The Pakistan Development Review
Vol. XXV, No. 4 (Winter 1986)

Social Rates of Return in Pakistan's Large-scale Manufacturing Sector

SHAMIM A. SAHIBZADA and MIR ANNICE MAHMOOD*

I. INTRODUCTION

The paper attempts to estimate social rates of return in Pakistan's large-scale manufacturing sector. As cut-off rates, they can help in the selection of public and private sector projects and can also be used as estimates of the Accounting Rate of Interest (ARI) which can then be used as test discount rates in the economic analysis of projects. In the context of Pakistan, our study makes an important contribution in that whereas the discount rates hitherto used in the country for an economic appraisal of projects have all been determined arbitrarily,[1] we, in this study provide first ever rates that have been arrived at empirically. For example, the discount rate used in both private and public sector investment projects for a considerable period of time was arbitrarily fixed at 12 percent. The reason given for choosing this estimate was that it was based on the rate used by lending institutions on the loans they advanced to various development-oriented agencies. The *Fifth Five Year Plan (1978–83)* raised this rate to 20 percent for the industrial projects which were to be undertaken in the public sector because it required this sector to generate more funds [9]. Also, during this period, it had been decided that a cut-off rate of 15 percent would be applicable to private-sector industrial projects because the private-sector investors complained that if the higher figure of 20 percent was used as a discount rate, then the Bruno Ratio, which measures the domestic cost of saving one unit of foreign exchange and also serves as a criterion of profitability, would decrease to such an extent that the project would become unprofitable.

In theory, the discount rate should reflect the marginal productivity of capital/ opportunity cost of investment in an economy. However, it is empirically difficult to estimate marginal returns to capital. One way to resolve this problem is to estimate the average rate of return on the assumption that average and marginal

*The authors are, respectively, Chief, Training Programme, and Research Economist at the Pakistan Institute of Development Economics, Islamabad. The authors would like to thank Prof. Ake Blomqvist for some very useful comments on an earlier draft.

[1]This piece of information was orally communicated to us by the Project Appraisal Section of the Govt. of Pakistan's Planning and Development Division. The various attempts [1; 2; 3; 11; 12; 13] made to calculate this rate have failed to draw any reaction – of acceptance or rejection – from the official circles.

returns are roughly equivalent. The social rate of return thus arrived at can serve as a good guide for the ARI/discount rate in project analysis. Squire and van der Tak [10] recommend two methods to estimate such a rate of return. One method is based on macro-level data.[2] It calculates the ratio of incremental net output to capital in the economy. The second method makes use of micro-level information. In this method, pre-tax profits, net of depreciation in the industrial sector, are used to estimate marginal productivity of capital. The second method is more reliable but as micro-level data were not available to us whereas macro-level data were, we, in this study, have used the first method:

As mentioned in footnote 1, several attempts were made earlier to estimate opportunity cost of investment in Pakistan, e.g. those by Zubair Khan [2], Shahrukh Rafi Khan [3], Stephen Guisinger [1], John Weiss [13] and the World Bank [11; 12]. This paper, in view of the availability of more recent data, attempts to provide a revised estimate. This is one objective of the paper. The other objective is to see how profitable manufacturing industry is for investment purposes. In this connection we would also determine if the social rates of return are near to the cut-off rates of 20 percent and 15 percent for public and private sector industrial projects respectively as recommended by both the Planning and Development Division and the Economic Co-ordination Committee of the Cabinet.

Section II discusses methodology and data while Section III surveys and estimates various adjustment ratios for converting market values of inputs and outputs into social values. Section IV presents both analysis of results and the conclusions drawn from the study.

II. METHODOLOGY AND DATA

Following a macro-level approach, we have based our estimates of social rates of return for 1981-82, the year for which the latest set of data are available, on the Census of Manufacturing Industries (CMI) for 1980-81 [7]. A similar macro-level was followed by Lal [4], who, basing his analysis on Little and Mirrlees [5], made use of the ratio of incremental net output to capital stock.

