concerning these adjustments and they are, in part, dependent on government policy. Accordingly, we work with three rather different classifications. In Case A we have 52 traded goods and 35 non-traded, and this has the maximum number of traded sectors (see Table 2). In case B, there are 39 non-traded goods, with (1) 'wheat', (8) 'other crops', (9) 'livestock' and (12) 'mining and quarrying' no longer being treated as traded. In going from case A to case C we have reclassified fourteen sectors as non-traded to allow for binding quotas giving 49 non-traded sections in all. These categories include: (16) 'sugar refining', (18) 'tea blending', (29) 'silk and synthetic textiles', (30) 'woollen textiles', (35) 'wood, cork and furniture', (36) 'paper and products', (40) 'rubber products', (41) 'pharmaceuticals', (43) 'perfumes and cosmetics', (46) 'chemicals', (48) 'petroleum products', (59) 'transport (large-scale)', (61) 'transport equipment', and (62) 'office equipment'. We have based this reclassification on classification given by Naqvi and Kemal (1983, Vol. 1, p. 97) in which implicit nominal protection rates, which use market prices, are compared with explicit nominal protection rates, which use published tariff rates. When the former exceed the latter, then quotas are taken as binding. Whilst the PIDE study was conducted for the year 1981, we have made the supposition that there were at least as many quotas in the earlier period 1975-76.

In practice, within an input-output category, there may be several commodities which are non-traded, or which have quotas associated with them, and others which are clearly traded. At the level of disaggregation available to us, many sectors are both traded and non-traded, and we have tried to use informed judgement on the basis of data relating to imports and exports. It would be useful to use the broad indicators resulting from the study as an input into more detailed analyses, in which commodities may be more adequately identified as tradeable or non-tradeable.

Once we have assembled information on inputs, outputs and taxes and classified sectors into tradeables and non-tradeables, one can apply the method described in Section 2. We consider shadow prices for exportables, importables, factors and non-traded goods in that order.

We express a shadow price in terms of its 'accounting ratios' (or AR) which is the shadow price divided by the market price. The values used in the input-output table are at purchaser prices. For exported goods, these are taken as equivalent to f.o.b. values and the accounting ratios are 1 for goods which do not have export taxes. The commodities which had major export taxes in 1975-76 are rice, raw cotton, leather and cotton waste. The Appendix Table 1 (i) gives details of export taxes, f.o.b. export values from FBS (1983) and the accounting ratios. The ARs are

Table 2

Non-traded Sectors		
Case A	Case B	Case C
04 Sugar-cane	01 Wheat	04 Sugar-cane
07 Pulses	04 Sugar-cane	07 Pulses
11 Forestry	07 Pulses	11 Forestry
13 Grain Milling	08 Other Crops	13 Grain Milling
14 Rice Milling & Husking	09 Livestock	14 Rice Milling & Husking
17 Gur and <i>Khandsari</i>	11 Forestry	16 Sugar Refining
20 Confectionery & Bakery	12 Mining & Quarrying	17 Gur and <i>Khandsari</i>
24 Bidis (i.e. Tobacco-SS)	13 Grain Milling	18 Tea Blending
26 Cotton Ginning	14 Rice Milling and Husking	20 Confectionery & Bakery
37 Printing & Publishing	17 Gur and <i>Khandsari</i>	24 Bidis (i.e. Tobacco-SS)
54 Iron & Steel Remg	20 Confectionery & Bakery	26 Cotton Ginning
58 Bicycles	24 Bidis (i.e. Tobacco-SS)	29 Silk & Synthetic Textiles
60 Shipbuilding	26 Cotton Ginning	30 Woollen Textiles & Hosiery
66 Other Small-scale Manufactures	37 Printing & Publishing	35 Wood, Cork & Furniture
67 Low-cost Residential Buildings	54 Iron & Steel Remg.	36 Paper & Products
68 Luxurious Residential Buildings	58 Bicycles	37 Printing & Publishing
69 Rural Buildings	60 Shipbuilding	40 Rubber Products
70 Factory Buildings	66 Other Small-scale Manufactures	41 Pharmaceuticals
71 Public Buildings	67 Low-cost Residential Buildings	43 Perfumes & Cosmetics
72 Roads	68 Luxurious Residential Buildings	46 Chemicals
73 Infrastructure	69 Rural Buildings	48 Petroleum Products
74 Ownership of Dwellings	70 Factory Buildings	54 Iron & Steel Remg.
75 Electricity	71 Public Buildings	58 Bicycles
76 Gas	72 Roads	59 Transport Large-scale
77 Wholesale & Retail Trade	73 Infrastructure	60 Shipbuilding

Continued -

Table 2 - (Continued)

Case A	Case B	Case C
78 Road Transport	74 Ownership of Dwellings	61 Transport Equipment Small-scale
79 Rail Transport	75 Electricity	62 Office Equipment
80 Air Transport	76 Gas	66 Other Small-scale Manufactures
81 Water Transport	77 Wholesale & Retail Trade	67 Low-cost Residential Buildings
82 Television	78 Road Transport	68 Luxurious Residential Buildings
83 Radio	79 Rail Transport	69 Rural Buildings
84 Phone, Telegraph & Post	80 Air Transport	70 Factory Buildings
85 Banking & Insurance	81 Water Transport	71 Public Buildings
86 Government	82 Television	72 Roads
87 Services	83 Radio	73 Infrastructure
35 Non-traded Sectors	84 Phone, Telegraph & Post	74 Ownership of Dwellings
	85 Banking & Insurance	75 Electricity
	86 Government	76 Gas
	87 Services	77 Wholesale & Retail Trade
	39 Non-traded Sectors	78 Road Transport
		79 Rail Transport
		80 Air Transport
		81 Water Transport
		82 Television
		83 Radio
		84 Phone, Telegraph & Post
		85 Banking & Insurance
		86 Government
		87 Services
		49 Non-traded Sectors

Notes: 1. 87 sectors in all.

2. For exportables and importables see Appendix Table 1.

derived as a proportion of f.o.b. to purchaser price values, where the latter are f.o.b. values less the export tax.

For imports, the final P.I.D.E. Input-Output Table (1985) presents gross absorptions at purchaser prices. Taking off taxes and trade and transport margins (derived from the relevant rows in the input-output table) we may work out the c.i.f. values and dividing these c.i.f. values by the values at purchaser prices we have p_1^{cif} - see Section 2. These c.i.f. values are presented in Appendix Table 2.

The calculation of shadow prices requires estimates of the breakdown of the payments to different factor inputs since, in general, these factors will have different accounting ratios. Such a breakdown is not available in the input-output matrix. Employment costs for large-scale manufacturing were taken from estimates calculated from the Census of Manufacturing Industry (CMI) for the 118-sector classification. However, since the value-added figures for the input-output study were lower than those for large-scale manufacturing from the CMI, the employment costs have been adjusted downwards by a factor of 0.658 to match the input-output estimates. We have assumed other employment costs as follows: 0.5 of value added in agriculture and small-scale industries, and 0.6 of value added in construction and services. For agriculture, we have taken land opportunity costs at market prices as 0.3 of value added. Capital coefficients have been described in a previous paper [see Ahmad and Stern (1986) where we used a rental charge based on a rate of interest of 10 percent]. The residual of value added, after these elements have been deducted, is "pure profit". It is sometimes positive and sometimes negative. Given that it is an item derived as a residual after many assumptions, it is not likely to be accurate. We have ignored it in the calculation of shadow prices which essentially involves treating it as a transfer payment with no social cost. We hope to refine the treatment of factor inputs and their shadow prices in later work. The breakdown of value added into the above components is given in Appendix Table 3.

To calculate the accounting ratios for non-traded activities we need those for traded goods (these have been discussed above) and for the disaggregated value-added terms. For land, we assume throughout an accounting ratio of 0.9. This is based on a rough average of accounting ratios for agricultural goods. For the employment accounting ratio, we experiment with values including 0.9, 0.75 and 0.5. It should be noted that there may be several models which could yield an AR for employment (or shadow wage) equivalent to say 0.75. However, we may regard variations in the AR for employment corresponding to different assumptions concerning the Pakistan labour market, with higher shadow prices corresponding to tighter markets or greater social costs of employment. These different assumptions could include, for instance, models which incorporate the migration of Pakistani workers to the Middle East and others which do not. Lower ARs would correspond to cases where one assumes a relative abundance of labour. The numbers used also cover a range

that has been generated by detailed studies, see for example Squire, Little and Durdag (1979) and Khan (1974). The reason that 0.9 is the maximum AR we have used is based on Section 2 where we state that the shadow price is the SCF times Expression (4). Given the high tariffs in Pakistan, 0.9 would be a high estimate for the SCF corresponding to labour, and this in turn would be multiplied by a factor less than one corresponding to Expression (4).

In a similar manner, an AR for assets may be generated by different combinations of the accounting rate of interest (r), the capital matrix, and the shadow price of capital goods. We have taken values of 0.75, 0.5 and 0.25 to provide a wide range of alternatives. For example, if 10 percent is thought to be reasonable for r and our estimate of the capital coefficient matrix (see Ahmad and Stern 1986) is satisfactory, then the appropriate AR is that corresponding to capital goods (so that the shadow cost of equipment is r times its value at market prices times the AR). In this case 0.75 might be plausible. Alternatively, if 10 percent is thought to be too high for a *real* accounting rate of interest (and historically this might be so) then a lower AR might be more appropriate. Given the uncertainty concerning the estimates (particularly of r and the capital matrix) we have chosen the broad range.

