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industry and development

INDUSTRY AND DEVELOPMENT No. 2

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AIMS AND SCOPE OF *INDUSTRY AND DEVELOPMENT*

ID/SER.M/2

Preface

Just as technologies should be "appropriate", so should policies for industrial development. Appropriateness depends upon the circumstances: in some cases the "best" policies are called for, but for the most part "second best" solutions will have to be accepted because of various factors political, institutional, informational etc.—that limit the feasible choices. In one way or another, much of the work being done by economists on industrial development is concerned with the determination of appropriate policies, and that is broadly the subject matter of the articles in this issue of *Industry and Development*.

Helen Hughes provides an overview of industrialization objectives and achievements over the past several decades, grouping countries into industrialized, semi-industrialized, industrializing and non-industrialized categories according to the share of commodity production accounted for by manufacturing. Current industrialization issues are examined in the context of broad national objectives—economic growth, equity and welfare, and national integrity and independence—and possibilities for international co-operation and public intervention in the industrial sector are discussed.

In his review of research on appropriate technology, Larry Westphal concludes that choice of technology should be considered as one of many issues related to the design of industrial development policies and institutions. These issues should encourage the setting of prices reflecting relative scarcities in terms of social value, improve levels of education and information flows and allow a reduction or spreading of the risks involved in research and development.

The interrelationship between educational attainment and the pattern of income distribution is examined in the paper by Amit Bhaduri. The author suggests that a policy intended to improve income distribution mainly by means of equalizing educational opportunities may not be particularly effective unless accompanied by other measures.

In his analysis of India's export incentives, Vijay Joshi stresses the high cost of inputs purchased domestically and the lack of clear principles for granting subsidies. Joshi proposes that exporters be allowed to purchase tradable inputs at international prices and implementation of a uniform rate of cash assistance to exporters. Similar views are expressed by Bhagwati and Desai and Bhagwati and Srinivasan in the two studies analysed in the books section.

Daniel Schydlowsky argues that project cost-benefit methodology and shadow pricing techniques should be country specific, that is, there should be incorporated into the analysis circumstances particular to the country in which project evaluation is to be undertaken. The economic structure of Peru is analysed and modifications of standard cost-benefit methodologies, aimed at making them more appropriate, are proposed.

EXPLANATORY NOTES

References to dollars ($) are to United States dollars, unless otherwise stated.

A slash between dates (e.g. 1970/71) indicates a financial or academic year.

The use of a hyphen between dates (e.g. 1960-1964) indicates the full period involved, including the beginning and end years.

The following forms have been used in tables:

Three dots (...) indicate that data are not available or are not separately reported.

A dash (–) indicates that the amount is nil or negligible.

A blank indicates that the item is not applicable.

Industrialization and development: a stocktaking*

*Helen Hughes***

Industrialization has long been a key issue for national and anti-colonial movements. The colonies' right to manufacture was a factor in the American Revolution, and the inability to develop manufacturing industries in colonial and semi-colonial conditions was a growing grievance in Africa, Asia and Latin America in the nineteenth and early twentieth centuries. The experience of primary exporters in the depression of the 1930s underlined the need for economic diversification, and by the end of the Second World War industrialization had become an important component of the developing countries' aspirations. Developing countries came to identify industrialization with development even more forcefully in the 1950s and 1960s. Manufacturing industries with their sophisticated technologies and high levels of productivity were seen to be the source of both rapidly rising living standards and national prestige in Europe and the United States of America, and of the motivating power of Japan's spectacular growth. They provided highly productive inputs into mining and agricultural production, and their impact transformed transport, commerce and other service industries.

I. Industrialization objectives

From a purely economic point of view, the principal potential of industrialization was seen in its contribution to rapid economic growth.[1] When developing countries began to formulate their economic strategies in the late 1940s and early 1950s, the emphasis was on the bridging of the gap between their own living standards and those of the industrialized countries. Basic social and physical infrastructure facilities were rudimentary so it was clear that social, political and economic difficulties would make the development of rural areas a slow task. Manufacturing industries with limited geographical infrastructure requirements promised a much more rapid increase of productivity and capital accumulation, and thus of further investment and growth, with commensurate rises in living standards.

As markets for industrial goods had been created in varying degrees in most developing countries by imports from the industrialized countries, import substitution provided a ready industrialization strategy for new, inexperienced governments beset by economic difficulties that most industrialized countries had taken generations to overcome. In most developing countries, import substitution seemed an attractive way of introducing local entrepreneurship into the industrial sector. The characteristics of the goods demanded were well known. Provided the new "infant" industries were protected from import competition, the previous foreign suppliers were usually eager to assist in the establishment of local production

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[1] P. Rosenstein-Rodan, "Problems of industrialization of Eastern and South-Eastern Europe", *Economic Journal*, June-September 1943, linked industrialization to development.

through subsidiaries or in partnership with the businessmen who were the importers. Thus, foreign investment came early to play an important role in many of the developing countries that pursued an import substitution strategy. Latin American countries with relatively high levels of imports of manufactures found foreign investment particularly useful, and so did several south-east Asian and, more recently, African countries.

An alternative approach was the establishment of publicly owned manufacturing enterprises. For countries concerned with the social and political implications of industrial ownership, public enterprises were seen as an important instrument for the control of such "commanding heights" of the economy as petroleum refining and basic metal production, and also, more generally, as a means of avoiding monopolistic practices and undue concentration of economic and political power.

Industrialization was expected to have an important by-product in substantially increasing productive employment opportunities, thus relieving pressure on the countryside and raising living standards in both villages and towns. As initial improvements in living standards, particularly in health, led to rapid population growth, and as the overall economic and social forces of development led to an increasing pace of urbanization, the importance of employment creation grew.

Balance of payments

As developing countries began to break out of their traditional economic productive structures, balance of payments considerations became another strong argument for import-substituting industrialization. For most colonial and neo-colonial countries, the Great Depression had started as early as 1926 or 1927 and continued through most of the 1930s. It was followed by an interruption of the supply of manufactured goods during the Second World War. Primary producers were under strong pressure to supply raw materials to the warring industrialized countries, but they were faced by shortages of manufactured goods. Local manufacturing was stimulated and in some cases manufactured goods were exported, but investment was limited by capital goods shortages. Many developing countries thus had very strong foreign reserves after the Second World War, but these were soon depleted and replaced by chronic balance of payments deficits as development strategies led to a rapidly rising propensity to import. It was widely believed that the developing countries could not compete in the export of manufactures and that, as in the 1920s, the terms of trade for primary exports would decline. Increasing emphasis was therefore placed on import substituting industrialization,[2] but the process of industrialization itself soon became a prime cause of high import levels.[3] The developing countries had to purchase capital equipment from industrialized countries. Many of the import substituting industries were initially largely assembly

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[2] Raul Prebisch, "Commercial policy in the underdeveloped countries", *American Economic Review*, May 1959; and K. N. Raj and A. K. Sen, 'Alternative patterns of growth under conditions of stagnant export earnings", *Oxford Economic Papers*, February 1961, expressed the quintessence of the import substitution industrialization strategy.

[3] Ian Little, Tibor Scitovsky and Maurice Scott, *Industry and Trade in Some Developing Countries: A Comparative Study* (London, Oxford University Press, 1970) and the six accompanying country studies carried out under OECD auspices noted this trend and became critical in turning import substitution strategies towards a more balanced approach to industrialization.

processes, relying on imported raw materials and components which also had to be purchased from industrialized countries. At the beginning of the 1960s, therefore, some countries began to abandon the idea of "import substitution at all costs". A decade later the export of manufactures had become an important component of industrialization strategies.

The objectives of industrialization, like those of development, have never been merely economic. The ability to handle machines, to manage complex processes and to produce synthetic products have been closely associated with national self-confidence and with military capability. The use of modern equipment meant the ending of slow, exhausting but unproductive manual labour that brought little remuneration. For peoples who combined in their daily lives grinding physical labour with little comfort or security, the symbols of industrialization—modern factorities, tall office buildings, rich department stores and the goods they displayed—promised prosperity and equality with industrialized countries.[4]

The industrialization of the developing countries is creating a second "industrial revolution" that is not only a critical element in the changes that are taking place in the developing countries themselves but is also transforming the world economy as radically as did the changes that took place in Great Britain in the eighteenth and nineteenth centuries.

II. The industrial achievement

The industrialized countries' manufacturing output has grown at an unprecedented rate in the last quarter century, but the developing countries' manufacturing output has grown even more rapidly. Some developing countries have built up a manufacturing sector to the point at which, though they still have relatively low income, they may be regarded as industrialized; a dozen countries are clearly semi-industrialized; most of the developing countries are well into an industrializing stage; and for the most part only very small countries with a low population are still non-industrialized (see table). For some, very small developing countries, as for some very small high income countries, industrialization remains a limited objective because their comparative advantages lies in other sectors.

There have been several attempts at a typology of industrialization based on the changing share of value added in manufacturing in the GDP,[5] the proportion of value added contributed by various manufacturing branches to value added in manufacturing as a whole,[6] value added per unit of capital and labour employed, the share of exports in manufacturing output, and of manufactured exports in total exports. These and similar indicators all contribute to an understanding of the growth of manufacturing and its role in the economy, but they have different implications in varying circumstances. Two large, traditionally agricultural countries—China and India—have each developed a highly complex and relatively sophisticated industrial structure and they should be regarded as semi-industrialized

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[4] See Lauchlin Currie, "The objectives of development", *World Development*, January 1978, for a thoughtful analysis of the objectives of development in relation to individuals and nations.

[5] Simon Kuznets' series of 10 papers, "Quantitative aspects of the economic growth of nations", *Economic Development and Cultural Change*, 1956-1967, which introduced a quantitative approach to the continuity of economic development used this measure.

[6] Hollis B. Chenery and Lance Taylor, "Development patterns: among countries and over time", *Review of Economics and Statistics*, November 1968.

Industrialization indicators 1976

Country or area	GNP			Value added in manufacturing							Manufacturing exports as percentage of total exports (%)
	Population (millions)	Per capita (dollars)	Average annual growth rate, 1960-1975 (%)	Total (millions of dollars)	Per capita (dollars)	Average annual growth rate (constant prices), 1960-1976 (%)	As percentage of value added in commodity production	Percentage of GDP 1960	Percentage of GDP 1976		
Developed											
Africa											
(south of Sahara)											
South Africa	26.03	1 340	2.3	7 605[a]	299[a]	—	71.3[a]	23.0	22.9[a]		21.5[b]
Northern America											
Canada	23.18	7 510	3.6	36 496	1 574	5.6[c]	53.2	26.4	18.8		46.4
United States	215.12	7 890	2.5	348 500[a]	1 632[a]	3.5[c]	64.2[a]	28.6	23.1[a]		65.5
Asia											
Japan	112.77	4 910	7.7	168 683[a]	1 512[a]	9.5[c]	70.5	33.4	34.4[a]		79.5
Europe											
Austria	7.52	5 330	4.3	12 826[d]	1 706[d]	3.7[c]	64.2	38.2[d]	31.6[d]		73.1
Belgium	9.83	6 780	4.4	17 335[a]	1 769[a]	5.9[c]	67.2[a]	31.6	29.5[a]		63.0[e]
Bulgaria[f]	8.76	2 310	4.6	7 272[g]	830[g]	8.3[g,h]	53.9[g]	23.2[g]	35.9[g]		40.4[i]
Czechoslovakia[f]	14.92	3 840	2.7	24 590[g]	1 648[g]	3.8[a,c]	66.0[g]	37.6[g]	43.0[g]		75.5[a]
Denmark	5.07	7 450	3.5	9 855	1 944	4.5[c]	61.7	29.5	25.6		54.5
Finland	4.73	5 620	4.5	7 488	1 583	6.3[c]	54.4	26.8	26.6		72.0
France	52.92	6 550	4.2	95.217	1 799	4.3[c,g]	64.4	36.6	27.5		68.3
German Democratic Republic	16.79	4 220	3.2	30 626[g]	1 823[g]	3.6	69.9[g]	39.2[g]	43.2[g]		48.9[l]
Germany, Federal Republic of	62.00	7 380	3.5	165 846	2 675	4.6[c]	72.4	42.2	37.2		80.5
Hungary[f]	10.60	2 280	3.1	8 184[g]	772[g]	4.3[g]	53.0[g]	29.5[g]	33.9[g]		—
Iceland	0.22	6 100	3.3	—	—	—	—	—	—		5.8
Ireland	3.16	2 560	3.9	1 546[i,j]	500[i,j]	3.3[i,k]	68.0[i,j]	29.6[j]	29.7[i,j]		47.1
Italy	56.19	3 050	3.9	52 075[a]	933[a]	7.2[c]	61.1[a]	27.2	31.1[a]		77.7
Luxembourg	0.36	6 460	2.6	792[a]	2 212[a]	—	66.7[a]	44.8	43.0[a]		—

A. Industrialized countries and areas

Netherlands	13.77	6 200	3.8	23 164[a]	1 696[a]	6.1[c]	65.6[a]	31.1	28.4[a]	50.6
Norway	4.03	7 420	3.6	8 845[g]	2 195[g]	4.6[c]	67.6[g]	21.5[g]	28.3[g]	45.9
Poland [f]	34.34	2 860	4.0	37 282[g]	1 086[g]	6.9	57.4[g]	29.4[g]	38.0[g]	52.3[a]
Romania [f]	21.45	1 450	8.3	12 350[g]	576[g]	10.1[a]	52.5[g]	21.2[g]	39.7[g]	56.2[m]
Sweden	8.22	8 670	3.1	20 025[a]	2 442[a]	4.8[c]	67.8[a]	28.2	29.0[a]	71.6
Switzerland	6.41	8 880	2.6	—	—	—	—	—	—	89.3
United Kingdom	56.07	4 020	2.2	55 024	981	2.5[c]	63.8	36.1	25.0	77.2
Oceania										
Australia	13.66	6 100	3.1	18 238[a]	1 351[a]	3.7[c]	50.3[a]	51.4	22.3[a]	15.2
New Zealand	3.09	4 250	2.0	—	—	—	—	—	—	14.7
USSR	256.67	2 760	3.8	225 428[a,g]	887[a,g]	6.2[c]	49.5[a,g]	24.5	31.8[a,g]	24.9[a]
Transitional										
Northern Africa and Middle East										
Israel	3.56	3 920	5.2	2 736[a]	789[a]	8.8[c]	59.7[a]	23.1	27.0[a]	76.2
Africa (south of Sahara)										
Southern Rhodesia	6.53	550	2.4	851[a]	135[a]	—	44.2[a]	16.7	24.8[a]	—
Asia										
Hong Kong	4.46	2 110	6.5	2 541	570	11.6	77.8	24.8	28.0	96.8[n]
Singapore	2.28	2 700	7.6	1 450	640	14.1	66.8	11.6	24.4	43.2[n]
Other	16.30	1 070	6.3	6 320	387	18.0	63.8	21.5	36.6	80.1
Europe										
Greece	9.12	2 590	6.6	3 997	438	10.2	41.9	16.3	20.7	42.5
Malta	0.33	1 780	6.8	153	464	—	85.3	16.1	34.6	89.0
Portugal	9.73	1 690	6.9	4 808	494	8.4	67.7	30.1	35.2	63.3
Spain	35.70	2 920	5.7	38 414	1 076	10.0	81.1	27.1	38.7	61.7
Yugoslavia	21.52	1 690	5.5	12 986	604	7.2	75.7	36.4	43.4	64.6
B. Semi-industrialized countries										
Northern Africa and Middle East										
Jordan	2.79	1 610	1.3	271	97	7.7	65.2	7.7	22.9	19.9[a]
Lebanon	3.06[i]	1 070[i]	—	398[d,m]	134[d,m]	6.1[d,h]	45.7[d,m]	12.8	14.6[d,m]	4.8[i]

Industrialization indicators 1976 (continued)

Country or area	GNP				Value added in manufacturing			Percentage of GDP		Manu-facturing exports as percentage of total exports (%)
	Population (millions)	Per capita (dollars)	Average annual growth rate, 1960-1975 (%)	Total (millions of dollars)	Per capita (dollars)	Average annual growth rate (constant prices), 1960-1976 (%)	As percentage of value added in commodity production	1960	1976	
B. Semi-industrialized countries (continued)										
Latin America										
Argentina	25.72	1 550	3.1	16 240	631	5.9	61.4	31.1	34.3	23.6[a]
Brazil	109.96	1 140	4.3	33 351	266	12.0	62.0	25.6	28.8	23.3[a]
Chile	10.45	1 050	1.3	2 383	228	2.8	51.7	23.3	21.6	4.3[i]
Mexico	62.02	1 090	3.2	20 537	331	8.2	58.9	22.6	26.1	36.0[i]
Asia										
China[f]	835.80	410	5.2	139 684[g]	167[g]	6.9[g]	51.6[g]	27.7[g]	40.7[g]	—
Democratic People's Republic of Korea	16.25	470	3.8	—	—	—	—	—	—	—
India	620.40	150	1.3	11 966	19	4.4	23.1	14.1	16.3	42.2[a]
Republic of Korea	35.97	670	7.1	5 692	158	18.8	42.8	12.1	26.6	82.6
C. Industrializing countries										
Northern Africa and Middle East										
Algeria	16.23	990	1.8	2 027	125	9.1	20.4	10.4	13.0	—
Egypt	38.07	280	1.5	3 329	87	5.1	40.9	20.1	23.9	24.5
Iran	34.30	1 930	8.1	6 979	204	13.5	15.1	11.0	10.2	1.2[a]
Iraq	11.48	1 390	3.3	1 076	94	7.3	44.3	9.6	6.7	21.0[i,o]
Kuwait	1.06	15 480	-2.9	—	—	—	—	—	—	7.7[a]
Morocco	17.20	540	1.9	1 021	59	4.8	23.7	12.1	12.4	12.5[a,o]
Saudi Arabia	8.30[a]	4 010[g]	6.6	—	—	—	—	—	—	5.6[i]
Syrian Arab Republic	7.65	780	2.2	825	108	5.7	25.6	16.0	13.5	8.0[j]

Tunisia	5.73	840	4.1	431	75	9.8	21.5	—	10.8	25.6[o]
Yemen Arab Republic	6.04	250	—	23[i,p]	4[i,p]	—	4.5[i,p]	20.1	23.9	6.6[a]
Africa (south of Sahara)										
Central African Empire	1.83	230	0.4	89	49	5.8	31.1	5.7	22.9	23.7[a,q]
Congo	1.36	520	2.9	93	68	8.7	46.3	8.2	13.0	8.0[j]
Ghana	10.14	580	-0.2	1 973	195	3.0	33.5	9.8	24.8	1.4[j]
Ivory Coast	7.03	610	3.5	551	78	9.9	26.3	7.1	11.8	7.0
Kenya	13.80	240	3.2	362	26	9.7	22.1	9.4	12.1	12.8[j]
Madagascar	9.11	200	0.1	341	37	3.0	37.5	4.1	18.5	9.2[j]
Malawi	5.17	140	4.1	105	20	12.4	23.0	5.8	13.5	3.9[j]
Mali	5.84	100	0.9	66	11	6.4	19.9	4.7	10.9	11.1[j]
Mauritius	0.89	680	0.8	99	111	2.8	33.2	13.1	19.1	11.0[a]
Nigeria	77.05	380	3.4	2 395	31	10.4	11.0	4.8	7.9	0.2[a]
Senegal	5.13	390	-0.7	491	96	5.1	46.3	12.4	23.8	21.5[a]
Swaziland	0.51	470	6.8	52	103	15.0	36.4	5.3	24.1	—[r]
United Republic of Cameroon	7.07	290	3.0	324	46	8.0	25.9	—	13.5	10.5[a]
Upper Volta	6.17	110	0.7	82	13	5.6	27.1	7.9	13.8	6.0[a]
Zambia	5.06	440	2.0	413	82	8.0	32.8	4.0	17.8	0.4[a]
Latin America										
Barbados	0.24	1 550	5.3	39	144	3.2	35.3	9.3	11.3	27.6[a]
Bolivia	5.79	390	2.5	265	46	5.1	18.1	12.6	10.7	—
Colombia	24.23	630	2.7	3 429	142	6.9	40.5	17.3	22.7	20.6[a]
Costa Rica	2.01	1 040	3.4	298[a]	152[a]	—	38.2[a]	12.4	17.8[a]	23.2[a]
Cuba[f]	9.46	860	-0.6	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Dominican Republic	4.84	780	3.4	757[a]	161[a]	7.8[c]	39.1[a]	17.3	21.0[a]	0.9[j]
Ecuador	7.32	640	3.4	798	110	7.8	33.8	13.9	16.1	1.9[j]
El Salvador	4.13	490	1.8	349	85	7.1	33.7	14.6	16.0	—
Guatemala	6.48	630	2.4	609	94	7.2	35.1	—	15.5	25.5[m]
Guyana	0.78	540	1.5	50	64	3.6	20.6	10.4	12.1	2.2[a]
Honduras	2.98	390	1.5	188	63	5.3	30.2	12.5	17.2	10.5[a]
Jamaica	2.08	1 070	3.6	593	285	4.4	40.8	15.1	19.5	54.4[a,s]
Nicaragua	2.33	750	2.4	393	169	8.8	41.8	16.0	21.3	16.0[a]
Panama	1.72	1 310	4.1	266[j]	165[j]	8.4[c]	34.9[j]	13.1	14.5[j]	—
Paraguay	2.63	640	2.0	272	104	5.6	28.2	16.7	16.0	—
Peru	15.83	800	2.7	2 234	141	7.0	38.9	17.3	18.6	3.4[j]

Industrialization indicators 1976 *(continued)*

Country or area	Population (millions)	GNP		Value added in manufacturing						
		Per capita (dollars)	Average annual growth rate, 1960-1975 (%)	Total (millions of dollars)	Per capita (dollars)	Average annual growth rate (constant prices), 1960-1976 (%)	As percentage of value added in commodity production	Percentage of GDP		Manufacturing exports as percentage of total exports (%)
								1960	1976	
Latin America *(continued)*										
Trinidad and Tobago	1.09	2 240	2.5	360	330	8.1	21.7	5.7	14.1	6.2[a]
Uruguay	2.80	1 390	0.5	792	283	1.7	53.0	21.2	24.8	–
Venezuela	12.36	2 570	2.2	5 363	434	6.2	32.1	–	17.3	1.3[a]
C. Industrializing countries *(continued)*										
Asia										
Afghanistan	14.00	160	–0.2	74[a]	5[a]	4.5	5.8[a]	–	3.6[a]	10.6[i]
Bangladesh	80.40	110	–0.6	319	4	2.6	8.7	6.2	6.0	60.9
Burma	30.82	120	0.7	350	11	3.2	15.4	8.2	8.9	7.2[i]
Democratic Kampuchea	–	–	–	–	–	–	–	–	–	–
Indonesia	135.91	240	2.4	4 413	33	7.6	16.0	9.4	10.1	1.4
Malaysia	12.65	860	4.0	1 866	148	12.0	32.7	8.8	19.6	17.1[a]
Mongolia[f]	1.49	860	1.0	–	–	–	–	–	–	–
Pakistan	71.30	170	3.3	1 894	27	6.9	28.0	12.1	15.8	54.3[a]
Philippines	43.29	410	2.5	4 370	101	7.0	39.0	20.3	24.4	8.7[i]
Sri Lanka	13.81	200	2.0	324	24	5.0	25.0	11.2	14.5	3.8[a]
Thailand	42.96	380	4.6	2 917	68	10.8	33.4	12.6	18.3	20.6[a]
Viet Nam	47.60	–	–	–	–	–	–	–	–	–
Europe										
Cyprus	0.63	1 480	4.7	116	184	6.2	36.5	11.7	16.3	36.7
Turkey	41.24	990	4.0	9 911	240	11.3	48.8	12.6	27.6	22.4[a]
Oceania										
Fiji	0.58	1 150	3.4	34[a]	59[a]	2.4	28.2[a]	–	10.5[a]	6.6[a]

D. Non-industrialized countries

Northern Africa and Middle East										
Democratic Yemen	1.49	860	7.6	11[a]	7[a]	8.2[c]	23.7	—	7.4[a]	—
Oman	0.77	2 680	10.1	9	11	—	0.5	—	0.4	—
United Arab Emirates	0.69	13 990	13.7	—	—	—	—	—	—	—
Africa (south of Sahara)										
Angola	5.47	330	3.6	168[a]	31[a]	7.6[c]	9.4[a]	4.3	5.3[a]	9.4[i]
Benin	3.20	130	-0.3	51	16	6.0	19.1	—	10.1	17.9[i]
Botswana	0.68	410	6.0	16	23	5.5	13.6	8.1	5.4	—[r]
Burundi	3.81	120	2.7	26	7	12.7	13.1	—	10.1	1.2[i]
Chad	4.12	120	-1.1	45	11	2.3	14.6	4.5	9.6	3.2[i]
Ethiopia	28.68	100	2.0	275	10	7.6	15.8	6.1	10.3	1.3[a]
Equatorial Guinea	0.32	330	-0.9	—	—	8.5	—	—	—	—
Gabon	0.54	2 590	5.0	105	194	—	14.9	6.1	7.4	4.8[m]
Guinea	5.69	150	0.2	—	—	17.8	5.4	—	2.4	—
Lesotho	1.24	170	4.6	2	2	17.8	7.6	—	5.3	—[r]
Liberia	1.60	450	1.8	36	22	12.2	20.1[a]	7.7	12.0[a]	1.0[i]
Mozambique	9.46	170	2.0	314[a]	34[a]	8.5[c]	25.8[a]	4.4	16.4[a]	3.3[i]
Niger	4.73	160	-1.3	99[a]	23[a]	12.5[c]	—	—	—	8.4[a]
Reunion	0.50	1 920	3.9	—	—	—	13.5[i]	0.7	10.0[i]	14.6
Rwanda	4.21	110	0.5	29[i]	7[i]	7.0	13.8	—	—	—
Sierra Leone	3.05	200	1.5	30	10	2.3	—	—	—	62.8[q]
Somalia	3.25	110	-0.3	25[a]	8[a]	16.8[c]	20.9[a]	2.4	8.3[a]	0.6[i]
Sudan	15.88	290	0.1	397[a]	26[a]	1.9[c]	17.0[a]	4.7	9.7[a]	0.1[a]
Togo	2.28	260	4.4	63	28	6.7	30.0	7.7	10.6	3.2[i]
Uganda	11.94	240	1.0	176	15	1.9	10.7	8.8	6.7	3.6[a]
United Republic of Tanzania	15.13	180	3.0	244[a]	16[a]	8.5[c]	17.0[a]	5.1	10.3[a]	11.9[a]
Zaire	25.39	140	1.6	210[a]	9[a]	8.0[c]	21.5[a]	13.2	10.0[a]	2.0[a]
Latin America										
Haiti	4.67	200	0.0	140	33	2.0	27.4	—	17.1	32.4[a]
Surinam	—	—	—	33[a]	90[a]	-3.6[c]	13.5[a]	8.5	7.1[a]	—

Industrialization indicators 1976 *(continued)*

Country or area	GNP			Value added in manufacturing						Manufacturing exports as percentage of total exports (%)
	Population (millions)	Per capita (dollars)	Average annual growth rate, 1960-1975 (%)	Total (millions of dollars)	Per capita (dollars)	Average annual growth rate (constant prices), 1960-1976 (%)	As percentage of value added in commodity production	Percentage of GDP 1960	Percentage of GDP 1976	
D. Non-industrialized countries *(continued)*										
Asia										
Bhutan	1.20	70	—	—	—	—	—	—	—	—
Lao People's Democratic Republic	3.25	90	—	—	—	—	—	—	—	4.1^j
Nepal	12.85	120	0.5	157^a	12^a	—	14.0^a	—	4.5^a	—
Oceania										
Papua New Guinea	2.83	490	3.8	—	—	—	—	—	—	3.4^j

^{a}1975.
^{b}Including Botswana, Lesotho, Swaziland and Namibia.
^{c}1960-1975.
^{d}Including mining.
^{e}Including Luxembourg.
^{f}The national accounts system of these countries differs from that of the other countries; the data shown here are therefore derived from national accounts estimates based on the System of National Accounts concepts. The trade data have been converted to dollars at the official exchange rate.
^{g}Including mining and electricity.
^{h}1960-1973.
^{i}1974.
^{j}Including mining, electricity and construction.
^{k}1960-1974.
^{l}Included in Belgium.
^{m}1973.
^{n}Including re-exports.
^{o}Including refined petroleum products.
^{p}1974 figures are at 1972 constant prices.
^{q}Mostly diamonds.
^{r}Included in South Africa.
^{s}Including mineral semi-processed products.

although their shares of manufacturing value added in total GDP is still relatively low. Exports of manufactures cannot be regarded as an index of manufacturing development[7] although the character of manufactured exports might be expected to change with industrial development.[8] Small "city states" such as Hong Kong and Singapore, had a high level of manufactured exports from the beginning of their industrialization process because their size required a high degree of specialization to encompass adequate economies of scale and it would be unreasonable for them to develop a "balanced" industrial structure that included all sectors.

Statistical difficulties add to the conceptual problems.[9] Countries with heavy protection for manufacturing over-value their manufacturing output in relation to non-protected activities and to other countries with lower protection.[10] The underpricing of agricultural production to keep down the urban cost of living similarly tends to over-value manufacturing production. The difficulties, and ensuing differences in the measurement of the value added in service industries among countries, make the use of conventional ratios of value added in manufacturing to GDP particularly prone to error. Comparing the share of value added in manufacturing to value added in commodity production may be a more useful indicator, for it eliminates both the difficulties of measuring value added in service industries and the effects of changing weights of service industries in a growing economy.[11] It corresponds fairly closely to the share of value added in manufacturing to GDP when the ratio of manufacturing to GDP is low, but the two indicators diverge when the ratio of manufacturing is relatively high because services, having declined in relative terms in the early stages of industrialization, grow quite rapidly at the high income levels that accompany a high level of industrialization. There are many difficulties in identifying export manufacturing data, and in reconciling such data with industrial production figures.[12] The differences in the

[7] R. Benerji and J. P. Donges, "Economic development and the patterns of manufactured exports", Kieler Diskussionsbeiträge No. 16 (Kiel, Institut für Weltwirtschaft, January 1972) give an indication of the results of studies of industrialization and exports in Brazil, Colombia, Israel, Mexico, Pakistan, Spain and Yugoslavia.

[8] B. Balassa, "A 'stages' approach to comparative advantage", World Bank Staff Working Paper No. 256 (Washington, D.C., World Bank, May 1977).

[9] Vinod Prakash, "Statistical indicators of industrial development. A critique of the basic data", Economics Department Working Paper No. 189 (Washington, D.C., IBRD, September 1974).

[10] B. Balassa and others. *The Structure of Protection in Developing Countries* (Baltimore, Johns Hopkins University Press, 1971).

[11] B. Balassa and H. Hughes, "Statistical indicators of levels of industrial development", Economics Department Working Paper No. 15 (Washington, D.C., IBRD, 19 May 1969), used this measure as a principal indicator in a classification of levels of industrial development. The four-level scheme evolved was subsequently adopted in "Industry sector working paper", in *World Bank Operations: Sectoral Programs and Policies* (Baltimore, Johns Hopkins University Press, 1972) and a four-level classification was also used in UNIDO, *Industrial Development Survey* (United Nations publication, Sales No. 72.11.B.15).

[12] V. Prakash, "Measuring industrial exports: a comparative statistical study of variations arising from difference of definition", World Bank Staff Working Paper No. 225 (Washington, D.C., World Bank, February 1976). Exports of manufacturing have been defined in this paper as SITC categories 5 to 8 minus 67 and 68 to ensure as broad a coverage of countries as possible, although this excludes processed food and other manufactures and thus underestimates the total value of manufactured exports for some countries. However, diamonds and other valuable but practically unprocessed mineral exports are included, so that the manufactured exports of some countries are exaggerated.

national accounts methodologies of centrally planned economies and market economy countries make for serious comparison difficulties. Finally, standardization of data in United States dollars at official rates introduces distortions.

The utilization of human and physical capital is an important aspect of industrial development. The ability to adapt and to innovate is critical to industrial progress and therefore entrepreneurial, managerial and technical capacities are perhaps the most important, and most elusive, qualities in the maturing of an industrial economy. Such capacities are in much more ample supply in the industrialized countries than in the non-industrialized developing countries, but at least to date they have not been meaningfully measured. Entrepreneurship, management and technical expertise require the support of adequate labour and capital resources. The supply of labour is not homogenous. Skills and skill potential are important. Indicators of educational levels, the only generally available proxy measurements of human capital, are thus poor reflections of actual human capital.

The measurement of physical capital is no less difficult. The availability and use of electric power is a generally used measure, but again it is a poor proxy of the complex of public utility facilities required in an industrialized economy, and an even poorer measure of the capital in the sense of fixed investment used in manufacturing. "Capital" remains conceptually illusive and the problems of measuring it are too well known to require elaboration.[13]

The commercial infrastructure—banking, import-export, wholesale and retail trade and such auxiliary services as market research and advertising—is also an important aspect of industrial development. Many of the external economies associated with industrial growth flow from interaction with appropriate commercial development. However, the difficulties of distinguishing between traditional commercial services that are sometimes inimical to industrial development, and those that complement industrial development have thus far also precluded measurement.