The CMI data provide information for Pakistan's large-scale manufacturing industries in both the public and private sectors. The data include information on capital stock, production costs, domestic output, employment, wages and inventories. All data are given in the market prices prevailing at the time of the Census.

From the data available, one can estimate net profit after subtracting production and wage costs from gross output, adjusted for any element of indirect taxation. The net profit thus derived is divided by the capital stock to get the rate of return. This rate of return is an average figure and is based on market prices. Now, if one

[2] For Method 1, see [2; 3; 4] and for Method 2, see [1].

makes the assumption that average investment opportunities reflect marginal investment opportunities, then the average rate of return can serve as a proxy for the marginal rate of return [4]. This expected rate of return is in respect of those funds which have been allocated to the manufacturing sector alone and does not refer to any other sector. This is because the rate that is calculated for the manufacturing sector may not be the same for non-manufacturing sectors.

The next step is to convert this marginal rate of return into a social rate of return by adjusting the market prices of inputs and outputs and then estimating the ratio of net profits to capital stock at border prices.

The items for which market prices are to be converted into border prices are categorized as follows:

1. *Traded Items*

   Fixed Assets, such as Plant and Machinery, and Transport Equipment; Other Fixed Assets, Working Capital; Raw Materials; Fuel, and Gross Output.

2. *Non-traded Items*

   Land and Buildings Electricity; Repairs and Maintenance; Other Production Costs and Depreciation.

3. *Skilled and Unskilled Labour*

   The salaried class is assumed to be skilled labour and is treated as tradeable. Wage-earners or production workers have been categorized as a special form of non-tradeables.

Our numeraire is border prices expressed in domestic currency at the official exchange-rate.

To allow for foreign-exchange premium, the economic value of the tradeables is obtained by converting the foreign-exchange price into its domestic currency equivalent at the official exchange rate Due to data constraints, the c.i.f. and f.o.b. prices of inputs and outputs cannot be obtained. Therefore, the market values of the tradeables in this study, which are taken directly from the CMI for 1980-81, are assumed to be approximately equal to border values but only after they have been adjusted for import duties and export taxes/subsidies. This adjustment has been made with the use of various deflators.

In the case of non-traded items, the premium on foreign exchange is allowed through a reduction in the prices of these items by multiplying them by appropriate conversion factors. When the market prices of non-traded items net of transfer payments are thought to be good estimates of opportunity costs, the market values are multiplied by the standard conversion factor to make them comparable to their

border price equivalents. When the market prices are not good estimates of opportunity costs, then the shadow price is first determined and that value is then multiplied by the standard conversion factor. We have done this for unskilled labour.

III. ADJUSTMENT RATIOS

Various types of adjustment ratios were used to convert market prices of inputs and outputs into their respective shadow prices. These included average tariff rates, standard conversion factor, shadow wage rates, and specific conversion factors for construction and electricity. Estimates of the average tariff rates were needed to adjust the values of tradeable items for import duties. The assumption here is that though the devaluation of the rupee in 1972 had sharply reduced its overvaluation in relation to foreign currency, industry is still heavily protected. Therefore, the market price values of various imported items such as machinery and raw materials on which custom duties are levied need to be adjusted to their border prices. These average tariff rates have been calculated by dividing the real effective exchange rate by the nominal effective exchange rate for the relevant year (Table 1), which in our study is 1980-81.

Table 1

Average Tariff Rates

Item	Real Effective Exchange Rate[1]	Nominal Effective Exchange Rate[2]	Average Tariff Rate (ATR) Col. 2/Col. 3	Conversion Factor (1/1+ATR)
(1)	(2)	(3)	(4)	(5)
Capital Goods	11.26	16.56	0.68	.59
Intermediate Goods	6.80	15.26	0.45	.69
Consumer Goods	11.06	19.24	0.57	.63
Overall Average	9.71	16.58	0.58	.63

[1] [8, Table 10. 25, p. 99].
[2] Economic Adviser's Wing, Finance Division, Government of Pakistan.