The accounting ratios for non-traded goods corresponding to each combination of the ARs for labour and assets are presented for Case C in Table 3. Those for cases A and B, which have fewer non-traded sectors, are presented in Appendix Table 4. Recall that we value the residual profit/loss at zero thus treating it as a transfer payment with no social cost. Therefore, *ceteris paribus*, one would expect the ARs for non-traded activities which exhibit high positive residuals to have relatively low ARs and those which have high negative residuals to have relatively high ARs (because the social input costs are high relative to the value of output). As one can see from Appendix Table 4 and Table 3, this holds true for most non-traded ARs. However, some ARs are greatly affected by the ARs of major inputs. These effects can be seen by examining Table 3. The results discussed are for Case C with employment AR of 0.9 and asset AR of 0.75. For example, sector (1) 'wheat' has a high AR of 1.30 and this gives (13) 'grain milling' a high AR of 1.32 (grain milling also has a negative residual). Also sectors (2) 'rice' and (3) 'cotton' have high ARs of 1.11 and 1.51 respectively, and these give (14) 'rice milling' and (26) 'cotton ginning' high ARs of 1.05 and 1.36 respectively. The high ARs of (73) 'infrastructure', (75) 'electricity', (76) 'gas' and (79) 'rail transport' are due to high negative residuals, which in turn are caused by high capital service coefficients. Thus charging appropriately for capital inputs implies a high social cost of production relative to the market value of output. One will also notice that activities with high labour coefficients are most sensitive to the wage conversion factor chosen – for example (79) 'wholesale trade'. Those which have high capital coefficients are most sensitive to the asset conversion factor chosen e.g. (73) 'infrastructure', (74) 'ownership of dwellings', (95) 'electricity' and (76) 'gas'.

Table 3 (i)

Case C: ARs for Non-traded Goods Corresponding to an AR for Assets of 0.75

Commodity	Labour AR		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7524	0.6821	0.5648
2 07 Pulses	0.8860	0.8495	0.7886
3 11 Forestry	0.7238	0.6476	0.5207
4 13 Grain Milling	1.3165	1.2992	1.2705
5 14 Rice Milling & Husking	1.0494	1.0287	0.9943
6 16 Sugar Refining	0.5332	0.4865	0.4085
7 17 Gur and <i>Khandsari</i>	0.7366	0.6538	0.5325
8 18 Tea Blending	0.5438	0.4972	0.4195
9 20 Confectionery & Bakery	0.7293	0.6871	0.6166
10 24 Bidis (i.e. Tobacco-SS)	0.6013	0.5432	0.4463
11 26 Cotton Ginning	1.3570	1.3473	1.3312
12 29 Silk & Synthetic Textiles	0.7748	0.7251	0.6423
13 30 Woollen Textiles & Hosiery	0.8307	0.7892	0.7199
14 35 Wood, Cork & Furniture	0.6681	0.6091	0.5106
15 36 Paper & Products	0.6163	0.5613	0.4696
16 37 Printing & Publishing	0.6225	0.5652	0.4696
17 40 Rubber Products	0.7472	0.7035	0.6308
18 41 Pharmaceutical	0.6248	0.5806	0.5070
19 43 Perfumes & Cosmetics	0.6289	0.5765	0.4891
20 46 Chemicals	0.6426	0.5984	0.5248
21 48 Petroleum Products	0.8731	0.8496	0.8106
22 54 Iron & Steel Remg	0.5900	0.5170	0.3954
23 58 Bicycles	0.7721	0.7447	0.6990
24 59 Transport Large-scale	0.7440	0.7209	0.6824
25 60 Shipbuilding	0.8568	0.8164	0.7489
26 61 Transport Equipment Small-scale	0.6863	0.6284	0.5319
27 62 Office Equipment	0.6852	0.6441	0.5755
28 66 Other Small-scale Manufacturing	0.6006	0.5563	0.4824
29 67 Low-cost Residential Buildings	0.7585	0.7110	0.6319
30 68 Luxurious Residential Buildings	0.7360	0.6866	0.6043
31 69 Rural Buildings	0.7174	0.6582	0.5594
32 70 Factory Buildings	0.7348	0.6880	0.6099
33 71 Public Buildings	0.7217	0.6691	0.5814
34 72 Roads	0.7320	0.6789	0.5904
35 73 Infrastructure	1.1042	1.0540	0.9702
36 74 Ownership of Dwellings	0.7329	0.6475	0.5053
37 75 Electricity	1.7528	1.6752	1.5459
38 76 Gas	1.7067	1.6305	1.5034
39 77 Wholesale & Retail Trade	0.6329	0.5438	0.3954
40 78 Road Transport	0.7485	0.6956	0.6074
41 79 Rail Transport	0.9625	0.9043	0.8074
42 80 Air Transport	0.7106	0.6476	0.5426
43 81 Water Transport	0.6351	0.5524	0.4146
44 82 Television	0.7287	0.6682	0.5672
45 83 Radio	0.6773	0.5945	0.4565
46 84 Phone, Telegraph & Post	0.8189	0.7355	0.5965
47 85 Banking & Insurance	0.6504	0.5681	0.4310
48 86 Government	0.8369	0.7566	0.6227
49 87 Services	0.6324	0.5435	0.3953

Table 3 (ii)

Case C: ARs for Non-traded Goods Corresponding to an AR for Assets of 0.5

Commodity	Labour AR		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7368	0.6665	0.5492
2 07 Pulses	0.8680	0.8315	0.7706
3 11 Forestry	0.7123	0.6361	0.5091
4 13 Grain Milling	1.2827	1.2654	1.2367
5 14 Rice Milling & Husking	1.0104	0.9897	0.9552
6 16 Sugar Refining	0.4984	0.4516	0.3737
7 17 Gur and <i>Khandsari</i>	0.7058	0.6330	0.5117
8 18 Tea Blending	0.4654	0.4188	0.3411
9 20 Confectionery & Bakery	0.6786	0.6363	0.5659
10 24 Bidis (i.e. Tobacco-SS)	0.5854	0.5273	0.4304
11 26 Cotton Ginning	1.3293	1.3196	1.3035
12 29 Silk & Synthetic Textiles	0.7110	0.6614	0.5786
13 30 Woollen Textiles & Hosiery	0.7885	0.7470	0.6778
14 35 Wood, Cork & Furniture	0.6318	0.5727	0.4743
15 36 Paper & Products	0.5471	0.4921	0.4004
16 37 Printing & Publishing	0.5619	0.5045	0.4090
17 40 Rubber Products	0.7027	0.6591	0.5864
18 41 Pharmaceutical	0.5584	0.5142	0.4407
19 43 Perfumes & Cosmetics	0.5770	0.5246	0.4372
20 46 Chemicals	0.5753	0.5312	0.4576
21 48 Petroleum Products	0.8395	0.8161	0.7771
22 54 Iron & Steel Remg.	0.5643	0.4913	0.3697
23 58 Bicycles	0.7327	0.7053	0.6596
24 59 Transport/Large-scale	0.7072	0.6841	0.6456
25 60 Shipbuilding	0.8170	0.7766	0.7091
26 61 Transport Equipment Small-scale	0.6466	0.5887	0.4922
27 62 Office Equipment	0.6234	0.5822	0.5137
28 66 Other Small-scale Manufacturing	0.5847	0.5404	0.4665
29 67 Low-cost Residential Buildings	0.7539	0.7065	0.6274
30 68 Luxurious Residential Buildings	0.7287	0.6793	0.5970
31 69 Rural Buildings	0.7110	0.6518	0.5530
32 70 Factory Buildings	0.7296	0.6827	0.6047
33 71 Public Buildings	0.7139	0.6613	0.5736
34 72 Roads	0.7288	0.6757	0.5872
35 73 Infrastructure	0.9704	0.9202	0.8364
36 74 Ownership of Dwellings	0.6748	0.5895	0.4472
37 75 Electricity	1.3633	1.2857	1.1564
38 76 Gas	1.3390	1.2628	1.1357
39 77 Wholesale & Retail Trade	0.6027	0.5137	0.3652
40 78 Road Transport	0.7092	0.6563	0.5680
41 79 Rail Transport	0.8557	0.7976	0.7007
42 80 Air Transport	0.6757	0.6127	0.5076
43 81 Water Transport	0.6130	0.5303	0.3925
44 82 Television	0.6982	0.6376	0.5367
45 83 Radio	0.6372	0.5544	0.4164
46 84 Phone, Telegraph & Post	0.7305	0.6471	0.5081
47 85 Banking & Insurance	0.6200	0.5377	0.4006
48 86 Government	0.7472	0.6669	0.5330
49 87 Services	0.6021	0.5133	0.3651

Table 3 (iii)