A composite index of indicators of industrial progress would thus be difficult to calculate. The best single indicator of the maturity of industrialization seems to be the share of value added in manufacturing in commodity production, but the more commonly used share of value added in GDP, value added in manufacturing per head of population, and the share of manufactured exports in total exports are also given in the table. The ensuing categorization remains artificial, making arbitrary demarcation lines in what is essentially a continuum of experience from countries barely beginning to industrialize to those with mature manufacturing capacity. In this context it is important to recognize that the differences between developing countries at the ends of the spectrum have become more important in many respects than the similarities between them.

Industrialized countries

(Share of manufacturing more than 60 per cent of value added
in commodity production)

The industrialized countries consist largely of the high income countries of Europe and North America, and Australia, Japan and New Zealand. In most of these countries, value added in manufacturing in 1976 represented more than 60 per cent of value added in commodity production. It is generally over $1,500 *per capita*, and

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[13] Dale W. Jorgenson, "Econometric studies of investment behaviour: a survey", *Journal of Economic Literature*, December 1971.

rises to approximately $2,500 *per capita* in the Federal Republic of Germany. It should be noted that in some high income countries with mature industrial structures, primary industries are of such weight that value added in manufacturing is less than 60 per cent of value added in commodity production. A few developing countries that still have relatively low income levels have relatively highly developed manufacturing sectors so that their manufacturing is more than 60 per cent of commodity production. In some cases, high protection for manufacturing and the consequent over-valuation of manufacturing value added give a somewhat exaggerated picture of the level of industrialization, thus Argentina, Brazil and Mexico have been classified as semi-industrialized although their share of manufacturing is over or nearly 60 per cent of commodity production.

The industrialized countries are well endowed with entrepreneurs, managers and technical staffs; in the market economies they are largely found in private enterprises whereas in centrally planned economies they are in public enterprises. Education is highly developed, and so are industrial and technological skills. Although there are foreign firms and managers in the market economy group of these countries, and although foreign technology is freely used, these are largely two-way flows. Australia, Canada and New Zealand, which are largely foreign capital recipients, and Japan, which until recently in effect barred foreign management and capital, are the only major exceptions. There has been a move to international investment flows among the centrally planned economies, and they have become receptive to limited types of investment from the market economies.

The bulk of manufacturing is located in major conurbations that have grown to exploit geographical economies of scale, but in some industrialized countries poorly-patterned urban development has led to heavy social costs. The location of manufacturing and the appropriate scale and structure of cities have thus become important policy issues in some countries.

Semi-industrialized countries

(Share of manufacturing 40 to 60 per cent of value added in commodity production)

The semi-industrialized countries are concentrated in Latin America, the Republic of Korea is a leading example in East Asia, and there are developments in this direction in the Middle East. Hong Kong and Singapore have only recently graduated from this category and, as already suggested, China and India should also be included.

In general, the semi-industrialized countries have relatively well-established private or public enterprise/manufacturing sectors; they have also clearly overcome the acute early human and physical capital shortages. Their industrial structure is being determined by their resource bases, size, geographic location, and policies reflecting comparative advantages arising from these endowments rather than by progressive import substitution. This is particularly so where they have taken care not to lock themselves into an inward-oriented, import substituting, excessively protected framework. The export-oriented countries tend to be specialized, whereas countries that have followed largely import substituting policies tend to have "balanced" industrial development patterns even though in the early days of industrialization this meant inadequate scales of production.

In relative terms, the geographic concentration of manufacturing is often greater than in industrialized countries, with most manufacturing plants in a handful of centres where physical infrastructure facilities are available. Other industrial "poles" are now being developed, but generally manufacturing-led urban concentration is a greater socio-economic problem in semi-industrialized than in industrialized countries because the semi-industrialized countries do not have the stock of infrastructure and levels of income that make rapid improvement in the urban structure economically, if not always politically, possible in high income countries.

Industrializing countries

(Share of manufacturing 20 to 40 per cent of value added
in commodity production)

The largest number of developing countries in Africa, Asia, and Latin America fall into the category of industrializing countries. Some countries' industrial production is heavily weighted by mineral processing, and in many cases high protection exaggerates the extent of industrial involvement.

These countries are well beyond their first steps towards industrialization. Most produce a substantial proportion of the consumer goods required by the local market; a significant range of intermediates, notably construction materials; and they have begun or are beginning to produce capital goods. Indonesia and Nigeria should probably come into this category although the value added in manufacturing falls short of 20 per cent of value added in commodity production. Again, the agricultural sectors of these very large countries swamp the industrial sectors that have been established. Except for the large countries, a balanced industrial structure again tends to reflect inward-oriented import substitution strategies and unduly small scales of production rather than industrial maturity.

The countries in this category have also overcome the initial lack of human and capital resources for industrialization. A pool of indigenous entrepreneurs, managers and technicians has been established although it is not yet adequate for the rapid rate at which these countries wish to expand industrial production. The industrializing countries have also built up, at least in some areas, some of the physical infrastructure–ports, land transport, water supply and power—necessary for industrial operations, but in most cases it is less adequate than in the semi-industrialized countries. Manufacturing industries still tend to be clustered in a capital city with perhaps one or two other centres, with concomitant socio-economic problems. Bangkok, Djakarta and Manila are typical of cities with acute urban development problems. However, there are exceptions: in Colombia and Malaysia, for example, manufacturing has, for historical reasons, developed in several centres in each country. and the problems of urbanization are correspondingly less pressing.

The non-industrialized countries

(Share of manufacturing less than 20 per cent of value added
in commodity production)

Some 30 countries fall into the non-industrialized category. There is only one in Latin America (Haiti); there are three in Asia and Oceania (Fiji, Nepal and Papua

New Guinea); and the rest are in Africa. These are the countries where manufacturing still largely consists of a handful of factories producing construction materials, clothing, textiles, footwear and processed foods, and where further production largely consists of simple assembly processes. These countries are acutely deficient in human capital—there are acute shortages of entrepreneurs, managers, technicians and skilled workers—so that the establishment of each additional factory is very difficult. Most of the countries in this category are very small and have very low *per capita* income, the demand for industrial goods is low, and it is difficult to achieve economic levels of production.

Some of the countries in this category are rich in resources, notably in petroleum or other minerals, so that they have a strong financial basis for industrialization. Their principal problems lie in finding an appropriate industrial or other specialization that will eventually act as a "leading sector", particularly if the natural resource base is exhaustible. For some of these countries, broadly-based industrialization may not prove to be a rewarding development path. They may find that some specialized industrial development together with internationally oriented service activities, such as shipping, and carefully planned and limited tourism, may bring higher returns than broadly-based industrialization. For most, the domestic market, because of low population and income levels, is very small, and exports are necessary almost from the beginning of industrialization to assure economies of scale and hence reasonable efficiency. This makes the first steps in industrialization particularly difficult.

Compared to the situation that the countries which are now industrializing or are semi-industrialized faced 20 to 30 years ago, the non-industrialized countries are in a more favourable situation. They can draw on a considerable accumulation of industrialization experience and basic infrastructure facilities exist in the principal cities.

Overall trends

Manufacturing now has a firm foundation in developing countries when they are regarded as a group. Indeed, some of the semi-industrialized countries are edging into the same levels of industrial maturity as some of the lagging industrialized countries. The overlaps become marked when such regions as the São Paulo area of Brazil and southern Italy are compared. Such countries as Argentina and Portugal clearly have characteristics of both industrialized and semi-industrialized countries. The semi-industrialized countries, moreover, account for a substantial proportion of the developing countries' population, particularly if the total population of China and India is included, and even if only their industrialized regions are included. The non-industrialized countries on the other hand account for a small proportion of the developing countries' total population. Because industrial growth has also been rapid in the industrialized countries since the Second World War, the developing countries as a group have not been very successful in catching up to a share of world industrial production commensurate with their share in total population. Those countries with rapid industrial growth have, of course, been closing the gap, and this is generally reflected in their rapid *per capita* income growth. In any case, to focus on the gap in manufacturing output between the industrialized and developing countries rather than on the achievements of the latter is not merely to say that the glass is half

empty when it is also half full, but to draw attention away from the factors that have led to the rapid growth of industrialization in some countries while retarding it in others.

III. Current issues in industrialization

The critical problems of industrialization have been sharpened by changing international economic relations and by changing perceptions of priorities in economic development. They are different for countries at different levels of industrialization and with different political goals. Some general issues have, however, emerged as characteristic of the problems of industrialization for the 1980s.

Economic growth

The appropriate utilization of scarce resources and efficiency in production have always been of concern in the design and implementation of industrialization strategy, for the attack on the endemic poverty of the developing countries through the creation of a highly productive sector has always been the central objective of industrialization.[14] The actual experience of industrialization has greatly underlined the concern with efficiency. A few developing countries have been able to use moderate protection to expand manufacturing output steadily and efficiently, but many countries have wasted both capital and labour resources in the course of industrial development. Experience indicates that although protection was introduced in these countries to assist infant industries in the belief that the dynamic benefits would exceed the short term costs, escalating levels of protection for manufacturing (and high export subsidies) led to the neglect of, and biases against, agriculture and other non-manufacturing activities, and permitted a high degree of inefficiency with concomitantly low social, though not necessarily private, returns on the human and capital resources invested in manufacturing itself. Excessive protection for manufacturing also tended to handicap overall economic growth by raising the costs of inputs into agriculture and other primary production and service industries instead of making such inputs widely and cheaply available. It has usually accentuated regional imbalances by the undue attraction of resources into large cities. It has permitted a great deal of X-efficiency[15] leading to the restriction of potential domestic markets, undue limitations on the scale of production, and further cost burdens to the economy.

Where excessive protection led to balance of payments problems, it became a brake to development rather than an instrument for its acceleration. Balance of payments problems have not been solved with the progress of industrialization as the proponents of infant industry protection expected. Indeed, where protection has

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[14] Lauchlin Currie, with an involvement with poverty dating back to the early 1930s, commented in January 1978 "...we must distinguish between objectives and policies to attain objectives, and not assume that the absence of a direct attack on poverty is an indication of a lack of concern with poverty. Otherwise, I fear, it is quite possible that the substitution of the abolition of poverty for rates of growth as the overriding objective of development may in the end have the undesired consequence of intensifying poverty", *op. cit.* p. 6.

[15] See Harvey Leibenstein, "Organizational or frictional equilibria, X-efficiency and the rate of innovation", *The Quarterly Journal of Economics,* November 1969.

been excessive, these problems have been exacerbated. Import restrictions did not cause serious social hardships when most manufactured goods were imported because imports of such luxury goods as automobiles could be restricted in times of balance of payments stringency and liberalized when export income permitted. With industrial progress balance of payments difficulties have necessitated the restriction of imports of industrial inputs rather than of final goods and this has led to unemployment. "Stop and go" policies have thus become very costly. Excessively protected infant industries often failed to grow up, though some have become competitive exporters. Where foreign investors were attracted by high levels of protection that enabled them to make monopoly profits, high volumes of remittances added to balance of payments problems.

In the late 1960s, the success of the small group of countries that had opted for export-led industrialization began to focus research on the effects of excessive protection on industrialization and overall growth.[16] An increasing policy emphasis on internationally competitive and export-oriented industrialization to overcome the misallocation of resources and barriers to efficiency and growth followed. A significant number of Asian, Mediterranean and Latin American countries opted for the export of manufacture as a corrective to excessive import substitution orientation. For some countries this at first meant adding large export bonuses to existing incentives to manufacturing, which sometimes created further distortions of the economy. Overly export-oriented economies have tended to neglect the growth of the domestic market. In recent years, a more sophisticated approach has avoided excess export incentives as much as excess protection.

Excessive protection for imports (or exports) has, of course, not been the only source of inefficiency. Inappropriate production licensing has often inadvertently exacerbated market imperfections, creating national and regional monopolies and oligopolies in the shelter of highly protective trade policies, and leading to the fragmentation of already limited scales of production. Laudably aimed price and output controls have often had unfortunate side effects in reducing internal and international competitiveness. Many countries lacking investment, accounting and other criteria in the public sector have found the public management of enterprises difficult. Well-intentioned tax holiday policies have been found to be largely unnecessary and inimical to efficiency.

In a broader context, the impact of industrialization on agriculture and other sectors began to be questioned in terms of overall efficiency. High costs of manufacturing tended to handicap rural development and traditional exports without commensurate growth returns. In contrast mutually supporting agricultural and industrial policies that emphasized agricultural productivity accelerated growth, improved the distribution of urban areas and thus reduced the problems of urbanization.

Equity and welfare

Having taken their first steps in industrialization, developing countries have in recent years increasingly turned to equity in industrial progress as in other aspects of development. Many of the issues concerned with efficiency and growth have also

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[16] Little, Scott and Scitovsky, *op. cit.*, Balassa, *op. cit.*, and J. N. Bhagwati and A. O. Krueger, "Exchange control, liberalization and economic development", *American Economic Review*, May 1973, a preview of the 10 National Bureau of Economic Research country studies on Foreign Trade Regimes and Economic Development and the Kiel studies.

come to be seen in equity terms. Thus excessive capital-intensity and low capital utilization,[17] arising from a structure of protection that favoured capital goods imports and from monetary and credit policies that led to artificially low capital prices (intended to encourage industrial investment), were thought to lead to low creation of employment opportunities.[18] This in turn led to a concern with labour/capital substitution opportunities with the effect of the choice of products to be manufactured on the choice of techniques, and with appropriate technology for various resource endowments and levels of industrialization.[19] It was then seen that income levels, and more particularly the distribution of income, affected the product mix, indicating a close interconnection between industrial growth and efficiency and income distribution issues and policies.

The relationship between the manufacturing and other productive sectors, particularly agriculture, has also come to be seen not only in terms of efficiency and growth, but also of welfare and income distribution. The undue protection and promotion of manufacturing at the cost of other sectors exacerbates existing, and creates new, income differentials and in turn limits the demand for manufacturing products with deleterious effects on economies of scale and production efficiency. The isolation of a modern privileged manufacturing sector from other urban activities--the traditional small-scale sector of traders, craftsmen and even small manufacturers--leading to a rigid dualism that restricts trade and the movement of resources between the sectors is now seen as another obstacle to rapid industrial and overall growth. Policies affecting the availability of resources, particularly capital, to firms of various sizes, and the impact of other policies, such as licensing and taxation on small firms, are being questioned.[20] It has become evident in recent years that dualism in the structure of manufacturing can be a strong and healthy trend in the industrialization process, providing that there is a vigorous and creative interaction between the large-scale, modern manufacturing sector and the more traditional, small-scale sector. Subcontracting by small firms for large firms has long been seen in east Asia as part of such a relationship,[21] encouraging the creation and strengthening of entrepreneurial capacities and an appropriate utilization of capital and labour resources, with a corresponding emphasis on the proximity relationships of small and large firms. In many countries, however, such creative dualism is yet to be achieved; over-protected or, much more commonly, restricted and repressed small-scale sectors are a barrier to efficiency and growth.

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[17] See G. Winston, "Capital utilization in economic development", *Economic Journal*, March 1971, Y. C. Kim and G. Winston, "The optimal utilization of capital stock and the level of economic development", *Economica*, November 1974, and Romeo Bautista and others, "Capital utilization in manufacturing in developing countries", World Bank Staff Working Paper No. 242 (Washington, D.C., World Bank, September 1976).

[18] David Morawetz, "Employment implications of industrialization in developing countries: a survey", *Economic Journal*, September 1974.

[19] Amartya Sen, *Employment, Technology and Development* (Oxford, Clarendon Press, 1975).

[20] George Beier and others, "The task ahead for the cities of the developing countries". *World Development*, vol. 4, No. 5 (May 1976).

[21] Susumu Watanabe, "Entrepreneurship in small enterprises in Japanese manufacturing", *International Labour Review*, December 1970.

National integrity and independence

An escape from the economic dependency that plagued the colonial and neo-colonial countries has been central to the industrialization effort. Many developing countries turned towards autarchy in reaction to the exploitation of colonial and semi-colonial regimes. But self-sufficiency should not be confused with self-reliance and for most countries inward-orientation was a limited phase as they saw that although there were costs to the various forms of international economic relations, these were far outweighed by the benefits, while autarchic policies led to slow economic growth with little room for improving welfare.

Inputs of foreign investment—a package of entrepreneurial, managerial and technical skills, capital, technology and, in some cases, access to foreign markets—have therefore been important in the industrialization effort of many developing countries, although at first the effort needed to maximize the benefits and limit the costs of such foreign investment was not made. As foreign investment was often attracted by high protection and tax holiday incentives[22] and benefited further from the overvaluation of exchange rates, foreign firms were able to earn high monopoly profits. In the 1950s, and into the 1960s in many developing countries, the resources and capabilities of foreign firms were not used to stimulate the flow of exports of manufactured goods. Restrictions on exports from transnational corporations' subsidiaries and associated corporations were accepted with little protest. An inevitably hostile reaction against foreign investment followed in those countries that had created an excessively favourable environment for foreign investment. It was not shared by countries that did not give foreign entrepreneurs the opportunity to make monopoly profits in highly protected markets and that used the transnationals' productive and marketing resources to become exporters of manufactures. In recent years more export-oriented policies have generally mitigated the excessive profits and balance of payments drain of foreign investment,[23] and an increasingly sophisticated cost/benefit approach supported by sophisticated bargaining in the host countries is leading to a more equitable share of foreign investment benefits for the hosts. Because of the prevalence of transfer pricing at other than market prices to take advantage of tax and other incentives,[24] policing such policies is not easy and it requires co-operation from the transnational corporations' home country, but it is increasingly being carried out successfully.

There has been a move in some countries to decompose the foreign investment package by purchasing sophisticated technology and management directly from transnational corporations and either borrowing capital abroad independently through banking channels or relying on domestic savings. Transnational firms have become increasingly amenable to such "unbundling" arrangements for they are thus able to minimize their exposure to business and political risks. It is not yet clear that

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[22] Jack Heller and Kenneth M. Kauffman, *Tax Incentives for Industry in Less Developed Countries* (Cambridge, Law School of Harvard University, 1963), warned against the dangers of excessive tax incentives. Their warning was amply justified by experience. See *Foreign Investment in Developing Countries* (United Nations publication, Sales No. 68.II.D.2).

[23] G. K. Helleiner, "Manufactured exports from less-developed countries and multinational firms", *Economic Journal*, March 1973, and Michael Sharpston, "International sub-contracting", *Oxford Economic Papers*, March 1975, for an account of the importance of foreign investment in developing country exports of manufactures.

[24] Sanjaya Lall, "Transfer pricing by multinational manufacturing firms", *Oxford Bulletin of Economics and Statistics*, August 1973.

the net benefit to a developing country of such unbundling is always higher than more traditional forms of foreign investment, particularly where levels of protection are low and where foreign investment plays an important role in production for exports. Also, some developing countries are themselves becoming foreign investors, albeit still on a small scale, initiating that two-way flow of foreign investment that is typical of industrialized countries.[25] There is thus a growing recognition that providing a country's policy framework is appropriate, the international movement of firms can assist in the improvement of resource allocation and efficiency without damage to the balance of payments or national integrity.

The costs of obtaining technology from industrialized countries has been another important issue for developing countries. It has two principal aspects: the appropriateness of the technology being transferred, and the net cost of the transfer. Much again depends on a country's framework of industrial policy and on its education, technology and science policies. In the past some developing countries regardless of their relative abundance of capital compared to labour tended to regard highly complex and capital intensive technology as appropriate for all manufacturing industries. They opted, through trade and artificially low interest policies, for a capital and technology rich mix of industries, and tended to neglect opportunities for the adaptation of technology. The use of second-hand, especially recently obsolete, equipment, can be a cost-effective means of importing technology to a country with ample labour. It was often specifically barred. Where complex technology was part of a monopolistic or oligopolistic package, the costs have usually been very high. However, the developing countries' ability to adapt technology and to analyse its costs and impact has improved with industrialization, and many countries are now engaged in the planning of national policies for science and technology to enable them to select and develop appropriate technologies and to minimize the costs of technology transfer.

The current outlook

The developing countries are, for the most part, as aware of the problems that face them as their critics. But while the conditions of underdevelopment that led to pressures for high protection, for high capital intensity and for shelter from domestic competition have been mitigated, they have not disappeared. The policy-makers and administrators now reviewing industrialization policies to make them more responsive to the factor endowments of the developing countries and international production possibilities have to dismantle the accumulation of past policies before they can effectively introduce more appropriate measures. In the past 20 years or so the rapid growth of international trade made it relatively easy to pay for mistakes on the domestic front by rapid export growth. For the immediate future, prospects in international markets do not appear to be as favourable as they were in the early 1970s.

[25] Louis T. Wells, Jr., "The internationalization of firms from developing countries" and Carlos Diaz-Alejandro, "Foreign investment by Latin America", in *Multinationals from Small Countries*, (Cambridge, Mass., Massachusetts Institute of Technology Press, 1977).

Possibilities for international co-operation

The effect of industrialization in the developing countries on the international economy began to be important in the late 1960s when developing countries began to export manufactured goods on a sufficient scale to cause concern to competing domestic manufacturers and labour unions in industrialized countries. The consequent failure to lower tariffs on such labour intensive products as textiles in the Kennedy Round of tariff negotiations,[26] the imposition of "voluntary" and other non-tariff restrictions on products that the developing countries have found it easiest to export,[27] and the failure to reduce tariff escalation on some processed primary products[28] have limited the growth of manufactured exports of developing countries. But for most goods tariffs in high income market economies are very low; exports of restricted products, such as textiles, have continued to grow at some 7 to 8 per cent per year, and the manufactured exports from developing countries grew at 15 per cent or more between 1965 and 1976. Some of the more efficient producers were encouraged by the limitations on trade to diversify and upgrade their exports, thus increasing their export earnings.[29] In fact, during the 1960s and early 1970s supply constraints were more important than demand constraints. Some developing countries were not able to produce a sufficient volume of goods to fill their quota allowances.[30] The 1974-1975 recession severely constrained high income country markets, but the principal developing country exporters of manufactures showed an impressive recovery in 1976 and growth was again significant in 1977 with the high income countries' imports from developing countries growing much faster than their total imports.

The slowing down of the high income growth to levels below those of the 1960s and early 1970s is now expected to continue into the 1980s, and world trade, which is still dominated by the high income market economies is also expected to slow down. Just as the rapid expansion of the exports of manufactures in the late 1960s and early 1970s saw unbounded optimism, so the current situation is encouraging undue pessimism. It is true that the mid-1970s recession and persistent high unemployment levels in the high income market economies have led to a revival of protectionist sentiments. But protectionist action ' as been limited, and it has largely been directed at other high income countries. Several of the European countries, mindful of the short-term anti-inflationary role of competitively priced imports and of the longer-term necessity of keeping their markets open to maintain economic efficiency, are firmly holding the line against protectionist pressures. For many industrializing and non-industrialized countries supply constraints are still more important than demand constraints.

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[26] *The Kennedy Round: Estimated Effects on Tariff Barriers* (United Nations publication, Sales No. 68.II.D.12).

[27] R. E. Baldwin, *Non Tariff Distortions of International Trade* (Washington, D.C., Brookings Institution, 1970).

[28] Bela Balassa, The structure of protection in industrial countries and its effects on the exports of processed goods from developing countries", in *The Kennedy Round . . . , op. cit.*

[29] Ronald Hsia, 'Hong Kong textile exports: a case study of voluntary restraints", *Obstacles to Trade in the Pacific Area* (Ottawa, Carleton University, 1972).

[30] G. Shepherd, "Exports of cotton-type textiles from developing countries to the EEC and the UK, 1958-1967", Economics Department Working Paper No. 52 (Washington, D.C., IBRD, 1969).

The industrialization achievements of the last 25 years or so have opened up new options for the developing countries' policies with respect to exports of manufactures. There is further room for exports of labour-intensive manufactured products from developing to industrialized countries. The ratio of imports from developing countries to total consumption in industrialized countries is still low for many products, and it is in the long-term interest of the high income countries to move further out of labour-intensive production. However, the rate at which structural adjustment can take place in high income countries is limited. A high proportion of the workers affected are women, and many skilled occupations are, in practice, still closed to them so that their mobility for this reason, and because they are usually regarded as secondary income earners, is usually low. There are also dangers of over-production of labour-intensive goods in developing countries, akin to those that have occurred in tea, coffee and other tropical products.[31] Thus diversification within manufacturing has become as important as diversification into manufacturing was 10 years ago.

Current trends indicate that such diversification is taking place. Although labour-intensive, technologically simple products still account for the bulk of manufactured exports from developing countries, exports now include most branches of manufacturing, the range is expanding and a wide variety of new, not necessarily labour-intensive, exports is growing very rapidly.[32] Developing countries have come to account for a significant share of the transnational corporations' exports of manufactures. The diversification of the export mix through the transnational corporations often enables the developing countries to increase their penetration of high income country markets without arousing protectionist prejudices.

At present some 35 per cent of developing country exports of manufactures go to other developing countries, but the oil-rich countries of the Middle East account for about half of these exports. A rapid growth of trade between developing countries could have marked impact on their growth through gains in efficiency. However, such trade will not be easy to achieve. The principal obstacles lie in the high and escalating levels of developing country protection against imports, particularly those imports other developing countries can readily supply. The developing countries will require a patient and protracted negotiation effort to achieve substantial increases in trade with each other. The first steps will be particularly difficult, but as momentum grows transport and commercial services will develop, and internal structural adjustment is likely to become easier. Trade between developing countries is not, of course, a substitute for trade with high income countries, but, rather, should be a complement to it. The high income countries have to be able to increase their exports to import more from developing countries. Only in such circumstances can there be a boost to world economy.

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[31] H. F. Lydall, *Trade and Employment: A Study of the Effects of Trade Expansion on Employment in Developing and Developed Countries* (Geneva, International Labour Organisation, 1975) appears to argue for a total transfer of labour intensive manufacturing to developing countries.

[32] See Hal E. Lary, *Imports of Manufactures from Less Developed Countries* (New York, Columbia University Press, 1968) and A. H. M. Mahfuzur Rahman, *Exports of Manufactures from Developing Countries* (Rotterdam, Rotterdam University Press, 1973) for an account of the early growth of labour-intensive exports of manufactures. Balassa, "A 'stages' approach . . .", *op. cit.*, indicates the progress that has been made in the diversification of developing country exports of manufactures since the 1960s.

Prospects for regional common markets do not appear to be strong. The normal costs of customs unions or common market arrangements become much higher when the countries concerned have little industrial development or if they are at different levels of industrial development. Some of the smaller developing countries have been aware for many years of the limitations of their individual markets, and have therefore explored the possibilities of avoiding exposure to the full competitiveness of international trade and capital flows by developing regional markets. The Central American Common Market has been the most successful of these arrangements. Nevertheless its creation appears to have strengthened trends towards import substitution through excessive protection, capital intensiveness, bias against agriculture and skewed income distribution in favour of relatively high income urban groups with consequent limitations on overall growth. The difficulties of creating multinational (as distinct from transnational enterprises) have in practice proved to be very considerable, particularly in non-industrial regional markets where the smallness of national markets at first sight made them most promising. Many regional trade and common market arrangements are, of course, part of broader text books that indicate long-term comparative political objectives, but when economic and industrialization objectives alone are considered, the potential for regional arrangements is being viewed more cautiously with a greater awareness of the difficulties of establishing multinational enterprises and a greater emphasis on more broadly based gains from trade.

International trade, capital and migration movements are both complementary and substitutable and accordingly they cannot be examined in isolation. Both temporary and permanent emigration from developing countries to manufacturing occupations in high income countries has been a marked feature of the industrialized countries' growth in the last two decades, although the flow of permanent migrants has become increasingly restricted, and the recent recession in the industrialized countries led to a halt in the migration of "guest" workers and drew attention to this situation from the point of view of both the country of origin and the host country. The movement of capital from industrialized countries to developing countries to produce goods for export to the industrialized countries is, in particular, a substitute for migration from developing to industrialized countries but has somewhat different impacts.

Increasing worldwide attention to environmental pollution is another reason for shifting international location of industry. A given level of pollution control is generally less costly in a developing country with little industrial development than in an industrialized country with crowded manufacturing locations. However, many developing countries also have crowded industrial locations, and they are also concerned that location shifts may take place not because the cost of given levels of pollution control will be lower in a developing country but as a form of environmental dumping.

IV. The role of the government in industrialization

Government intervention is now so well established and pervasive even in essentially market-oriented economies that it requires no justification. The depression of the 1930s and the subsequent Keynesian revolution in economic thought indicated that a market economy could not be expected to be

self-equilibrating. During the Second World War there was increased government intervention in market economies and a growing recognition of the economic and social costs of market imperfections. Social aspirations in the second half of the twentieth century made previously acceptable inequities in the distribution of income intolerable. To developing countries seeking a model path to development, the rapid growth of the centrally planned economies proved persuasive, and for many strands of socialist thought the ownership of the means of production was an important building block. In developing country conditions only the government could supply the social and physical infrastructure—schools, roads, railways, ports, electricity and water supplies—on which industrialization depended so heavily.

For developing countries the government's role in industrialization has thus been part of an overall development responsibility to accelerate growth and ensure equity.

The role of developing country governments has often been particularly important in the initial stages of industrialization when experienced manufacturers were lacking. Technological innovation, the lumpiness of investment, economies of scale, and the presence in the world economy of large, experienced transnational corporations led to the creation of quasi-rents so that market prices (including returns to investment) often diverged so markedly from social prices that intervention was required to bring them back into line. Protection and subsidies for capital investment in manufacturing, tax concessions, production licensing and the establishment of public enterprises affected internal market prices moving them towards or away from social p..ces. International prices were not the stable, competitive prices of neo-classical textbooks that indicate long-term comparative advantage. Distortions in prices thus became a reason for government intervention which often led to new distortions requiring further intervention.

As in industrialized countries, the government role has been varied. It has acted as an entrepreneur through planning, direct controls and the ownership of enterprises, and it has been "an invisible hand" seeking to influence industrialization by giving individual manufacturing units appropriate price signals.

The government as an entrepreneur

Some developing countries have followed the lead of the Union of Soviet Socialist Republics and the centrally planned economies of East Europe in using planned industrial development to eliminate the frictions and wastes of the private enterprise system. It has been commonly supposed that as resources were scarce the developing countries could not afford the costs of failure and bankruptcy that were an essential mechanism for disposing of investment mistakes in the private enterprise system.

In many countries national planning units have thus engaged in planning economic development as a whole, attempting to plan manufacturing development according to particular economic and social criteria. Even where central planning has not been adopted, the government has identified potential investment areas, and in some cases even found local and foreign investors, adding an entrepreneurial function to the more conventional role of providing information for potential industrialists. The judgements of government officials have been substituted, at least in part, for those of private entrepreneurs to raise the social returns on manufacturing investment.

In many countries lacking indigenous entrepreneurship, governments have intervened directly to establish and operate manufacturing enterprises. In some countries they encouraged enterprise formation through public development banks or by supporting private development banks. Some countries divested themselves of public ownership as manufacturing grew; some have maintained an important role for direct government ownership in a mixed enterprise system; and some have opted for complete social ownership in the manufacturing sector.

The assumption of government entrepreneurial functions led to the evolution of social, in addition to financial, project evaluation to enable the officials setting up public enterprises and reviewing industrialists' proposals to choose between manufacturing projects on the grounds of their socio-economic desirability. Social project evaluation methodologies initially simply consisted of the rough quantification of such criteria as the amounts a project was likely to contribute to industrial output and employment, and its balance of payments effects. More recently, attempts at a more systematic evaluation of social prices and the likely distributive impact of projects have been made.[33] The use of project evaluation methods to improve the design of a project, at first a mere by-product of project evaluation methodology, has been a particularly valuable input into industrial development. The methodological and practical problems of project evaluation have not, however, all been resolved,[34] and, even more importantly, socio-economic evaluation has been largely limited to new and relatively large manufacturing projects. With the exception of fully centrally planned economies, the bulk of investment decisions—those concerning gradual expansions and those undertaken by small to medium-sized enterprises—have not involved the project evaluation network, although many small and medium-sized firms, of course, have in time become major producers. Nor would such controls be desirable in market and mixed economies. Countries that have attempted to control the decisions of small to medium-scale private enterprises, have usually, albeit inadvertently, restricted and repressed them.

An even greater difficulty concerns the impossibility of predicting comparative advantage in a methodologically sound way. At early levels on industrialization it is generally not difficult to decide which manufacturing enterprises should be established; only light consumer goods, construction materials, and usually a handful of export-oriented manufacturing activities are feasible. However, as the industrialization process expands the prediction of success for a manufacturing activity (or in a large country, the expansion of a branch of manufacturing) becomes fraught with risks. A country's natural resource advantages shift in the context of changing world natural resources and technological discoveries, there are changes in taste at home and abroad, and internationally there are new entrants into manufacturing. Comparative advantage cannot be predicted with certainty *ex ante;* there is some doubt, in fact, whether it can even be identified *ex post* with any precision. In economies producing a wide variety of complex manufactured products the wastes created by individual enterprise mistakes, whether private or public, are likely to become smaller than those of central direction. Centrally planned

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[33] See particularly Ian M. D. Little and James A. Mirrlees, *Manual of Industrial Project Analysis in Developing Countries,* vol. II, Social Cost-Benefit Analysis (Paris, OECD, 1969) and *Guidelines for Project Evaluation* (United Nations publication, Sales No. 72.II.B.11).