The effective exchange rates were for three categories of commodities, viz. consumer goods, intermediate goods and capital goods. The tariff rates that were calculated were 68 percent, 45 percent and 57 percent, respectively, for capital goods, intermediate goods, and consumer goods. The overall average tariff rate for the three categories is 58 percent.

Having obtained these rates, we adjusted the market price values of the following categories of inputs and outputs to their border price equivalent. In the Fixed Asset Category, the values of Machinery and Plant, Transport Equipment and Other Fixed Assets were deflated by the average tariff rate for capital goods. Working capital, which consists of inventory items, has been deflated by the overall average tariff rate (58 percent). Raw materials which are considered to be tradeables have been deflated by a 45-percent average tariff rate for intermediate goods, which included raw materials for both consumer and producer goods.

Fuel costs were adjusted by a factor of 1. This is because fuel consists largely of two items: petroleum-based products and natural gas. The former are heavily taxed, making their domestic price greater than the world price, while the latter, despite excise duties, is underpriced relative to its actual world price. Thus, to offset this imbalance between petroleum and natural gas prices, we decided to adjust fuel prices by a factor of 1.

The market prices of non-tradeable inputs were first shadow-priced where possible and then converted into their border price equivalents by the use of a standard conversion factor (SCF), since our numeraire is border price expressed in domestic currency. Weiss's estimate of .85 for the SCF which we are using in our study is based on a formula given in Squire and Van der Tak [10]. It can be defined as the reciprocal of one plus the premium on foreign exchange which Weiss calculated by taking the inverse of the Shadow Exchange Rate [13]. The same estimate of SCF has been used for adjusting market price values of Repairs and Maintenance, and other Production Costs to their border prices. Other estimates of SCF by the World Bank (.90) and the Planning Commission (.909) exist, but we chose the Weiss estimate because, with the data on the whole tending to be overestimated, a lower conversion factor appears to be more appropriate.

If depreciation is given separately for each asset category, it is possible to arrive at its market value by adding the depreciation to its respective book value and then adjust it with the use of appropriate deflators to arrive at its shadow value. However, the CMI gives only one figure for depreciation which covers all the asset categories. Because much of the depreciation has been estimated for assets that can be classified as tradeables, the market value of depreciation has been deflated with the overall average tariff rate of .63 (Table 1). To allow for overestimation, mainly caused by tax-exempt[illegible] we have taken half the value of depreciation, following a convenient [illegible] and Mirrlees [6].

Wages paid to production workers were first shadow-priced and then converted into border value equivalent by the use of the standard conversion factor. Salaries were not adjusted because their recipients, skilled labour, were assumed to be a traded commodity. The shadow wage rates (SWRs) for production workers have been estimated by the World Bank as .55 and .65 for the urban organized sector [11]. John Weiss [13] in his study, however, assumes three shadow wage rates, viz. 0, .33 and .66. An earlier estimate of the SWR was calculated by Shahrukh Rafi Khan [3] which was .50. Muhammad Zubair Khan [2] calculated the SWR to be 40 to 49 percent of the market wage for the late Seventies.

In our study, we have assumed SWRs ranging from .33 to .80. We feel that a higher SWR of .80 would be more appropriate because of the large-scale migration to the Middle East in the latter Seventies and early Eighties which led to a shortage of semi-skilled and unskilled labour in the domestic market. This is confirmed by a recent (unpublished) PIDE (Pakistan Institute of Development Economics) study which found the market wage to be quite close to the shadow wage in 1980-81, and also by Squire, Little and Durdag [12] who concluded that the differential in the market wage rate and shadow wage rate in Pakistan was due to the cost of migration.

Conversion factors for construction, based on various assumptions of the SWR, have been used (Table 2). The conversion factor for construction was used to allow for the market price of land and buildings in the Fixed Asset Category in the absence of a break-down of costs into land costs and building costs. This simple approach is adopted on the assumption that land and building can be treated similarly and, therefore, both can be revalued by the use of the conversion factor for construction. A specific conversion factor for electricity on the same pattern and based on various assumptions of the SWR has been estimated (Table 3). This conversion factor has been applied to the market price of electricity to convert it into its border price equivalent.