Case C: ARs for Non-traded Goods Corresponding to an AR for Assets of 0.25

Commodity	Labour AR		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7212	0.6509	0.5336
2 07 Pulses	0.8500	0.8135	0.7527
3 11 Forestry	0.7008	0.6246	0.4976
4 13 Grain Milling	1.2489	1.2316	1.2029
5 14 Rice Milling & Husking	0.9713	0.9506	0.9161
6 16 Sugar Refining	0.4636	0.4168	0.3389
7 17 Gur and <i>Khandsari</i>	0.6850	0.6122	0.4909
8 18 Tea Blending	0.3870	0.3404	0.2627
9 20 Confectionery & Bakery	0.6278	0.5856	0.5152
10 24 Bidis (i.e. Tobacco-SS)	0.5695	0.5113	0.4145
11 26 Cotton Ginning	1.3016	1.2919	1.2758
12 29 Silk & Synthetic Textiles	0.6473	0.5977	0.5149
13 30 Woollen Textiles & Hosiery	0.7464	0.7049	0.6356
14 35 Wood, Cork & Furniture	0.5955	0.5364	0.4379
15 36 Paper & Products	0.4779	0.4229	0.3312
16 37 Printing & Publishing	0.5012	0.4439	0.3483
17 40 Rubber Products	0.6583	0.6147	0.5420
18 41 Pharmaceutical	0.4920	0.4479	0.3743
19 43 Perfumes & Cosmetics	0.5251	0.4727	0.3853
20 46 Chemicals	0.5081	0.4639	0.3904
21 48 Petroleum Products	0.8060	0.7826	0.7436
22 54 Iron & Steel Remg.	0.5385	0.4655	0.3439
23 58 Bicycles	-0.6933	0.6659	0.6203
24 59 Transport Large-scale	0.6703	0.6472	0.6087
25 60 Shipbuilding	0.7772	0.7367	0.6693
26 61 Transport Equipment Small-scale	0.6069	0.5490	0.4525
27 62 Office Equipment	0.5615	0.5204	0.4519
28 66 Other Small-scale Manufacturing	0.5688	0.5244	0.4505
29 67 Low-cost Residential Buildings	0.7494	0.7019	0.6228
30 68 Luxurious Residential Buildings	0.7215	0.6721	0.5898
31 69 Rural Buildings	0.7064	0.6453	0.5466
32 70 Factory Buildings	0.7243	0.6775	0.5994
33 71 Public Buildings	0.7061	0.6535	0.5657
34 72 Roads	0.7255	0.6724	0.5840
35 73 Infrastructure	0.8366	0.7863	0.7026
36 74 Ownership of Dwellings	0.6168	0.5314	0.3892
37 75 Electricity	0.9737	0.8961	0.7668
38 76 Gas	0.9713	0.8951	0.7681
39 77 Wholesale & Retail Trade	0.5726	0.4835	0.3351
40 78 Road Transport	0.6699	0.6169	0.5287
41 79 Rail Transport	0.7490	0.6909	0.5940
42 80 Air Transport	0.6407	0.5777	0.4727
43 81 Water Transport	0.5910	0.5083	0.3705
44 82 Television	0.6677	0.6071	0.5061
45 83 Radio	0.5971	0.5143	0.3762
46 84 Phone, Telegraph & Post	0.6421	0.5586	0.4196
47 85 Banking & Insurance	0.5896	0.5074	0.3702
48 86 Government	0.6575	0.5772	0.4433
49 87 Services	0.5719	0.4830	0.3349

The ARs for importables are presented in Appendix Table 1(ii) and (iii). Note that they are insensitive both to the classification of A versus C and to the ARs for labour. This is to be expected, given their definition – see Section 2.

One minus the accounting ratio for a sector can be interpreted as a shadow subsidy on output in that sector, since it measures the extent to which producers are paid more than the shadow price of their product. As such it provides a direct commentary on the incentives which have been provided. Another partial guide is the analysis in terms of social profitability (described below) which involves an examination of the social profitability of expanding exports (at the margin) or of expanding domestic production of importables (at the margin). A more complete analysis, integrating the shadow prices with a reform analysis incorporating the effects on households in different circumstances, along the lines of Drèze and Stern (1987) and Ahmad and Stern (1986) will be presented in a subsequent paper.

The inputs and outputs of each sector are evaluated at shadow prices to derive shadow profits or losses. However, for non-traded goods the method will automatically involve zero net profits at shadow prices. The classification into traded and non-traded is therefore crucial in interpreting results on social profitability. There are three cases: (A) with 52 traded sectors, (B) with 48 traded sectors, and (C) with 38 non-traded sectors. In practice, given the level of aggregation, one might expect to find within any one sector, commodities or sub-sectors which may be traded, or intrinsically non-traded, or non-traded at the margin given the existence of quotas. Consequently, this analysis should be seen as an exercise to generate economy-wide parameters which would be used as an input to more detailed studies of specific industries.

In Table 4(i) we present the social profitability (shadow profit or loss as a proportion of the shadow value of output) for case A corresponding to a definition of 52-traded goods sectors. We have chosen the smallest number of non-traded sectors here since such sectors automatically have a social profitability of zero. In each table we present the sensitivity of the social profitability to ARs for labour ranging from 0.9 to 0.5 for a given AR for assets. In Table 4(i), an AR for assets of 0.75 is presented, with values of 0.5 and 0.25 in the following tables.

There is a zero net shadow profit for non-tradeables by definition; this arises from specifying the shadow prices as the marginal cost at shadow prices, and in this model marginal and average costs are equal. The policy interest in the calculations for these sectors lies in examining the shadow marginal cost. For example, we could ask whether there would be any benefit in the relaxation of import quotas in that sector (if this is the reason for their being non-traded) by comparing the shadow price with the import price. If there appear to be particularly beneficial domestic uses of the non-traded output we could try to calculate a shadow value of these uses (for example, extra electricity supply). If the shadow value of the use exceeds the

shadow marginal cost, then one might argue that the output should be expanded and directed towards the beneficial use.

One expects that activities whose outputs have relatively low ARs will exhibit negative social profitability. In general, sectors with an AR less than 0.75 tend to fall into this category. We focus on Case A with a conversion factor for labour of 0.9 and for capital of 0.75 and this implies that the average AR applied to input costs is around the value of 0.75. Thus an AR for output of 0.75 is a rough dividing line. However, there are a few exceptions to this general rule. For instance, sector (16) 'sugar refining' has an AR less than the mean (at 0.64) and yet it exhibits a social profit. This is due to the large indirect tax element (0.25) which must be subtracted from costs to get shadow prices. Also, sector (15) 'edible oils' has a low social profit even though it has a relatively high AR of 0.95. This reflects the high AR of its major input sector (26) 'cotton ginning'. Sector (19) 'fish and preparations' exhibits a lower social profit than might be expected from its relatively high AR. This reflects the large input of sector (10) 'fishing' which also has a high AR. Sector (22) 'beverages' has a very low AR of 0.17 (due to high import tariffs) and this leads to a very high social loss of -2.16 for this activity, despite the fact that it has a relatively high indirect tax coefficient. This very high social return of sector (23) 'cigarettes and tobacco products' is attributable to its high AR combined with a very high indirect tax element which is subtracted from costs. Similarly, sector (43) 'perfumes and cosmetics' makes a large social loss despite a high indirect tax coefficient due to its low AR at 0.18. On the other hand, sector (44) 'paints and varnishes' has a relatively high indirect tax coefficient which contributes to a return greater than might be expected from its AR.

From Table 4(i) one can see that some sectors have negative social profits across all our combinations of SCFs for labour and capital. These include (08) other crops; (22) beverages; (29) silk and synthetic textiles; (30) woollen textiles and hosiery; (31) threadballs and other textiles; and (43) perfumes and cosmetics. Other sectors which have negative social profits at high SCF combinations switch to a positive social profit as we reduce the SCFs. These include (05) tobacco growing; (06) oilseeds; (25) cotton yarn; (27) cotton textiles (LS); (40) rubber products; (50) glass and products; and (59) transport (LS). Thus if domestic factors are involved at low levels of SCFs (in the spectrum we have chosen) then the activities in the latter list appear attractive; but even at the lowest levels we have considered that the former activities do not.

One can analyse the effect on social profitability in going from Case A to Case B, i.e. considering fewer sectors to be tradeable. Since agricultural ARs fall, this leads to an increase in the social return of other sectors which use these as inputs (in Case A the high ARs are the result of low domestic prices relative to world prices). The social profitability of sector (38) 'leather and products' increases, reflecting the

Table 4 (i)

Case A: Social Profitability with an Asset AR of 0.75

Commodity	Labour ARs		
	0.9	0.75	0.5
01 Wheat	0.3973	0.4332	0.4939
02 Rice	0.2657	0.3152	0.3977
03 Cotton	0.4717	0.5124	0.5801
04 Sugar-cane	0.0000	0.0000	0.0000
05 Tobacco Growing	-0.0181	0.0606	0.1965
06 Oilseeds	-0.1176	-0.0510	0.0638
07 Pulses	0.0000	0.0000	0.0000
08 Other Crops	-0.3336	-0.2515	-0.1082
09 Livestock	0.2368	0.2869	0.3712
10 Fishing	0.2657	0.3394	0.4623
11 Forestry	0.0000	0.0000	0.0000
12 Mining & Quarrying	0.1968	0.2641	0.3790
13 Grain Milling	0.0000	0.0000	0.0000
14 Rice Milling & Husking	0.0000	0.0000	0.0000
15 Edible Oils	0.0666	0.0803	0.1036
16 Sugar Refining	0.1708	0.2313	0.3362
17 Gur and <i>Khandsari</i>	0.0000	0.0000	0.0000
18 Tea Blending	0.1618	0.1773	0.2033
19 Fish & Preparations	0.1054	0.1264	0.1613
20 Confectionery & Bakery	0.0000	0.0000	0.0000
21 Other Food Industries	0.2645	0.3103	0.3866
22 Beverages	-2.1608	-2.2111	-2.3274
23 Cigs. & Tobacco Products Large-scale	0.6453	0.6622	0.6903
24 Bidis (i.e. Tobacco-SS)	0.0000	0.0000	0.0000
25 Cotton Yarn	-0.0525	-0.0251	0.0206
26 Cotton Ginning	0.0000	0.0000	0.0000
27 Cotton Textiles (Large-scale)	-0.0271	0.0086	0.0681
28 Cotton Textiles (Small-scale)	0.1638	0.1928	0.2411
29 Silk & Synthetic Textiles	-0.4236	-0.3903	-0.3308
30 Woollen Textiles & Hosiery	-0.4459	-0.4183	-0.3686
31 Threadballs & other Textiles	-0.2281	-0.2003	-0.1511
32 Carpets & Rugs	0.3532	0.3867	0.4426
33 Made-up Garments	0.2594	0.2829	0.3221
34 Footwear (non-rubber)	0.1547	0.1907	0.2506
35 Wood, Cork & Furniture	0.3007	0.3557	0.4474
36 Paper & Products	0.0647	0.1052	0.1772
37 Printing & Publishing	0.0000	0.0000	0.0000
38 Leather & Products	0.2827	0.2945	0.3143
39 Rubber Footwear	0.2422	0.2886	0.3660
40 Rubber Products	-0.1118	-0.0760	-0.0121
41 Pharmaceutical	0.2421	0.2621	0.2963
42 Fertilizer	0.1646	0.1943	0.2458
43 Perfumes & Cosmetics	-2.7978	-2.7328	-2.6100