[34] See, for example, papers by Bela Balassa, M. F. G. Scott, Trent J. Bertrand and Raveendra Batra and Stephen Guisinger on shadow exchange rates, *Oxford Economic Papers,* July 1974, and papers by F. Stewart and others, "Cost-benefit analysis and income distribution in developing countries", *World Development,* vol. 6, No. 2 (1978).

economies tend to have grave difficulties in predicting local and foreign demand, and particularly consumer demand, even reasonably accurately; they also tend to have very serious balance of payments difficulties because comparative advantage is particularly difficult to anticipate in international trade. Some, therefore, are experimenting with various measures that could incorporate risk-taking by enterprises in the system without abandoning the overall direction of central planning. Although project evaluation methodology has become sophisticated, it is still not able to eliminate major risks in forecasting the success of investments, but rather is helpful in avoiding socially costly investments. It is not, moreover, a substitute for improved policies that bring market prices into closer juxtaposition with social prices; it may, in fact, by assuming undue entrepreneurial functions if used as such a substitute, create new costs.

The government as "an invisible hand"

If a market economy wishes to assure itself of a competitive, dynamic manufacturing sector responsive to changing comparative advantage, it has to have a broad entrepreneurial decision-making base. Enterprises, whether private or public, have to be permitted to make the entrepreneurial decisions. Policies that reflect economic and social priorities interact with economic forces to provide the rules of the game that determine the behaviour of the enterprises. It is true that in centrally planned economies policy decisions are built directly into planning directives, but whether explicitly or implicitly, the same range of policy decisions affecting judgements on social prices vis-à-vis existing national and international prices is made by the central planners as by those who determine policies that affect industrial development in market economies.

An industrialization strategy is made up of policies that emanate from a number of ministries that usually include trade, foreign exchange and other monetary and credit policies, taxation, labour, and location policies among their responsibilities. Policy-makers are faced with a plethora of market imperfections and with a considerable range of sharply fluctuating "international" prices for most manufactured products. In practice, "border" prices turn out to be a nightmare conglomeration of qualities, differing c.i.f. quotations according to countries of origin, and in the case of capital goods, terms of interest on supplier financing. Many policies that are primarily designed to affect other sectors such as primary production, transport, construction or services, or such issues as income distribution, also affect the behaviour of manufacturing enterprises. A new government or minister can not sweep the chessboard clean and start a new game. It is sometimes said in countries with an ancient cultural heritage that while new laws are constantly added, none have been repealed for 2000 years or more.

The design of an industrialization strategy is thus a much simpler task than its execution through changes in the complex of relevant policies. Existing policies that have grown up over a number of years are usually far.from cohesive. Indeed they are frequently in conflict. Complex and conflicting policy frameworks have become costly to enterprises and to the economy in many countries. The efficient administration of policies is as important as their careful formulation and it is usually even more difficult. The filling out of forms and other bureaucratic procedures are endlessly time-consuming and can impinge quite heavily on the availability of the scarcest resources, entrepreneurship and management, in developing countries. The

manufacturers who so frequently fill the waiting rooms of ministries should be on the factory floors. Monopolistic quasi-rents and "dead weight" rents[35] mulitply as conflicts among policies negate the intention now of one policy, now of another. In many countries it is not parliaments and ministers of state, but petty officials that rule. Of course, these very conditions create strong vested interests in the administrative and private sectors that make policy reform very difficult.

The analysis of exchange, trade, and to a lesser extent, credit policies for industrialization has led to a series of policy reform prescriptions in these areas in the last decade. Although the analysis has been based on a partial equilibrium, largely static approach that assumes a competitive market framework as a starting point, the resulting discussion has been effective in identifying the principal obstacles to industrial development. It has thus proved to be a useful tool in the refinement of industrialization strategies and associated policy reform. In the long run, industrialization strategies tend to merge into one another. "Import substituting", "basic industry", "resource based" and "export oriented" countries tend to build a broad industrial base with a significant export sector if they are medium-sized to large countries, and a more specialized, more export-oriented pattern of manufacturing if they are small to medium-sized countries. Their industrialization strategies only describe their industrial progress in very broad brush strokes. The production of consumer goods, the exploitation of natural resource processing opportunities, relatively early entry into such intermediate and capital goods as construction materials and transport equipment, are broadly characteristic of all industrial development. Policy differences, however, appear to be critical for the differing evolution of manufacturing industries during the industrialization process.[36] The refinement of existing analysis, and the extension of industrialization policy analysis into such areas as taxation, location and labour are likely to be important steps in accelerating industrial development.

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[35] Anne Krueger, "The political economy of the rent seeking society", *American Economic Review*, June 1974.

[36] Hollis B. Chenery and Moises Syrquin, *Patterns of Development, 1950-1970* (London, Oxford University Press, 1975), discuss patterns of industrial development according to the size of countries and their natural endowment.

Research on appropriate technology*

*Larry E. Westphal***

Recent interest in appropriate technology stems from dissatisfaction with the development process in a number of developing countries. On the one hand, the pace of development, as reflected in an aggregate index such as *per capita* real income, has been disappointingly slow. On the other hand, the fruits of development appear not to have been distributed evenly among members of society. In view of the close connection between technological change and development, it is argued that public action must be directed towards the selection and design of appropriate technologies. It is sought here to clarify the issues concerning appropriate technology and to identify areas where further research is required to improve the design of public policy as regards the choice of technology in the manufacturing sector.

Focal issues

The issues concerning appropriate technology can be formulated in terms of the objectives, constraints, and policy variables of a generalized planning model. From this perspective, public action is directed towards maximizing social welfare subject to constraints that specif: the system's responses to such action.[1] Thus one important set of issues concerns the selection of the objectives to be sought and the relative weights to be placed on each, i.e. the definition of social welfare.

Dissatisfaction with the development process in a particular setting results from unexpectedly low levels of attainment of the desired objectives. This may stem from the objectives being differently weighted by the policy makers than by the observer; for example, the importance given to a more equitable income distribution may differ. Other reasons are either the infeasibility of achieving the expected levels of attainment of objectives or incorrect public action. With respect to the former, it may not be possible to achieve the expected level of social welfare under any programme of public action because of technological constraints or because of the behavioural characteristics of the system.

Several courses of action are open to resolve the dissatisfaction: *(a)* where the policy makers' objectives are believed to be incorrect, an effort, as much educational as strictly political, should be made to persuade them to adopt different objectives; *(b)* where the objectives are agreed upon, it must first be established whether the expected levels of attainment of objectives can be realized. If not, the operative constraints would have to be identified. A revision of expectations may be necessary;

[1] As used here, the term "public action" encompasses all instruments available to the government: price policy, tax, tariff and subsidy policies, quantitative controls of various forms, the operation of public enterprises, the establishment and operation of technology extension and research institutions, and so on.

however, constraints are rarely absolute and immutable—technological change or changes in the system's behavioural characteristics can be sought. If the expectations appear to be realizable. then changes in public actions are required. In this case, there would be no effort to change the fundamental behavioural relationships within the system (including its capacity to generate technological change); instead, these would be taken as given and the optimal package of public action would be designed based on them.

Rather than follow only one specific course of action, a number may be pursued simultaneously owing to uncertainty as to where the fault lies. In fact, the literature on appropriate technology reflects all of these courses of action. Research activity directed towards improving development performance must be based upon a clear understanding of the causes of dissatisfaction. Research activity is costly and uses scarce resources; a cost-effective programme of research must be sought that will achieve maximum results for a given level of expenditure. The areas of possible research can be organized along the lines of the foregoing discussion.

If it is sought to establish objectives that reflect the aspirations of all members of the society, it is necessary to investigate those aspirations, determine procedures whereby agreement on the social welfare function can be reached, and establish political processes through which policy makers' objectives are made to correspond to the agreed-upon social welfare function. If the political system is accepted, then means of working within the system to change the objectives of the policy makers must be sought. All of this is work for the political scientist rather than the economist.

However, the pursuit of multiple objectives introduces an issue on which economists have expertise. The complexity of efficient decision processes increases as additional objectives are introduced. To the degree that objectives are compatible, so that the pursuit of one is not at the expense of another, trade-offs need not be considered; it is sufficient to focus public debate only on the set of conflicting objectives. Research on the complementarity of alternative objectives is therefore very valuable; for example: To what extent does the objective of maximizing *per capita* real income conflict with that of evenly distributing the rewards of development? [2] Furthermore, the weights to be placed on various objectives appear difficult to define until something is known about the trade-offs between them. Thus, the present concern with income distribution as an independent objective resulted in large measure from recent development experience which has shown that rapid development need not be accompanied by an even distribution of its fruits. Investigations of the trade-offs among objectives help to better define the weights to be used in the objective function.

Even where it is assumed that mechanisms exist to implement any desired allocation of resources, so that the question of feasibility is purely technological, the feasible levels of attainment of objectives cannot in practice be fully established. For example, it is often contended that the use of more labour-intensive techniques would simultaneously raise aggregate output and equalize the distribution of development gains; however, it is not known by how much output and employment would increase.[3] The full range of existing production techniques for each of a sufficiently diverse set of products has not yet been comprehended in a manner that would enable the necessary projections to be made. But even were the full range of

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[2] For a recent investigation of this particular issue, see Chenery and others [36].

[3] A recent survey of research concerned with this issue is contained in Cline [10].

production techniques known, the answers would be misleading if individual economic agents have only an imperfect knowledge of these techniques. Furthermore, that a particular set of expectations is unfeasible under existing technology does not mean that it would be unfeasible if new production techniques were developed. The issues that arise here may be summarized as follows: What is the existing production technology (the set of all production techniques presently known wherever and whenever practised)? What elements of the existing technology are understood by agents in the system and how can their knowledge be broadened and to what effects? What are the possibilities for developing new production techniques and how should they be developed?

The question of feasibility is by no means only technological; it also involves the institutionally determined behavioural relationships that affect how resources are actually allocated and technologies chosen. Within the literature on appropriate technology, the issues related to the organization of production have centred on small-scale versus large-scale enterprises, traditional versus modern production methods, subcontracting patterns, capacity utilization rates, marketing schemes, regional decentralization, management skill requirements, labour skill requirements, and the like. Knowledge of the issues involved is spotty.

In order to select an optimal package of public actions, the system's responses to different public policies must be predictable. Satisfactory predictions cannot be made because the mechanisms through which resources are allocated, either in the public or private sectors, are not fully understood. Even where a particular mechanism is assumed, predictive ability is often lacking. What, for example, is the effect of protectionist trade policy on technological progress? Only recently have the relative efficiencies of alternative policy instruments used to pursue a given target begun to be evaluated. Thus, here too there is ample scope for productive research. In addition, there is a need to make the results of such research known to policy makers. Government activity may not be conducted as rationally as it could be given the present knowledge, in which case efforts towards improving public policy formulation and implementation are in order. This involves not only policies towards the private sector, but the tools of management science as well.

The particular concern of research on appropriate technology might appear to be with the issue of feasibility, in so far as the emphasis is on technology. However, this appearance is misleading. For, as is now understood, the use of inappropriate technology may result from the pursuit of incorrect objectives, the incomplete perception of existing technological choices, the non-existence of appropriate technologies which would permit the fulfilment of expectations, institutionally determined behavioural constraints, or the choice of incorrect public actions. To which of these possible causes should research be directed? In particular, how much research effort should be devoted to the purely technological aspects of the problem? Given the uncertainty regarding which of these is the most significant cause of dissatisfaction with development as it has taken place in many countries, a balanced and diversified portfolio seems best.

Discerning the appropriate technique

Within the context of a generalized planning model, an appropriate technique is one that is used under the resource allocation that leads to maximum social welfare. Under this definition, an appropriate technique exists only for those specific

products that would be produced domestically under the optimal allocation. In addition, it will be found among the production techniques that are known rather than among those that might be developed. The term "appropriate" is not always defined in this manner; often, when the use of appropriate techniques is called for, what is really being asked for are the research and development (R & D) directed towards finding them. There are thus two uses of the term "appropriate": *(a)* as a criterion to select one of many known techniques; and *(b)* as a criterion for directing R & D to develop new techniques. Establishing and applying criteria for directing R & D are clearly far more difficult than determining and using criteria for selecting known techniques. the discussion below relates specifically to criteria for selection, but most of the comments apply as well to criteria for development.

Can a more specific definition be given of "appropriate"? In terms of its characteristics, appropriate technology has been variously defined by comparison with capital-intensive, modern (i.e. Western) technology, urban industrial technology, and large-scale technology, and by identification with rural-based technology, labour-intensive or capital-saving technology, small-scale technology, and low-cost technology. (Jackson [16]). But the proponents of appropriate technology shy away from even these rather vague characteristic definitions, since a particular characteristic (e.g. small-scale) may validly describe what is appropriate for the production of some products in some countries but not what is appropriate for other products or other locales. In recognition of the fact that there can be no simple designation that is valid in all circumstances, proponents have advanced more general terms including intermediate, middle level, and progressive (Marsden [23]).

The term "appropriate" is itself one of the general terms that has come from the literature on technology and development. All authors agree that the fundamental requirement of an appropriate technology is that it make optimum use of the available resources in a given economic environment - but this is merely a restatement of the definition given at the outset. In their proper reluctance to identify any single characteristic with "appropriate", many authors have settled on circular definitions that define "appropriate" in terms of the effects of using an appropriate technology; such definitions are polemical rather than operational.

A specific criterion for what is appropriate is given in the literature of benefit-cost analysis. The objectives of the development process are most often formulated at an economy-wide level, far above the level at which individual technological choices are made. While the social welfare that is achieved is the compound result of such individual choices, to make these choices so that social welfare will be maximized is, to say the least, difficult. Only in the economist's ideal type, the competitive system, is there a mechanism whereby individual choices must achieve the desired overall allocation of resources and the selection of the appropriate technology in each case. Through the use of "shadow prices" and benefit-cost, project appraisal criteria, economists have been trying to devise choice mechanisms that would permit individual choices in the real world to be made on the basis of, and to achieve, the maximum social welfare. But economists still have a long way to go, particularly in the inclusion of multiple objectives.

Some idea of the problems involved in tying individual choices back to the rest of the economy can be gained by reflecting on the several examples of technology cited by Marsden [23] as being inappropriate. Taking only one, Marsden refers to a case in which 500 artisan shoemakers were displaced by 40 workers making plastic footwear with machines costing $100,000 and using imported plastic material. As

presented by Marsden, this is indeed a horror story if he is correct in assuming that the displaced resources (capital, labour, land), both in the shoemaking industries and in the industries supplying materials (leather, glues etc.), had no alternative employment at comparable levels of remuneration; that the capital invested in the machinery could have been put to more productive use elsewhere; that the demand for footwear was fixed irrespective of its prices; and that consumers did not differentiate between new and traditional footwear types (or should have?). As regards the latter point, because of mass production, plastic footwear can be very cheap; it also tends to be relatively durable and wear resistant. Thus plastic footwear may be a more appropriate product for low-income consumers than is traditional footwear, though as regards production technology, the latter may be the more appropriate. A complete assessment thus requires evaluating the gains in real income to all individuals, producers and consumers alike.

In the case Marsden cites, it may have been sufficient merely to "look around" to see that the necessary assumptions were valid, but it is not always so simple and the issue is rarely so clear. There are developing countries in which the choice of plastic footwear would have been appropriate. As regards making a systematic evaluation, it might appear that the value in alternative employment of the displaced resources and the invested capital could be determined by using market prices. But first it would have to be determined whether market prices truly reflected relative scarcities in terms of social welfare; if not, there would be the difficult job of estimating shadow prices that would correctly reflect values in alternative employments. Here it must be noted that there is rather widespread dissatisfaction, on a number of grounds, with the shadow price estimation procedures and project appraisal criteria presently available, so that research in this area is vital (Rhee and Westphal [38]).

The development of better criteria is obviously necessary, but it is not sufficient to guarantee that decisions will actually be made on the basis of these criteria. In order to ensure that profit-maximizing decision makers in a market economy will select the appropriate techniques. ways must be found to make market prices more nearly correspond to shadow prices. This is not easily accomplished, for the effects on the distribution of income and investment behaviour of bringing market prices into full equality with shadow prices may be pronounced and could have major political consequences. In turn, the substitution of public enterprises or other forms of ownership and management for private enterprise does not automatically overcome these problems; means must still be found to determine and motivate appropriate technological choices. There is consequently a pressing need for research on public policies that will lead individual decision makers, whether in the private or public sector, to make those decisions that will maximize social welfare – it is not merely a matter of designing criteria, they must also be applied, or at least choices must be consistent with their application.

Feasibility given existing technology

The early (roughly pre-1974) literature on appropriate technology consisted largely of anecdotal evidence in support of the argument that greater efficiency, higher employment, and thereby higher aggregate output distributed more equitably would result from selecting and/or creating labour-intensive production techniques (Pack [31], Ranis [34]). Whether this argument is correct or not turns on the range of

alternative production methods through which any given product can be produced.[4] Within the economics literature there are numerous investigations of the scope for substitution among inputs. But before turning to these, several terms must be defined.

Many economists have found it convenient to assume the existence of a production function that fully specifies, in the form of an isoquant diagram, each and every known (at a specific time) and efficient combination of capital, labour and all other inputs that can be employed to produce a given amount of output.[5] Given the concept of a production function, it naturally follows to distinguish between *(a)* changes in actual production technique within the same production function; and *(b)* technological changes that lead to a new production function as well as to a change in actual production technique. In the usual parlance, capital-labour substitution is thought of as coming into the former category and technological progress as coming into the latter. There are serious questions whether such a distinction is either conceptually or operationally useful in the context of development dynamics.[6]

If such a distinction can be made, then it turns on the relative difficulty of obtaining technical information concerning alternatives to current practice in a particular setting. While it is easier to obtain information regarding "points" on the existing production function (by the very definition of the production function), it may still be quite costly for either a producer or a researcher. For the purposes of this paper, "alternative production techniques" will include those that exist and can be determined by search activity as well as those that could be developed given the state of scientific and technological information. This definition is chosen in the belief that a sharp distinction between search and development is meaningless; both entail costs to the decision maker. (An argument along similar lines is more fully articulated by Nelson [29].)

The absence of a clear distinction between changes within the same production function and changes through technological progress makes it impossible to determine precisely feasibility given existing technology. What is determined to be feasible depends upon the effort expended to obtain technological information; technological change merely represents a polar case in which a "new" technique is developed. And, technological change itself covers a wide variety of changes in production techniques, from minor adaptations through radical innovations.

In most of the following discussion, "technology", "production technique", and "production method" will be used interchangeably to denote a specific process for the production of a concretely specified good or service. A process is described by a list of its input requirements (labour, capital, and materials) along with the supporting documentation (engineering drawings, routing sheets, tool specifications etc.) required for actual production. "Labour", "capital", and "materials" are to be thought of not as homogeneous aggregates but in terms of requirements for specific grades of labour, individual machines (including tools, plant etc.), and particular intermediate inputs. It must be stressed that we are speaking in specific terms and

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[4] For more comprehensive and detailed surveys than that which follows here, see Morawetz [24] and White [49].

[5] An efficient technique, i.e. combination of inputs, is one that uses less of at least one input than is used by any alternative technique to produce a given level of output. A technique may be efficient at some, but not at other, levels of output.

[6] These questions are encountered whenever one deals with production methods at the most detailed level; they are neglected in econometric estimation of production functions which rarely use data below the plant level.

not at a general level. However, where it is convenient or necessary to speak in more general terms, "technology" will be used with the context being relied upon to distinguish its meaning.

Economists' investigations of input substitution fall into five broad categories: econometric estimation of production functions, estimation of engineering production functions, input-output studies, process analysis models describing production processes, and descriptive studies. To the degree that these investigations are based on data pertaining to actual production in the past and present, they do not embrace possible future technological progress. In particular, econometric estimates are almost always based on historical data, and most frequently on data at or above the plant level. Estimates at this level of aggregation over processes fail to distinguish between input substitution through changes in the method of producing a specific product and that through changes in the mix of products produced within the sector for which the production function is estimated.[7] Nonetheless, data at the plant, establishment, and especially firm level are far more readily accessible than are data at the process level, so that most investigations by economists are econometric in nature and employ data aggregated to the plant level or above. Almost without exception, econometric estimates indicate a wide range of possible substitution among factors (Bruton [7], Morawetz [25]).

However, beyond their use to indicate relationships at a rather broad level, it must be concluded that the existing econometric studies are not well suited to identify the range of substitution possibilities within particular industries (Acharya [1]). They relate only to the technologies actually used within the sample of plants from which the underlying data were drawn; they do not sufficiently distinguish between different inputs and different specific production processes; there are a number of problems in the specification of the production functions fitted that make it difficult to interpret the results (Johansen [18]); and, the parameter estimates (particularly of the degree of factor substitution) are quite sensitive to the body of data used and the precise specification of the model.

Engineering production functions come the closest (if not as close as is possible) to isolating input substitution. "Analytical" engineering production functions are derived directly from the "laws" governing physical and natural phenomenon (i.e., the relationships investigated by the physical and natural sciences). Unfortunately, analytical functions have been developed for only a few processes, while it appears that the approach is not as promising as once thought because of the severe mathematical problems in going from the relations governing the underlying processes to the relationship between inputs and output.[8] "Experimental" functions are based on experimental results for the production process being investigated. The author knows of no studies employing the "experimental" approach to estimating engineering production functions; however, many of the process analysis studies border on using this methodology.

Input-output studies are generally conducted at too high a level of aggregation to be of much value, though there have been some interesting studies of technological change using the input-output approach (Carter [8]). Process analysis, a close cousin to input-output analysis, appears to be the most fruitful method of investigating

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[7]The current state-of-the-art is well reflected in Griliches and Ringstad, where plant-level data are analysed [13].

[8]On the methodology of engineering production function analysis, see Chenery [9]; Solow [43] passes the judgement made here.

production alternatives, for it makes possible analysis at an operationally meaningful level of detail. Moreover, it has the potential flexibility to deal with almost any production process in which there is a well defined output, and a large body of relevant studies of production techniques exist for the "process industries", where production takes place in a continuous flow (e.g. cement, petroleum refining, chemicals, metal refining, and metal products such as rolled sheet) rather than in discrete units.[9] There have also been a number of studies of agriculture employing process analysis models.

While investigations using process analysis have the greatest relevance to the identification of appropriate technology, they have the major draw-back of being very expensive because of the mass of data that must be collected (usually starting from scratch), assembled into a meaningful format, and then analysed.[10] Moreover, no single process analysis study can answer all of the questions that are relevant to assessing the scope for input substitution, even with respect to a single product that is analysed exhaustively. And, unfortunately, there is no firm basis on which to determine whether valid generalizations on input substitution can be made from studies of narrowly defined product groups, however detailed those investigations might be.

Descriptive studies use an approach that is very close to process analysis, but without formalizing it into a mathematical model. Most of the recent spate of studies investigating the scope for input substitution within manufacturing fall within this genre.[11] These studies were prompted precisely by the concern of development specialists for whether there is any possibility of substituting labour for capital vis-à-vis the techniques being transferred from developing countries. Taken together, they demonstrate that there is indeed scope for efficient input substitution in the production of many manufactured products, such that the appropriate technique for use in a developing economy would, in some cases, provide employment for as many as 10 times or more workers than would be employed with a reasonably "advanced, modern" technique.[12]

Some of these studies find that the appropriate technique, i.e. that which would result in maximum social welfare, is often not the technique that has been chosen. Various reasons may be adduced to explain this finding, including the departure of market from shadow prices, lack of profit maximization, and failure to search exhaustively among the available techniques.[13] Another explanation, more frequently offered by commentators on these studies than by the investigators themselves, is that it is the study itself which is "at fault" for not having appreciated all of the elements that went into the choice. In turn, it is not unusual to find a great deal of scepticism on the part of commentators to the rather wide scope for efficient substitution that is revealed by the entire set of studies, leaving aside the question of whether a particular choice was in fact appropriate.

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[9] The seminal reference on applied process analysis is Manne and Markowitz [21].

[10] On problems of data collection and assembly, with specific reference to mechanical engineering activities, see Nam, Rhee and Westphal [28].

[11] See, for example, the studies appearing in Bhalla [5]. In turn, examples of recent studies employing the process analysis approach are contained in the recent special issue of *World Development*. vol. 5, No. 9/10 (1977).

[12] Wells [48] and Rhee and Westphal [37] provide explicit estimates that are within this range.

[13] With respect to the cases they have investigated, these explanations are favoured respectively by Rhee and Westphal [37], Wells [48], and Morley and Smith [26, 27].

Much of the scepticism that is encountered derives from a focus on alleged constraints to the adoption of more appropriate techniques. Often cited in this connection is the scarcity of the management and labour skills thought necessary for the effective operation of what might otherwise appear to be appropriate production methods. Thus it is argued that smaller scale and/or more labour-intensive production methods require a larger input (of a different type) of management and organizational skills. Equally, it is observed that mechanization (i.e. the substitution of capital for labour) frequently permits the substitution of less skilled for more highly skilled labour, so that more labour-intensive methods may require higher skilled labour.

These assertions as regards the characteristics of alternative technologies are often valid [14] but to jump to the conclusion that capital intensive methods are therefore superior begs an important question in that it assumes the scarcity of requisite skills to be immutable. The real issue is whether the social return to the construction of plants that embody capital-intensive methods is greater than that to investments which combine human capital formation with the construction of plants that embody more labour-intensive production methods. Moreover, it should not be forgotten that even projects to construct capital-intensive plants include management and labour training components, which can account for a substantial share of the entire project cost. Conventional project design thus does not take all constraints as being immutable.

There are other trade-offs in addition to that between investing in physical and specific types of human capital that must be considered as well. For example, a frequently mentioned constraint as regards the employment of used equipment, which often embodies more labour-intensive methods than do currently produced types of equipment, is the difficulty—if not the impossibility—of obtaining replacement parts for the maintenance and repair of the equipment. Here the neglected trade-off is between investments in the production process and in local facilities to produce, through copying, replacement parts that can no longer be purchased on the market.[15] The general point that underlies this discussion is that the design of investment projects is not simply a matter of choosing the production technology to be embodied in the plant. Project design is also concerned with means to overcome what would otherwise constrain, or increase the cost of, project implementation. Explorations in this regard should by no means neglect ways to alleviate possible impediments to the adoption of ostensibly more appropriate techniques.

Several possibly fruitful foci for exploration, other than those implied above, deserve mention. First, much of the anecdotal evidence suggests that input substitution often centres on a change in the raw materials used, especially in terms of their quality (Ranis [34]). One observer (Chudson, commenting on Baranson [3]) has even suggested that most innovations appropriate for developing countries have been, and will continue to be, found in the area of raw material utilization, and not in the direction of capital-labour substitution. In turn, it is not infrequently observed that the presently available, labour-intensive techniques are wasteful of raw materials

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[14] It should, however, be noted that with respect to labour skills, it is also generally the case that equipment embodying greater mechanization requires far more highly skilled labour for its maintenance and repair.

[15] This is not to suggest that there are no other problems associated with the employment of used equipment; for an excellent discussion of the full range of problems, as well as of possible ways to circumvent them, see Cooper and Kaplinksy [11].

in some cases.[16] However, it is not always true that reducing material wastage requires more capital-intensive techniques (Ranis [34]). More generally, it needs to be recognized that techniques cannot be judged solely on their relative use of labour and capital; raw material and energy use, environmental impact, and a host of other factors must also enter into the calculus that determines which is the "appropriate" technique.

In many cases it appears that the greatest scope for capital-labour substitution relative to best practice Western technology is in ancillary processes; machine-peripheral and plant related activities as contrasted with core activity in Ranis's [34] terminology, or material receiving and handling processes, packaging, and storage versus material processing in Pack's [31] language. In fact, the majority of the labour force employed in most plants is involved in ancillary activity. However, since it is in this type of activity that adaptations are most likely to have occurred, it may be questioned whether there remains much scope for capital-labour substitution in these areas.

Nor should it be concluded that there is no scope for capital-labour substitution in the core or material processing activities vis-à-vis best practice Western technology, though here the prospects differ greatly as among industries. Generally speaking, the scope is least in the continuous flow, process industries, including such subsectors as metal refining and chemicals. But even in these industries there is increasingly scope for reducing the cost of capital inputs through purchasing equipment produced in developing countries. This mode of capital-labour substitution, which exploits the emerging comparative advantage of the semi-industrial countries in skill-intensive mechanical engineering activities and involves at most only minor differences in the embodied production technology, has heretofore received relatively little attention, but the pay-off in terms of lower investment cost per worker can be quite handsome. Equally, there is some evidence that developing countries produce equipment embodying more appropriate techniques for those industries in which the scope for capital-labour substitution is relatively great.[17] Care must be taken, though, not to see the production of capital goods in developing countries as a panacea; the capital goods sector in these countries continues to be an infant industry with many problems to be overcome (Pack [32]).

There still remain important questions to be answered regarding the scope for capital-labour substitution in manufacturing, even for some of those industries that have been the object of recent research. Without doubt, the most serious questions concern the degree and nature of increasing returns to scale. Historically, capital-labour substitution has accompanied the change to larger scale production units in the Western economies. Published research leaves open the question for many individual industries whether there are economies of scale such that high volume production is both less costly and more capital intensive (at the same price for inputs) than is low volume production.[18] But the scope for capital-labour substitution is obviously greatly reduced if economies of scale cause efficient production to be large-scale and capital-intensive. In turn, the coexistence in reality

[16] See, for example, Baron's study of sugar-processing techniques in Bhalla [5].

[17] See, for example, the study of can-making by Cooper and others, in Bhalla [5], and Rhee and Westphal [37].

[18] For a recent survey of the literature on economies of scale, see Silberston [41]. The influence of economies of scale on capital-labour substitution is investigated over a small sample of activities in F n [6]; also see Boon's study of metalworking processes and Stewart's study of brickmaking in Bhalla [5].

of large and small firms using capital- and labour-intensive techniques respectively could then only be explained by transportation costs and market "imperfections" such as market segmentation and product differentiation.

Mention of product differentiation raises another set of issues, namely those connected with product design and quality control. Above all, it must be stressed that the detailed, micro research that has uncovered substantial scope for capital-labour substitution in various industries has generally been very careful to hold product design and quality control constant, so that the alternative techniques produce products of identical characteristics and performance. Thus, for example, it has been found that labour-intensive methods can produce textiles of exportable quality, identical to those produced using best practice Western technology (Rhee and Westphal [37]). Nonetheless, as Baranson [2, 3], among others, has repeatedly stressed, in some industries capital-labour substitution necessarily results in a change in the degree to which objective product standards (e.g. tolerances) are met, if product design is not changed. Alternatively, capital-labour substitution is sometimes not possible without changes in the design of the product.[19] Moreover, it is certainly the case in all industries that the scope for capital-labour substitution is greatly widened by permitting product design changes.

The foregoing discussion has concentrated on manufacturing activities, where research has largely focused on the technological feasibility of input substitution and, though to a lesser degree and not nearly as systematically, on the explanation of inappropriate choices of technology.[20] Research in regard to other activities—in agriculture, social overhead, and services—has tended to give greater and more systematic attention to a wider range of issues, including the influence of institutions and the interaction between economic and social factors.[21] This difference in research emphasis undoubtedly relates, at least in part, to the more active direct involvement of government in these other activities.

In discussions of development strategies that meet basic human needs, the point is increasingly being made that choice of technology extends to the design of products, in terms of their characteristics and performance, and of systems to deliver public services.[22] Indeed, with respect to the provision of public services, institutions such as the World Bank have for some time emphasized questions of design standards, largely in recognition of the fact that there is a trade-off between the standards that are set and the number of people that can be served.[23] While certainly warranted, especially with regard to publicly provided goods and services, the introduction of design considerations complicates analysis, for it is not then possible to consider technological choices independently of the forces determining demand.

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[19] But greater labour intensity does not necessarily imply "inferior" product design or poorer conformance with design standards. In this connection it is worth remembering, for example, that the finest racing automobiles are produced by very labour-intensive methods (at the low volume of production, mechanization does not pay off).

[20] There has also been a good deal of research concerned with the conditions of "technology transfer" (see, for example, Vaitsos [47]) but no attempt is made to cover this work here. In turn, polemical discussions and suggestions for public policy have ranged across a much wider set of issues, but have not always been well informed by relevant research.

[21] With respect to agriculture, for instance, see the article by Gotsch in Edwards [12].

[22] Singer [42] and Stewart [44]; also see the latter's article in Edwards [12].

[23] See, for example, the World Bank's Sector Policy Papers on Health (March, 1975), Urban Transport (May, 1975), Housing (May, 1975), and Rural Electrification (October, 1975).