Assuming output to be wholly tradeable, we have shadow-priced the value of gross output less indirect taxation by using a ratio of value added at world prices to value added at domestic price in order to allow for domestic price distortions. Weiss [13] calculated this ratio to be .67. Two alternative estimates of the ratio are .63, based on an overall tariff deflator (58 percent), and .55, based on an unpublished study done at PIDE.

IV. RESULTS AND CONSLUSIONS

Results

Tables 4(a), 4(b), 4(c) and 4(d) present the social rates of return (SRR) based on CMI data for 1980-81. These rates of return have been estimated with the following formula, where all the values have been adjusted to their border price equivalents.

Table 2

Conversion Factor for Construction

Item	Value at 1969-70 Market Prices (Millions of Rupees)	Conversion Factors	Value at Shadow Prices (Millions of Rupees)	
Traded-goods Inputs Direct Imports	876.9	0.8	701.5	
Metals, Metal Products	1396.6	0.741	1034.9	
Non-traded-good Inputs	1006.9	1.00	1006.9	
Labour Costs	1082.7	SWR = 0	0	
		SWR = .33	357.3	
		SWR = .66	714.6	
		SWR = .75	812.0	
		SWR = .80	866.2	
Capital Costs	205.7	0.83	170.7	
Surplus Profits	844.6	0	0	
	5413.5		2914.0	SWR = 0
			3271.3	SWR = .33
			3628.6	SWR = .75
			3726.0	SWR = .75
			3780.2	SWR = .80

$$\text{Conversion Factor for Construction} = \frac{\text{Value of Total Costs at Shadow Prices}}{\text{Value of Total Costs at Market Prices}}$$

$\frac{2914.0}{5413.5}$	= 0.54	SWR = 0
$\frac{3271.3}{5413.5}$	= 0.60	SWR = .33
$\frac{3628.6}{5413.5}$	= 0.67	SWR = .66
$\frac{3726.0}{5413.5}$	= 0.69	SWR = .75
$\frac{3780.2}{5413.5}$	= 0.70	SWR = .80

Source: Taken directly from [13, pp. 42-43] and further extended to the derivation of construction conversion factors based on SWR = .75 and .80.

Table 3

Conversion Factors for Electricity

Item	Value at 1969-70 Market Prices (Millions of Rupees)	Conversion Factors	Value at Shadow Prices (Millions of Rupees)
Traded-good Inputs	38.2	0.8	30.6
Non-traded-good Inputs	123.2	1.0	123.2
Labour Costs	127.4 For	SWR = 0	0
		SWR = .33	42.0
		SWR = .66	84.1
		SWR = .75	95.6
		SWR = .80	101.9
Capital Costs	263.4	0.71	187.0
	552.2		340.8 SWR = 0
			382.8 SWR = .33
			424.9 SWR = .66
			436.4 SWR = .75
			442.7 SWR = .80

$$\text{Conversion Factor for Electricity} = \frac{\text{Value of Total Costs at Shadow Prices}}{\text{Value of Total Costs at Market Prices}}$$

$$\frac{340.8}{552.2} = 0.62 \quad \text{SWR} = 0$$

$$\frac{382.8}{552.2} = 0.69 \quad \text{SWR} = .33$$

$$\frac{424.9}{552.2} = 0.77 \quad \text{SWR} = .66$$

$$\frac{436.4}{552.2} = 0.79 \quad \text{SWR} = .75$$

$$\frac{442.7}{552.2} = 0.80 \quad \text{SWR} = .80$$

Source: Taken directly from [13, p. 45] and further extended to the derivation of conversion factors for electricity based on SWR = .75 and .80.

$$\frac{\text{Value Added} - \text{Wage Costs} + \tfrac{1}{2}\text{ Depreciation}}{\text{Capital Stock} + \tfrac{1}{2}\text{ Depreciation}}$$