Continued -

Table 4(i) - (Continued)

Commodity	Labour ARs		
	0.9	0.75	0.5
44 Paints & Varnishes	0.1342	0.1479	0.1716
45 Soaps & Detergents	0.1637	0.1817	0.2128
46 Chemicals	0.1864	0.2216	0.2823
47 Plastic Products	0.2721	0.3175	0.3951
48 Petroleum Products	0.0315	0.0449	0.0680
49 Cement	0.1731	0.2169	0.2900
50 Glass & Products	-1.3082	-1.2110	-1.0391
51 Non-Met. Mineral Products	0.1220	0.1500	0.1977
52 Basic Metals	0.0264	0.0571	0.1111
53 Metal Products	0.1609	0.2205	0.3239
54 Iron & Steel Remg	0.0000	0.0000	-0.0000
55 Agricultural Machinery	0.1278	0.1442	0.1720
56 Other Non-electric Machinery	0.2173	0.2476	0.2989
57 Electric Machinery	0.0873	0.1101	0.1487
58 Bicycles	0.0000	0.0000	0.0000
59 Transport Large-scale	-0.0893	-0.0681	-0.0320
60 Shipbuilding	0.0000	0.0000	0.0000
61 Transport Equipment Small-scale	0.1852	0.2191	0.2761
62 Office Equipment	0.2185	0.2405	0.2779
63 Sports Goods	0.2630	0.2887	0.3316
64 Surgical Instruments	0.4064	0.4519	0.5278
65 Other Large-scale Manufacturing	0.5094	0.5394	0.5894
66 Other Small-scale Manufacturing	0.0000	0.0000	0.0000
67 Low-cost Residential Buildings	0.0000	0.0000	0.0000
68 Luxurious Residential Buildings	0.0000	0.0000	0.0000
69 Rural Buildings	0.0000	0.0000	0.0000
70 Factory Buildings	0.0000	0.0000	0.0000
71 Public Buildings	0.0000	0.0000	0.0000
72 Roads	0.0000	0.0000	0.0000
73 Infrastructure	0.0000	0.0000	0.0000
74 Ownership of Dwellings	0.0000	0.0000	0.0000
75 Electricity	0.0000	0.0000	0.0000
76 Gas	0.0000	0.0000	0.0000
77 Wholesale & Retail Trade	0.0000	0.0000	0.0000
78 Road Transport	0.0000	0.0000	0.0000
79 Rail Transport	0.0000	0.0000	0.0000
80 Air Transport	0.0000	0.0000	0.0000
81 Water Transport	0.0000	0.0000	0.0000
82 Television	0.0000	0.0000	0.0000
83 Radio	0.0000	0.0000	0.0000
84 Phone, Telegraph & Post	0.0000	0.0000	0.0000
85 Banking & Insurance	0.0000	0.0000	0.0000
86 Government	0.0000	0.0000	0.0000
87 Services	0.0000	0.0000	0.0000

Notes: 1. The social profitability is defined as the difference between the shadow value of outputs and the shadow value of inputs, as a proportion of the shadow value of output.
 2. The social profitability for non-tradeables is identically zero.

Table 4(ii)

Case A: Social Profitability with an Asset AR of 0.5

Commodity	Labour ARs		
	0.9	0.75	0.5
01 Wheat	0.4048	0.4407	0.5017
02 Rice	0.2828	0.3323	0.4148
03 Cotton	0.4816	0.5222	0.5899
04 Sugar-cane	0.0000	0.0000	0.0000
05 Tobacco Growing	-0.0094	0.0698	0.2065
06 Oilseeds	-0.1061	-0.0390	0.0766
07 Pulses	0.0000	0.0000	0.0000
08 Other Crops	-0.3219	-0.2391	-0.0946
09 Livestock	0.2444	0.2946	0.3791
10 Fishing	0.2749	0.3487	0.4715
11 Forestry	0.0000	0.0000	0.0000
12 Mining & Quarrying	0.2177	0.2854	0.4011
13 Grain Milling	0.0000	0.0000	0.0000
14 Rice Milling & Husking	0.0000	0.0000	0.0000
15 Edible Oils	0.1017	0.1158	0.1398
16 Sugar Refining	0.2193	0.2808	0.3876
17 Gur and <i>Khandsari</i>	0.0000	0.0000	0.0000
18 Tea Blending	0.1892	0.2048	0.2311
19 Fish & Preparations	0.1373	0.1582	0.1931
20 Confectionery & Bakery	0.0000	0.0000	0.0000
21 Other Food Industries	0.3032	0.3490	0.4253
22 Beverages	-2.0775	-2.1201	-2.2203
23 Cigs. & Tobacco Products (Large-scale)	0.6740	0.6908	0.7189
24 Bidis (i.e. Tobacco-SS)	0.0000	0.0000	0.0000
25 Cotton Yarn	-0.0009	0.0265	0.0722
26 Cotton Ginning	0.0000	0.0000	0.0000
27 Cotton Textiles (Large-scale)	0.0207	0.0564	0.1160
28 Cotton Textiles (Small-scale)	0.1755	0.2045	0.2528
29 Silk & Synthetic Textiles	-0.3598	-0.3246	-0.2616
30 Woollen Textiles & Hosiery	-0.3958	-0.3665	-0.3136
31 Threadballs & other Textiles	-0.1749	-0.1457	-0.0941
32 Carpets & Rugs	0.3827	0.4162	0.4721
33 Made-up Garments	0.2865	0.3100	0.3493
34 Footwear (non-rubber)	0.1820	0.2180	0.2779
35 Wood, Cork & Furniture	0.3325	0.3876	0.4793
36 Paper & Products	0.1289	0.1712	0.2466
37 Printing & Publishing	0.0000	0.0000	0.0000
38 Leather & Products	0.3069	0.3188	0.3385
39 Rubber Footwear	0.2802	0.3267	0.4041
40 Rubber Products	-0.0610	-0.0235	0.0432
41 Pharmaceutical	0.2750	0.2954	0.3305
42 Fertilizer	0.2494	0.2807	0.3352

Continued -

Table 4(ii) - (Continued)

Commodity	Labour ARs		
	0.9	0.75	0.5
43 Perfumes & Cosmetics	-2.6910	-2.6198	-2.4852
44 Paints & Varnishes	0.1697	0.1839	0.2086
45 Soaps & Detergents	0.1952	0.2137	0.2455
46 Chemicals	0.2482	0.2844	0.3468
47 Plastic Products	0.3061	0.3520	0.4304
48 Petroleum Products	0.0628	0.0767	0.1006
49 Cement	0.2833	0.3271	0.4002
50 Glass & Products	-1.1403	-1.0384	-0.8582
51 Non-Met. Mineral Products	0.1508	0.1792	0.2273
52 Basic Metals	0.0768	0.1088	0.1651
53 Metal Products	0.1959	0.2564	0.3614
54 Iron & Steel Remg	-0.0000	0.0000	-0.0000
55 Agricultural Machinery	0.1569	0.1735	0.2018
56 Other Non-electric Machinery	0.2567	0.2873	0.3393
57 Electric Machinery	0.1221	0.1453	0.1845
58 Bicycles	0.0000	0.0000	0.0000
59 Transport Large-scale	-0.0507	-0.0290	0.0080
60 Shipbuilding	0.0000	0.0000	0.0000
61 Transport Equipment Small-scale	0.2104	0.2445	0.3017
62 Office Equipment	0.2541	0.2765	0.3146
63 Sports Goods	0.2925	0.3183	0.3612
64 Surgical Instruments	0.4397	0.4852	0.5611
65 Other Large-scale Manufacturing	0.5397	0.5697	0.6197
66 Other Small-scale Manufacturing	0.0000	0.0000	0.0000
67 Low-cost Residential Buildings	0.0000	0.0000	0.0000
68 Luxurious Residential Buildings	0.0000	0.0000	0.0000
69 Rural Buildings	0.0000	0.0000	0.0000
70 Factory Buildings	0.0000	0.0000	0.0000
71 Public Buildings	0.0000	0.0000	0.0000
72 Roads	0.0000	0.0000	0.0000
73 Infrastructure	0.0000	0.0000	0.0000
74 Ownership of Dwellings	0.0000	0.0000	0.0000
75 Electricity	0.0000	0.0000	0.0000
76 Gas	0.0000	0.0000	0.0000
77 Wholesale & Retail Trade	0.0000	0.0000	0.0000
78 Road Transport	0.0000	0.0000	0.0000
79 Rail Transport	0.0000	0.0000	0.0000
80 Air Transport	0.0000	0.0000	0.0000
81 Water Transport	0.0000	0.0000	0.0000
82 Television	0.0000	0.0000	0.0000
83 Radio	0.0000	0.0000	0.0000
84 Phone, Telegraph & Post	0.0000	0.0000	0.0000
85 Banking & Insurance	0.0000	0.0000	0.0000
86 Government	0.0000	0.0000	0.0000
87 Services	0.0000	0.0000	0.0000

Table 4(iii)