Only now are economists beginning to develop tools that can simultaneously entertain input substitution and demand preferences.[24]

In turn, research in the scope for capital-labour substitution in civil construction highlights other elements that have been neglected in the extant investigations of manufacturing activities. While labour-intensive methods are technically feasible for a wide range of construction activities, for which they achieve product standards equal to those of more capital-intensive methods, traditional labour-intensive methods are not economically competitive even at extremely low wage rates. However, traditional methods can be made economically competitive even at modest wage rates by adapting them through introducing improved tools, proper wage incentives, changed project organization, and more careful management of the work (Sud, Harral, and Coukis [45]). Interactions between the organization of production and the choice of technology have not been systematically analysed for manufacturing. Equally, the need to adapt traditional methods to render them economically viable reinforces a point made earlier in the discussion: all of the research that has been undertaken to examine the scope for input substitution strongly suggests that there is, in many cases, a high pay-off (in terms of social welfare) in searching for, and then carefully evaluating, possible means to overcome what would otherwise be constraints to the adoption of ostensibly more appropriate techniques.

Development of new technology

The quest for appropriate technologies must be extended beyond the selection between known alternatives to the development of new techniques; this will affect the technological constraints of the system. To answer the question: Can individual producers be expected to allocate sufficient resources to R & D? it is necessary to examine what is known about R & D activity. There has been very little systematic research into innovation in the developing countries; thus the discussion below is based on experience in the developed countries.[25]

Innovation is almost always induced as a response to a perceived need that is generally stimulated by changes in factor or material input prices or in demand conditions. In turn, most of the R & D carried on in the United States of America is product development (which of course involves new processes) rather than the development of better production processes. Assuming that this is a rational allocation of R & D funds, it reinforces the argument that work on product design and process selection must go hand-in-hand. Moreover coupled with the stimulus-response mechanism that seems to be at work—aptly captured in the phrase "induced innovation"—the result is strong support for the argument that

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[24] The most promising approach on the demand side appears to be that suggested by Lancaster [20]. An example of its application to manufacturing activity is given in a study of sugar processing by James [17].

[25] The following observations have been culled in large part from surveys by Gruber and Marquis [14], Kennedy and Thirlwall [19] Mansfield [22], Nelson and others [30], chap. 3, 4 and 5, and Scherer [40], chap. 15 and 16, each of which is an excellent summary of the state of knowledge in this field. In turn, what is said below is not at variance with the emerging results of systematic research on innovation in developing countries that is now in progress under the auspices of the joint Inter-American Development Bank/Economic Commission for Latin America Research Programme in Science and Technology and at the Science Policy Research Unit at the University of Sussex, Brighton, England.

the innovation and adaptation leading to the design of appropriate technologies must be closely tied to individual producers.[26] But, it has also been found that R & D activity is concentrated in large firms, in a few industries and product lines, and on short term, applied effort characterized as "modest design improvement" (Nelson and others [30]).

There appear to be economies of scale in R & D activity, such that a minimal scale must at least be achieved. Within manufacturing, the concentration of R & D activity is in those industries that produce capital goods and the major intermediate inputs (chemicals, fabricated metals) used elsewhere; industries using these products benefit from the R & D activity in the key producers-goods industries. Whether such an organization of R & D is appropriate depends vitally upon the relationships between suppliers and users; where these relationships are not well established, as they may not be in many developing countries, it is likely that there would be too little R & D activity. In addition, under such an organization, it seems doubtful that very much effort would be expended towards designing new consumer products.

The concentration of private R & D on modest design improvement, if it carries over to developing countries, would appear to imply that private market allocations would be sub-optimal. Most of the examples of technological adaptations actually observed in developing countries are quite modest; for example, increasing machine speeds (Pack and Todaro [33] and Ranis [34]). It may be tentatively concluded, then, that major technological adaptations and innovations—of the sort that the proponents of appropriate technology have in mind—will not be forthcoming in significant numbers if all R & D activity is left to the private market.

But merely to conduct R & D under non-market sponsorship is not enough; it still remains that most of the vitally important adapting and innovating will come from individual producers. While such activity will largely result in modest production engineering and product design improvements (which some observers would not term innovation), its role must not therefore be minimized. Indeed, most technological progress results precisely from modest improvements carried out by producers, through a form of learning-by-doing. An environment conducive to decentralized innovation and a market structure in which improved techniques and product designs are rapidly diffused are the indispensable condition of rapid economic development (Kennedy and Thirlwall [19], p. 61). Mansfield [22] gives an excellent survey of the knowledge that can be brought to bear and of the areas in which further research is needed. (Also see the later volume, Mansfield and others [46].) Here are only emphasized several points.

First, it is necessary to separate innovation into its component parts and consider policies with respect to each. Specialists have found it useful to distinguish between the following component activities within innovation: *(a)* invention, the initial insight and its rudimentary embodiment; *(b)* entrepreneurship, the organization of innovation and the decision-making locus; *(c)* investment, the risking of capital; *(d)* development, carrying the invention through to its initial commercial use; and, *(e)* diffusion, the adoption of the innovation beyond its first use. It is an important fact that the costs of R & D (and therefore the risks) rise rapidly as full-scale commercial utilization is approached; thus it may often be far more cost effective to subsidize the development phase, through tax policy for example, than to establish institutes concentrating on invention.

[26] That needs are best perceived by those not directly involved in R & D activity is also relevant. See Gruber and Marquis [14].

Secondly, though the impact of market structure on R & D activity is not fully understood, it appears that highly competitive, small-scale producers are unlikely to invest the socially desirable amount in R & D because of their inability to obtain the rewards from such activity before the successful innovations are copied by other firms. Such producers may in addition not have adequate information on the needs of their customers, especially if they sell to distributors rather than direct to the final users. Direct government activity may thus be particularly required in industries composed of small-scale producers. However, this is a highly disputed argument, as there is a body of anecdotal evidence that small-scale producers in developing countries, particularly in the metalworking and machinery sectors, are highly innovative (Rawski [35] and Bell [4]).

Thirdly, the available evidence suggests that the degree of scientific or engineering sophistication required to adapt or innovate has an important influence on whether R & D activity will be forthcoming from the private sector. The greater the degree of sophistication required, the less likely is private activity to be sufficiently great because of the high costs of invention.

Very little systematic information is available regarding technological change in developing countries; a high priority should be placed on discovering how innovation occurred, where it has been found and why it has not occurred elsewhere.[27] It will not be possible to formulate sensible government action programmes without a more solid understanding of the precise nature of impediments to the several components of innovation.

Serious attention must also be given to the problems of technology diffusion, i.e. to the mechanisms through which appropriate technologies are adopted for use. Rapid diffusion requires the efficient flow of technical and market information to producers and the ability of producers to implement new techniques. Elements of the adoption process include setting up tooling, designing production programmes, designing plant lay-outs, advertising and sales, locating credit sources etc. Governments should perhaps establish extension services to facilitate the adoption process, though a better understanding of the process as it now takes place is necessary to design such services.

Finally, to repeat, the importance cannot be over-emphasized of the cumulative impact of many modest innovations made by a large number of producers, not usually (in developing countries certainly) through formalized R & D, but in the course of solving day-to-day production problems. In turn, the importance of modest innovations has a fundamental consequence for the initial choice of technology from among available production methods. Modest innovations are by their very nature "local", which is to say that they change the production function only in a very small neighbourhood of the initial choice. It thus follows that initial choices of technology have profound implications for the types of technologies that may be developed indigenously. This observation—which is supported by the historical research of, among others, Rosenberg [39]—has yet to be translated into operationally meaningful terms in the context of criteria for choice.

Conclusion

There is no simple resolution of the dissatisfaction with recent development experience. In particular, resolution is not to be found in concentrating solely on the

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[27] For an excellent example of the type of study that is needed, see Bell [4].

technological aspect. Criteria for identifying appropriate techniques are needed as well as better information on technological choices. But to be of any value, appropriate technologies must be employed; this can only be achieved through proper public policies. The host of factors to be considered makes technological choices quite complicated; thus the choice of appropriate technologies can only be made by individual producers (i.e. entrepreneurs, managers, production and design engineers, technicians, marketing specialists, and others involved in implementing the choice made) familiar with the specific technological alternatives and the characteristics (market demands, supply conditions etc.) of the industry in which they operate.

Public policies affect these decisions by establishing the environment in which they are made. Policies that affect only prices are insufficient. In the long run, policies regarding the educational process will be extremely important. In the short run, direct action to facilitate information flows, to stimulate diffusion, to train labour etc. will be needed. But the need for direct action should not obscure the need for proper price policies; assuming that technological choices are consistent with either profit maximization or cost minimization, the greatest short-term impact will come from setting prices to reflect relative scarcities in terms of social welfare.

While it appears that proper price policies are a necessary condition for stimulating private R & D on appropriate techniques, they may not be sufficient to generate the optimal level of R & D activity. Private decisions on R & D activity are based on a comparison of costs with the return to the individual enterprise. The social return often exceeds the private return since the latter does not take into account possible returns were other enterprises to adopt the new technique or the possible benefits to demanders through lower prices. The extent of misallocation depends upon the market structure and the cost of R & D.

Where the misallocation is likely to be very severe, a case can be made for direct public support to innovation. However, very little is known regarding the institutional forms that such support should take, certainly with regard to the manufacturing sector.[28] The key to successful innovation is an accurate comprehension of the problems facing producers and the ability to deal with these problems. As the problems often involve the absorptive capacity to implement changes in production techniques or to market new product designs, the mere invention of appropriate techniques is not sufficient. There is no formula or recipe to design public or quasi-public institutions that possess a detailed knowledge of the current state of an industry, the collective insight to identify and resolve technical and non-technical problems, and the capacity for invention and successful diffusion. Creativity of the type required cannot, unfortunately, be programmed.

A priori, it seems that the case for direct public R & D activity is strongest in the area of exploiting a country's specific natural resource base (particularly in agriculture) and in the design and operation of social overhead and public service activities. In the former case, it is unlikely that Western technological research has been directed toward the use of these resources; in the latter case, there appears to be little incentive for private R & D, while the magnitude of public investment in these activities implies a significant impact.

In a preceding section it was noted that systematic research on appropriate technology in manufacturing has tended to concentrate on the technical feasibility of

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[28] In this respect, there has been a great deal more work with regard to agriculture; see, for example, Hayami and Ruttan [15].

capital-labour substitution. While this research has shown that substitution is possible across a range of activities, it has also demonstrated that there is no simple rule to be followed to achieve the appropriate choice. That technological choices are complex, therefore, and have to be made in the light of specific circumstances can not be escaped. What appears to be of overriding importance is that individual decision makers have access to technological information and be able to adopt appropriate technologies without undue risk..Thus also deserving of high priority is systematic research into policies and institutional mechanisms that will lead to the use of techniques that are more appropriate (Rhee and Westphal [38]).

Among the questions that need to be answered with respect to technology choice are the following: Is there a systematic bias such that it is cheaper to obtain information regarding capital-intensive, inappropriate techniques? If so, how can this bias be overcome? Are there mechanisms that would facilitate the search for techniques embodied in used equipment and that would offset the higher risk that attends the use of used equipment? If not, how can such mechanisms be implemented?

Research priorities are no different in regard to stimulating technological advance and the development of more appropriate technologies. Thus, for example, as yet there is no conclusive evidence that protectionist, import substituting policies must necessarily retard technological progress. In turn,. mention has already been made of the need for research into the design of institutional forms for direct public support to innovation.

Finally, a caveat is in order lest it be thought that the conclusion reached here is that the results of further research must be received before taking any action. The opposite is rather the case: many of the answers sought can come only out of accumulated experience with action programmes. However, it should be required that these programmes be designed in the light of the best available knowledge. Also, it is fundamentally important that their progress be systematically monitored in order to learn from experience.

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Education and the distribution of personal income: an analysis of issues and policies

Amit Bhaduri *

Introduction

Education may serve the national interest in a variety of ways. It may be perceived as contributing to the process of nation-building. More specifically, it may strengthen the basis for economic growth and industrial development no: only directly through its influence on the amount of skilled manpower, but also indirectly through its influence on the distribution of income. It is the latter aspect of education that is the subject of the present paper.

The relation between educational attainment and the pattern of distribution of personal income involves some of the most complex and fundamental issues in the development process. Broadly speaking, the problem falls into two parts: first, what causal interpretation can be given to the positive statistical association between levels of education and earnings? Secondly, what policy inferences can be drawn from this connection? Although these two questions are closely related, it may be useful to analyse them separately and they are considered in sections I and II respectively of this paper. In section III are summarized the main findings, and suggestions are made for future research, especially in the context of developing countries.

I. Relation between education and earnings

A high degree of caution is needed when interpreting the positive association or correlation between levels of education and earning. That there exists such a positive association seems to be fairly well established in terms of statistical evidence, and numerous calculations of the personal and social rates of return of education in a wide range of countries, based on the "human capital" approach, have this positive association between education and earnings as their starting point. This positive association has a near-universal character as table 1 shows.

Two inferences can be made from this table:

(a) The positive association between education and earnings appears valid for a wide range of countries with very different levels of economic development and *per capita* income;

(b) A relatively higher premium is associated with higher levels of education in the developing countries than in the developed market-oriented economies.

However, this kind of table contains insufficient information to judge the rate of return on education as an investment item, either in public or in private terms, since no corresponding cost data associated with education at different levels are provided.

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Table 1.   Relative earnings of persons of different education levels by country group

Country group	Ratio of average annual earnings of persons in adjacent education levels		
	Primary	*Secondary*	*Higher*
	None	*Primary*	*Secondary*
Group A			
Canada, France, Netherlands, Norway, United Kingdom, United States of America	–	1.4	1.7
Group B			
Chile, Colombia, Greece, Israel, Mexico	2.4	1.9	1.8
Group C			
India, Kenya, Malaysia, Nigeria, Philippines, Republic of Korea, Uganda	2.4	2.4	2.7

Source: G. Psacharapoulos, *Returns to Education* (Amsterdam, Elsevier), table 8.4.

It simply shows the type of association that exists between levels of education and earnings.

One of the main difficulties in causally interpreting the positive association between educational and earning level[1] is the multiplicity of other factors that can be expected a priori to influence the distribution pattern of personal earnings, such as:

> Genetic inheritance
>
> Class
>
> Age (by changes in experience through learning)
>
> Market structure
>
> Hierarchical structure of work.

Looked at in this way, differences in earning levels are influenced by a range of factors of which the level of formal education is only one. Consequently, it would be unjustified to explain earning differences solely or even primarily in terms of educational differences without further investigation. Given the multiplicity of factors that influence the distribution of earnings, it is not even clear from statistical analysis that there is any validity in attributing a definite portion of the observed

[1] Harold Lydall, *The Structure of Earnings* (London, Oxford University Press, 1968), chap. 4, pp. 68-120 and chap. 7, pp. 202-206. The choice of these variables as the major explanatory ones is dependent on Lydall's definition of "earnings" relating only to "full-time male adult employees in all occupations and in all industries except farming, classified according to their pre-tax money wage or salary earnings" (p. 7). Many more factors could be added, such as geographic region, city size, race and sex, particularly if the definition of earnings were enlarged.

differentials in earnings to education alone.[2] There are two ways in which attempts have been made to resolve the problem. One is to preselect a sample that tries to hold the other factors as constant as possible or explicitly adjusts for such differences.[3] By its very nature, such a sample is likely to be too restrictive to provide convincing evidence on the class of issues discussed. The other way is to use the technique of multivariate analysis which permits the isolation of the "pure" effect of education on earnings.

Multivariate analysis assumes that the variables are independent in the sense that they do not interact with one another, consequently, their total effect is assumed to be decomposable into a simple summation of their separate effects. However, this assumption is clearly invalid in the present context of explaining earning differentials since a whole range of factors such as social class and education are known to be highly correlated.

Nevertheless, several statistical studies, particularly those based on data from the United States of America, have used the technique of multivariate analysis to isolate the effect of education on earnings. In an exhaustive study of this kind,[4] Morgan and his associates found that a multitude of factors other than age and education accounted for 40 per cent of the gross unadjusted earnings differentials between high school and college graduates in the age group 18-34 years, while for the age group above 34 years, it explained only 12 per cent. More recent work,[5] along similar lines, was carried out by Duncan and his associates based upon larger and more comprehensive samples and using more rigorous and systematic statistical techniques. They came to similar conclusions, which tended to discredit the widely held sociological view that social class is a major determinant of the quantity and quality of education received by an individual[6] and thus influences his earnings. While these studies, based on fairly exhaustive statistical material, have tended to argue that additional schooling exerts a major effect on earnings and occupational status independently of the social class background of the individual, it would be rash to accept this conclusion without further scrutiny of the analytical and empirical steps involved.

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[2] This is recognized as a major difficulty when quantifying the human capital approach to education, a fact that many critics have noted. See, for example, J. Vaizey, *The Economics of Education* (London, Faber and Faber, 1962), pp. 43-47; H. G. Shaffer, "Investment in human capital: comment", *American Economic Review*, December 1961; T. Balogh and P. P. Streeten, "The coefficient of ignorance", *Bulletin of the Oxford University Institute of Statistics*, vol. 25, No. 2 (1963), pp. 97-107.

[3] See, for example, D. Wolfe, *America's Resources of Specialized Talent* (New York, 1954), and an earlier study by D. E. Georseline, *The Effect of Schooling Upon Income* (Bloomington, 1932), which makes a study of income differentials among brothers with varying levels of education.

[4] J. N. Morgan and others, *Income and Welfare in the United States*, (New York, 1962), pp. 387-421 and also J. N. Morgan and M. H. David, "Education and income", *Quarterly Journal of Economics*, August 1963. Morgan and his associates also argued that subjecting data to multivariate analysis tends to understate the pure effect of education on earnings so that their finding is likely to be an underestimate.

[5] O. D. Duncan, D. L. Featherman and B. Duncan, "Socioeconomic background and occupational achievement: extensions of a basic model". Project No. S-0074 (EO-191), U.S. Department of Health, Education and Welfare, May 1968.

[6] See, for example, P. M. Blau and O. D. Duncan, *The American Occupational Structure*, (New York, 1967); O. D. Duncan "Ability and achievement", *Eugenics*, March 1968; Duncan Featherman and Duncan *op. cit.*; R. M. Hauser, "Schools and the stratification process, *American Journal of Sociology*, May 1969.

The main thrust of the above-mentioned types of studies has been to substantiate the human capital interpretation of inequality. There are two steps to this argument: first, it explains earning differentials through productivity differences and the link between higher income and higher productivity presupposes some version of the "marginal productivity" theory of distribution. Secondly, higher productivity is linked to higher educational level through the concept of raising productivity by investment in human capital.

Both steps of this argument are open to serious empirical and logical objections based on recent developments in economic theory. The marginal productivity theory of distribution is based on the assumption of a competitive market which is seldom a valid empirical approximation to the real market structure. From the point of view of economic theory, it is not even enough to argue that only the market for labour is competitive because the validity of the marginal productivity theory will require at least all the major factor and commodity markets to be broadly competitive.[7] In addition, existence of a competitive solution as well as use of the total factor supply by paying each factor according to its marginal product will entail the assumption of constant returns to scale.[8] An analytically more subtle and logically devastating criticism of the marginal productivity theory follows from an analytical demonstration that capital cannot be treated as a factor of production in a macro-economic production function whose partial derivative or marginal product is expected to equal the rate of profit without becoming hopelessly involved in circular reasoning.[9] In short, this implies that the logical foundations (leaving aside empirical objections) of marginal productivity theory in the macro-economic context are insecure. Consequently, any connection between productivity and income through traditional avenues of marginalist theory should be considered suspect even as a purely logical proposition.

.   Going from the logical to the empirical, increasing statistical evidence and its careful interpretation based on more refined analysis has caused considerable doubt of the validity of the human capital approach, which tries to explain earning differential primarily in terms of educational differences, as an independent explanatory variable. In an outstanding piece of econometric work, Bowles subjects the data and statistical inference model of Duncan and his associates to a more rigorous, systematic scrutiny.[10] His analysis tends to re-establish the earlier position that attributes to social class a crucial role in influencing earning differentials and thereby undermines the human capital approach.

Bowles' study not only clarifies some of the typical weaknesses of the human capital approach, but also opens up a range of issues that have often been ignored in economic and sociological research on the subject. There are at least two levels on which Bowles criticizes earlier findings supporting the human capital theory: on the

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[7] Otherwise, there may be a second-best solution that diverges considerably from the competitive solution

[8] This refers to the so-called adding-up problem that follows directly from an application of Euler's theorem to production functions which are homogenous of degree one.

[9] Joan Robinson, "Production function and the theory of capital", *Review of Economic Studies*, 1953-1954; Piero Sraffa, *Production of Commodities by Means of Commodities: Prelude to a Critique of Marginalist Theory* (Cambridge University Press, 1960); and G. C. Harcourt and Liang, ed., *Capital and Growth*, Penguin Modern Economics series (Harmondsworth, Penguin, 1971) for a series of articles dealing with these issues.

[10] Samuel Bowles, "Schooling and inequality from generation to generation", *Journal of Political Economy*, vol. 80, No. 3 (supplementary) (May/June 1972).

socio-economic level, he argues that it is based on an inadequate understanding of the problem of social class and. therefore, leads to statistical misspecification of the problem; on the more technical level of statistical inference, he shows that the nature and treatment of the data introduce systematic bias to underplay the influence of social class in explaining earning differentials owing to what may be called the statistical errors-in-variables problem.[11] Since this latter problem is largely concerned with the particular set of United States data, it can be left aside to concentrate on the statistically inadequate specification of the socio-economic class background.

Typical data on social class concerns parental education and occupation but does not include (usually because of lack of information) such crucial variables as family income, parental wealth and the position of the parents in hierarchical work relations. By leaving out some of these variables, which constitute the overall social class position of an individual, most empirical studies justifying the human capital approach systematically introduce a bias in exaggerating the influence of education as a determinant of earnings. In brief, social class involves several determinants, e.g. parental education, income, wealth, occupation and position in the hierarchy of work relations. Without statistical indicators and information on most of these crucial determinants, it is premature and indeed rash to accept the human capital approach as explaining observed earning differentials.[12]

The problem of the relative importance of social class and education as determinants of earning differentials assumes still greater dimensions when data are analysed on personal income distribution in the context of developing economies. With any actual set of data on personal income distribution, the investigator is faced with at least three major problems of the following nature:

(a) In countries where the cost of education, particularly at the higher level, is largely privately borne, it is not at all clear what the positive association between education and income implies. In such cases, expenditure on education may be interpreted either as a cause or an effect of superior income. Consequently, it remains an open question whether higher education leads to higher earnings or higher earnings create access to higher education.[13] The positive association between family income and educational expenditure is shown in table 2.

In view of such data in many developing countries where a significant portion of educational cost is privately borne, the following observation should be taken quite seriously:

"... much of the higher earnings is not a return on education but a monopoly rent on:

"(i) The scarcity of parents who can afford to educate their children well; and

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[11] The errors-in-variables problem arises when the data available do not measure what they purport to measure and the measure itself, even if accurately observed, tends not to correspond to the variable of the model. For example, there is an association between permanent component of income and education level, but the statistical data relate to annual earning figures, not to permanent income.

[12] The Bowles study introduces statistical information on many of the crucial determinants and concludes that social class is a major determinant of earning differentials.

[13] This second view becomes quite plausible, particularly when parental or family income is seen to be highly correlated to the next generation's income (which according to Bowles, *op. cit.,* seems to be the case.

Table 2.   Relation of family income to educational expenditure in the Philippines

Annual income (pesos)	Average annual educational expenditure	
	Amount (pesos)	Proportion of annual income (percentage)
Below 500	4	1.4
500- 999	14	1.8
1 000-1 499	26	2.1
1 500-1 999	35	2.0
2 000-2 499	62	2.5
2 500-2 999	83	3.0
3 000-3 999	151	4.3
4 000-4 999	225	5.0
5 000-5 999	319	5.8
6 000-7 999	343	4.9
8 000-9 999	486	5.4
10 000 plus	. . .	5.5

Source: The table is computed from information in the Bureau of Consumer Statistics (BCS), *Survey of Household Bulletin Family Income and Expenditures,* Series No. 22. 1965.

"(ii) The restrictions on members permitted into a profession in which existing members have a financial interest in maintaining scarcity."[14]

In brief, the human capital approach linking education and earning through the theoretical framework of the marginal productivity doctrine in a competitive model is counterpoised against a monopoly rent theory which runs in terms of socio-economic class privilege regulating access to education and thus to certain higher-paid occupations. Both these hypotheses seem to have a statistical basis to support them and at this stage, without further investigation, it would be unwise to reject either as obviously untenable;

(b) A second major problem in the area of education and income studies, especially in several developing market economies, relates to the interpretation of unemployment figures by specific categories of skilled manpower. Educated unemployment is a typical problem in several developing economies and the researcher is faced with reconciling the notion of average earning of a group with the manifest rate of unemployment in that group. Thus, at any particular educational level it is not clear whether the unemployed at that educational level should be included in calculating the statistically expected value of mean earning or that the actually observed value of earning should be correlated with that level of education. It is evident that the strength of the association is likely to vary considerably, if the rate of unemployment itself varies significantly for different educational levels. This is a problem that has not yet received the attention it seems to deserve, particularly in those developing economies which face the problem of educated unemployment on a significant scale;

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[14] T. Balogh and P. P. Streeten, "The planning of education in poor countries", *Economics of Education,* Penguin Modern Economics series, M. Blaug, ed. (Harmondsworth, Penguin, 1968) vol. I, p. 387.

(c) Finally, one of the most important problems facing empirical research on personal income distribution concerns the scope and nature of the data. Data on the distribution of personal income, especially from developing countries, do not usually distinguish between income from work and income from property. This implies that the relative importance of human and physical capital as determinants of personal income (especially the latter in the form of inheritance of private property as a source of personal income), cannot be determined. A recent study based on income distribution data in Brazil illustrates both the nature of the problem and its quantitative significance in some cases.[15] Since the income concept employed in the Brazilian census includes receipt from property and property income accounts for perhaps a third or more of Brazilian personal income, the association between property income and education produces a significant bias to exaggerate the role of education as a determinant of personal income.[16] To correct for this bias, the Brazilian census data (1960) on personal income in the agricultural sector were examined by multivariate analysis with three sets of explanatory factors, namely:

(i) Training and education;

(ii) Effect of market disequilibrium as measured by purely sectoral and regional effects;

(iii) Contribution of wealth accumulation resulting in income from private property as measured imperfectly by occupational position;[17]

The result was striking in so far as the role of occupation in "explaining" inequality in income was seen to be greater than any of the other variables including education. Thus, occupation was responsible for almost 20 per cent of the total variance in the logarithms of income, while education explained 14 per cent.[18] The analysis with the Brazilian data, therefore, illustrates a typical pitfall in the human capital interpretation of income inequality, especially when income is known to include income from property.

In view of the above-mentioned complexities, it is hardly surprising that the productive and income-generating role of education via the human capital approach has been questioned. This has led to substantial modification and reformulation of the original idea. One such reformulation is to be found in the more recent theories of search and screening where schooling is fundamentally looked upon as a social device to search out talents and higher education operates as a filter to screen out the more talented from the less.[19] In this theory, too, a higher level of educational attainment is linked to higher earning through greater talent presumably leading to higher productivity. Thus, higher earning is explained through higher productivity through the neo-classical conceptual framework of marginal productivity theory,

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[15] Albert Fishlow, "Income distribution and human capital: some further results for Brazil", *Contemporary Issues in Economics*, Proceedings of the Conference of the Association of University Teachers of Economics, Warwick, 1973, M. Parkin and A. R. Nobay, eds. (Manchester, University Press, 1975).

[16] *Ibid.*, p. 355.

[17] This means occupational position in agrarian relations was used as an index (or proxy) for private property, as no data are directly available on this score. The occupational classification included in ascending order the following five groups: family workers (at the bottom), sharecroppers, employees, self-employed and employers.

[18] Fishlow, *op. cit.*, p. 357, table 17.1

[19] Oscar Lange, *Introduction to Econometrics* (Oxford, Pergamon, 1959) and K. Arrow's "Higher education as a filter", *Journal of Public Economics*, vol. 2, No. 3 (July 1973).

although the "cause" for higher productivity is explained through identification of talent through the educational system rather than through direct investment in human capital. As has been pointed out, the theory is difficult to test econometrically and some evidence exists to suggest that this too may not be a relevant factor for linking education to earning.[20] Apart from the empirical implications, such a screening-and-search poses questions of the kind of abilities that an education system does test. Here too, opinions diverge sharply from the narrow economic view of ability as a productivity-raising concept to the radical view of some of the most influential contemporary thinkers who look upon the present education system primarily as a social device to control others and justify special privilege for the more educated.[21] Interesting sociological studies have also been carried out that indirectly lend at least some support to this latter view. Personality attributes are developed at a young age in the family and, to a lesser extent, in secondary socialization institutions of which schools are perhaps the most important. However, several sociological studies do tend to suggest that the particular personal attributes that are encouraged in schools and at home differ considerably depending on the child's socio-economic background: by and large, children of managers and professionals are taught self-reliance while the children of workers are taught obedience.[22] This is reflected in the difference between working class high schools emphasizing a discipline-based value system in contrast to the relatively greater freedom of the wealthy surburban schools.[23] In view of the findings of these types of sociological research, it is far from evident that an educational system can be looked upon exclusively as a mere social device to search out talent, as the search and screening hypothesis would have us believe.

II. Some policy issues

In spite of the problems involved, the positive association between earning differentials and educational qualifications is a significant one in so far as it entails an important set of policy issues. How these issues are formulated is strongly influenced by the kind of causal significance attached to such a positive association. Thus, if the human capital approach is adopted and the inequality in personal income distribution considered largely as a reflection of the inequality in the distribution of education, a set of policy proposals is arrived at that are based upon the choice of education as a major instrument to bring about greater equality in income. This is where the subject arouses more than theoretical interest for in a number of countries and policy prescriptions increased access to education is held out as a great equalizing force to reduce the present concentration of income and wealth. For instance, the

[20] Richard Layard and George Psacharopoulos, "The screening hypothesis and the return to education", *Journal of Political Economy*, vol. 82, No. 5 (September /October 1974).

[21] Two most original radical thinkers in this field are Paulo Freire. *Pedagogy of the Oppressed* (New York, Seabury, 1970) and Ivan Ilich, *Deschooling Society* (New York, Harper and Row, 1971).

[22] M. Winterbottom, "The sources of achievement motivation in mothers' attitudes towards independence training", *The Achievement Motive*. David C. McClelland and others (New York, 1953), pp. 294-304, and Melvin L. Kohn, "Social class and parent-child relationship: an interpretation", *American Journal of Sociology*, vol. 68 (January 1963), pp. 471-480.

[23] Bowles, *op. cit.*, pp. 225-227.

supposed positive impact of education on earnings based on the human capital approach appears to have influenced the st.ategy adopted by the United States Government to combat poverty. The lion's share of the "War on Poverty" funds was consumed by education and training programmes to build up the human capital potential of the poor.[24] Variations of the same strategy are repeated in other countries.[25] In a certain sense, it is hardly surprising that in policy discussions education has been assigned the role of a great equalizer. Such a strategy is particularly conducive to liberal social philosophy and even implies inclination to conservative ideology. By relying primarily on educational equalization to achieve greater economic equality, policy discussions can avoid raising awkward questions about socio-economic class privileges and property relations that are otherwise deemed to be of fundamental importance in explaining economic inequality. However, there are two reasons why policy prescriptions based on educational equalization to deal with economic inequality must be considered inadequate. First, recent empirical studies have by no means shown the relative unimportance of socio-economic class background as a determinant of personal income distribution. Hence, policies trying to avoid this range of issues by concentrating more or less exclusively on more equal access to educational opportunities are unlikely to be effective. Secondly, the effectiveness of education in achieving greater economic equality involves time, i.e., the speed with which this works in relation to other policies. The question is of considerable sociological complexity as it entails such considerations as the disadvantage suffered by first generation literates compared to second generation literates etc. or the advantages of having a professional family background compared to, say, an illiterate or semi-literate peasant background. Surprisingly, little research material seems to be available on these matters even from the human capital enthusiasts, but it is clear that judgement on education as an instrument of policy for equalization has to involve considerations of the time taken to bring about a given degree of equalization, and the present state of policy-oriented human capital theory may well be considered somewhat inadequate from this point of view.

Even without being committed to looking at economic inequality primarily in terms of human capital inequality, an important role could still be assigned to education as an equalizer. In an alternative formulation, the higher monetary premium associated with higher levels of education was largely explained in terms of monopoly rent. Since this arises at least partly from the relative scarcity of parents who can afford to bear the cost of higher education, an argument can be made for greater equality in educational opportunity with the cost of education largely borne by the state to reduce the monopoly rent element.[26] The general analytical point that should be borne in mind in formulation policies on this matter is, however, quite simple: equalization of educational opportunity, even considered narrowly as an instrument for attaining greater economic equality, is not committed to a particular brand of theory. It seems broadly compatible with two such dissimilar formulations

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[24] Theodore W. Schultz, "Investment in poor people", Seminar on Manpower Policy and Programmes (Washington, D.C., Department of Labor, Office of Manpower Policy Evaluation Research, 1966).