Each table is based on the assumption of a different SWR. For example, 4(a) assumes an SWR of .33, 4(b) one of .66 and so on. Given the range of SWRs from .33 to .80, the SRR varies from a high of 24 percent to a low of 16.5 percent. The

Table 4(a)

Social Rate of Return in Pakistan's Manufacturing Industry

Item	Market Values[1] (000 Rs) (I)	Adjustment Ratio (II)	Social Value (000 Rs) (III)
A. *Capital Account*			
(a) Fixed Assets			
(i) Machinery & Plant	16,002,541	.59[2]	9,441,499.2
(ii) Land & Building	5,089,823	.60[3]	3,053,893.8
(iii) Transport Equipment	608,942	.63[4]	383,633.5
(iv) Other Fixed Assets	1,017,428	.63[4]	640,979.6
(b) Depreciation	2,393,972	.63[4]	1,508,202.4
(c) Working Capital	17,222,548	.63[4]	10,850,205.0
Total A (a + c)	39,941,282		24,370,211.0
B. *Production Cost*			
(a) (i) Salaries	1,486,634	1.0[5]	1,486,634.0
(ii) Wages	4,137,179	.33[6] (.85)[7]	1,160,478.7
(b) Fuel Costs	1,302,547	1.0[8]	1,302,547.0
(c) Electricity Costs	1,611,092	.69[9]	1,111,653.5
(d) Raw Materials	52,262,776	.69[10]	36,061,315.0
(e) Repairs and Maintenance	236,389	.85[7]	200,930.7
(f) Other Production Costs	183,403	.85[7]	155,892.6
(g) Indirect Taxation	10,009,349		
Total (Bb + Bc + Bd + Be +Bf)			38,832,339.0
C. *Gross Output (net of indirect taxation)*	74,278,978	.63[4]	46,795,756.0
D. *Value Added (C–Bb–Bc–Bd–Be–Bf)*	18,682,771		7,963,417.0

$$\text{Social Rate of Return: } \frac{D_{(III)} - [Bi_{(III)} + .33Bii_{(III)}] + \tfrac{1}{2}Ab_{(III)}}{A_{(III)} + \tfrac{1}{2}Ab_{(III)}} = 24.16\%$$

[1] All values under column 1 have been taken from CMI 1980-81 [7]. These are market values.

[2] Average tariff rate for capital goods. For estimation, see Table 1.

[3] Construction conversion factors based on SWR = .33, SWR = .66, SWR = .75 and SWR = .80. (See Table 2.)

[4] Overall average tariff rate. (See Table 1.)

[5] Adjustment ratio of 1 is used under the assumption that the salaried class has been treated as skilled labour. Hence market and social values are equal.

[6] Shadow wage rates taken from Weiss [13] and World Bank [11].

[7] Standard conversion factor calculated by Weiss [13] and World Bank [11].

[8] Fuel is a traded good, which assumed to be

Table 4(d)

Social Rate of Return in Pakistan s Manufacturing Industry

Item	Market Values[1] (000 Rs) (I)	Adjustment Ratio (II)		Social Value (000 Rs) (III)
A. *Capital Account*				
(a) Fixed Assets				
(i) Machinery & Plant	16,002,541	.59[2]		9,441,499.2
(ii) Land & Building	5,089,823	.70[3]		3,562,876.1
(iii) Transport Equipment	608,942	.63[4]		383,633.5
(iv) Other Fixed Assets	1,017,428	.63[4]		640,979.6
(b) Depreciation	2,393,972	.63[4]		1,508,202.4
(c) Working Capital	17,222,548	.63[4]		10,850,205.0
Total A (a + c)	39,941,282			24,879,193.0
B. *Production Cost*				
(a) (i) Salaries	1,486,634	1.0[5]		1,486,634.0
(ii) Wages	4,137,179	.80[6]	(.85)[7]	2,813,281.7
(b) Fuel Costs	1,302,547	1.0[8]		1,302,547.0
(c) Electricity Costs	1,611,092	.80[9]		1,288,873.6
(d) Raw Materials	52,262,776	.69[10]		36,061,315.0
(e) Repairs and Maintenance	236,389	.85[7]		200,930.7
(f) Other Production Costs	183,403	.85[7]		155,892.6
(g) Indirect Taxation	10,009,349			
Total (Bb + Bc + Bd + Be + Bf)				39,009,559.0
C. *Gross Output (net of indirect taxation)*	74,278,978	.63[4]		46,795,756.0
D. *Value Added (C–Bb–Bc–Bd–Be–Bf)*	18,682,771			7,786,197.0