Case A: Social Profitability with an Asset AR of 0.25

Commodity	Labour ARs		
	0.9	0.75	0.5
01 Wheat	0.4122	0.4483	0.5095
02 Rice	0.2998	0.3493	0.4318
03 Cotton	0.4915	0.5321	0.5998
04 Sugar-cane	0.0000	0.0000	0.0000
05 Tobacco Growing	-0.0006	0.0790	0.2167
06 Oilseeds	-0.0944	-0.0269	0.0895
07 Pulses	0.0000	0.0000	0.0000
08 Other Crops	-0.3101	-0.2266	-0.0808
09 Livestock	0.2520	0.3023	0.3870
10 Fishing	0.2842	0.3579	0.4808
11 Forestry	0.0000	0.0000	0.0000
12 Mining and Quarrying	0.2387	0.3069	0.4234
13 Grain Milling	0.0000	0.0000	0.0000
14 Rice Milling and Husking	0.0000	0.0000	0.0000
15 Edible Oils	0.1371	0.1515	0.1762
16. Sugar Refining	0.2682	0.3308	0.4395
17 Gur and <i>Khandsari</i>	0.0000	0.0000	0.0000
18 Tea Blending	0.2166	0.2324	0.2589
19 Fish and Preparations	0.1691	0.1900	0.2250
20 Confectionery and Bakery	0.0000	0.0000	0.0000
21 Other Food Industries	0.3418	0.3876	0.4639
22 Beverages	-1.9866	-2.0197	-2.0990
23 Cigarettes & Tobacco Products (Large-scale)	0.7026	0.7195	0.7476
24 Bidis (i.e. Tobacco SS)	0.0000	0.0000	0.0000
25 Cotton Yarn	0.0507	0.0781	0.1238
26 Cotton Ginning	0.0000	0.0000	0.0000
27 Cotton Textiles (Large-scale)	0.0685	0.1043	0.1638
28 Cotton Textiles (Small-scale)	0.1872	0.2162	0.2645
29 Silk & Synthetic Textiles	-0.2949	-0.2576	-0.1910
30 Woollen Textiles & Hosiery	-0.3448	-0.3136	-0.2575
31 Threadballs & other Textiles	-0.1208	-0.0902	-0.0361
32 Carpets and Rugs	0.4122	0.4457	0.5016
33 Made-up Garments	0.3136	0.3372	0.3764
34 Footwear (non-rubber)	0.2093	0.2453	0.3052
35 Wood, Cork & Furniture	0.3644	0.4194	0.5112
36 Paper & Products	0.1941	0.2384	0.3173
37 Printing & Publishing	0.0000	0.0000	0.0000
38 Leather & Products	0.3311	0.3430	0.3627
39 Rubber Footwear	0.3183	0.3648	0.4422
40 Rubber Products	-0.0092	0.0299	0.0997
41 Pharmaceutical	0.3082	0.3291	0.3649
42 Fertilizer	0.3361	0.3692	0.4268
43 Perfumes & Cosmetics	-2.5805	-2.5028	-2.3555

Continued -

Table 4(iii) - (Continued)

Commodity	Labour ARs		
	0.9	0.75	0.5
44 Paints and Varnishes	0.2056	0.2204	0.2460
45 Soaps and Detergents	0.2270	0.2460	0.2785
46 Chemicals	0.3107	0.3478	0.4118
47 Plastic Products	0.3404	0.3868	0.4660
48 Petroleum Products	0.0944	0.1087	0.1334
49 Cement	0.3935	0.4373	0.5104
50 Glass and Products	-0.9693	-0.8626	-0.6738
51 Non-metal Mineral Products	0.1798	0.2085	0.2572
52 Basic Metals	0.1280	0.1613	0.2200
53 Metal Products	0.2314	0.2928	0.3994
54 Iron & Steel Remg	0.0000	0.0000	0.0000
55 Agricultural Machinery	0.1862	0.2031	0.2317
56 Other Non-electric Machinery	0.2964	0.3273	0.3799
57 Electric Machinery	0.1573	0.1808	0.2206
58 Bicycles	0.0000	0.0000	0.0000
59 Transport Equipments (Large-scale)	-0.0115	0.0108	0.0487
60 Shipbuilding	0.0000	0.0000	0.0000
61 Transport Equipments (Small-scale)	0.2357	0.2698	0.3272
62 Office Equipments	0.2900	0.3127	0.3515
63 Sports Goods	0.3221	0.3478	0.3907
64 Surgical Instruments	0.4730	0.5185	0.5944
65 Other Large-scale Manufacturing	0.5700	0.6000	0.6500
66 Other Small-scale Manufacturing	0.0000	0.0000	0.0000
67 Low-cost Residential Buildings	0.0000	0.0000	0.0000
68 Luxurious Residential Buildings	0.0000	0.0000	0.0000
69 Rural Buildings	0.0000	0.0000	0.0000
70 Factory Buildings	0.0000	0.0000	0.0000
71 Public Buildings	0.0000	0.0000	0.0000
72 Roads	0.0000	0.0000	0.0000
73 Infrastructure	0.0000	0.0000	0.0000
74 Ownership of Dwellings	0.0000	0.0000	0.0000
75 Electricity	0.0000	0.0000	0.0000
76 Gas	0.0000	0.0000	0.0000
77 Wholesale & Retail Trade	0.0000	0.0000	0.0000
78 Road Transport	0.0000	0.0000	0.0000
79 Rail Transport	0.0000	0.0000	0.0000
80 Air Transport	0.0000	0.0000	0.0000
81 Water Transport	0.0000	0.0000	0.0000
82 Television	0.0000	0.0000	0.0000
83 Radio	0.0000	0.0000	0.0000
84 Phone, Telegraph & Post	0.0000	0.0000	0.0000
85 Banking & Insurance	0.0000	0.0000	0.0000
86 Government	0.0000	0.0000	0.0000
87 Services	0.0000	0.0000	0.0000

fall in the AR of (9) 'livestock' which is its major input. The same is true for (48) 'petroleum products' due to the reclassification of (12) 'mining and quarrying'. Other changes are relatively insignificant.

Moving from Case A to Case C, when more sectors are treated as non-traded, those manufacturing activities reclassified as non-traded go to zero by definition. There is no effect of any significance on the social profitability of the agricultural sectors reflecting the fact that manufactures, on the whole, are not important inputs into agricultural activities. However, some manufacturing activities, whose classification between traded and non-traded does not change, exhibit changes in social profitability due to the reclassification of inputs. Table 5 below presents these changes. (These results are for a labour SCF of 0.89 and an asset SCF of 0.75.)

Table 5
Change in Social Profitability for Selected Manufacturing Sectors
on Decreasing the Number of Tradeable Sectors (A to C)

Sector	Change in Social Profitability	Input Sector (Sign of AR Change)
(22) Beverages	+0.106	(16) Sugar Refining (-)
(32) Carpets & Rugs	-0.060	(30) Woollen Textiles (+)
(44) Paints & Varnishes	+0.106	(46) Chemicals (-)
(50) Glass & Products	+0.070	(46) Chemicals (-)

It is also interesting to compare the social profitability presented above with commercial profitability (Table 6) as reflected by the residual. Again we concentrate on Case A for labour SCF of 0.9 and asset SCF of 0.75. Notice that the residual is calculated as value added less assumed wage and asset costs.

These results suggest that there is a substantial difference between social and commercial profitability and that these differences vary across sectors. However, as we have seen above, the social profitability of some sectors is not sensitive to the SCFs chosen.

For the results presented above we have valued the residual at zero, thus treating it as a transfer with no social cost. The analysis was repeated with the residual valued at 0.8. This may be interpreted as assuming that profits have a social value of only 0.2 so that a unit of profit received has a social cost of 0.8. The social profitability of only three sectors exhibits sign changes: (27) 'cotton textiles' from -0.03 to +0.02; (36) 'paper and products' from +0.06 to -0.03; (48) 'petroleum products' from +0.03 to -0.01. Social profitability of the sectors does not in general differ with respect to changes in the valuation of the residual.

Table 6
Social Profitability and Commercial Profitability

Sector	Social Profitability	Commercial Profitability
(05) Tobacco Growing	-0.02	+0.13
(06) Oilseeds	-0.12	+0.10
(08) Other Crops	-0.33	+0.10
(15) Edible Oils	+0.07	-0.04
(22) Beverages	-2.16	+0.08
(25) Cotton Yarn	-0.05	+0.07
(30) Woollen Textiles	-0.23	+0.02
(39) Rubber Footwear	+0.24	-0.04
(40) Rubber Products	-0.11	+0.02
(41) Pharmaceuticals	+0.24	-0.02
(44) Paints and Varnishes	+0.13	-0.05
(45) Soaps and Detergents	+0.16	-0.01
(55) Agricultural Machinery	+0.13	-0.03
(57) Electrical Machinery	+0.09	-0.01
(59) Transport (LS)	-0.09	+0.08
(62) Office Equipment	+0.22	-0.09

4. POLICY AND FURTHER RESEARCH

We have presented calculations of a system of shadow prices which can be used in the appraisal of industrial, commercial and fiscal policy. We have used a reasonably disaggregated inter-industry transaction matrix at purchasers' prices. Alternative sets of shadow prices have been derived for different classifications of activities into traded, non-traded and valuations of factors of production. The broad-ranging set of calculations encompasses several plausible models for commercial policy, labour market and growth possibilities.

Despite the broad range of the sensitivity tests, there are a number of reforms suggested by the analysis that would appear desirable under most of the configurations considered. Thus on the basis of these calculations one might recommend, for instance, that the 'fertilizer' sector be expanded. The social profitabilities indicate the following general directions for industrial and commercial policy. In general, the agricultural sectors are socially profitable, especially sectors (1) 'wheat' and (3) 'cotton'. Given stable world prices, domestic policy should be directed towards increased production in these areas. Although (8) 'other crops' is socially unprofitable throughout, one must be careful in deriving policy conclusions, given the level

of aggregation of this sector, since individual crops within the classification may be socially profitable. For the most part, manufacturing activities proved socially profitable, especially those classified as exported on the margin, e.g. (64) 'surgical instruments' and (63) 'sports goods'. The textile sectors such as cotton and carpets and rugs also exhibit relatively high social returns. Sectors such as (29) 'silk and synthetic textiles' and (30) 'woollen textiles' are socially unprofitable throughout and 'perfumes and cosmetics' and 'beverages' did not appear to be sectors that should be encouraged greatly.