[25] Albert Fishlow mentions in his article that in Brazil also "increased schooling has become the official policy response to criticisms concerning the distribution of income", *op. cit.*, p. 354.

[26] Whether this involves an optimal policy is another matter and must take into account the alternative opportunity cost of providing education.

as the human capital approach and the monopoly rent theory.[27] As soon as socio-economic class is also considered an important independent determinant of economic inequality, equalization of educational opportunities becomes an inadequate method of dealing with the problem of inequality. It remains one of the necessary conditions, but does not provide sufficiently by the conditions needed to achieve a given degree of economic equality.

A somewhat different range of issues is involved when the role of education in bringing about equality is viewed in the context of developing market economies. At least two sets of tendencies deserve emphasis. First, it it probably a fairly general pattern that greater equality in educational opportunities creates a net inflow towards urban jobs in the modern sector in dichotomous, dualistic economies. This tends to transform disguised unemployment into more open unemployment.[28] Secondly, it has also been argued that it may create aspiration levels that do not correspond to the available job opportunities.[29] Both these tendencies merge to produce "educated unemployment" in many of the developing economies. Any discussion of using education as an equalizer of income in developing economies must reckon with the uncon.fortable fact of educated unemployment. Policy prescriptions relating either to education or to income equality are not useful unless they deal with this problem.

Thus, to avoid the problem of the educated unemployed, for example, education policy may need to be closely related to manpower planning. Without overall consistency among development policies, educational structures which ideally would encourage more equitable income distribution could quite perversely lead to greater inequality. Development policies themselves and views on the goals of education are likely to be influenced by greater equality in the distribution of income as, for instance, the creation of a new middle class may result in a greater interest in education as an investment opportunity rather than an advancement in social status.

III. Conclusions and identification of areas for future research

A diverse set of theoretical formulations and explanations are consistent with the observed positive association between education and earnings. Nevertheless, the simple human capital approach, which chooses education as the crucial variable to explain income differentials independently of such other important factors as socio-economic class backgrounds, seems too extreme. Recent studies from the United States and Brazil show that the statistical basis is not sufficient to show socio-economic class background as a relatively minor influence.

There is also difficulty with the other logical step in the human capital approach that links higher earnings with higher educational qualification through higher productivity. Such a chain of reasoning rests on some version of the marginal productivity theory of distribution whose logical and empirical foundations are open

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[27] It should be noted that the underlying reasoning in the two cases are somewhat different. Balogh and Streeten, *op. cit.*

[28] See *Education and Employment*, ECAFE Growth Studies Series No. 11 (Bangkok, 1970), pp. 2, 11-15.

[29] *Ibid.*, pp. 85-86, see also *Matching Employment Opportunities and Expectations*, a programme of action for Ceylon (Geneva, ILO, 1971).

to serious objections. Empirically, the competitive model rules out all sorts of market imperfections and does little justice to explanations based on the premium arising from monopoly rent of education. Nevertheless, evidence does exist to suggest that this monopoly rent may indeed be an important element. On a logical level, capital-theoretical objections to the marginal productivity theory of distribution raise doubts abou: the link between productivity and earnings in terms of the traditional framework. The same objections to the human capital approach are also made to the screening and search hypothesis of education as a social device for discovering abilities. In addition, this theory is inadequate in so far as it pays little attention to the important question of the kind of abilities looked for by the conventional systems of formal education.

Since the human capital approach cannot be considered to be a general explanation of income differences, any policy prescription for income equalization mainly through equalization of educational opportunities should be considered inadequate in most cases. It is an attractive proposal in so far as it does not raise awkward questions on class privileges as a major determinant of income differentials, but in terms of existing evidence, it remains highly debatable whether such a strategy can be effective. Further, it remains to be shown how larger issues concerning education and employment, e.g. the problem of educated unemployment in many developing countries, can be incorporated into such a framework.

A few important areas of research are identified below for a better understanding of the role of education in the determination of personal income which in turn will help to clarify related policy issues.

(a) Data on educational and earning differentials from developing countries need to be supplemented by data on the proportion of unemployment by skill categories. It would be worthwhile to compare education and earning data with such unemployment data for a clearer understanding of the mode of operation of labour markets and the mechanism by which education exerts its influence on earnings. To illustrate, if it is found that education and earning differentials are positively correlated, but at the same time highly-paid skill categories also have higher proportional unemployment in some cases, then the usual competitive market based theories will need close re-examination in the light of the monopoly rent view of higher education resulting in higher earnings;

(b) One of the assumptions of the human capital approach, the screening and search hypothesis and related theories is that higher earning is simply a reflection of higher productive ability. It is a fundamental assumption that needs to be clarified in terms of socio-economic research; in particular, precisely what the attributes of ability are in the present context and how an educational system augments or searches out these abilities. This is a difficult and interdisciplinary area of research, but given its importance investigation would be especially worthwhile;

(c) It has been stressed that the influence of socio-economic class background on educational qualifications and earning level, in both developed and developing economies, is one of the most important and difficult areas of research. However, given its importance, further theoretical and empirical research in this area is highly desirable. Perhaps research activities in this area could initially involve the following:

(i) A theoretical formulation leading to a more complete statistical specification of the overall class position of an individual in terms of the relevant variables (which may vary from country to country);

(ii) Collection and utilization of data relating to the above statistical framework.

Developing a theoretical framework of this kind supported by factual basis is not an easy process since the relationship between statistical information and theory is bound to be complex. No relevant theorizing and statistical specification are possible without some facts, but at the same time, organization of knowledge cannot escape some pre-conceived or primitive theory. The two processes, from facts to theory and from theory to facts, must interact to generate new knowledge in this area, and several interactions between the two processes may be needed to arrive at reliable results for policy formulations.

India's export incentive system

*Vijay Joshi**

Introduction

The object of this paper is to analyse the working of India's export incentive system and to suggest the lines along which it should be reformed. The paper is divided into three parts: introduction; description of the existing export incentive system; and suggestions for reform. In the introductory section, recent export trends are briefly reviewed, the causes of India's export stagnation outlined, the need for export promotion explained and the main conclusions of the paper summarized. In the descriptive section, the main export promotional measures undertaken by the Government of India are reviewed. In the analytical section, the criteria which a desirable export incentive system should satisfy are devised, various options examined and suggestions made for improving the system. While the analysis in the third section is grounded in international welfare economics, its bias is severely practical, making due allowance for the fact that economic policy cannot start from a clean slate.

I. Export structure

Export stagnation: facts and explanations[1]

India's export performance has been poor if viewed over the period from 1951 to the present though there has been a marked improvement in recent years. Between 1950/51 and 1968/69, the value of exports grew at only 2 per cent per annum.[2] Since then the improvement has been quite striking. Between 1968/69 and 1971/72, the value of exports grew at 6 per cent per annum, followed in 1972/73 by 18.3 per cent, in 1973/74 by 24.6 per cent, in 1974/75 by 28.9 per cent, in 1975/76 by 9 per cent and in 1976/77 by 18 per cent. The recent acceleration in export growth, however, is largely due to world inflation and is excessively dependent on a few unstable commodities such as sugar and silver.

In volume terms, the increase in exports has been more modest. From 1950/51 to 1960/61, India's exports grew by only 1.3 per cent per annum in real terms, from 1960/61 to 1970/71 by 3.5 per cent per annum and from 1969/70 to 1975/76 by 6.5 per cent per annum. From 1948 to 1968, India's share in world exports fell from 2.4 per cent to 0.7 per cent; in 1973 it fell further to 0.5 per cent but has since been roughly constant.

In explaining India's poor long-term export performance, some weight must be given to the dominance in the export basket of 1950/51 of items that subsequently turned out to be stagnant. Tea, jute and cotton textiles, which in 1950/51 accounted

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for 52 per cent of exports, grew by only 30 per cent in value over the next 23 years. The 10 leading items in 1950/51, accounting for 72.7 per cent of exports, grew in value over the same period by only 44 per cent. This explanation for India's poor overall performance, however, does not go very far for two reasons.

First, the stagnation even in these traditional commodities was not inevitable. In each of these commodities, India's share in world exports diminished considerably. In tea, jute and most glaringly in cotton textiles, the story is one of unnecessary market erosion. In 1953, India accounted for 58 per cent of all developing country exports of cotton textiles and this share had fallen to 8 per cent by 1969.

Secondly, India's overall export performance could have been better in spite of the stagnation of traditional commodities, if newer exports had grown adequately. Taking all manufactured exports, India's performance is abysmal compared to many other developing countries and areas, e.g. Argentina, Brazil, Hong Kong, Israel, Malaysia, Mexico, Republic of Korea, Singapore and Yugoslavia.[3] But even if the traditional manufactures are left out and exports considered from 1971-1974 of specific new manufactures, India's position is markedly worse. Disaggregated statistics show clearly that India's export growth in the new manufactures suffers from being spasmodic and unsustained.[4]

The reasons for the stagnation in India's exports have been extensively analysed.[5] While special explanations can be given for particular commodities, there is widespread agreement that the root cause was the inward-looking economic strategy pursued by the Government. Industrialization on the basis of an overvalued exchange rate and heavy and across-the-board protection of import-competing sectors led to a severe discrimination against exports. In addition to protection, there were other important reasons for the inefficiencies created in Indian industry: *(a)* government policy was characterized by a bias against large firms; and *(b)* the pattern of industrialization was geared to demands generated by the existing distribution of income so that many sectors of Indian industry came to cater to rather limited markets for goods consumed by upper income groups. As a result, Indian industry was afflicted with the problem of too many plants of inadequate scale producing too many products. Furthermore, the security of producing in protected markets caused Indian firms to place inadequate emphasis on high quality and rapid innovation, factors that are essential to maintaining international competitiveness.

The above critique applies particularly to the 1950s. Since the 1960s there has been a gradual change in government policy and exports have been encouraged by various incentives. Many studies have confirmed, however, that the effective protection of export activities has been considerably less than that accorded to import-substituting activities. The system of export incentives has also been haphazard and extremely complex. Since 1975, the system has been streamlined but there is considerable scope for improvement and rationalization.

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[3] See IBRD, *op. cit.*

[4] See IBRD, *op. cit*

[5] See, in particular, Manmohan Singh, *India's Export Trends* (London, Oxford University Press, 1964), J. N. Bhagwati and P. Desai, *India, Planning for Industrialization* (London, Oxford University Press, 1970), J. N. Bhagwati and T. N. Srinivasan, *Foreign Trade Regimes and Economic Development: India* (New York, Columbia University Press, 1975) and IBRD, *op. cit.*

The need and scope for export promotion

In spite of the stagnant trend of India's exports, the case for export promotion needs to be made rather carefully. Arguably, the Indian balance of payments outlook is now extremely favourable. The level of foreign exchange reserves was roughly constant at around $1.3 billion[6] for four years from 1971/72 to 1974/75. Consequently, over this period, the number of months of imports covered by reserves declined from approximately six to less than three. In 1975/76, however, about $1 billion was added to the reserves and in 1976/77 an estimated further $1.5 billion. Reserves now cover more than eight months of imports. Nevertheless, it would be incorrect to conclude that India can afford to slacken its export drive.

The improvement in the balance of payments is to a large extent the result of a pronounced increase in invisible receipts, which have been running at more than $100 million per month since 1975. These cannot be accounted for by transport, tourism or interest earnings and there is overwhelming evidence that they represent remittances from Indians living abroad. There has been no investigation into the nature of these inflows but it is reasonable to infer that this phenomenon consists partly of a once-for-all shift of wealth by non-resident Indians as a result of the impression of political stability created during the Emergency combined with the impression (and in some cases the fact) of political instability in the countries of origin. Another part of the recorded inflows very probably consists not of a genuine increase in remittances but simply of a shift from unofficial to official channels of remittance induced by the rupee's improved position on trade account and the higher risks involved in illegal transactions occasioned by measures taken during the Emergency. However, the rupee's strength on trade account is unlikely to be sustained when economic growth is resumed at a more normal pace. Incentives in the free foreign exchange market are then liable to turn again in favour of illegal channels of transfer. A part of the inflows undoubtedly represents a more permanent change resulting from the new earnings of skilled labour exported to Middle East countries. Nevertheless, for an industrializing country, financing imports by remittances from non-resident citizens is an uncertain and imprudent course of action, open to the danger that these remittances may decline or become unavailable to the authorities with export industries having declined in the interim.

On the visible trade account, India has moved from a record deficit in 1974/75 to a small surplus in 1976/77. One reason for this is the exceptionally favourable weather since 1975 leading to a drastic reduction in food imports. More fundamentally, the balance of trade improvement is the result of the industrial stagnation since the oil crisis. The combination of rapid inflation and worsening balance of payments between 1972 and 1974 was dealt with by a highly restrictive policy, the recessionary effects of which have yet to be reversed. When economic growth is restored, imports can be expected to rise quite sharply. Furthermore, the basic structural defects of the economy, alluded to earlier, have come to the surface in recent years, as they were bound to. Narrowness of demand has emerged as a major constraint on India's industrial development. Ironically, the nature of India's high-cost, inward-looking industrialization has been clearly exposed by the recent fortuitous inflows of foreign exchange. For a country that supposedly suffers from a foreign exchange constraint, these inflows have proved to be remarkably difficult to use.

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[6] The term billion is used to indicate a thousand million.

In the author's view, these problems emphasize the need to build a base for self-sustaining export growth. Indian industry is presently confined in a vicious circle of low demand and high costs of production. Increasing exports have a vital role to play in providing a market for industrial products though the main impetus must come from increasing agricultural productivity and incomes. Moreover, the phase of building an industrial base is over. It is now necessary to become more cost-conscious and to establish the viability of Indian industry in a competitive world economy. The comfortable short-term foreign exchange position should be seen as an opportunity to enable the country to tide over the transitional problems that will be encountered in correcting the biases in India's previous strategy.

This subsection ends with some discussion of the present composition of Indian exports with reference to their growth potential, to help put the policy problem into proper perspective. About one third of India's exports consist of items whose long-term prospects are likely to be poor even with sound policies because of demand constraints or unavoidable supply difficulties so that their volume growth rates are unlikely to exceed approximately 3 per cent per annum. These items include some important traditional agricultural and manufactured goods such as tea, spices, cashew kernels, essential oils, tobacco, semi-finished leather, jute manufactures, coir manufactures and fuels. Another third of India's exports consist of items with intermediate prospects which, given sensible policies, could achieve up to 8 per cent volume growth, for example, oil-seed products, coffee, raw cotton, sugar, iron ore, iron and steel, silver, handloom and mill-made cotton piece-goods, and some chemicals. This leaves another third consisting of the dynamic commodities: engineering goods, apparel, gems, handicrafts, marine products, finished leather goods and some chemicals. India's overall export growth is heavily dependent on the performance of these new manufactures. It is difficult to see how the Government's target of 8 to 10 per cent per annum volume growth can be achieved unless this group increases at more than 15 per cent per annum. It is worth noting that the proportion of output exported is very much higher in the commodities with low or moderate export potential as compared with commodities in the dynamic category.[7] This is fortunate for two reasons: first, an increase in exports of the dynamic commodities would not have a large impact on domestic availability of them; and secondly, import liberalization of inputs used in exports of the dynamic commodities would not have a traumatic effect on the domestic producers of these inputs.

II. Existing export incentive system

In this section is reviewed the existing structure of export incentives that bear directly on export profitability.[8] There are many such incentives of which the most important are cash assistance, import replenishment and duty drawbacks.

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[7] For example, in jute manufactures and iron ore the export/output ratio is higher than 50 per cent; in tea, oil-cakes and tobacco, it is between 15 per cent and 50 per cent; on the other hand, in marine products it is 3 per cent and in engineering goods less than 10 per cent.

[8] Not considered because they are too far afield are more general policies, such as industrial licensing and policies on foreign collaboration which bear on export profitability but only indirectly.

Cash assistance

This is simply a cash subsidy on f.o.b. value, the rate of subsidy being fixed separately for each product group. About 500 items receive cash assistance at rates ranging between 5 per cent and 25 per cent of f.o.b. value. About 80 per cent of the items receive cash assistance of between 10 and 15 per cent. All the items receiving cash assistance are manufactured goods and most of them are new manufactures.[9] Engineering goods figure prominently in the list of items receiving cash assistance. In 1974/75, cash assistance of approximately $120 million was given on exports of f.o.b. value of approximately $1,200 million, which is approximately one third of total exports. The determination of cash assistance rates is undertaken by an interdepartmental committee and the rates have, in the past, been subject to frequent changes. About two years ago, however, the Government decided that all cash assistance rates would be regarded as guaranteed minima for three years. The disbursement of cash assistance has, in the past, been subject to many delays. Again, the machinery for disbursement has recently been streamlined. The criteria by which cash assistance rates are fixed have never been very clear. Ostensibly, two criteria were in operation for a number of years: first, that exporters be compensated for various state and local taxes incurred by them directly and indirectly, this being required because the duty drawback scheme (considered below) takes into account only import and excise duties; and secondly, that the difference be covered between marginal cost and f.o.b. price in the case of specified exportable items. In practice, a cut-off point was used limiting the maximum subsidy payable to 25 per cent of domestic value added.

The first criterion is perfectly sound; the second has little to recommend it. Marginal cost has been interpreted as short-run marginal variable cost. A subsidy based on this concept would be sufficient only when there is a recession. It cannot form the basis for a dynamic expansion of exports. First, if exporting is to become a normal rather than a distress activity, a businessman would be unwilling to export unless his cash realization from exports, inclusive of subsidy, covered not only his variable cost but also his fixed cost; and he would be unwilling to expand his export capacity unless his export proceeds inclusive of subsidy were sufficient to give him an adequate return on his investment. Secondly, even the above incentive may not be sufficient to induce exports because this requires not only that costs be covered but also that the profitability of exporting is at least equal to the profitability of sales on the home market. The basic principle of tailoring the subsidy to the difference between cost and export price is itself questionable. In so far as higher costs are an indication of inefficiency, the principle implies giving bigger subsidies to the least efficient industries. The correct principle must surely be to tailor the subsidy to offset that part of a firm's cost of production that is the result of factors unrelated to its own efficiency. This would involve compensating for various taxes on inputs (unless they are looked after by duty drawbacks) and also for the high ex-factory costs of production of bought-out inputs in relation to world prices.

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[9] There are some exceptions, notably cash assistance on exports of cotton textiles and, more recently, on some jute manufactures.

In the last few years, the criteria for cash assistance were multiplied under the aegis of a special committee that reviewed export promotion measures.[10] It suggested that cash assistance rates:

> "should be determined by a balanced judgement of several criteria such as: *(a)* export potential and domestic availability as well as supply elasticity of the products; *(b)* import content and domestic value added; *(c)* approximate implicit subsidy, if available under other incentive schemes; *(d)* compensation for irrecoverable taxes and levies; *(e)* difference between the domestic cost and international price of indigenous inputs and raw materials; *(f)* costs of entry into new markets; *(g)* a cut-off point up to which subsidy is to be allowed."

Cash assistance committees now presumably operate with the above criteria. Some of these criteria are sensible, others are not. More importantly, there is no guidance to the committees on how to weigh one criterion against another. In other words, there is lacking a basic framework for cash assistance policy in particular and export incentives in general.

Duty drawback

The duty drawback scheme is supposed to provide exporters with exemption from excise taxes on final products that are exported and drawback on direct and indirect import and excise duties that are embodied in the cost of production of exports.

Most of the export shipments are dealt with by means of all-industry rates worked out by the Drawback Directorate. If an enterprise can prove that the actual duty it has paid exceeds the all-industry rate assessment by 25 per cent it can choose to be considered under a brand rate which is on a firm-by-firm basis. The time-lag between applications and receipt of drawback is generally more than six months. Naturally, it could be even longer in the case of new products and products assessed under brand rates.

The following points may be noted in connection with duty drawbacks:

(a) Duty drawback is available only on materials "used up" in the process of manufacture. It is therefore not available on purchases of machinery. Strictly speaking, this makes no sense because the services of machinery are just as much "used up" in the process of manufacture for exports as raw materials are;

(b) It is generally agreed—the Drawback Directorate included—that drawbacks, especially at the all-industry rates, are on a safe minimum basis and do not, in many cases, compensate exporters fully for the cascading effects of taxes. This is also evident by a comparison of duty drawback on imports and the value of replenishment licences issued. Brand rates are made use of only by firms that can afford the costs involved in conducting prolonged negotiations with the Directorate;

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[10] This was an interdepartmental committee under the chairmanship of the then Secretary of the Ministry of Commerce. The report was not published but its conclusions were reported in the press.

(c) The drawback rate granted on an input that is both imported and domestically produced is calculated by taking the weighted average of the import duty (including countervailing duty) and the excise duty, the weighting being the shares of imports and domestic production in total domestic availability. This means that if a firm satisfies its need for a particular input entirely from imports, it does not receive full compensation for duties paid. This is a very important point. Even if imported inputs are liberally provided to exporters, the advantage will be substantially reduced unless this policy is changed.

Import replenishment

In addition to cash assistance and duty drawbacks, the Government has for many years operated an import entitlement scheme. In addition to actual user (AU) licences, the total value of which is equal to the previous year's consumption of imported materials, an exporting unit can get import replenishment licences (REP) equal in value to fixed percentages of export sales, depending on the "product group".

The stated objective of REP licences was to replenish exporters for the import content of their exports so that the production base of exports does not suffer as a result of the otherwise tight import control system. This was sought to be achieved by making the allowable shopping list for REP licences wider than that for AU licences. There is no doubt, however, that the REP scheme also acquired the unstated objective of giving a cash subsidy to exporters. This follows from the provision that exporters are entitled to an automatic licence each year equal in value to the previous year's actual consumption of imported materials plus an REP licence based on the previous year's exports. It is evident that even if a manufacturer kept his exports and his total production constant he would continue to receive the REP licence each year which he could sell at a premium. (This is even more true of select industries—an extremely wide category—which are also entitled to supplementary licences.)

The confusion between the replenishment and the monetary assistance aspects of the scheme has meant that neither objective is satisfactorily served. The replenishment aspect has been inadequately looked after because though REP shopping lists have been wider than AU shopping lists, they were still subject to the principle of indigenous clearance underlying the Indian import control policy which meant that, in general, import of an item was permitted only if it was not available domestically.

The monetary assistance aspect of REP licences, on the other hand, was limited by restrictions on transferability which, in the case of REP licences, was a once-for-all transferability. Nominations had to be decided on before applications for REP licences were made and the nominees could not re-transfer them. Also, nominations could only be in favour of manufacturers in the same product group or to producers of components used in those products. Furthermore, the shopping list available to nominees was even more restricted than that available to direct receivers. Not surprisingly, suggestions have often been made to increase the subsidy element in the scheme by reducing the restrictions on transferability. The main problem with making REP licences transferable is that there may be a concentration of demand on particular imports. Domestic industries whose costs are most out of line with world prices would then be very much at risk.

Recent policy changes[11]

The export incentive policy described above was in force till 1976. In the last two years there have been some significant changes that are indicated briefly below:

(a) Import policy has become much more liberal and particularly so for exporters. Bureaucratic scrutiny of firms' applications for import licences has been reduced and the automaticity of annual import licences (based on the previous year's imports plus a growth margin) has been increased. In 1978, import controls were abolished for a significant range of capital goods (though tariffs, of course, remain);

(b) Import policy for exporters has been radically liberalized. The shopping list for imports against REP licences has been largely done away with, though a number of restrictions on what can be imported have been maintained to safeguard the legitimate interests of indigenous industry;

(c) Some changes have been made in the duty drawback scheme to give exemptions of duties for a listed category of imports against advance licences granted on evidence of firm export orders. This scheme is, however, highly complicated and has had no effect;

(d) The procedures for payment of cash assistance and duty drawback have been streamlined and speeded up.

Overview of the existing system

·   An examination of India's export incentive system leads to the conclusion that it has two principal defects, one of which is being removed by recent changes in policy but the other remains:

(a) The incentive system did not, until very recently, remove the central constraint on export profitability created by India's protective structure. Industrialization behind import controls led to a situation in which many goods were produced in India whose processing costs were considerably above international levels. Since imports were not, in general, allowed if the items in question were available at home, the duty drawback system could not overcome this disadvantage and to have offset it by cash assistance would have required, in many cases, very high rates indeed. To give only one example, the main reason why India has shared so inadequately in the boom in garment exports from developing countries is the extremely high cost of synthetic fabric produced in India. The discrimination against exports created by import controls has been reduced in the last two years by allowing exporters considerable freedom in what they import against REP licences. There are still a number of restrictions, however, as evidenced by the fact that fabric imports are not permitted;

(b) The other notable feature of the incentive system is the lack of any clear principles for the determination of cash assistance rates. Cash assistance rates are haphazard and have been subject to frequent changes.

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[11] Recent policy changes have been well documented in IBRD, *op. cit.*

III. Suggestions for reform

Criteria for desirable export subsidies

In reforming the framework of export incentives it is essential to distinguish between two distinct issues: first, the desirable quantum or level of export incentives; and secondly the desirable form in which export incentives should be provided. As far as the first issue is concerned, principles have to be evolved to determine the extent to which export profitability should be improved so that exports are adequately encouraged without wasting public money. As far as the second is concerned, a choice has to be made between different methods of incentive provision, for example, cash assistance, import entitlement schemes, duty drawbacks, import liberalization.

As far as determining the desirable quantum of export incentives is concerned, it is useful to distinguish conceptually between the following kinds of export incentives, constituting increasing degrees of export assistance: *(a)* incentive measures that eliminate negative subsidization of net value added in export activities. This requires that exporters should receive commodity inputs at world prices; *(b)* incentive measures that go further and subsidize net value added in export activities up to a predetermined cut-off point; *(c)* incentive measures that go still further and give additional, strictly temporary, support to export activities. It should be noted that "net value added", unless specifically qualified, should be taken to mean value added at world prices, i.e. f.o.b. realization minus the cost of tradable current and capital inputs at international prices. In other words, the cost of non-traded inputs is included in value added.

Measures to eliminate negative subsidy to net value added

The rationale of such measures is straightforward assuming that the official exchange rate is not undervalued. If exporters have to pay higher than world prices for inputs (because of taxes, tariffs and quantitative restrictions (QRs)) they are in effect being penalized relative to their foreign competitors even if they are as efficient as the latter. Hence, unless there are genuine terms-of-trade reasons to the contrary, the minimum assistance that exporters should receive must be such as to compensate them for any disadvantages arising from: *(a)* the excess of the domestic prices of tradable intermediate goods over their world prices; and *(b)* the excess of the domestic prices of tradable capital goods over their world prices.

Tradable intermediate inputs

Providing exporters tradable intermediate inputs at international prices boils down to: *(a)* compensating exporters for the effect of import controls on the cost of intermediate inputs. This principle has only recently been accepted to a limited extent in India's export incentive policy; and *(b)* compensating exporters for taxes and tariffs on inputs through duty drawbacks or cash assistance. This principle has been accepted in Indian policy.

Even if there is a perfectly functioning system of compensation for taxes and tariffs on inputs, there is still a problem created by import controls or the principle

of indigenous clearance as a result of which exporters, along with other producers, are denied the option of importing. In the case of several domestically bought inputs (e.g. synthetic fabric), domestic prices (even exclusive of embodied taxes) are above world prices. This may be due to inadequate scale of production, inefficient processing or excessive quasi-rents. The disadvantage thereby created for exporters can in principle be handled either by monetary subsidies or by import liberalization for inputs into exports. The subsidy method itself has two variants, cash assistance or an import entitlement scheme. For various reasons, some already alluded to and some to be discussed later, an import entitlement scheme is unsuitable. One problem is that a monetary subsidy given to offset the high costs of domestically bought inputs would necessarily have to vary from year to year since world prices are volatile. It is most unlikely that import entitlements can be fine-tuned in such a way as to yield the appropriate subsidy from year to year and from product to product.

Cash assistance versus import liberalization

The real choice, therefore, is between cash assistance and import liberalization. The difficulty with cash assistance is twofold: first, in cases where there is a large difference between domestic and world prices, it would involve a sizeable burden on the budget. Moreover, it may often not be possible to obtain inputs of the requisite quality quickly from indigenous sources. Secondly, revising cash assistance rates frequently to take account of fluctuating world prices would be cumbersome.

Import liberalization for inputs into exports would obviate the need for frequent revisions of cash assistance. It would increase the demand for foreign exchange but, in the present context, that is not a burden to the Indian economy. It would be self-financing in the sense that net foreign exchange earnings would increase in due course. It is a direct method of assisting exporters and deals with the problem of high-cost inputs at its source. The problem with import liberalization is of course the adverse effect on existing domestic capacities. However, this effect should not be exaggerated since in the industries producing non-traditional exports, the latter are rarely above 10 per cent of domestic production. Moreover, if in particular instances the effect on domestic suppliers of the inputs is felt to be too adverse, the alternative of cash assistance would in any case be available.

Careful thought would have to be given to the modalities of working out such a scheme to compensate for the effects of import controls. Some ideas are given here:

(a) Exporters could be given complete freedom to import input requirements against REP licences. In order to minimize the risk of diversion, this widening should not be combined with the benefit of transferability;[1,2]

(b) The provision of principal tradables, such as iron and steel, non-ferrous metals, raw cotton and chemicals, to exporters at international prices could be entrusted to existing or new canalizing agencies. These agencies would have the responsibility of monitoring movements in domestic and world prices and supplying inputs to exporters at world prices either by foreign or domestic procurement. If it is decided to protect domestic producers in specific cases, these canalizing agencies could be subsidized by the Treasury.

[1,2] As noted earlier, the import policy of 1977 has gone some way towards adopting this policy.

Duty drawbacks

The abolition of indigenous clearance is a necessary but not a sufficient condition for enabling exporters to obtain inputs at international prices. There has to be a mechanism to ensure that exporters do not bear the burden of taxes and tariffs on inputs. The existing duty drawback system may not be adequate for the purpose for the following reasons:

(a) As already explained, the drawback rate on an input is fixed by taking the weighted average of the import duty (including countervailing duty) and the excise duty, the weights being the shares of imports and domestic production in total domestic availability of the input. Since export activities are likely, especially with the suggested import liberalization, to be more import-intensive than purely domestic activities, this principle would discriminate against exporters and the advantage of import liberalization would be seriously reduced. There is no fully satisfactory workable solution to this but a partial solution would be to give exemptions from import duties for imports against REP licences. This would have to be accompanied, however, by a reduction in the cushion in the REP system and by making REP licences non-transferable;

(b) There is a widespread suspicion that duty drawbacks are extremely ungenerous and do not compensate exporters fully for the effects of taxes, especially as very few units can afford to conduct the prolonged negotiations required to fix brand rates. It would be desirable to investigate whether there is any truth in these suspicions. If there is, cash assistance rates would have to be increased on an appropriate basis.

Tradable capital goods

Duty drawbacks are not available on capital goods. Strictly speaking, tariffs and import controls on capital goods would affect the competitiveness of export products because depreciation and interest charges are higher than they would be if capital goods were available at world prices.[13] There is no easy solution to this problem since capital goods are used to produce for home and export sales simultaneously, but two possible schemes could be considered. The first would be the abolition of indigenous clearance and import duties on capital goods for export-oriented units, say those exporting more than 20 per cent of their output. At the moment the total revenue from import duties on capital goods imported by the economy as a whole is about $200 million. It is doubtful if the loss in revenue from such a measure would exceed $25 million, a negligible proportion of total government revenue.

The second solution would be to follow the cash assistance route. It would be too cumbersome to take account of the variations in world prices of capital goods etc. A rough and ready method would be to give a subsidy on f.o.b. value equal to (the share of capital charges in f.o.b. price) *times* (the percentage average difference

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[13] As noted earlier. the import policy of 1978 has ushered in a major relaxation of import control on capital goods. However, about half the capital goods needed in industry are still subject to import control. Tariffs on capital goods, of course, still continue.

between domestic and world prices of capital goods). The latter could plausibly be set at about 33 per cent.[14] This can be incorporated with the subsidy to net value added.

Subsidy to net value added

So far the discussion has only referred to elimination of negative subsidization of value added in export activities. However, it should be extended further to provide a positive subsidy to value added. The reason is simply that the current exchange rate is over-valued; even if there were optimum export taxation of primary products, elimination of other trade barriers would lead to a trade deficit. Another way to say the same thing would be that at the current exchange rate, money factor prices are too high in relation to productivity to secure trade balance with optimum trade taxes, so that subsidization of value added in tradable goods activities is required. Now it so happens that production and sale for the home market already receives a substantial effective subsidy (protection). It stands to reason, therefore, that value added in exports should also be subsidized.

However, this subsidy to net value added in exporting should only be up to a predetermined point. The need for such a benchmark arises for two reasons:

(a) Several import substituting activities have ultra-high rates of effective protection indicating processing costs that are far above world levels. To give them export subsidies sufficient to make the products internationally competitive would simply compound the inefficient use of resources;

(b) Selling in the home market may result in abnormally high profits. In such a case, the appropriate way to give an adequate incentive to exports is to impose excise duties.