Social Rate of Return: $$\frac{D_{(III)} - [Bi_{(III)} + .80Bii_{(III)}] + \frac{1}{2}Ab_{(III)}}{A_{(III)} + \frac{1}{2}Ab_{(III)}} = 16.54\%$$

Notes: [1] All values under column 1 have been taken from CMI 1980-81 [7]. These are market values.

[2] Average tariff rate for capital goods. For estimation, see Table 1.

[3] Construction conversion factors based on SWR = .33, SWR = .66, SWR = .75 and SWR = .80. (See Table 2.)

[4] Overall average tariff rate. (See Table 1.)

[5] Adjustment ratio of 1 is used under the assumption that the salaried class has been treated as skilled labour. Hence market and social values are equal.

[6] Shadow wage rates taken from Weiss [13] and World Bank [11].

[7] Standard conversion factor estimated by Weiss [13] and World Bank [11].

[8] Fuel is a tradeable good. Therefore its market value has been used, which assumed to be approximately equal to its social value.

[9] Conversion factor for electricity based on SWR = .33, SWR = .66, SWR = .75 and SWR = .80. (See Table 2.)

unadjusted, or market rate of return is 35 percent, based on the same formula as given above, but using market prices.

If we ignore the upper limit of the SRR based on an SWR of .33, because we feel that the developments in the labour market during the early Eighties were such as to reduce the gap between the market wage rate and the SWR, then the applicable range for our SRR lies between 16.5 percent and 19 percent, approximately. This range can then be used for determining a cut-off rate to be applied as a discount rate for the social analysis (exclusive of distribution effects) of projects in the large-scale manufacturing sector.

Concluding Remarks

Two points can be inferred from our analysis:

1. The social rates of return to investment in manufacturing are reasonably high. If the inefficiencies inherent in this sector are allowed for, the social rates of return could be even higher.
2. In view of the resulting rates of return, it is not unfair to recommend a 15–20 percent range as a cut-off rate for determining the social profitability of industrial sector projects.

The rates of returns estimated in this study can not be considered definitive. These are just approximate values, based on unsatisfactory data. Our intention has been to provide an estimate for a cut-off rate/test discount rate, which we think would be relatively more reliable as it is based on an empirical study. Thus, this study provides an empirical basis for verifying the cut-off rates being used by the Planning and Development Division for private and public industrial sector projects.

REFERENCES

Guisinger, Stephen E. "Calculating Shadow Prices in Pakistan: Reflection on the Paper by Squire, Little and Durdag". *Pakistan Development Review.* Vol. XVIII, No. 2. Summer 1979.

Khan, Muhammad Zubair, "Estimation of Shadow Prices for Project Evaluation". *Pakistan Development Review.* Vol. XVIII, No. 2. Summer 1979. pp. 129–145.

Khan, Shahrukh Rafi. "An Estimate of the Shadow Wage Rate in Pakistan". *Pakistan Development Review.* Vol. XIII, No. 4. Winter 1974. pp. 389–408.

Lal, D. *Wells and Welfare.* Paris: Development Centre for the OECD. 1972.