Notwithstanding the social profitability of 'traditional' sectors, our estimates also point to basic and heavy industry as desirable activities across a wide range of possible valuations of labour and assets. A number of items in Pakistan are subject to high tariff and non-tariff barriers, with the ratio of c.i.f. to domestic prices being as low as 0.12 for (43) "perfumes and cosmetics", or around 0.75 for basic metals and machinery sectors. However, accounting ratios for such sectors are somewhat, though not much, higher, since allowance must be made for trade and transport margins. There is, thus, a supposition that such sectors are heavily protected and are 'inefficient'. However, several sectors are socially profitable and one would point to cement and the basic metals and machinery sectors as examples of non-traditional activities that are socially profitable and that should be encouraged. This is because such sectors use inputs that are also heavily taxed, and which have low accounting ratios. As a result, this leads to overall results in social profitability for some 'protected' sectors.

It is important to note that economy-wide shadow prices are at the broad sectoral level but can feed into more detailed analyses of industries within a given sector or at the project level. Other extensions should include an examination of potential changes and the stability of the shadow prices, since policies and international context are both subject to many vagaries. We will use the shadow prices along with the welfare consequences of policy changes in the analysis of the reform along the lines of Ahmad and Stern (1986).

Appendix Table 1(i)
Accounting Ratios for Exportables

Commodity	Value of Exports (Rs Million)	Export Tax (Rs Million)	Accounting Ratio
Rice	2479.1	241.2	1.1078
Cotton (Raw)	980.5	330.0	1.5073
Leather	595.5	80.0	1.1551
Cotton Waste	1422.3	10.0	1.0071

Source: FBS (1983).

- Notes: 1. The ARs for all other exportables is one.
2. The exportables are those tradeables which are not importables – see Table 2 and Appendix Table 1(ii) and (iii).

Appendix Table 1(ii)

ARs for Importables Case A
(Asset SCF = 0.75)

	Commodity	p_i^{cif}	Labour		
			0.9	0.75	0.50
1	01 Wheat	1.3034	1.3821	1.3738	1.3599
2	05 Tobacco Growing	0.6573	0.7365	0.7268	0.7106
3	06 Oilseeds	0.6456	0.7155	0.7065	0.6914
4	08 Other Crops	0.4966	0.5757	0.5660	0.5498
5	09 Livestock	0.9435	0.9818	0.9778	0.9709
6	12 Mining & Quarrying	0.8713	0.9408	0.9327	0.9192
7	15 Edible Oils	0.8859	0.9562	0.9471	0.9320
8	16 Sugar Refining	0.5716	0.6445	0.6350	0.6191
9	18 Tea Blending	0.9185	0.9494	0.9454	0.9388
10	22 Beverages	0.0203	0.1699	0.1521	0.1225
11	29 Silk & Synthetic Textiles	0.4147	0.5147	0.5018	0.4804
12	30 Woollen Textiles & Hosiery	0.4405	0.5625	0.5468	0.5207
13	31 Other Textiles	0.5339	0.6379	0.6245	0.6023
14	35 Wood, Cork & Furniture	0.9845	0.9865	0.9863	0.9862
15	36 Paper & Products	0.5725	0.6935	0.6773	0.6504
16	40 Rubber Products	0.5463	0.6743	0.6582	0.6313
17	41 Pharmaceutical	0.8686	0.9517	0.9414	0.9242
18	42 Fertilizer	0.7656	0.9451	0.9305	0.9063
19	43 Perfumes & Cosmetics	0.1168	0.1802	0.1723	0.1592
20	44 Paints & Varnishes	0.6942	0.7770	0.7667	0.7495
21	45 Soaps & Detergents	0.8749	0.9577	0.9474	0.9302
22	46 Chemicals	0.7485	0.8308	0.8206	0.8036
23	47 Plastic Products	0.8498	0.9218	0.9136	0.8998
24	48 Petroleum Products	0.8028	0.9021	0.8909	0.8722
25	50 Glass & Products	0.3091	0.3804	0.3722	0.3585
26	51 Non-metal Mineral Products	0.8647	0.9654	0.9589	0.9479
27	52 Basic Metals	0.6079	0.7623	0.7470	0.7216
28	53 Metal Products	0.7636	0.8824	0.8694	0.8479
29	55 Agricultural Machinery	0.8867	0.9708	0.9648	0.9548
30	56 Other Non-electric Machinery	0.7716	0.8495	0.8441	0.8352
31	57 Electric Machinery	0.7491	0.8231	0.8180	0.8095
32	59 Transport (Large-scale)	0.5926	0.6774	0.6716	0.6619
33	61 Transport Equipments (Small-scale)	0.9631	0.9876	0.9847	0.9799
34	62 Office Equipments	0.8945	0.9659	0.9576	0.9440

Appendix Table 1(iii)

ARs for Importables Case C

	Commodity	Labour		
		0.9	0.75	0.5
1	01 Wheat	1.3820	1.3734	1.3589
2	05 Tobacco Growing	0.7364	0.7265	0.7100
3	06 Oilseeds	0.7155	0.7064	0.6911
4	08 Other Crops	0.5757	0.5658	0.5493
5	09 Livestock	0.9818	0.9775	0.9705
6	12 Mining & Quarrying	0.9407	0.9325	0.9188
7	15 Edible Oils	0.9561	0.9469	0.9316
8	22 Beverages	0.1697	0.1516	0.1214
9	31 Other Textiles	0.6378	0.6243	0.6018
10	42 Fertilizer	0.9447	0.9292	0.9034
11	44 Paints & Varnishes	0.7769	0.7665	0.7491
12	45 Soaps & Detergents	0.9576	0.9472	0.9298
13	47 Plastic Products	0.9217	0.9133	0.8991
14	50 Glass & Products	0.3803	0.3719	0.3579
15	51 Non-metal Mineral Products	0.9652	0.9577	0.9452
16	52 Basic Metals	0.7621	0.7461	0.7193
17	53 Metal Products	0.8822	0.8689	0.8466
18	55 Agricultural Machinery	0.9706	0.9640	0.9528
19	56 Other Non-electric Machinery	0.8493	0.8433	0.8332
20	57 Electric Machinery	0.8229	0.8173	0.8080

Appendix Table 2
Value of Imports and c.i.f. Values

(Rs '000)

Commodity	c.i.f. Values	Value at Purchaser Price	p_i^{cif}
1 01 Wheat	2992595.1	2296062.0	1.3034
2 02 Rice	37.2	49.0	0.7584
3 03 Cotton	0.0	0.0	0.8177
4 04 Sugar-cane	0.0	0.0	0.8174
5 05 Tobacco Growing	17468.4	26574.0	0.6573
6 06 Oilseeds	50504.7	78225.0	0.6456
7 07 Pulses	0.0	0.0	0.8824
8 08 Other Crops	271515.1	546751.0	0.4966
9 09 Livestock	4834.7	5124.0	0.9435
10 10 Fishing	0.0	0.0	0.8726
11 11 Forestry	93190.4	115446.0	0.8072
12 12 Mining & Quarrying	3461943.7	3973445.0	0.8713
13 13 Grain Milling	0.0	0.0	0.9503
14 14 Rice Milling & Husking	0.0	0.0	0.8058
15 15 Edible Oils	1825805.5	2061018.0	0.8859
16 16 Sugar Refining	3437.8	6014.0	0.5716
17 17 Gur and <i>Khandsari</i>	0.0	0.0	0.8862
18 18 Tea Blending	1583598.4	1724178.0	0.9185
19 19 Fish & Preparations	1276.9	1495.0	0.8541
20 20 Confectionery & Bakery	136.7	176.0	0.7767
21 21 Other Food Industries	594552.6	797763.0	0.7453
22 22 Beverages	251.5	12416.0	0.0203
23 23 Cigs. & Tobacco Products	16817.6	19060.0	0.8824
24 24 Bidis (i.e. Tobacco-SS)	0.0	0.0	0.8816
25 25 Cotton Yarn	40636.9	65113.0	0.6241
26 26 Cotton Ginning	45977.3	79329.0	0.5796
27 27 Cotton Textiles (Large-scale)	187028.0	301963.0	0.6194
28 28 Cotton Textiles (Small-scale)	0.0	0.0	0.8776
29 29 Silk & Synthetic Textiles	53605.5	129254.0	0.4147
30 30 Woollen Textiles & Hosiery	50225.0	114019.0	0.4405
31 31 Threadballs & Other Textiles	934925.4	1751184.0	0.5339
32 32 Carpets & Rugs	12806.3	14593.0	0.8776
33 33 Made-up Garments	5877.0	6018.0	0.9766
34 34 Footwear (non-rubber)	584.6	620.0	0.9430
35 35 Wood, Cork & Furniture	181627.0	184483.0	0.9845
36 36 Paper & Products	281851.7	492313.0	0.5725
37 37 Printing & Publishing	23073.7	33270.0	0.6935
38 38 Leather & Products	87441.8	91476.0	0.9559
39 39 Rubber Footwear	4.0	5.0	0.8051
40 40 Rubber Products	256594.5	469707.0	0.5463
41 41 Pharmaceutical	383390.9	441392.0	0.8686
42 42 Fertilizer	681405.3	890057.0	0.7656
43 43 Perfumes & Cosmetics	3758.2	32167.0	0.1168

Continued -

Appendix Table 2 - (Continued)