The natural question is of course what should be the rate of subsidy to net value added for Indian exports. One useful criterion would be to subsidize value added in exports to the same extent as the average subsidy (protection) to net value added in production for home sale. The application of such a criterion, however, presents many difficulties in the Indian context and involves a large element of personal judgement. Previous studies of effective protection in India have estimated it to be very high indeed, on average about 100 per cent.[15] However, the author believes that the value added in Indian export activities should be subsidized by 33 per cent. No great precision can be claimed for this estimate but it is based on the following presumptive reasons:

(a) As far as previous studies of effective protection are concerned, they are out of date, the most recently published estimate being for 1968/69. In addition, they are highly aggregative and lump together import substitute and export activities in each sector so that there is no way of comparing the effective protection given to home and export sales. Value added at world prices for each sector is calculated in

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[14] This is the approximate average tariff on capital goods derived from data on import duties broken down by type of commodity. With the recent liberalization of capital goods imports, the need to make an allowance for the effect of QRs on domestic prices has been reduced. Of course, some import controls remain but allowance must be made for the fact that India produces some capital goods cheaply enough to export them. A 33 per cent difference therefore seems a reasonable average.

[15] Bhagwati and Desai, *op. cit.*, and Bhagwati and Srinivasan, *op. cit.*

many cases by using extremely unreliable data on import premia (the difference in internal and external prices). Furthermore, it must be noted that import premia have declined sharply in recent years so that the previous estimates of effective protection certainly overstate its magnitude;

(b) It is important to remember that the Government of India is now committed to a more outward-looking industrialization strategy than hitherto. Import controls are gradually being relaxed and it is these that were principally responsible for the high effective rates of protection in the home market. It seems reasonable to assume, in the light of the comfortable balance of payments position, that the Government is unlikely to pursue trade policies that would give the home market an average effective protection of higher than 33-50 per cent. Of course, some activities, e.g. the manufacture of some luxury consumer goods, may continue to enjoy high effective rates of protection since they cannot easily be wound up. However, in the Indian context, in which the Government controls the direction of investment through industrial licensing etc., high effective rates do not necessarily indicate resource pulls;

(c) If the maximum effective protection to the home market that can be expected over the medium run is 33-50 per cent, it seems reasonable to give a subsidy to net value added in exports of 33 per cent. (This allows for some bias in favour of the home market for the usual reasons and for the conservatism of the Ministry of Finance which does not like giving money away!) In comparison, the average import duty is about 25 per cent, and the average subsidy on f.o.b. value of exports (not total exports but those that receive subsidies) is currently around 15 per cent. This would constitute a subsidy to net value added of 30 per cent if net value added were (say) 50 per cent of the f.o.b. price and if tradable intermediate and capital goods were available at world prices. Since this latter condition is not fulfilled at the moment, the subsidy to value added is less, probably in the region of 20-25 per cent. Thus, a subsidy to net value added of 33 per cent would constitute an increase over the present average level of subsidy to net value added in export activities.[16]

The conclusion of this line of argument is that the subsidy to net value added in export activities should be in the region of 33 per cent unless there are terms-of-trade reasons to the contrary. One important point should be made here. It is of course implicit in the above argument that the subsidy to the f.o.b. price should vary directly with share of net value added in the f.o.b. price. It is also implicit that if net value added is zero or less, the subsidy should also be zero. In practice, however, to prevent the phenomenon of negative net value added, there should be a minimum net value added specified (say 25 per cent of the f.o.b. price) to qualify for a subsidy.

Uniform versus differentiated subsidies to value added

The next question is whether there is any argument for differentiated subsidy to value added. In fixing subsidy rates only one such argument has theoretical or practical merit, that is, the terms-of-trade argument. If the country is entirely or approximately a price-taker in the world market for a particular product, the

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[16] On the other hand, the Government of India has recently announced its intention of reducing export subsidies. (*Times of India,* 4 April 1978.) The argument in the text suggests that this would be an unwise move.

presumption must be on giving a 33 per cent subsidy to value added. If this is not the case, however, demand and supply conditions have to be brought in. Lower subsidy (and in extreme cases even negative subsidy) on value added may be called for if extra sales reduce the price on intra-marginal sales (unless discriminating monopoly is possible). Judgements concerning long-run elasticities of demand and supply are extremely difficult to make, but unavoidable. The principal business of government committees that fix subsidy rates would be to make informed judgements on this question.

The author is against introducing any other criteria for differentiated subsidies on value added. Proliferation of criteria should be avoided because if they conflict further criteria are needed to balance them. Two such criteria put forward in recent Government of India pronouncements are considered below.

One faulty criterion is that export subsidy should be positively correlated with labour intensity of exports, presumably because the social cost of labour is lower than its private cost. (This is a particular example of the standard argument that factor prices in the economy are distorted.) This criterion should be ignored for the following reasons: *(a)* the difference between the social and the private cost of labour is much smaller than often made out if the premium on public money is taken into account; and *(b)* the divergence between the social and private cost of labour is relevant for import-substituting activities as well. Since some ideal optimum is not being aimed for, there is no case for subsidizing exports as such, except to the extent that exports are more labour-intensive than import substitutes. In any case, the suggested subsidy on value added is a step in the direction of reducing real factor costs.

Another faulty criterion is that import content and domestic value added should play a part in determining export subsidies. (It should be understood that domestic value added here simply means f.o.b. realization minus import content.) This is a confusing criterion in the present context, if at the same time import policy is liberalized for exporters in order to offset the effect of import controls on their costs of production. Moreover, high domestic value added per unit of output is not worth aiming at if that means a sizeable reduction in the quantity that can be sold. The uniform subsidy to net value added suggested in this paper implies in anv case a differentiated subsidy on f.o.b. value depending on the share of net value added in f.o.b. realization.

Cash assistance versus import entitlements

The next question is the manner in which the subsidy to value added should be provided. The choice here is between cash assistance and a transferable import entitlement scheme, a choice which has been much debated in India. (Other budgetary methods such as tax rebates on export profits etc., can be dismissed because cash assistance can achieve everything they can besides being administratively simpler and less open to abuse.) A transferable import entitlement scheme has the advantage, under certain circumstances, of subsidizing exports without imposing a budgetary burden. But, on balance, in the present context, it does not seem to be a route worth following. The reasons are as follows:

(a) An import entitlement scheme can become a major vehicle of export subsidization only in the context of a tight import control regime necessitated by foreign exchange scarcity. Foreign exchange is not likely to be scarce over the next

five years and the pressures in the system are in the direction of a more liberal import policy and the replacement of quantitative restrictions by tariffs. To create an artificial foreign exchange scarcity in order to run an entitlement scheme would be to fit the facts to the mould of a preconceived theory;

(b) The transferability of entitlements over people and products creates other problems. If there are too many restrictions on transferability, premia will be inadequate. If there are too few such restrictions, there is the danger of over-concentration of demand on certain imported products leading to a highly directional impact on domestic capacities. Again, it is extremely difficult to ensure, even if the premium is high, that the higher costs are borne only by non-priority industries. Indeed, Indian experience is sufficient to conclude that it is very difficult to devise a satisfactory import entitlement scheme. The main difficulty with the scheme is the unpredictability and haphazardness of its impact. These problems are much more likely to be avoided by conscious policy decisions such as widening non-transferable REP shopping lists for exporters or replacing quantitative restrictions by tariffs selectively to raise the revenue to give cash assistance to exporters;

(c) A fundamental problem with an import entitlement scheme is the instability of the premia. From an exporter's point of view, stability of the incentive is crucial for forward planning. Of course, the economic environment is bound to be uncertain but some stability is better than no stability. As far as investment in export capacity is concerned, a stable cash assistance rate is likely to be a much more powerful incentive than many suggested alternatives. It has sometimes been suggested that the variability of the entitlement premium is a good thing because the premium varies inversely with export performance. This argument is not compelling. A poor export performance can coincide with a domestic recession and slack demand for foreign exchange and therefore result in a low premium;

(d) The disadvantage of a cash assistance scheme is that it can strain the budget if the level of the subsidy is increased. However, the scheme suggested in this paper is unlikely to add a sizeable budgetary burden. First, the effect of high-cost domestic inputs is to be removed at least partially by import liberalization for exporters rather than by cash assistance. Secondly, it has been suggested that capital charges, and net value-added (including non-traded inputs) as a proportion of f.o.b. price should be subsidized by 33 per cent. Except when modified by terms of trade considerations, this would imply subsidy rates of 10-25 per cent on f.o.b. value, which are similar to existing rates.

The author has examined the combined incidence of cash assistance and REP premia in 1975/76 by broad product categories on the assumption of an REP premium of 20 per cent.[17] The implicit subsidy rates to f.o.b. realizations were found to be as follows: engineering goods (20%), chemicals etc. (18%), plastics (16%), sports goods (21%), woollen carpets (19%). The considerations outlined above

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[17] Data relevant to the calculation are not published by the Government of India. They were made available to the author by the relevant ministries. Note that duty drawbacks have been left out of the calculation of effective subsidy since it is assumed that tradable inputs will be made available to exporters at international prices. The REP premium, as reported in business journals, is much lower than before 1975—for obvious reasons.

suggest that cash assistance rates would in general not have to be increased further. In some cases, they could even be reduced.[18] The main change would be in the direction of a more liberal import policy for inputs into exports.

Additional strictly temporary subsidies

In exceptional circumstances, after the most intensive analysis of benefits and cost, additional export assistance may be justified for the following reasons:

(a) Aggressive sales in particular markets to overcome costs of entry. It is doubted that this should ever exceed 5 per cent of f.o.b. value;

(b) It may be necessary in a recession to cover the difference between marginal cost and f.o.b. price up to a cut-off point. Actually, this argument would be of very limited application. If exporters are guaranteed inputs at international prices and if, in addition, they are assured a uniform subsidy on value added except for genuine terms of trade reasons, the difference between private marginal cost and f.o.b. value would already have been covered to the appropriate extent.

Framework of export incentive policy

Export subsidization should proceed on the following principles:

(a) Eliminate negative subsidies to value added in export activities: This basically involves providing exporters with current commodity inputs at world prices. In the Indian case, the most convenient way to do this is to abolish the shopping lists on REP licences. Of course, entitlement percentages would still have to be fixed in order to minimize abuse leading to excessive impact on domestic capacities. For the same reason, transferability of REP licences should be eliminated. REP licences should basically serve the function of removing the bottleneck of high-cost domestic inputs as far as exporters are concerned. This policy recommendation has been partially adopted in the last two years. It only remains to give it full effect. In addition to liberalizing imports against REP licences, the duty drawback system should be streamlined and extended in the direction of giving exemptions of import duty for imports against REP licences;

(b) Provide a cash subsidy on f.o.b. value of exports, the subsidy to be fixed along the following lines:

   (i) Subsidy to cover irrecoverable taxes, say 3 per cent of f.o.b. value;
   (ii) Uniform subsidy on net value added and on the share of capital services in f.o.b. value.

It should be safe to subsidize both of these at 33 per cent. Thus, the subsidy on f.o.b. value should be 33 per cent of gross value added. The share of this element in f.o.b. value is likely to vary between 30 per cent and 75 per cent, implying subsidies on

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[18]The latest indications are, however, that the Government of India is contemplating a substantial reduction in cash assistance rates, having made some moves in the direction of import liberalization. (See *Times of India,* 4 April 1978.) The above calculations suggest that a substantial reduction is not called for.

f.o.b. value ranging from 10 per cent to 25 per cent. There should obviously be some minimum bound to gross value added, say 30 per cent, to qualify for any subsidy at all, in order to prevent the phenomenon of negative value added at world prices.

Elements (i) and (ii) can be combined and the rates of cash assistance simplified. It is doubtful if it is worth having more than four rates, 10 per cent, 15 per cent, 20 per cent and 25 per cent of f.o.b. value.

Conclusion

This paper has indicated how India's export incentive system could be reformed without imparting a traumatic shock to the industrial structure which has been built up under a policy of extensive protection. The main idea has been to change the system so as to enable exporters to obtain inputs at world prices. Such a policy is likely to lead to increased imported inputs only in the industries producing new manufactured exports. Since the export/output ratio in these industries is low, this change is likely to have only a diffused effect on domestic capacities. The effect of additional imports on the trade balance is not a problem in view of the fortuitously comfortable balance-of-payments position. In addition to this measure, a cash assistance scheme providing a uniform subsidy to value added in manufacturing has been suggested. Some steps towards the provision of raw materials to exporters at world prices were taken by the Indian import policy of 1977. The cash assistance scheme, however, is still administered in an extremely *ad hoc* way and is in need of revision along the lines outlined above.

The design of benefit-cost analysis of investment projects in Peru

Daniel M. Schydlowsky *

Introduction

The general principles of benefit-cost analysis have recently received considerable attention with the objective of making them more operational. The most notable efforts in this field have been undertaken by the United Nations Industrial Development Organization (UNIDO) [39], the Organisation for Economic Co-operation and Development (OECD) [26] and the World Bank [36]. However, several other authors have made a major contribution to this effort.[1] Their works portray a general system of analysis which in principle is applicable to any given situation. Specific country analyses, on the other hand, are few, although a number of illustrative applications of the major manuals exist. The proper application of benefit-cost methodology to a particular country requires that the salient features of the respective economy be incorporated into the framework of the analysis. In particular, the project analyst must take into account certain policies as given [35], the adjustment mechanism in each of the major factor and product markets, the interactions between these different markets, the changes that will occur in each market and in its interaction with the others over time, and the nature of the scarce resource being allocated.

Countries will differ from one another, in some instances considerably, with regard to each of the elements mentioned. Thus, in some countries it may be appropriate to take as given the exchange rate and the severity of import restrictions (tariffs or quotas). In some other countries, it may be more appropriate to take as given only the exchange rate, but to regard the extent of import restriction as dependent on the projects themselves. Likewise, in some countries the balance of payments might be adjusted principally by changes in price, i.e. by modifications of the exchange rate and trade restrictions; or elsewhere the adjustment may take place principally or wholly by means of income effects, with the level of activity of the economy adjusting. In certain countries it may be appropriate to regard the market for foreign exchange as independent of the market for savings and investment; such would be the case for example if the imports of capital goods did not change with the availability of foreign exchange. In some other countries, it may be appropriate to assume an explicit interdependence between these markets, such as when the level of investment and the import of capital goods respond to the availability of foreign exchange. Or it may be appropriate to assume that the adjustment mechanism in existence will continue unchanged and that the divergences that exist between market and shadow prices will continue to be the same at least in quality if not in quantity. It may be more appropriate in another case to conclude that the nature of

[1] Harberger [19], Little and Mirrlees [27] Bruno [8] and Schydlowsky [33, 34].

the system is such that the divergences between market and shadow prices will disappear in a gradual and systematic fashion. Finally, in some countries it may be clear that the resource being allocated is government savings.

These various differences and many more that could be cited mean that it is impossible to have a single set of equations for the calculation of shadow prices that are universally applicable. Evidently, the theory can be expressed in sufficient generality to be applicable everywhere, but when the general functional forms are translated into particular specifications that enable the calculation of shadow prices from market prices, no single specification will do for all countries. Rather, each particular specification will have to reflect the characteristics of the economy concerned.

This study focuses specifically on one country, Peru. It attempts to set out in section I the macro-economic framework in which the projects are analysed. Thus the discussion covers the general functioning of the Peruvian economy under institutional arrangements pertaining in late 1975, the attendant mechanisms for the generation and absorption of savings, foreign exchange and labour, and the interaction between the private and public sectors. Section II focuses on the role of investment in the system and attempts to bring out the extent to which investment resources are fungible, both between the private and public sectors and within the public sector. Section III draws the implications from the previous two sections for the definition of shadow prices in the Peruvian economy. Emphasis is given to defining the difference between market price on the one hand and marginal social cost and marginal social utility on the other, in each of the major factor and product markets. The choice of one of these (or an average of them) as shadow price is assessed. Finally, attention is paid to the interdependence between the various markets in order to take the existing general disequilibrium into account. Section IV takes up the question of the form of the benefit-cost criterion that is appropriate to the economy under consideration. Various alternative formulations are considered, compared with each other, and related to the institutional framework discussed in section II in order to arrive at a proper recommendation of what criterion or combination of criteria to apply in Peru. Section V is a digression on distributive weights in which the types of such weights appropriate to the Peruvian situation are discussed. Section VI closes the circle by summarizing the main constituent elements of a system of shadow prices for Peru, and indicates the extent to which the Peruvian specification may be generalized to apply to other countries.

I. The macro-economic framework

Peru in late 1975 was a veritable mixed economy, in which the Government was preponderant but the private sector was by no means unimportant. Government activity was not monolithic and centrally co-ordinated; government enterprises behaved in a quite independent manner and often found their interests conflicting with those of other government enterprises or with those of the central Government in much the same way as private firms.[2]

In Peru, government participation in the economy occurs through two major channels: direct ownership of the means of production or of the channels of trade

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[2] See Aharoni [2] for a useful discussion of the differences and similarities between private and government-owned enterprises.

through wholly goverment-owned corporations, and regulation of market activity through taxes, tariffs or quantitative restrictions of various sorts. However, the economy is still overwhelmingly one in which prices and profits (of public as much as of privately owned corporations) are important. Inflation is of as much concern to the Government as to the consumers; losses are regarded as a sign of failure as much in government corporations as in private corporations; although they are obviously more sustainable in government corporations, all enterprises look for tariff and other protection and all prefer to pay minimum taxes, publicly owned corporations being no exception.

The reforms undertaken since 1968 have had an important effect on the working of the economy. The changes in the forms of ownersnip have been major. Not only have some large holdings been expropriated, principally large farm units and foreign enterprises, some of which have been transferred to state-owned corporations, but of even greater effect has been the creation of a legal framework for different forms of ownership, of which the main ones are co-operatives and worker-managed enterprises. The remaining private enterprise sector has been reformed to the extent that workers now mandatorily share in equity and in management control in medium-scale and large enterprises and obtain more in profits than heretofore in small ones.[3] Hence, one now speaks in Peru of a reformed private sector.

Exchange and price control have also transformed the character of the economy. Before 1968 the sol was fully convertible and price control was virtually non-existent, with the minor exceptions of bread and edible oil. The imposition of extensive exchange control and the rationing of foreign exchange naturally has affected current production plans and pricing policies; price control has needed therefore to be added to repress the ensuing inflation. This has been done mainly for basic consumption goods. The control of trade implicit in the licensing system is complemented by government ownership of the major channels of trade, which centralizes in the hands of the Government a major fraction of the country's trading activity.

These characteristics of the workings of the current Peruvian economy naturally need to be taken into account in the design of measures of marginal social cost and marginal social utility of inputs and outputs, since investment activity will take place within this environment. Definitions of shadow prices based on another hypothetical environment, say the perfectly competitive free trade situation, would be completely irrelevant to the Peruvian case; there is no chance that such a hypothetical situation would be implemented in Peru in the near or even intermediate future. Hence, it is important to examine in some detail the workings of the major markets of the economy, in order to specify the nature of the divergence between supply and demand prices and their permanent disequilibria, and to identify the adjustment mechanisms that would equalize quantities demanded and quantities supplied. This analysis will later be used as the basis for a definition of shadow prices to be discussed in section III.

The market for foreign exchange

The market for foreign exchange is characterized by extensive state intervention. Its volume of transactions may be seen in table 1.

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[3] See Knight [24] tor a discussion of the "industrial community" and Abusada-Salah [1] for a discussion of the Peruvian version of worker management.

Table 1. Balance of payments, Peru

(Million US dollars)

Item		1969	1970	1971	1972	1973[a]
Goods and services						
(1)	Exports, goods (f.o.b.)	879.5	1 043.3	889.4	945.0	1 136.6
(2)	Imports, goods (f.o.b.)	−658.8	−699.6	−730.0	−812.0	−1 029.0
(3)	Trade balance = (1)+(2)	220.7	334.7	159.4	133.0	107.6
(4)	Freight	−46.0	38.6	37.3	−37.6	42.7
(5)	Insurance	−13.8	−14.3	−15.6	−17.6	−12.6
(6)	Factor income payments (net) = (7)+(8)	−184.7	148.5	−125.4	−120.9	−174.5
	(7) (public)	(−37.3)	(−31.3)	(−47.7)	(−50.6)	(−65.6)
	(8) (private)	(−147.4)	(−117.2)	(−77.7)	(−70.3)	(−108.9)
(9)	Government transactions	−8.1	−15.0	−14.0	−13.4	−14.6
(10)	Transport	1.3	−2.1	−31.9	−42.2	−54.5
(11)	Travel	−4.2	−9.7	8.4	15.8	14.4
(12)	Other services	3.1	3.2	−16.9	12.0	1.2
(13)	Service balance = (4)+(5) +(6)+(9)+(10)+(11)+(12)	−252.4	−231.4	−232.7	−203.9	−283.3
(14)	Other transfers	31.3	81.6	39.4	39.2	32.2
(15)	Current account balance = (3)+(13)+(14)	−0.4	184.9	−33.9	−31.7	− 143.5
Capital						
(16)	Direct investment	19.4	−79.2	−50.2	−24.2	65.2
(17)	Private loans = (18)+(19)	0.9	2.4	7.5	−29.5	−13.2
	(18) (used)	(25.0)	(28.2)	(66.1)	(24.8)	(20.5)
	(19) (amortization)	(−24.1)	(−25.8)	(−58.6)	(−54.3)	(−33.7)
(20)	Official loans = (21)+(22)	132.2	69.5	27.5	121.3	319.5
	(21) (used)	(220.9)	(19C.4)	(183.8)	(285.6)	(671.8)
	(22) (amortization)	(−88.7)	(−120.9)	(−156.3)	(−164.3)	(−352.3)
(23)	Other loans (public sector)	−8.5	31.0	−13.0	−7.3	14.0
(24)	Changes in assets and liabilities = (25)+(26)	—	—	—	6.3	−51.2
	(25) (public)	(−)	(−)	(−)	(2.6)	(−35.7)
	(26) (private)	(−)	(−)	(−)	(3.7)	(−15.5)
(27)	Total long-term capital =(16)+(17)+(20)+(23)+(24)	144.0	23.7	−28.2	115.0	334.3
(28)	Net basic balance = (15)+(27)	143.6	208.6	−62.1	83.3	190.8
(29)	Total short-term capital	−55.7	21.4	−80.1	23.7	−109.3
(30)	Special drawing rights	—	14.3	14.2	16.1	−4.0
(31)	Errors	−52.7	13.1	51.8	−72.7	−64.3
	(32) Total = (28)+(29)+ (30)+(31)	35.2	257.4	−76.2	50.4	13.2
(33)	Compensatory finance = −(32)=(34)+(35)+(36)+ (37)+(38)	−35.2	−257.4	76.2	−50.4	−13.2
	(34) (central bank)	(−37.1)	(−182.5)	(29.8)	(−143.9)	(−95.1)
	(35) (state bank)	(−18.6)	(−127.1)	(39.6)	(113.3)	(79.9)
	(36) (development banks)	(−1.2)	(−8.2)	(2.3)	(−13.4)	(1.4)
	(37) (commercial banks)	(21.7)	(60.4)	(4.5)	(−6.4)	(0.6)
	(38) (central government)	(−)	(−)	(−)	(−)	(−)

Source: Banco Central de Reserva del Perú, *Cuentas Nacionales del Perú 1960-1973*, (1975).

[a] Preliminary figures.

As regards exports, all major export products except coffee and wool are traded through government export trading companies. In addition, the Government owns all but one of the major mining enterprises (Southern Peru Copper Corporation comprising the Toquepala and Cuajone mines), and all fish-meal production. All sugar production estates are owned by co-operatives (and now have the option of transforming themselves into worker-managed firms). Private enterprise contributes only a share of copper (Southern Peru Copper Corporation), the output of small- and medium-scale mining (with the latter subject to extensive government regulation), cotton, coffee and wool plus the industrial exports that so far exist. The importance of the various items in total exports may be seen in table 2.

Table 2. Export products of Peru

Product	Value			Composition		
	1971	*1972*	*1973*[a]	*1971*	*1972*	*1973*
	(Thousand US dollars)			*(Percentage)*		
Copper	175 191	188 140	337 408	19.6	19.9	29.6
Iron	60 646	67 527	66 142	6.7	7.1	5.8
Silver	49 118	61 230	83 468	5.5	6.5	7.3
Lead	26 708	33 514	47 465	3.0	3 5	4.1
Zinc	47 971	70 439	98 351	5.4	7.5	8.6
Petroleum and derivatives	5 568	6 471	15 016	0.6	0.7	1.3
Fish-meal and other fish products	327 687	265 902	157 269	36.8	28.1	13.8
Cotton	44 660	46 963	63 306	5.0	5.0	5.6
Sugar	69 148	85 888	78 078	7.8	9.1	6.8
Coffee	35 929	49 145	64 683	4.0	5.2	5.7
Wool	2 356	6 073	11 797	0.2	0.6	1.0
Others	44 465	63 703	113 641	5.0	6.7	10.0
Total	889 447	944 995	1 136 642	100.0	100.0	100.0

Source: Banco Central de Reserva del Perú, *Anuario de Estadística Económica y Financiera,* 1963-1973 (1975).

[a]Preliminary figures.

The combined effect of government marketing and government ownership is twofold. Firstly, for those exports with a very elastic foreign demand, the short-term price elasticity of supply is reduced,[4] since the government enterprise is able to assess future profitability over a longer period than private entrepreneurs, by looking at average returns over several years rather than at shorter-term results. The longer horizon may be viewed as a result of the impossibility of government bankruptcy, a lower social than private discount rate, and the pooling of results across export lines which implies a lower average risk. For exports in which the country has some monopoly, however, the result is quite the contrary: the short-term elasticity of supply is much increased as attempts are made to implement optimum tariff policies.

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[4]The short-term supply elasticity is low for many products in any case. In mining, this results from the high ratio of fixed to variable costs; in agriculture, it results from the perennial or quasi-perennial nature of the plantings (e.g. coffee. sugar cane, cotton). See Brecher |5| for an analysis of the implications of such a time frame on comparative advantage and trade.

Secondly, the exchange rate has much less effect on supply since there is considerably less need for government enterprises to realize a profit than private firms, and, indeed, government enterprises can if necessary cover such losses by recourse to the treasury. Nonetheless, the erosion of profits in government export enterprises does generate pressures for adjustment of the exchange rate, even if the mechanism is through loss of the surplus cash flow rather than through a reduction in export revenue. The exchange rate retains its importance for the production of the private sector. Foreign exchange revenue under current institutional arrangements is thus principally a function of installed export capacity and of the realized world price.

In the period 1967-1975, the nominal exchange rate was maintained fixed, which in the presence of rising domestic costs was equivalent to revaluation. Up to 1974, this revaluation was offset by the raw material price boom. The situation is now significantly different and one of the reactions has been to adjust the nominal exchange rate by 18 per cent. Whether this adjustment will eventually lead to a crawling peg policy is not clear at the time of this writing, although it does not seem likely.[5] The nature of that decision is in any case relevant only for small- and medium-scale mining, coffee, cotton and wool. Large private copper mining, i.e. the Southern Peru Copper Corporation, can probably rival the staying power of the Government by being able to finance successive cycles of over-valuation and undervaluation. In turn, non-traditional exports since 1968 have been promoted with a tax reimbursement certificate (CERTEX) enabling the Government to adjust the effective export rate selectively for such products.

In summary, then, the supply of foreign exchange is characterized by a situation of very low short-term elasticity, in part because of the nature of the output and in part because of the ability of the producers (Government and Southern Peru Copper Corporation) to wait out cycles of income without changing the volumes of output. Consistent with this, the major impact on foreign-exchange revenue comes from externally determined world prices for the products that Peru wishes to sell.

Imports are also subject to extensive government controls. There is an explicit licensing system which is administered separately for the Government and for private importers. In addition, there is a system of import duties, and, finally, there is the compulsory purchase of certain import and industrial inputs through a government buying corporation.

Import controls are administered with a preference for raw materials and capital goods over consumption goods, although significant amounts have been spent for the latter, particularly food in which Peru is not self-sufficient. Food imports, however, have been handled directly through the public sector. The composition of imports is given in table 3.

Macro-economic policy also contributes in an important manner to import control, through the management of aggregate demand. Tight money, expressed as a reduction in credit to the enterprise sector (both public and private), limits the level of economic activity in the economy and thus the demand for current inputs. In the private reformed sector, credit restriction also affects investment plans, limiting or postponing them, and thus contributes to a reduction in the demand for capital goods imports. In turn, central government investment is constrained by the desire (and need) to keep the deficit within the limits of acceptable increases in internal and

[5] Events have since disproved this forecast. A crawl was in effect from late 1976 onwards, and it was being considered once again in July 1977.

Table 3.   Imports by use or economic destination, Peru

Imports	Value			Composition		
	1971	*1972*	*1973*	*1971*	*1972*	*1973*
	(Thousand US dollars)			*(Percentage)*		
Consumer goods	*97 152*	*109 174*	*154 393*	*12.9*	*13.7*	*15.1*
Non-durable	77 095	90 130	102 474	10.3	11.3	10.0
Durable	20 057	19 044	51 919	2.7	2.4	5.1
Raw materials and						
Intermediate products	*423 847*	*446 328*	*464 138*	*56.4*	*56.0*	*45.5*
Fuels, lubricants						
and others	24 772	44 802	56 555	3.2	5.6	5.5
For agriculture	13 191	15 335	18 964	1.8	1.9	1.9
For industry	385 884	386 191	388 619	51.4	48.5	38.1
Capital goods	*226 846*	*236 832*	*381 248*	*30.1*	*29.7*	*37.4*
Construction						
materials	18 262	18 940	21 650	2.4	2.4	2.1
For industry	164 302	178 204	279 037	21.9	22.3	27.3
For agriculture	14 299	12 030	17 982	2.0	1.5	1.8
Transport equipment	29 983	27 658	62 579	4.0	3.4	6.1
Other	*3 813*	*4 234*	*18 770*	*0.5*	*0.5*	*1.8*
Total	751 658	796 568	1 018 549	100.0	100.0	100.0

Source: 8anco Central de Reserva del Perú, *Cuentas Nacionales del Perú 1960-1973* (1974).

external debt. Domestic deficit finance is limited by the amount of credit expansion consistent with the balance of payments and price stability targets, and by the credit needs of the enterprise sector. Increases in external debt are affected by the value of bankable investment projects and by the country's credit rating, which in turn reflects the balance of payments and price stability situation. When expenditure restriction becomes necessary for balance of payments reasons, government imports fall as the result of reductions in investment funded from internal (deficit finance) sources; foreign-debt-funded, project-related, capital-goods imports are cut last.

Given the monetary and fiscal policy and the tariff levels, there is still some excess demand for imports, which makes the exchange control (import licensing) binding. As a result, imports command a premium over the landed price when they are resold in the internal market. It should be noted, however, that the overwhelming part of import licences is allocated directly to users, so that the scarcity value of imports is not directly observable in an organized local market, but simply becomes part of the profit rate of the assignee of the licence, except in so far as the price of this output is controlled. Only in that segment of the import market serviced by import houses is some approximation to the scarcity premium of imports observable.

The capital account is subject to tight government control as well, with authorizations required for all non-banking-sector indebtedness of the public and private sectors and a minimum of finance required from foreign suppliers for current imports.[6] Direct foreign investment is negotiated with the Government as is the

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[6] The range varied from 90 to 180 days' worth of finance.

finance for those investment projects that are carried out by government enterprises. The balance on long-term and on medium- and short-term trade and investment finance is used to contribute to the balance-of-payments strategy, with attempts made to increase indebtedness when the current account is weak and to limit it when that account is strong. The short-term debt of the banking sector is managed with the same intent. However, in practice the room for manoeuvre is quite limited, with the net inflow usually hovering near the ceiling allowed by world market conditions. Thus only limited offset is available when the current account worsens; on the other hand, considerable flexibility exists. Some indication of the magnitudes involved can be gained from table 4.

The adjustment mechanism for the balance of payments that is implied by this market structure is one in which the level of imports is the contributing factor, acting in part through changes in the severity of exchange control and in part through the adjustment of the macro-economic level of activity of the economy. When more foreign exchange is available, exchange control is relaxed, more imports of raw materials and capital goods are allowed, and monetary and fiscal policies are eased with the consequent reflation taking up the additional available import supply. If there is a teduction in the availability of foreign exchange, imports decline with a reversal of the previously described mechanism. Change in the level of exports plays a minor role in the adjustment mechanism. With the production of exportables constant in the short term, domestic off-take is the variable that affects exportable supplies. Thus, when domestic reflation occurs, exports fall, limiting the foreign exchange available to sustain the expansion. When deflation occurs, the opposite takes place and increased export supplies limit the need for downward adjustment of

Table 4. Foreign capital requirements and their financing

(Million US dollars)

	Annual averages				
Item	*1968-1969*	*1970-1971*	*1972*	*1973*[a]	*1974*[a]
Deficit on current account	10	−75	93	144	761
Amortization of medium- and long-term debt	150	163	169	229	272
Capital required	160	91	262	373	1 033
Direct private investment (net)	−7	−26	48	65	91
Capital to public sector (gross)	241	218	301	562	963
Re-financing	(49)	(25)	(76)	(126)	(100)
Other	(192)	(193)	(225)	(436)	(863)
Other	−47	−8	−52	−241	271
Capital inflow	187	185	297	386	1 325
Surplus (inflow less requirement)	27	94	35	13	292

Source: Banco Central de Reserva del Perú.