5. Little, I.M.D., and J. Mirrlees. *Manual of Industrial Project Analysis in Developing Countries, Vol. II: Social Cost-Benefit Analysis.* Paris: O.E.C.D. 1968.
6. Little, I.M.D., and J. Mirrlees. *Project Appraisal and Planning for Developing Countries.* London: Heinemann Educational Books. 1974.
7. Pakistan. Federal Bureau of Statistics. Statistics Division. *Census of Manufacturing Industries, 1980-81.* Karachi. 1984.
8. Pakistan. Finance Division. Economic Adviser's Wing. *Pakistan Basic Facts, 1984-85.* Islamabad. 1985.
9. Pakistan. Planning Commission. *Fifth Five Year Plan (1978–83).* Islamabad. June 1978.
10. Squire, Lyn, and Herman G. van der Tak. *Economic Analysis of Projects.* Baltimore, Maryland (USA). The Johns Hopkins University Press. 1975.
11. Squire, Lyn, I.M.D. Little and M. Durdag. "Application of Shadow Pricing to Country Economic Analysis with an Illustration from Pakistan". Washington, D.C. (USA): World Bank. n.d. (World Bank Staff Working Paper No. 330)
12. Squire, L., I.M.D. Little and M. Durdag. "Shadow Pricing and Macro-economic Analysis. Some Illustration from Pakistan". *Pakistan Development Review* Vol. XVIII, No. 2. Summer 1979.
13. Weiss, John. *Practical Appraisal of Industrial Projects Application of Social Cost-Benefit Analysis in Pakistan.* New York: UNIDO. 1980.

Comments on "Social Rates of Return in Pakistan's Large-scale Manufacturing Sector"

Given the state of the discipline of project evaluation in Pakistan, studies like the present one face formidable problems. However, such studies are essential to put decision-making on a sound empirical basis. This is because of the large measure of arbitrariness involved in evaluating investments. For example, discount rates being used at present for evaluation of investments are no more than arbitrary figures. A fairly high discount rate of 20 percent is being used to evaluate public investments, which has no empirical basis but can be justified only on grounds of generating more funds for additional public investment.

In this situation, an empirically estimated economic rate of return in the large-scale manufacturing sector can serve a useful purpose. It can be used as a cut-off rate in the choice of industrial projects and also as a discount rate in the economic analysis of projects. But one has to be careful in using the results of the present study, not only because, intuitively, the estimate of 5–8 percent for the economic rate of return in large-scale manufacturing seems to be on the lower side but also because of the two major reasons discussed below.

Firstly, while the rate of return is calculated in a straightforward way as the ratio of the economic value of the net profit to the economic value of capital under the assumption that average and marginal returns are roughly equivalent the problem arises in the way market values have been converted into economic values. This has been done by applying conversion factors available from previous studies to CMI data for 1980-81. Some of the conversion factors are not for this year. In addition, there is no empirical basis for choosing the conversion factors, given that a fairly wide range is available, in particular for the shadow wage rate. This is extremely important, at least for the purposes of the study, because of the very high sensitivity of the rate of return to the SWR and SCF. In making the choice of the appropriate conversion factors, intuitive reasoning alone may not be enough and may also introduce a subjective bias in the results in addition to the biases caused by unreliable data and conversion factors that may not truly reflect the existing distortions.

Secondly, no distinction has been made between the public and the private sectors and a single rate of return is imposed on the entire large-scale manufacturing sector. This problem arises from the nature of the data, as the CMI lumps private and public sectors together. But a single discount rate cannot be used for both the

public and private sectors in most situations. The use of a discount rate for public sector project, which is equal to the marginal productivity of capital in the private sector, can be justified only if the government has to invest in projects with the highest return. The problem is that no allowance is made for the adjustment in the allocation of funds in a well-functioning capital market. The underlying assumption is that, given additional investible funds, there is no change in the allocation of resources between private investment and consumption. This will not be true if funds are optimally allocated. Then, if the funds are invested in the private sector instead of the public sector, the return will be a mix of the gross returns from private investment and private consumption. The discount rate for the public sector would be the weighted average of the marginal productivity of capital in the private sector and the rate of time preference for consumption.

Khwaja Sarmad

Pakistan Institute
of Development Economics,
Islamabad