Commodity	c.i.f. Values	Value at Purchaser Price	p_i^{cif}
44 44 Paints & Varnishes	13628.3	19632.0	0.6942
45 45 Soaps & Detergents	17098.2	19544.0	0.8749
46 46 Chemicals	1255973.2	1678039.0	0.7485
47 47 Plastic Products	239096.9	281362.0	0.8498
48 48 Petroleum Products	4642386.5	5782756.0	0.8028
49 49 Cement	0.0	0.0	0.8474
50 50 Glass & Products	51507.4	166658.0	0.3091
51 51 Non-metal Mineral Products	189059.5	218654.0	0.8647
52 52 Basic Metals	1317511.0	2167368.0	0.6079
53 53 Metal Products	691465.4	905562.0	0.7636
54 54 Iron & Steel Remg	0.0	0.0	0.7833
55 55 Agricultural Machinery	661498.4	746050.0	0.8867
56 56 Other Non-electric Machinery	2287805.2	2964953.0	0.7716
57 57 Electric Machinery	1517298.1	2025417.0	0.7491
58 58 Bicycles	23533.1	26066.0	0.9028
59 59 Transport Large-scale	1345314.0	2270005.0	0.5926
60 60 Shipbuilding	130580.2	144635.0	0.9028
61 61 Transport Equipment Small-scale	0.0	0.0	0.9631
62 62 Office Equipment	104441.9	116757.0	0.8945
63 63 Sports Goods	6595.3	9727.0	0.6780
64 64 Surgical Instruments	21946.7	25247.0	0.8693
65 65 Other Large-scale Manufacturing	325253.9	473515.0	0.6869
66 66 Other Small-scale Manufacturing	0.0	0.0	0.9307
67 67 Low-cost Residential Buildings	0.0	0.0	1.0000
68 68 Luxurious Residential Buildings	0.0	0.0	1.0000
69 69 Rural Buildings	0.0	0.0	1.0000
70 70 Factory Buildings	0.0	0.0	1.0000
71 71 Public Buildings	0.0	0.0	1.0000
72 72 Roads	0.0	0.0	1.0000
73 73 Infrastructure	0.0	0.0	1.0000
74 74 Ownership of Dwellings	0.0	0.0	1.0000
75 75 Electricity	0.0	0.0	1.0000
76 76 Gas	0.0	0.0	0.9967
77 77 Wholesale & Retail Trade	0.0	0.0	0.9804
78 78 Road Transport	0.0	0.0	1.0000
79 79 Rail Transport	0.0	0.0	1.0000
80 80 Air Transport	0.0	0.0	1.0000
81 81 Water Transport	0.0	0.0	1.0000
82 82 Television	0.0	0.0	0.9731
83 83 Radio	0.0	0.0	0.9694
84 84 Phone, Telegraph & Post	0.0	0.0	0.9632
85 85 Banking & Insurance	0.0	0.0	0.9792
86 86 Government	0.0	0.0	0.9875
87 87 Services	0.0	0.0	0.9809

Note: The third column is the second divided by the first and represents p_i^{cif} the value of a unit of the importable at c.i.f. prices. Recall that units of goods are chosen so that purchaser prices are units.

Appendix Table 3
Breakdown of Value Added (% of Value Added)

Commodity	Labour	Capital	Residual	Value Added
1 01 Wheat	0.5000	0.0358	0.1642	0.5625
2 02 Rice	0.5000	0.0428	0.1572	0.4712
3 03 Cotton	0.5000	0.0350	0.1650	0.5758
4 04 Sugar-cane	0.5000	0.0305	0.1695	0.6616
5 05 Tobacco Growing	0.5000	0.0273	0.1727	0.7391
6 06 Oilseeds	0.5000	0.0335	0.1665	0.6012
7 07 Pulses	0.5000	0.0855	0.1145	0.2357
8 08 Other Crops	0.5000	0.0324	0.1676	0.6228
9 09 Livestock	0.5000	0.0355	0.1645	0.5684
10 10 Fishing	0.5000	0.0234	0.1766	0.8609
11 11 Forestry	0.5000	0.0255	0.1745	0.7904
12 12 Mining & Quarrying	0.5000	0.0628	0.1372	0.6378
13 13 Grain Milling	0.4428	1.2166	-0.6594	0.0756
14 14 Rice Milling & Husking	0.4959	0.9162	-0.4121	0.1004
15 15 Edible Oils	0.3458	1.1611	-0.5068	0.0792
16 16 Sugar Refining	0.2541	0.5838	0.1621	0.1575
17 17 Gur and <i>Khandsari</i>	0.5000	0.1902	0.3098	0.0871
18 18 Tea Blending	0.3248	0.5291	0.1461	0.1738
19 19 Fish & Preparations	0.2547	0.6296	0.1157	0.1460
20 20 Confectionery & Bakery	0.2972	0.5097	0.1930	0.1804
21 21 Other Food Industries	0.4090	0.2659	0.3252	0.3459
22 22 Beverages	0.4851	0.2685	0.2464	0.3425
23 23 Cigarettes & Tobacco Products	0.2012	0.6661	0.1327	0.1380
24 24 Bidis (i.e. Tobacco-SS)	0.5000	0.0502	0.4498	0.3297
25 25 Cotton Yarn	0.3673	0.3674	0.2653	0.2503
26 26 Cotton Ginning	0.1514	1.0495	-0.2009	0.0876
27 27 Cotton Textiles (Large-scale)	0.7376	0.4386	-0.1762	0.2097
28 28 Cotton Textiles (Small-scale)	0.5000	0.0728	0.4272	0.2275
29 29 Silk & Synthetic Textiles	0.5535	0.6343	-0.1878	0.1450
30 30 Woollen Textiles & Hosiery	0.4635	0.4329	0.1036	0.2124
31 31 Threadballs & Other Textiles	0.3622	0.3905	0.2472	0.2355
32 32 Carpets & Rugs	0.4369	0.2897	0.2734	0.3174
33 33 Made-up Garments	0.2789	0.2444	0.4768	0.3763
34 34 Footwear (non-rubber)	0.4960	0.2504	0.2536	0.3672
35 35 Wood, Cork & Furniture	0.4706	0.2399	0.2895	0.3833
36 36 Paper & Products	0.3063	0.3217	0.3720	0.2858
37 37 Printing & Publishing	0.3104	0.3373	0.3523	0.2726
38 38 Leather & Products	0.1682	0.4590	0.3729	0.2004
39 39 Rubber Footwear	0.4913	0.9115	-0.4027	0.1009
40 40 Rubber Products	0.2833	0.5707	0.1460	0.1611
41 41 Pharmaceutical	0.2785	0.8719	-0.1503	0.1055
42 42 Fertilizer	0.1746	0.2818	0.5436	0.3263
43 43 Perfumes & Cosmetics	1.1219	0.6254	-0.7473	0.1470

Continued -

Appendix Table 3 - (Continued)

Commodity	Labour	Capital	Residual	Value Added
44 44 Paints & Varnishes	0.1111	2.2353	-1.3464	0.0411
45 45 Soaps & Detergents	0.3283	0.7046	-0.0329	0.1305
46 46 Chemicals	0.3218	0.2898	0.3884	0.3173
47 47 Plastic Products	0.4445	0.2399	0.3156	0.3834
48 48 Petroleum Products	0.1743	0.6105	0.2152	0.1506
49 49 Cement	0.4311	0.4403	0.1286	0.2089
50 50 Glass & Products	1.7755	0.7902	-1.5657	0.1164
51 51 Non-metal Mineral Products	0.5023	0.3403	0.1574	0.2702
52 52 Basic Metals	0.3557	0.5126	0.1316	0.1794
53 53 Metal Products	0.6196	0.2177	0.1627	0.4224
54 54 Iron & Steel Remg	0.5000	0.0347	0.4653	0.4772
55 55 Agricultural Machinery	0.4263	0.9338	-0.3601	0.0985
56 56 Other Non-electric Machinery	0.2393	0.2637	0.4970	0.3488
57 57 Electric Machinery	0.4483	0.5949	-0.0432	0.1546
58 58 Bicycles	0.2897	0.4623	0.2479	0.1989
59 59 Transport (Large-scale)	0.2627	0.3957	0.3417	0.2324
60 60 Shipbuilding	0.3321	0.2010	0.4669	0.4575
61 61 Transport Equipment (SS) (Small-scale)	0.5000	0.2343	0.2657	0.3925
62 62 Office Equipment	1.0701	1.8286	-1.8987	0.0503
63 63 Sports Goods	0.2196	0.2442	0.5362	0.3766
64 64 Surgical Instruments	0.3305	0.1742	0.4953	0.5278
65 65 Other Large-scale Manufacturing	0.1679	0.1634	0.6687	0.5629
66 66 Other Small-scale Manufacturing	0.5000	0.0479	0.4521	0.3459
67 67 Low-cost Residential Buildings	0.6000	0.0108	0.3892	0.4366
68 68 Luxurious Residential Buildings	0.6000	0.0118	0.3882	0.3997
69 69 Rural Buildings	0.6000	0.0094	0.3906	0.5000
70 70 Factory Buildings	0.6000	0.0116	0.3884	0.4036
71 71 Public Buildings	0.6000	0.0110	0.3890	0.4258
72 72 Roads	0.6000	0.0085	0.3915	0.5549
73 73 Infrastructure	0.6000	1.2007	-0.8007	0.4165
74 74 Ownership of Dwelling	0.6000	0.2556	0.1444	0.8997
75 75 Electricity	0.6000	1.8999	-1.4999	0.7671
76 76 Gas	0.6000	1.7862	-1.3862	0.8159
77 77 Wholesale & Retail Trade	0.6000	0.1134	0.2866	0.9449
78 78 Road Transport	0.6000	0.1825	0.2175	0.3157
79 79 Rail Transport	0.6000	0.7169	-0.3169	0.5510
80 80 Air Transport	0.6000	0.1408	0.2592	0.4092
81 81 Water Transport	0.6000	0.0703	0.3297	0.8198
82 82 Television	0.6000	0.1076	0.2924	0.5354
83 83 Radio	0.6000	0.0751	0.3249	0.7669
84 84 Phone, Telegraph & Post	0.6000	0.3891	0.0109	0.8055
85 85 Banking & Insurance	0.6000	0.0376	-0.3624	0.7285
86 86 Government	0.6000	0.5082	-0.1082	0.5342
87 87 Services	0.6000	0.1119	0.2881	0.9581

Notes: 1. This value-added coefficient is as a percentage of gross output.
2. For agricultural goods land is regarded as contributing 0.5 of value added.