Note: Figures in parentheses are subtotals of the figures directly above.

[a] Excluding loans received to prepay other loans.

the level of activity. Among the main export products of Peru only cotton, wool and sugar have significant domestic off-take; thus the contribution of changes in exports to the adjustment mechanism is slight.[7]

Over the longer term, a reduction in the availability of foreign exchange will also generate policy responses, particularly in order to increase exports, but also with regard to the capital account. Such policy responses (e.g. devaluation, increase in export support, changes in the rules governing financing of imports) are the result of continuous and major balance-of-payments difficulties and only begin to be considered when the balance-of-payments problem has crossed a fairly high threshold. Hence, it is a reasonable approximation to consider imports as being the main variable through which the balance of payments adjusts in the short term.

The savings and investment market

Peru does not have a single market to which all savings accrue and from which all investments flow, with the quantities supplied and demanded being equated by a market interest rate or any other mechanism. Rather, the country is characterized by a fragmentation of the savings and investment market virtually down to the enterprise level, and with fairly few horizontal links between firms and between sectors of economic activity. The size of the market and some indication of sources of savings and uses of investment are given in table 5.

Table 5. Savings and investment in Peru

(Million soles)

Category of savings or investment	1969	1970	1971	1972	1973
Gross savings	27 863	31 049	39 636	41 834	53 014
Corporate savings	22 013	28 582	34 126	38 149	51 004
(depreciation)	(13 994)	(15 234)	(17 800)	(18 972)	(. . .)
(undistributed profits)	(8 019)	(13 348)	(16 326)	(19 177)	(. . .)
Personal savings	2 815	6 177	4 199	1 735	(. . .)
Government savings	4 238	4 558	1 226	1 551	−2 668
External savings	−1 203	−8 268	85	399	4 678
Gross domestic investment	27 863	31 049	39 636	41 834	53 014
Gross fixed investment	25 905	29 896	33 284	37 824	50 195
Government	3 911	6 427	8 098	9 010	8 848
(machinery and equipment)	(391)	(1 712)	(1 908)	(1 704)	(1 355)
(new construction)	(3 520)	(4 715)	(6 190)	(7 306)	(7 493)
Corporate	21 994	23 469	25 186	28 814	41 347
(machinery and equipment)	(13 641)	(14 327)	(15 558)	(17 171)	(26 562)
(new construction)	(8 353)	(9 142)	(9 628)	(11 643)	(14 786)
Changes in stocks	1 968	1 153	6 352	4 010	2 819

Source: Banco Central de Reserva del Peru, Cuentas Nacionales del Perú 1960-1973 (1974).

Note: Figures in parentheses are subtotals of the figures directly above.

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[7] The domestic consumption of coffee is also significant; however, exports are limited by agreement rather than by available supply.

It is useful to classify these "sub-markets" into six groups:

Pure households

Pure households are those that do not own a business (e.g. a wage earner). Such households are savers but not investors except in the industrial community, as will be noted below. The savings instruments accessible to them are fairly few and depend on their geographical location and income level. Basically, they have a choice of saving in kind through the purchase of real assets, or of saving in the financial system at (nominal) rates of interest ranging from 0, if they simply hold currency or demand deposits, to 10 per cent tax free if they invest in certain kinds of public institution paper. With an inflation rate above 20 per cent, it is apparent that all these rates are negative in real terms. The one respect in which pure households are investors is through their participation in the industrial community, from which they receive shares each year in proportion to the profits realized by the firm in which they work. This distribution is by law rather than voluntary, and the rate is specified (15 per cent). Households are not entitled to purchase additional shares to those distributed, nor are they able to sell those that the industrial community obtains. Indeed, property is not vested in the individual worker, but rather in the collectivity. Nonetheless the dividends earned by these shares are distributed to the collective owners, half on an equal *per capita* basis and the other half in proportion to wage income.

Business households of the private reformed sector

Business households of the private reformed sector are also owners of private enterprises, but they are subject to the regulations establishing the industrial community. Savings of these households consist of their personal savings and the earnings retained in the enterprises they control. The alternatives they have for investment are those of the pure household plus the option of reinvesting in their own enterprise. They thus have the option of deciding directly between consumption and investment and may choose by comparing the marginal utility of each alternative.[8] The incentive to reinvest in one's own enterprise is overwhelming since the rate at which workers acquire control depends in part on the amount of reinvestment that the majority shareholders undertake. Thus the business household of the private reformed sector typically reinvests extensively in its existing enterprise. The business households of these sectors also have access to a certain amount of rationed bank credit at the going (subsidized) rate. They typically take advantage of any amount they can borrow, using it to expand their asset base. The availability of rationed credit for some purposes and not others often determines the decision to invest in a new enterprise rather than, or in addition to, reinvesting in existing enterprises; however, the creation of new enterprises in the private reformed sector has been the exception rather than the rule in the last few years.

Business households of the agrarian co-operative sector

Business households of the agrarian co-operative sector correspond to the owners of shares in the large sugar co-operatives, in the highland agrarian societies

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[8] The Keynesian dichotomy between savers and investors disappears for these households; they compare directly the rate of return on investment in their enterprise with their rate of time preference.

Table 6. Income and value added in the

(Million

Type of income and value added		PETRO-PERU	ELECTRO-PERU	MINERO-PERU	EPCHAP	SIDER-PERU
Income						
(1)	Remunerations	*1 123*	*288*	*169*	*43*	*609*
	Salaries	1 006	260	151	41	525
	Social security contributions	117	28	18	2	84
(2)	Property income	*62*	*197*	*66*	*72*	–
	Net interest	9	188	65	–	–10
	Net rent	53	9	1	7	10
	Profit to treasury	–	–	–	65	–
(3)	Gross corporate savings	*924*	*–208*	*131*	*9*	*660*
	Depreciation	595	173	26	9	321
	Non-distributed profits	329	–381	105	–	289
	Others	–	–	–	–	50
(4)	Current transfers	*2 328*	*13*	*174*	*8*	*29*
	Received	–	–83	–	–	–
	(from central Government)	(–)	(–83)	(–)	(–)	(–)
	(from public sector)	(–)	(–)	(–)	(–)	(–)
	(from private sector)	(–)	(–)	(–)	(–)	(–)
	Paid	121	5	114	5	28
	(to public sector)	(–)	(–)	(114)	(–)	(3)
	(to private sector)	(121)	(5)	(–)	(5)	(25)
	(to foreigners)	(–)	(–)	(–)	(–)	(–)
	Indirect taxes	1 918	91	–	–	–
	Direct taxes	289	–	60	3	–
	Total income generated = (1)+(2)+(3)+(4)	4 437	290	540	132	1 298
Value added						
(5)	Gross value of output	*9 737*	*459*	*772*	*176*	*3 163*
	Goods and services sold	9 040	454	725	164	2 905
	Other current income	151	5	47	12	–
	Changes in stocks	546	–	–	–	258
(6)	Value of inputs	*5 300*	*169*	*232*	*44*	*1 865*
	Gross value added = (5)–(6)	4 437	290	540	132	1 298

(Sociedades Agrícolas de Interés Social) and others. Their savings consist of personal savings and the earnings retained in the co-operatives. Their investment options consist of all those open to the pure household and of reinvestment in their co-operative or outside the sector. Reinvestment in the co-operative should be broadly defined to include amenities for membership in the co-operative (e.g. housing) and the purchase of new and additional machinery. The existence of this type of business household is rather new. and it is not clear to what extent they make their savings and investment decisions jointly to maximize the return. Indeed, it would appear that the decision to save out of income at their personal disposal and

non-financial government enterprises, Peru, 1973[a]

soles)

EPSA	CPV	ENAPU	COR-PAC	ENAPER-PERU	ENTEL-PERU	EMADI-PERU	ESAL	Others	Total
201	239	868	190	579	329	69	228	673	5 608
188	205	826	177	518	296	63	208	614	5 078
13	34	42	13	61	33	6	20	59	530
333	133	27	11	—	53	20	28	120	1 122
326	18	14	10	—	9	9	17	37	692
7	115	13	1	—	44	11	11	22	304
—	—	—	—	—	—	—	—	61	126
1 031	169	180	140	116	124	227	18	−13	1 446
47	114	127	81	151	57	—	81	52	1 834
1 078	55	52	59	−35	50	227	−63	−65	−455
—	—	—	—	—	17	—	—	—	67
−441	39	—	47	—	78	40	4	−158	2 161
−540	—	—	—	—	—	—	—	−222	−845
(−540)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−221)	(−844)
(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−1)	(−1)
(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)
1	15	—	47	—	30	23	4	43	436
(−)	(15)	(−)	(−)	(−)	(2)	(11)	(−)	(−)	(145)
(1)	(−)	(−)	(47)	(−)	(28)	(12)	(4)	(43)	(291)
(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)	(−)
98	24	—	—	—	3	—	—	17	2 152
—	—	—	—	—	45	17	—	4	418
−938	580	1 075	388	695	584	356	278	622	10 337
329	2 050	1 248	494	835	663	403	404	2 245	22 978
735	2 034	1 128	442	832	650	403	373	2 187	22 072
230	16	120	52	3	13	—	31	58	738
−635	—	—	—	—	—	—	—	—	168
1 267	1 470	173	106	140	79	47	126	1 623	12 641
−938	580	1 075	388	695	584	356	278	622	10 337

Note: Figures in parentheses are subtotals of the figures directly above.

[a]Preliminary figures.

to invest the proceeds is still separate from the decision on the disposal of the operating surplus of the co-operatives. Recent experience indicates a tendency to raise personal incomes at the expense of the co-operative's surplus, but this may reflect the uncertainty surrounding the permanence of the present institutional arrangements.[9] Furthermore, it is not entirely clear where the division between wages, fringe benefits and co-operative investment should be drawn. Thus, for

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[9] Events in 1976 and 1977 justified such doubt about the permanence of the reforms of previous years.

example, the construction of houses for the members of the co-operative is an investment of that co-operative, but it can also be thought of as a supplement to wages. All these factors indicate a significant behavioural distinction between the business households of the agrarian co-operative sector and business households of the private reformed sector.

Business households of the social property sector

Business households of the social property sector are those that have decided to form worker-managed enterprises and have borrowed the capital to do so. They have the same savings and investment options as pure households and in addition they have some discretion in the use of the surplus from their enterprises. This sector was the chosen instrument for the growth of the economy and until 1977 had unusual access to credit and technical assistance from various government agencies. At the same time, it is fairly closely regulated; wage levels, and hence savings, in the worker-managed enterprises are closely watched by CONAPS, the supervisory agency of the worker-managed sector which also has to approve reinvestments.

Government enterprises

The government corporations generate savings in the form of current surpluses of which a part is distributed to the central Government in the form of profit taxes, and an additional part is transferred to the central Government in the form of dividends; however, by far the largest part takes the form of reinvestment in the same enterprises. Indeed, in many instances gross investment exceeds the enterprise's current surplus, thus generating a "deficit" which prompts recourse to the treasury. There is no provision for the investment of one government enterprise in another, nor is there much scope for a government enterprise to expand outside its designated sector of activity. The performance of the main government enterprises and their savings rates and transfers to and from the general Government are indicated in table 6.

Central Government

The savings of the central Government arise from the current account surplus and from borrowing abroad; its investments are in infrastructure as well as in government enterprises. Furthermore, its current account surplus is affected by the level of subsidies required to implement the price control policy and by the need to maintain solvency in those government enterprises that run financial deficits. The recent savings performance of the central Government is shown in table 7.

The Peruvian market for savings and investment can be characterized in summary as a market segmented virtually down to the individual firm, in which reinvestment is the overwhelming rule, and in which few horizontal links exist to transfer excess savings from one sector to attractive investment opportunities in another. Most transferable savings arise in the pure household and in the general government sub-markets; business households in the social property sector are expected to contribute to such funds in the future. The banking system and the government budget are the conduits of these savings to the business households and to government enterprises that use them. The availability of foreign loans through the public sector and the banks gives a greater degree of flexibility to the allocation of investment.

Table 7. Income and expenditure of the central Government of Peru

(Million soles)

Item	1969	1970	1971	1972	1973
(1) Current incomes	33 952	38 842	41 382	45 636	53 363
Taxes	*29 507*	*33 494*	*35 453*	*39 096*	*46 770*
Income, property					
and export taxes	10 863	13 443	12 666	15 516	18 365
Import duties	7 832	8 074	8 898	7 843	9 097
Production and					
consumption taxes	10 873	12 109	14 228	15 925	19 991
Minus	−61	−132	−339	−188	−683
Others	*4 445*	*5 348*	*5 929*	*6 540*	*6 593*
(2) Current expenses	27 949	33 194	37 017	42 333	51 995
Salaries	15 248	17 211	19 956	22 623	26 110
Goods and services	3 950	5 420	6 103	7 634	9 747
Interests and other					
payments	1 793	2 604	3 113	4 274	5 928
Current transfers	6 958	7 359	7 845	7 802	10 210
(3) Government savings =					
(1)−(2)	6 003	6 648	4 365	3 303	1 368
(4) Capital expenses	6 385	9 930	12 468	14 134	15 416
Gross capital investment	2 912	5 553	7 377	8 552	8 278
Capital transfers	3 247	3 609	4 642	4 510	6 410
Others	226	768	449	1 072	728
(5) Economic deficit = (3)−(4)	−382	−3 282	−8 103	−10 831	−14 048
(6) Finance account = −(5) =					
(7)+(8)	382	3 282	8 103	10 831	14 048
(7) External (net)	*1 623*	*1 461*	*−967*	*1 855*	*6 897*
Used	4 076	4 622	4 483	6 983	18 129
Project loans	(2 333)	(3 621)	(3 464)	(4 056)	(8 868)
Refinancing	(1 743)	(1 001)	(1 019)	(2 927)	(4 313)
Prepayment	(−)	(−)	(−)	(−)	(4 948)
Amortization	−2 453	−3 161	−5 450	−5 128	−11 232
Expected	(−2 453)	(−3 161)	(−5 450)	(−5 128)	(−6 284)
Prepayment	(−)	(−)	(−)	(−)	(−4 948)
(8) Internal (net)	*1 241*	*1 821*	*9 070*	*8 976*	*7 151*
Banking system (net)	−149	−879	7 704	6 287	7 313
Central Bank	(10)	(2)	(47)	(365)	(−115)
Banco de la Nación	(−1 219)	(−5 888)	(4 532)	(2 853)	(3 417)
Bancos de Fomento	(157)	(1 173)	(2 516)	(1 005)	(1 046)
Commercial banks	(903)	(3 634)	(609)	(2 064)	(2 965)
Open market transactions					
to the public	899	1 654	1 041	319	1 213
Public sector	(797)	(156)	(732)	(−582)	(−605)
Private sector	(102)	(1 498)	(309)	(901)	(1 818)
Others and errors	−1 991	1 046	325	2 370	−1 375

Source: Banco Central de Reserva del Perú.
Note: Figures in parentheses are subtotals of the figures directly above.
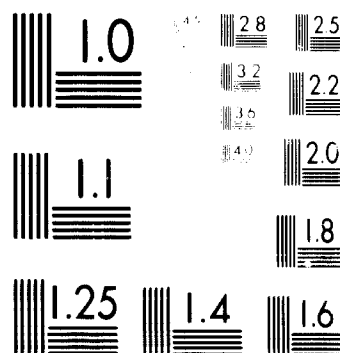
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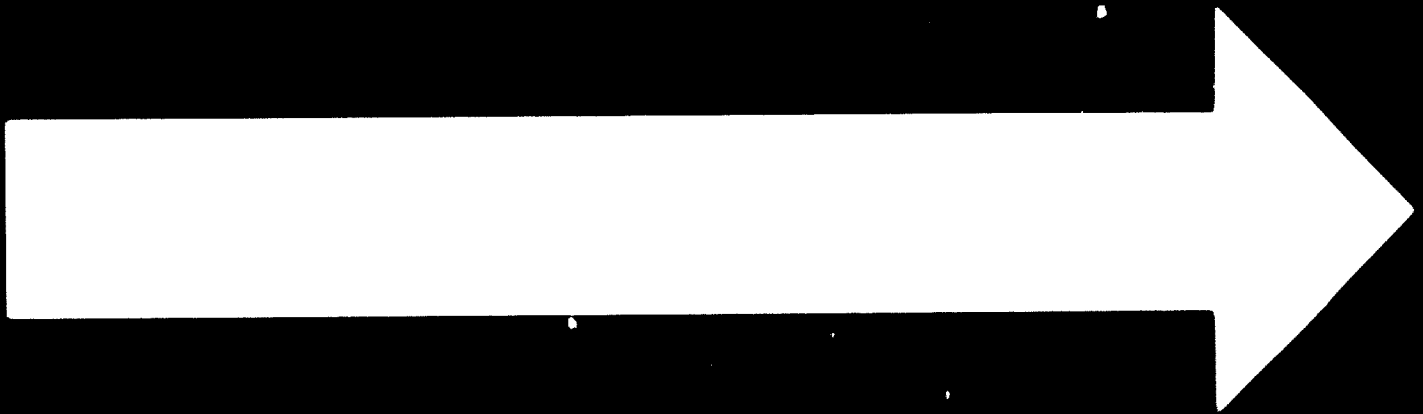
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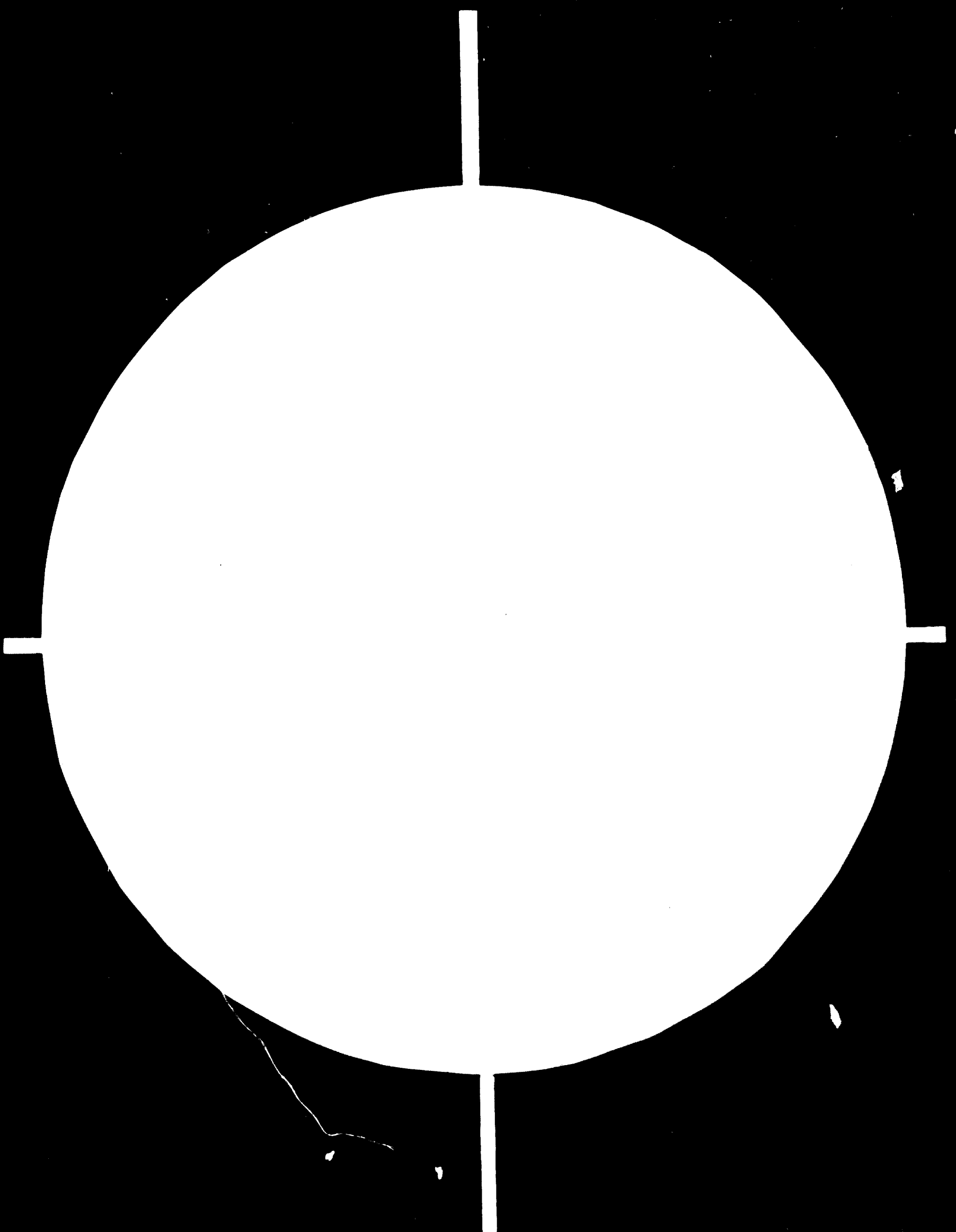
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The market for labour

It is useful to distinguish within this market three distinct but related sub-markets: the market for unskilled labour, the market for skilled labour and the market for professionals.

The market for unskilled labour consists of five clearly defined and protected sub-sectors and of a sixth sub-sector which is unprotected and which absorbs the residual supply not taken up by the five protected sub-sectors.

The first protected sub-sector exists in the firms of the private reformed sector, in which minimum wages are legislated, unions exist, and enterprises are regulated to share their equity and profits with the workers under rules of the industrial or mining community. The second protected sub-sector consists of the agrarian production co-operatives. In this market, there are two types of workers: those who are owners and those who are not. The co-operative owners are those who had obtained property rights at the time of the expropriation of the firm, and who were essentially "stable" workers before expropriation. Under current rules, the co-operatives may hire non-owners and in fact do so quite frequently. Hired hands do not as a matter of course acquire property rights over time.[10] The third protected sub-sector consists of the labour-managed firms of the social property sector, in which there are only owners since labour is entitled only to hire capital but not other labourers. The fourth sub-sector is within the government enterprise sector where minimum and maximum wages apply, unions exist and, in some but not all cases, the same rules apply as in the private reformed sector. The fifth sub-sector is the central Government in which wages are subject to overall maximum and minimum and civil service rules.

All five sub-sectors draw from the same pool of unskilled labour; indeed, workers attempt to enter these sub-sectors and there is more demand for entry than can be accommodated. Entry into the private reformed and government enterprise sectors is limited by the demand for labour in these sectors; at the institutionally fixed wage, this demand falls far short of the available supply. Entry into the agrarian co-operatives is limited in the owner category by the fact that in general only the original group of workers at the time of expropriation became owners; for the hired category, entry is limited in exactly the same manner as in the private reformed sector. In the social property sector entry is limited by the availability of capital for hire on the part of labour-managed firms, and by the constraint that the scarcity of management skills imposes on the rate of creation of such firms. Finally, entry into the central Government is limited by the available finance for government jobs.

It should be noted that in each of the protected sub-sectors take-home pay differs from wages and from the cost of labour to the enterprise owing to the existence of the different fringe benefits and participation schemes.

As the protected sub-sectors are unable to absorb the total unskilled labour, the traditional agrarian and urban sectors provide activity if not employment. Many individuals are self-employed in these sectors; others work at regulated wages; and others are partially or wholly unemployed.

The market for skilled labour is much more integrated than that for unskilled, with demand exceeding immediate supply. The only segment of the market that is not fully integrated is that of the agrarian co-operatives, in which the owners form a

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[10] This situation is of importance in the sugar co-operatives of the coast. In the highlands virtually all workers on co-operatives are owners in one sense or another. See Knight [24].

group that is not in competition with the rest of the skilled labourers.[11] In the short to medium term, the supply of labour expands in response to the excess demand through the training of unskilled labourers and their introduction into the various levels of skilled labour. This is therefore a market in which excess demand is a transitional phenomenon and in which there is potentially excess supply as the unskilled matriculate through training to this market.

The professional market is again a fairly unified market except for owners of several sorts (of agrarian production co-operatives, in the private reformed sector or partners in social property firms). However, professionals who own private reformed firms may sell their shares to take employment; and partners in co-operatives or in worker-managed enterprises may also choose to offer themselves for hire. Movement in the other direction is considerably more difficult, thus introducing a partial segmentation in this market. Given the long gestation period of a professional, the excess demand in this market is of a fairly long-term nature and does not easily generate its own supply through training. Indeed, it appears that the combination of skills produced by the educational system is not very responsive to the mixture of skills demanded in the market place.

The Peruvian market for labour thus consists of a series of sub-markets, governed by different institutional arrangements regarding labour income, wages and cost of labour. These sub-markets are linked by recourse to a common pool of unskilled labour and to skilled labour trained from this pool. The overall distribution of the labour force is shown in table 8.

Table 8. Labour force by economic sector, Peru, 1961 and 1971

Economic sector	1961 Absolute (thousands)	1961 Relative (percentage)	1971 Absolute (thousands)	1971 Relative (percentage)	1971 Estimated equivalent employ-ment[a] (thousands)	1971 Relative employ-ment (per-centage)
Agriculture	1 597	49.1	1 936	43.8 }	1 352	69
Fishing	22	0.7	25	0.6 }		
Mining	70	2.2	83	1.9	76	92
Manufacturing	429	13.2	648	14.7	550	85
(factory-scale)	(155)	(4.8)	(225)	(5.1)	(. . .)	(. . .)
(cottage industry)	(274)	(8.4)	(423)	(9.6)	(. . .)	(. . .)
Construction	108	3.3	141	3.2	128	91
Commerce	291	8.9	490	11.1	389	79
Services	614	18.9	950	21.5	743	78
Not specified	83	2.6	96	2.2	–	–
New entrants	36	1.1	46	1.0	–	–
Total	3 250	100.0	4 415	100.0	3 238	73

Source: Dirección General del Empleo, *Situación Ocupacional del Perú* (1971).

Note: Figures in parentheses are subtotals of the figures directly above.

[a] Including adequately employed plus full-time equivalent of underemployed. A person is defined as underemployed if he either earns less than the legal minimum wage (salary), or if he involuntarily works less than 35 hours per week. The full-time equivalent is computed by using the share of minimum wage earned, or proportion of the full-time worked.

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[11] Note that "shares" in co-operatives are not saleable; shares in worker-managed enterprises have been saleable since 1977. All owners' rights are lost when a worker chooses to leave his firm. However, although a worker can easily join another worker-managed firm it is very difficult if not impossible for him to rejoin a co-operative, particularly a profitable one.

The relationship between the public and private sectors

The great increase in the extent of government ownership of production and trade companies raises the question of where to draw the line between public and private sectors. The legal terms of incorporation and the identity of the share-owner appear not to be sufficient criteria for placing a company in the private or public sector, since for the purpose of the analysis the relevant elements are more related to the behaviour of the entity than to the receiver of the dividends.[12] From this point of view, it is noteworthy that the government-owned corporations so far operate mainly on principles of management that are essentially the same as those by which the private sector operates: profit making is deemed to be important and an indicator of success. This does not mean that there is no distinction between public-sector and private-sector enterprises. For example, in the public sector there is no industrial community; the profits of public corporations are not routinely disbursed in the form of dividends to the treasury, but are usually reinvested in the same enterprises. In government corporations losses are frowned upon, but the treasury will nonetheless typically come to the rescue. These differences notwithstanding, it would appear that the similarities in behaviour of private and public enterprises are such that it is more useful to think of an "enterprise sector" or "business sector" grouping government and other enterprises than it is to think of a government sector that includes the central Government and the government enterprises, on the one hand, and a private enterprise sector on the other.

The relationship between the central Government and the business sector has the usual two aspects. On the one hand, the Government collects revenue through taxes and dividends. It is not of note in this respect that government enterprises are taxed in exactly the same way as private enterprises. On the other hand, the business sector receives subsidies from the Government which have until recently been quite considerable as a result of the pricing policy for basic staples. The Government's attendant subsidy programmes have left it without funds to undertake other investment projects; rather it finds itself "investing" in price stability.

II. Investment in the system

It is useful to examine the investment flows of the Peruvian economy with two questions in mind: who undertakes the investments and to what extent is government assent or control exercised over this investment? The answer to the first question is of crucial importance to an understanding of the pattern of capital accumulation and the direction that the growth of the economy will take. The answer to the second question would indicate to what extent a rational national investment budgeting system based on benefit-cost analysis would apply.

The structure of the savings and investment market discussed in the previous section is the major factor determining the identity of the investing sectors. In turn, the segmentation that characterizes the market is a major constraint on changes in the distribution of investment. Yet segmentation of the capital market is so complete that flows between sectors and types of firms are entirely inhibited.

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[12] Note that not all government enterprises are incorporated as "public enterprises", e.g. CENTROMIN is still subject to the legislation governing private enterprise, although all shares are government-owned.

The private reformed sector is characterized by segmentation down to the individual firm level, with strong incentives to reinvest in the same enterprise and a widespread practice of reinvestment. Nonetheless, one long-established and another newer mechanism exist for inter-firm and inter-activity transfer of investment funds. The long-standing mechanism is the "family conglomerate", which consists of the ownership by the same investment group of a number of different corporations, with interlocking directorates and often interlocking managerial functions. It has long been the practice to shuttle investment funds between these companies in order to maximize return on investment. In a very effective way, these intra-group but inter-firm transfers have subsittuted for the non-existent capital market, thus breaking down the market segmentation to some extent. At one time, intra-conglomerate financial markets of this sort extended throughout an important part of the industrial sector and linked it with major parts of agro-industry. The agrarian reform severed some of these links and the industrial community legislation has made it significantly more difficult to continue with past practices, since worker participation in management inevitably has led to the questioning of transfer of funds between firms. As a consequence, segmentation of the capital market has increased in recent times.

A newer device has appeared to offset this segmentation to some extent, and this consists of the formation of trading companies owned by the major stockholders of manufacturing enterprises, with the purpose of reducing the profits of the producing unit and of thus delaying the growth of the labour share. Simultaneously, the existence of the trading companies has provided a pool of investable savings which are not tied to the particular industrial enterprise in which they originate, and which are thus able to move more freely across firms and sectors of activity. In a very real sense, these trading companies have become substitutes for the earlier family conglomerates.

The agrarian co-operative sector is completely self-contained and currently shows capital market segmentation down to the individual unit. It is a strong example of an "every-tub-on-its-own-bottom" approach: savings do not move between the firms of this sector.

The social property sector has built-in transfer mechanisms in the form of the national fund for worker-managed enterprises (FONAPS) from which all enterprises rent their capital and into which all are required to contribute a part of their surplus. Beyond that requirement, however, segmentation down to the firm level is expected. Furthermore, the incentives for the owners of the enterprises is such that it is to be expected that they will attempt to minimize horizontal transfers.

The public enterprise sector consists of firms that do not transfer savings directly to each other but only indirectly through the treasury. Indeed, to the extent that surplus-earning enterprises pay dividends and deficit enterprises are funded, such a transfer occurs routinely. There is also room for more subtle transfers when investment budgets financed by the treasury are reassigned from one enterprise to another. Some impression of the extent to which this has taken place can be seen from table 6. The dynamics of the sector are such, however, that the pressure for self-financing and for paying little or no dividends, particularly among the larger enterprises, is irresistible. Gross capital formation by public enterprises is shown in table 9.

Table 9. Gross capital formation of public enterprises in Peru

Type of enterprise	1971	1972	1973[a]	1971	1972	1973[a]
	(Million soles)			(Percentage)		
Energy and mines	2 724	3 109	7 343	71.0	62.6	71.2
Industry, tourism and trade	48	297	241	1.3	5.9	2.3
Housing and urban infrastructure	261	653	384	6.8	13.2	3.7
Telecommunications	21	46	377	0.5	1.0	3.6
Agriculture	25	93	220	0.6	1.8	2.1
Fishery	48	41	29	1.3	0.8	0.3
Airports	14	25	25	0.4	0.5	0.2
Aeronautics	—	—	757	—	—	7.3
Ports	127	316	244	3.3	6.4	2.3
Merchant marine	4	7	330	0.1	0.1	3.2
Railroads	—	—	112	—	—	1.0
Others	2	3	1	—	—	—
State banking	559	374	255	14.6	7.5	2.4
Total	3 833	4 963	10 318	100.0	100.0	100.C
Financing:						
External	1 126	305	4 568			
Internal	2 707	4 658	5 750			

Source: Banco Central de Reserva del Perú, *Anuario de Estadística Económica y Financiera, 1963-1973* (1975).

[a]Preliminary figures.

·The central government sector has the greatest flexibility and contributes most to the unification of the financial market. Government investment resources arise from the current account surplus of the treasury, from the availability of an increase in foreign indebtedness and from the possibility of borrowing from the domestic banking system. Expenditures are tied only to some extent to ongoing investment projects and thus there is considerable room for discretion in allocation of the available investment funds. The evolution of public-sector finance is shown in table 10, and the changing balance of central government and public enterprise investment is shown in table 11. The flexibility exercised within central government investment may be seen in table 12.