Appendix Table 4(i)

Case A: Non-traded ARs (Asset SCF = 0.75)

Commodity	Labour		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7532	0.6833	0.5669
2 07 Pulses	0.8870	0.8511	0.7913
3 11 Forestry	0.7239	0.6479	0.5211
4 13 Grain Milling	1.3168	1.3003	1.2728
5 14 Rice Milling & Husking	1.0503	1.0310	0.9989
6 17 Gur and <i>Khandsari</i>	0.7272	0.6549	0.5344
7 20 Confectionery & Bakery	0.7554	0.7221	0.6666
8 24 Bidis (i.e. Tobacco-SS)	0.6028	0.5456	0.4504
9 26 Cotton Ginning	1.3572	1.3478	1.3322
10 37 Printing & Publishing	0.6540	0.6114	0.5404
11 54 Iron & Steel Remg	0.5907	0.5189	0.3992
12 58 Bicycles	0.7707	0.7474	0.7086
13 60 Shipbuilding	0.8575	0.8179	0.7520
14 66 Other Small-scale Manufacturing	0.6075	0.5664	0.4979
15 67 Low-cost Residential Buildings	0.7586	0.7114	0.6327
16 68 Luxurious Residential Buildings	0.7361	0.6869	0.6050
17 69 Rural Buildings	0.7175	0.6585	0.5601
18 70 Factory Buildings	0.7349	0.6883	0.6106
19 71 Public Buildings	0.7219	0.6695	0.5824
20 72 Roads	0.7321	0.6793	0.5913
21 73 Infrastructure	1.1055	1.0556	0.9725
22 74 Ownership of Dwellings	0.7329	0.6476	0.5054
23 75 Electricity	1.7579	1.6825	1.5568
24 76 Gas	1.7071	1.6311	1.5044
25 77 Wholesale & Retail Trade	0.6330	0.5441	0.3960
26 78 Road Transport	0.7499	0.7046	0.6290
27 79 Rail Transport	0.9674	0.9114	0.8183
28 80 Air Transport	0.7170	0.6567	0.5563
29 81 Water Transport	0.6352	0.5527	0.4151
30 82 Television	0.7527	0.6955	0.6003
31 83 Radio	0.6769	0.5954	0.4595
32 84 Phone, Telegraph & Post	0.8203	0.7375	0.5996
33 85 Banking & Insurance	0.6528	0.5719	0.4369
34 86 Government	0.8379	0.7582	0.6253
35 87 Services	0.6330	0.5444	0.3967

Appendix Table 4(ii)

Case A: Non-traded ARs (Asset SCF = 0.5)

Commodity	Labour		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7386	0.6687	0.5523
2 07 Pulses	0.8705	0.8346	0.7749
3 11 Forestry	0.7127	0.6366	0.5099
4 13 Grain Milling	1.2846	1.2681	1.2406
5 14 Rice Milling & Husking	1.0141	0.9949	0.9627
6 17 Gur and <i>Khandsari</i>	0.7075	0.6351	0.5146
7 20 Confectionery & Bakery	0.7160	0.6827	0.6273
8 24 Bidis (i.e. Tobacco-SS)	0.5889	0.5317	0.4364
9 26 Cotton Ginning	1.3301	1.3208	1.3052
10 37 Printing & Publishing	0.6178	0.5752	0.5041
11 54 Iron & Steel Remg	0.5674	0.4956	0.3760
12 58 Bicycles	0.7381	0.7148	0.6760
13 60 Shipbuilding	0.8196	0.7800	0.7141
14 66 Other Small-scale Manufacturing	0.5972	0.5561	0.4876
15 67 Low-cost Residential Buildings	0.7545	0.7073	0.6286
16 68 Luxurious Residential Buildings	0.7293	0.6801	0.5981
17 69 Rural Buildings	0.7115	0.6524	0.5540
18 70 Factory Buildings	0.7301	0.6835	0.6058
19 71 Public Buildings	0.7147	0.6624	0.5752
20 72 Roads	0.7295	0.6767	0.5888
21 73 Infrastructure	0.9722	0.9223	0.8392
22 74 Ownership of Dwellings	0.6749	0.5896	0.4473
23 75 Electricity	1.3735	1.2981	1.1724
24 76 Gas	1.3399	1.2639	1.1372
25 77 Wholesale & Retail Trade	0.6032	0.5143	0.3662
26 78 Road Transport	0.7263	0.6809	0.6053
27 79 Rail Transport	0.8659	0.8100	0.7169
28 80 Air Transport	0.6886	0.6283	0.5279
29 81 Water Transport	0.6135	0.5309	0.3933
30 82 Television	0.7287	0.6715	0.5763
31 83 Radio	0.6393	0.5578	0.4219
32 84 Phone, Telegraph & Post	0.7331	0.6503	0.5124
33 85 Banking & Insurance	0.6251	0.5441	0.4092
34 86 Government	0.7494	0.6696	0.5367
35 87 Services	0.6033	0.5147	0.3671

Appendix Table 4(iii)

Case A: Non-traded ARs to Accounting

(Asset SCF = 0.25)

Commodity	Labour		
	0.9	0.75	0.5
1 04 Sugar-cane	0.7240	0.6541	0.5377
2 07 Pulses	0.8540	0.8181	0.7584
3 11 Forestry	0.7015	0.6254	0.4987
4 13 Grain Milling	1.2523	1.2358	1.2083
5 14 Rice Milling & Husking	0.9780	0.9587	0.9266
6 17 Gur and Khandsari	0.6877	0.6154	0.4948
7 20 Confectionery & Bakery	0.6767	0.6434	0.5879
8 24 Bidis (i.e. Tobacco-SS)	0.5749	0.5177	0.4224
9 26 Cotton Ginning	1.3031	1.2937	1.2782
10 37 Printing & Publishing	0.5815	0.5389	0.4679
11 54 Iron & Steel Remg	0.5441	0.4723	0.3527
12 58 Bicycles	0.7055	0.6822	0.6434
13 60 Shipbuilding	0.7817	0.7422	0.6762
14 66 Other Small-scale Manufacturing	0.5870	0.5459	0.4774
15 67 Low-cost Residential Buildings	0.7505	0.7033	0.6246
16 68 Luxurious Residential Buildings	0.7224	0.6733	0.5913
17 69 Rural Buildings	0.7055	0.6464	0.5480
18 70 Factory Buildings	0.7254	0.6787	0.6010
19 71 Public Buildings	0.7075	0.6552	0.5680
20 72 Roads	0.7269	0.6741	0.5862
21 73 Infrastructure	0.8389	0.7890	0.7059
22 74 Ownership of Dwellings	0.6169	0.5315	0.3893
23 75 Electricity	0.9892	0.9137	0.7880
24 76 Gas	0.9727	0.8967	0.7700
25 77 Wholesale & Retail Trade	0.5734	0.4845	0.3363
26 78 Road Transport	0.7026	0.6572	0.5816
27 79 Rail Transport	0.7645	0.7086	0.6155
28 80 Air Transport	0.6602	0.5999	0.4995
29 81 Water Transport	0.5917	0.5092	0.3716
30 82 Television	0.7047	0.6475	0.5523
31 83 Radio	0.6017	0.5201	0.3842
32 84 Phone, Telegraph & Post	0.6458	0.5631	0.4252
33 85 Banking & Insurance	0.5973	0.5164	0.3814
34 86 Government	0.6608	0.5810	0.4481
35 87 Services	0.5737	0.4851	0.3374

REFERENCES

- Ahmad, S. E., and N. H. Stern (1984). "The Theory of Reform and Indian Indirect Taxes". *Journal of Public Economics*. Vol. 25, No. 3. pp. 259-298.
- Ahmad, S. E., and N. H. Stern (1986). "Tax Reform for Pakistan: Overview and Effective Taxes for 1975-76". *Pakistan Development Review*. Vol. XXV, No. 1. Spring. pp. 43-72.
- Ahmad, S. E., and N. H. Stern. *Tax Reform and Development*. New York: Cambridge University Press. (Forthcoming)
- Dasgupta, P., S. Marglin and A. K. Sen (1972). *Guidelines for Project Evaluation*. New York: UNIDO.
- Dervis, D., J. De Melo and S. Robinson (1982). *General Equilibrium Models for Development Policy*. New York: Cambridge University Press.
- Diamond P. A., and J. A. Mirrlees (1976). "Private Constant Returns and Public Shadow Prices". *Review of Economic Studies*. pp. 41-48.
- Drèze, J. P., and N. H. Stern (1987). "The Theory of Cost-benefit Analysis". In A. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics*. Volume II. North-Holland.
- Government of Pakistan. Federal Bureau of Statistics (1983). *Ten Years of Pakistan Statistics 1972-82*. Karachi.
- Government of Pakistan. Federal Bureau of Statistics (1982). *National Accounts of Pakistan (Product and Expenditure)*. Karachi.
- Government of Pakistan. Ministry of Finance (1976). *Explanatory Memorandum on the Budget 1976-77*. Islamabad.
- Khan, S. R. (1974). "An Estimation of the Shadow Wage Rate in Pakistan". *Pakistan Development Review*. Vol. XIII. pp. 389-408.
- Little, I. M. D., and J. A. Mirrlees (1974). *Project Appraisal and Planning for Developing Countries*. London: Heinemann.
- Naqvi, Syed Nawab Haider, and A. R. Kemal (1983). *The Structure of Protection in Pakistan: 1980-81*. Islamabad: Pakistan Institute of Development Economics.
- Pakistan Institute of Development Economics (1985). "Final P.I.D.E. Input-Output Table of Pakistan's Economy: 1975-76". Islamabad. (Research Reports Series No. 139)
- Squire, L., I. M. D. Little and M. Durdag (1979). "Shadow Pricing and Macroeconomic Analysis: Some Illustrations from Pakistan". *Pakistan Development Review*. Vol. XVIII, No. 2. pp. 89-112.
- Stern, N. H. (1984). "Optimum Taxation and Tax Policy". *International Monetary Fund Staff Papers*. Vol. 31, No. 2. pp. 339-378.