Foreign direct investment is completely specific to a sector at this time, and is found mostly in petroleum and copper. The resources invested in a specific sector would clearly not be available in any other sector; the same is true for potential investors in any sector one chooses to examine.

Finally, it should be mentioned that the major connecting link with all parts of the capital market is the banking system. Commercial banks lend to all sectors and are the main distributors of non-sector-specific savings. Despite this, the banking system is subject to constraints in the sectoral mix of its marginal lending activity, since production plans of borrowers are often based on extrapolation of past financing obtained, and thus an abrupt shift in the mix of the commercial banks' portfolios would in all likelihood imply a major drop in the rate of growth. Over a somewhat longer period, however, major shifts in credit can be accomplished, thus providing some offset to the sectoral specificity of the savings generated. Table 13

Table 10. Indicators of public-sector finance, Peru, 1968-1974

Sector and indicator	1970	1971	1972	1973	1974[a]
Consolidated public sector					
Savings as percentage of current revenues[b]	19.9	13.9	11.4	2.2	6.0
Savings as percentage of fixed investment[b]	107.8	69.7	55.9	9.5	20.8
Fixed investment as percentage of overall deficit	312.1	182.1	159.3	93.5	102.9
	(Percentage of GDP)				
Current revenues	23.6	23.1	24.2	24.4	25.5
Current expenditures	19.2	20.2	21.7	23.8	24.0
Savings[b]	4.6	3.2	2.7	0.5	1.5
Fixed investment	4.3	4.c	4.9	5.6	7.4
Overall deficit (--)	−1.4	−2.5	−3.1	−6.0	−7.2
Central Government					
Savings[b]	2.6	1.8	1.2	0.3	1.6
Fixed investment	2.0	2.8	2.9	2.3	3.1
Transfers to rest of public sector	2.8	2.8	2.2	2.9	n.a.
Overall deficit (−)	−1.4	−2.9	−3.6	−4.1	−3.3
Public enterprises					
Savings[c]	1.1	0.9	1.0	−0.1	−0.7
Fixed investment	1.5	1.2	1.6	2.9	4.2
Overall deficit (−)	−0.6	0.3	0.1	−2.2	−4.0
Overall deficit, excluding public sector transfers	−1.0	−0.5	−0.7	−3.3	−5.1

Source: Banco Central de Reserva del Perú.

[a]Preliminary estimates.

[b]Savings = current account surplus capital revenues.

[c]Excluding net public sector transfers.

Table 11. Investment of the central Government and of government enterprises, Peru

Category	1969	1970	1971	1972	1973
	(Million soles)				
Central Government	2 912	5 553	7 377	8 552	8 278
Government enterprises	4 307	3 852	3 833	4 963	10 318[a]
Total	7 219	9 405	11 210	13 515	18 596
	(Percentage)				
Central Government	40.3	59.0	65.8	63.3	44.5
Government enterprises	59.6	41.0	34.2	36.7	55.5

Source: Banco Central de Reserva del Perú, *Anuario de Estadística Económica y Financiera, 1963-1973* (1975).

[a]Preliminary figures.

Table 12. Allocation of central Government investment, Peru

(Percentage)

Type of services	1969	1970	1971	1972	1973
Economic					
Agriculture	17.7	12.2	13.1	20.7	32.0
Fishing	—	1.2	2.0	3.6	3.6
Energy and Mines	2.4	0.7	0.7	0.2	0.6
Transport and communications	57.6	57.0	46.6	25.6	23.2
Industry and trade	0.2	0.9	1.6	0.5	0.8
Social					
Education	2.3	4.9	2.8	2.7	6.9
Health	3.1	3.0	2.6	3.6	3.4
Housing and community	9.6	9.4	6.7	5.9	5.6
Labour and social security	—	—	—	—	0.1
General	7.1	3.6	3.3	6.8	3.9
Multisectoral	—	7.1	20.6	30.4	19.9
Total	100.0	100.0	100.0	100.0	100.0

Source: Banco Central de Reserva del Perú, *Anuario de Estadística Económica y Financiera, 1963-1973* (1975).

Table 13. Consolidated balance sheet of the banking system, Peru

	December			
Credits and liabilities	1971	1972	1973	1974[b]
	(Billion soles)[a]			
International reserves (net)	*13.7*	*15.4*	*15.9*	*27.0*
Foreign assets	18.2	20.2	22.1	37.5
Foreign liabilities	—4.5	—4.8	—6.2	—10.5
Domestic credit	*56.8*	*69.3*	*88.6*	*100.3*
To central Government (net)	19.3	25.6	32.9	32.7
Credit	(28.4)	(35.4)	(43.9)	(47.1)
Deposits	(—9.1)	(—9.8)	(—11.0)	(—14.4)
To rest of public sector (net)	—4.2	—8.6	—5.7	—5.3
Credit	(5.0)	(6.0)	(15.0)	(31.3)
Deposits	(—9.2)	(—14.6)	(—20.6)	(—36.7)
To private sector	48.0	59.0	73.2	85.3
Official capital and surplus	—9.1	—9.7	—12.0	—16.2
Net unclassified assets	3.4	3.3	—0.5	4.1
Interbank float	—0.6	—0.3	—0.3	—0.3
Total credits or liabilities	70.5	84.7	104.5	127.3
Long-term liabilities to international institutions	*1.2*	*2.7*	*6.2*	*9.2*
Liabilities to private sector	*69.3*	*82.0*	*98.3*	*118.1*
Money	36.3	43.9	53.1	67.2
Currency	(18.9)	(21.9)	(27.2)	(33.4)
Demand deposits	(17.4)	(22.0)	(25.9)	(33.8)

Credits and liabilities	December			
	1971	1972	1973	1974[b]
	(Billion soles) [a]			
Liabilities to private sector (continued)				
Quesi-monay	26.6	31.3	37.2	42.4
Time deposits	(7.3)	(7.6)	(8.6)	(8.7)
Saving deposits	(8.9)	(10.0)	(11.3)	(12.8)
Deposits in foraign currency	(0.2)	(0.3)	(0.4)	(0.6)
Mortage bonds	(10.2)	(13.4)	(16.9)	(20.3)
Capital and surplus	6.1	6.8	7.9	8.5
Foreign axchanga certificates	0.1	0.1	–	–
	(Percentage)			
Shares of credit	*100.0*	*100.0*	*100.0*	*100.0*
Central Government	34.9	35.3	33.2	28.8
Rest of public sector	6.1	6.0	11.4	19.1
Private sector	58.9	58.8	55.4	52.1

Source: Benco Central de Raserva del Perú.

Note: Figuras in parentheses are subtotels of th.· figures directly ebove.

[a]Small differences in the totals are due to rounding.

[b]Preliminery estimates.

shows developments in the banking sector and the distribution of credit between the public and private sector.

Despite the great sectoral specificity of savings, there is considerable room for an exercise of government control of investment. This may be done through three mechanisms: *(a)* assent to the investment (and provision of the corresponding foreign exchange for the import of the capital goods, tax benefits and other concessions), *(b)* provision of funding in the form of credit or equity and *(c)* direct control over the investing entity.

Assent is the tool most relevant to the private sector, which is dependent on the Government not only for provision of foreign exchange, but also for the application of concessionary tax rates. As a condition for giving its assent to a particular investment project, the Government may require certain action on the part of the individual firm; the requirement may be based on the benefit-cost analysis of the investment concerned. This mechanism also applies for the social property sector in which CONAPS has the role of overseer of the sector. To some extent assent also functions with regard to the agrarian co-operatives and public enterprises, particularly when a state bank guarantee of foreign finance for the import of capital equipment is concerned.

Government control through funding of investment has acquired an increasingly important role, mainly as a result of the acquisition of control over a large part of the commercial banking sector. Government banks at the end of 1974 held one third of all deposits in commercial banks and extended almost one half of the credit. However, even in its allocation of bank credit, the Government is constrained by the need to finance the credit required by expanding output of existing enterprises. Thus, the government banks extended four times as much credit to the private as to the public sector.

Funding through the contracting of foreign debt is another major means of government influence over investment, in this case mostly publ.c-sector investment.

Subject to the limitations of the balance-of-payments forecast and the consequent willingness of the international money market to lend to Peru, the Government is free to take to the market any project it wishes. Not all, however, are equally acceptable to the lenders. Thus a process of negotiation ensues in which finance becomes increasingly specific to a project. This does not mean that there is no room for substitution within the government plan between projects that the international community wishes to finance and those that it does not wish to finance but the government wishes to execute anyhow; it does mean, however, that the government execution of projects and contracting of foreign debts are related and interdependent.

Direct government control of investing entities is difficult outside the central Government itself. The agrarian co-operative sector, although subject to some control, tends to press for its own objectives, as no doubt the social property sector will do in time. Public enterprises are not much less independent. Indeed, it is typical of the behaviour of government corporations around the world that they are independent of the central government whenever they run a surplus and dependent whenever they have a deficit. Peru is no exception; government enterprises propose and execute their own investment programme. The central Government does have a review function and is able to choose the project and project design. even if it is often unable to extract the investable funds from one government corporation in order to make it available to another. In circumstances in which the central Government has more influence, namely when the company runs at a loss, no investable surplus is available and hence the control cannot be exercised in a meaningful manner.

In summary, investment takes place mostly in the sectors that generate savings, with the Government able to influence the distribution to some extent at the margin. The principal government control is exercised on project design and choice within sectors by means of its denial of assent, its provision (or denial) of funding and, to a lesser extent, its direct control over the investing entity.

III. Definition and measurement of shadow prices

Among different markets the definition of marginal social utility and marginal social cost is implied by the structure of each market. The following discussion indicates which of these two factors or what combination is the appropriate measure of the shadow price. As the markets are dependent on one another and the shadow prices are therefore interactive, it will be necessary on occasion to refer here to shadow prices not yet defined.

The shadow price for labour[13]

Three labour markets are distinguished here: for unskilled labour, for skilled labour and for professionals. In turn, in the market for unskilled labour a distinction is made between the unprotected sub-sector and the protected sub-sector.

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[13] The analysis in this sector adopts the distinction between protected and unprotected sub-sectors used by Harberger [20], but does not incorporate the migration analysis suggested by Harris and Todaro [22] because it does not appear to be a good description of the Peruvian process. See also Stiglitz [37] on this point. Also excluded are savings effects [26, 39] since the level of output is not invariant to the factor-mix used.

In the unprotected sub-sector of the market for unskilled labour, the demand curve reflects the demand for personal services, the demand for casual labour and, above all, the reservation demand of the self-employed. This last group includes a broad range of occupations having a wide spectrum of capital intensity, from family farming through street vending. The demand in this market is thus partly final demand (for "consumption", i.e. personal services) and partly derived demand (for inputs into a production process, e.g. porterage, clean-up); in general, the demand curve is very elastic and the wages offered are low. In turn, the supply curve is also very flat; its level is conditioned by the alternative means of survival that suppliers of labour services have (e.g. family support, staying with friends).

The unprotected sub-sector of the market for unskilled labour is illustrated in figure 1. The market wage (W_o) represents and equilibrium (point P) in this market; however it does not measure marginal social productivity or marginal social cost. It does not measure marginal social productivity because the demand curve in this market is in part a residual demand arising from a situation in which unskilled labour co-operates with other factors of production whose market prices differ from their shadow prices. Consider, for example, the demand for cleaning an automobile. The price the demander is willing to pay depends on the value to him of the service provided, which may be divided into *(a)* the value of having a cleaner car and *(b)* the value of the increase in the life of the car owing to its slower deterioration. The first of these benefits is a final consumption good; the second is not, and its value is a positive function of the cost of the car. If the private price of the vehicle falls short of its shadow price (the usual situation), then the private value of the marginal product of cleaning will fall short of its social value. Since most services require some input of co-operating factors, in general the private value of the marginal physical product of labour in this market is different from the corresponding social value. Furthermore, part of the demand arises from family farming and may reflect average product rather than marginal product.

The market wage also does not measure the marginal social cost of labour since the supply curve is determined not only by the value of the leisure foregone by the

Figure I. Supply and demand curves for the unprotected sub-sector of the market for unskilled labour

Number of unskilled labourers
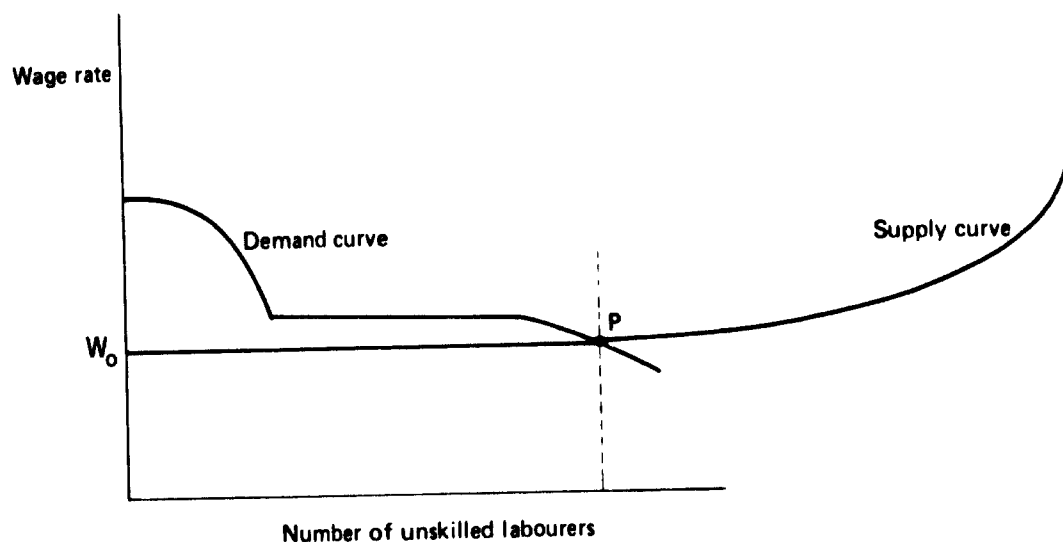
suppliers of labour but also reflects the transfers between the employed and unemployed that occur in the society, and the valuation of such transfers by the decision unit governing the quantity of labour offered at each wage. Thus, it is common for the unemployed to receive an income subsidy from family or friends, which stops when a job is obtained. Similarly, the newly employed person often has to share his income with other members of his family or with friends who are still unemployed. Both of these features imply that the marginal revenue to the individual is less than the price of his services. If the individual equates the marginal utility of his marginal revenue to the marginal utility of his leisure to determine his supply of effort, then evidently his supply price will be higher than his valuation of the leisure foregone. Figure II shows the derivation of the supply curve of labour in the presence of the income transfer mechanisms mentioned. Point B on the diagram indicates the endowment point of the unemployed: leisure equal to OA (24 hours) and wage equal to OY_0 (i.e. the subsidy). To offer any labour at all, the wage has to be above the tangent AP, or the individual's welfare would not increase above that obtainable at point B. Hence the supply curve of labour is discontinuous at the tangent AP (point F). Were the income subsidy non-existent, the worker's endowment point would be A and the quantity of labour for which a wage on tangent AP is required under the subsidy system would be forthcoming at a lower wage on tangent AP'. Furthermore, the supply of labour curve would be continuous. Finally, the support to others required of the newly employed can be depicted as a tax on his income: for a marginal revenue of AP, a greater amount APTx has to be collected. Evidently

Figure II.   Effect of income subsidy on the supply of unskilled labour
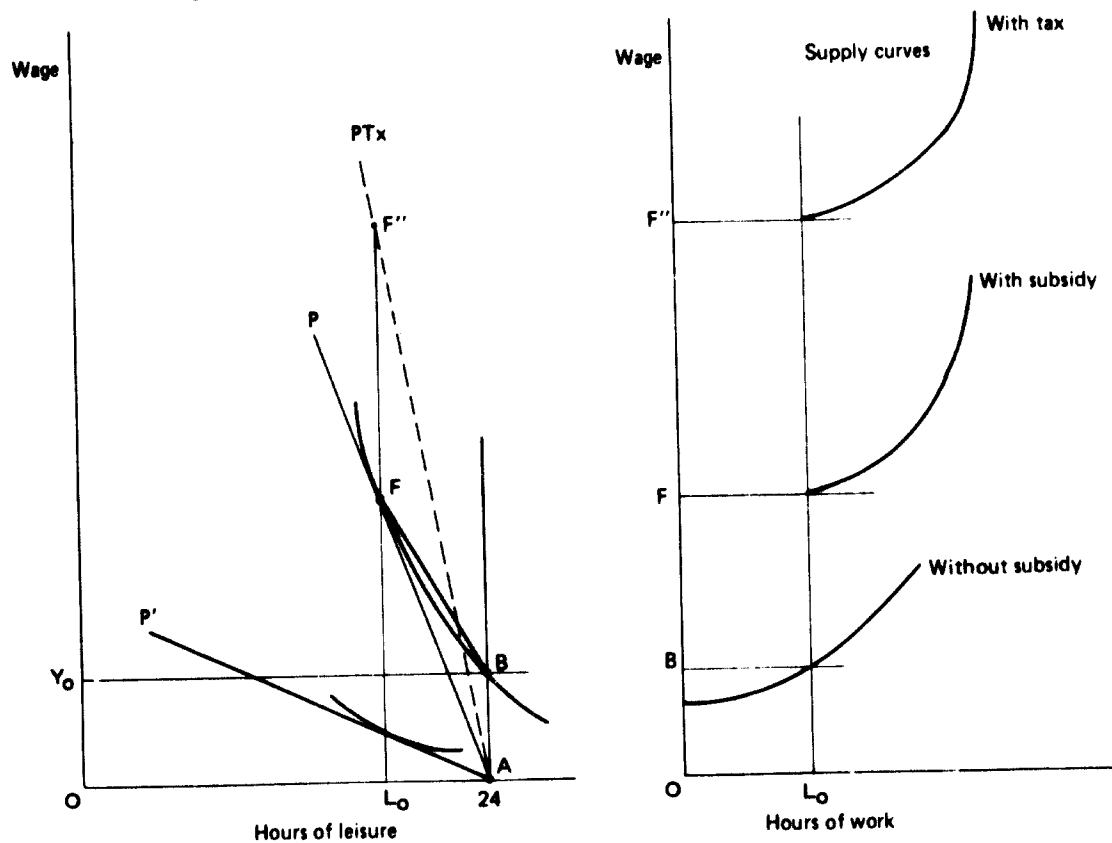
tangency will occur with the marginal revenue line AP and not with the gross revenue or market price line APTx. In summary, while the marginal utility of the leisure given up AL_0 is given per hour by the slope of BF or in total by the money amount $L_0F - OY_0$, the actual wage to be paid will be L_0F'', which is greater than the marginal utility foregone by the tax FF″ and the income subsidy foregone OY_0; correspondingly, the market wage will be the slope of APTx, which is greater than the slope of BF.[14]

The protected sub-sectors of the unskilled labour market have a supply curve equal to the excess supply curve of the unprotected sector of the market, i.e. curve S minus curve D in figure III. As will be noted from the figure, at the equilibrium wage in the unprotected market, excess supply is zero; as the wage rises the difference between the quantities supplied and demanded grows: $AB < A'B' < A''B''$; these constitute the net supplies to the protected sub-sectors. Note that above a certain wage (W″ in this case), the excess supply curve is equal to the total supply curve, i.e. no demander in the unprotected sector can afford to pay that wage. Because of its origin, the supply curve of labour in the protected sub-sectors incorporates all the imperfections on either side of the unprotected sub-market.

On the demand side, we have a curve reflecting the derived demand for unskilled labour in the industries belonging to the protected sub-sectors. Wages offered in no case represent the cost of labour to the employer or take-home pay to the worker, or to the worker's income. The sources of difference vary by sub-sector. In the private reformed sector, the cost of labour to the enterprise exceeds wages owing to the existence of employer-paid social security contributions, tenure and firing regulations, fringe benefits such as vacations, maternity leave and sick pay, and profit and property sharing. On the other hand, take-home pay excludes the deferred fringe benefits and property sharing as well as the employee contributions to social security and taxes on wages. Labour income in turn equals take-home pay plus the present value of the deferred fringe benefits and property sharing. Since the discount rates differ for employer and employee, the present value of the deferred benefits will have a perceived cost that is different from the perceived benefits (the cost typically will be lower). Furthermore, property sharing (i.e. the distribution of shares to worker communities) will have very different values for the payer and the receiver.[15] Finally, the social security payments are part of labour income in so far as they have an expected present value different from zero. Depending on the size of the contributions, the size of the benefits and the discount rate involved, contributions may be in excess or fall short of the value of the benefits. In fact, at high rates of expected inflation the present value of the expected real level of benefits may be well below the value of the current contributions.

Figure IV is designed to illustrate wage formation in the private reformed sub-sector. AMPL is the (private) marginal productivity of labour curve. At the minimum wage, OL of labour would be hired. Required fringe benefit payments raise the cost of labour above the minimum wage to min W′, at which OL′ would be hired.

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[14] This reasoning assumes that for the decision-maker there is utility to others' income. If he were to value the transfers to his family and friends made possible by his employment (OY_0 + FF″), the equilibrium would vary accordingly.

[15] The value to the receiver also differs depending on *(a)* whether the industrial community has 50 per cent of the shares or not, *(b)* the ratio of the individual's wage to the average wage, *(c)* whether the worker stays with the firm or leaves *(d)* what dividends are paid and *(e)* years of service with the firm.

Figure III.   The origin of supply of unskilled labour to the protected sectors
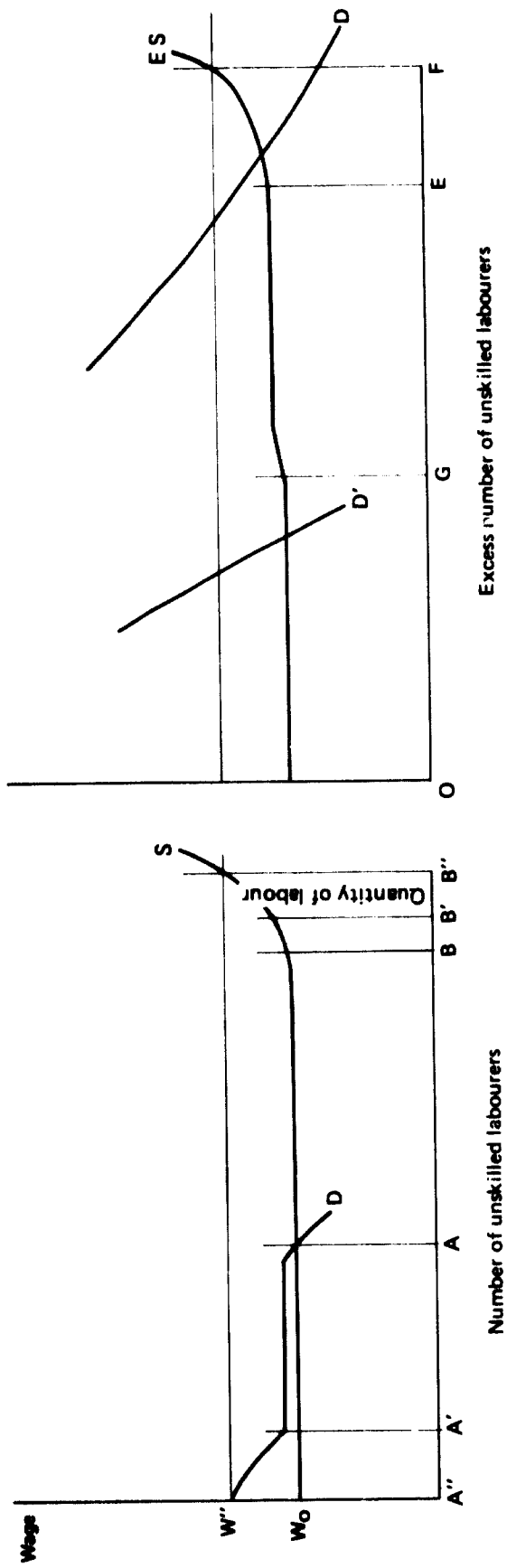
Note: D, D' = Demand curves;   S = Supply curve;   ES = Excess supply curve;   AB ≡ OG;   A'B' ≡ OE;   A"B" ≡ OF.

Figure IV. Wage formation in the private reformed sub-sector
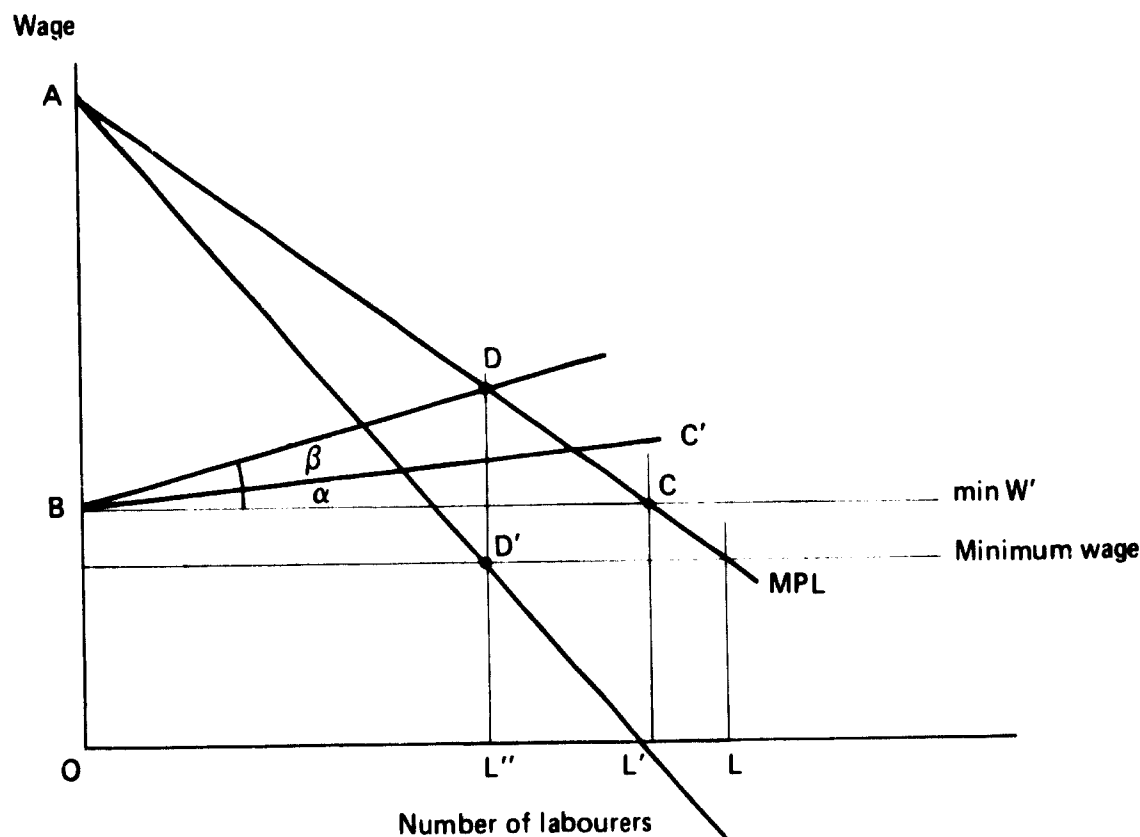
Profit sharing is at 10 per cent of before-tax profit. In the figure, pre-tax rights are equal to area ABC which in turn equals ½(OL' x BA). Hence, the profits shared will be 0.05(OL' x BA). This extra payment, since it is proportional to the number of workers employed, can be thought of as a straightforward addition to the wage bill and graphed as BC', where $\tan \alpha = 0.05$. Property sharing can be included in a similar manner, with $\tan \beta = 0.075$, since the requisite share of profits is 15 per cent.[16] With both additional costs included, the quantity of labour hired declines to OL''. Graphing the points that relate to the explicit wage with the quantity of labour demanded, i.e. points analogous to D', yields a demand for labour curve between D and L, which lies well below the marginal product curve.[17] Labour income, it should be noted, is not equal to L''D per worker, but is usually less than that amount because of the partial deferment or partial loss under certain circumstances of both fringe benefits and property sharing.

In the agrarian co-operative sector, wages diverge from cost of labour and from labour income as in the private reformed sector except that there is no property sharing, while profit sharing is more extensive and even more egalitarian, accruing to each member in proportion to the number of days worked in the previous year.

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[16] This treatment excludes the effect of dividend payments since they entail a separate decision and it does not take into account the subjective cost to the original owners of gradual loss of sole property and control.

[17] Its precise relation to MPL depends on the shape of the MPL curve, and on whether the fringe benefits are proportional to the basic wage or not.

In the social property sector it is not appropriate to refer to wages since the workers hire the capital and not vice versa. Yet the enabling legislation does provide for wages to be paid and for part of the surplus to be taxed, with part of the remainder being distributed to the worker-owners. Social security legislation and tax legislation, but not tenure and severance legislation, apply. Hence in this sector "wages" do not measure labour income either.

Government enterprises are subject to the general social security and tenure and severance rules but not to profit sharing. The central Government is subject only to social security rules and to civil service regulations.

All the sub-sectors are affected by the minimum wage legislation which varies by department, as can be seen from table 14. In addition, the central Government has wage maxima, whereas private enterprises have a "taxation maximum" for wage levels, i.e. a ceiling on the wage level which can be subtracted from income to arrive at taxable profits. Finally, the social property sector is subject to wage and distribution guidelines laid down by CONAPS, its supervisory agency.

In none of the protected sub-markets is the cost of labour equal to its marginal social productivity. For the private reformed sub-sector, this conclusion was developed in detail in the preceding pages. In the agrarian co-operatives and the social property sectors, the conclusion follows directly from the objective function of such enterprises, i.e. the maximization of the average return to labour. A further very important factor contributes to the result stated, however, both in these sub-sectors and in those that equate cost of labour with the (private) value of its marginal

Table 14. Legal minimum salaries and wages by department, Peru, 1972 and 1974[a]

(Soles)

Department	Urban areas		Rural areas	
	1972	*1974*	*1972*	*1974*
	Monthly salaries			
Amazonas	1 620-1 890	1 950-2 250	1 410-1 620	1 710-1 950
Ancash	1 200-1 750	1 700-2 150	1 200	1 500
Apurimac	1 110-1 230	1 350-1 470	800	1 200
Arequipa	1 500-2 100	1 500-2 100	1 050-1 500	1 050-1 500
Ayacucho	1 410-1 620	1 410-1 620	1 200	1 200
Cajamerca	1 485-1 670	1 485-1 670	1 200-1 458	1 200-1 458
Cuzco	1 440-1 620	1 440-1 620	1 050-1 110	1 050-1 100
Huancavelica	1 470-1 500	1 470-1 500	1 200	1 200
Huanuco	1 470-1 650	1 470-1 650	1 260-1 590	1 260-1 590
Ica	1 500-1 800	1 950-2 250	1 200-1 350	1 650-1 800
Junin	1 530-1 860	1 530-1 860	1 260-1 530	1 260-1 530
La Libertad	1 400-1 650	1 670-1 920	963-1 450	1 233-1 720
Lambayeque	1 400-1 600	1 670-1 870	1 320-1 500	1 590-1 770
Loreto	1 950-2 200	1 950-2 220	1 680-1 950	1 680-1 950
Madre de Dios	2 160	2 350	1 740	1 950
Moquegua	1 500-1 800	1 500-1 800	1 050-1 200	1 050-1 200
Pasco	1 470-1 740	1 470-1 740	1 260-1 650	1 260-1 650
Piura	1 650-2 200	1 650-2 200	1 590-2 400	1 590-2 400
Puno	1 200-1 560	1 200-1 560	1 050-1 110	1 050-1 100
San Martin	1 620-1 890	1 950-2 250	1 410-1 620	1 800-1 950
Tacna	1 500-1 800	1 500-1 800	1 050-1 200	1 050-1 200
Tumbes	1 800-1 900	1 800-1 900	1 590-1 800	1 590-1 800
Lima-Callao	2 400	1 800-3 000	1 800	1 800-2 250

Department	Urban areas		Rural areas	
	1972	1974	1972	1974
	Daily wages			
Amazonas	54-63	65-75	47-54	57-65
Ancash	40-55	50-68	40	50
Apurimac	37-41	45-49	25	40
Arequipa	50-70	50-70	35-50	35-50
Ayacucho	47-54	47-54	40	40
Cajamarca	44-49	44-49	40-43	40-43
Cuzco	48-54	48-54	35-37	35-37
Huancavalica	49-50	49-50	40	40
Huanuco	49-55	49-55	42-53	42-53
Ica	50-60	65-75	40-45	55-60
Junin	51-62	51-62	42-51	42-51
La Libertad	41.5-50	50.5-59	29-44	40-53
Lambayeque	45-51	54-60	37-43	46-52
Loreto	65-74	65-74	57-65	57-65
Madre de Dios	67	75	57	65
Moquegua	50-60	50-60	35-40	35-40
Pasco	49-58	49-58	42-55	42-55
Piura	55-70	55-70	53-65	53-65
Puno	40-52	40-52	35-37	35-37
San Martin	54-63	65-75	47-54	60-65
Tacna	50-60	50-60	35-40	35-40
Tumbes	60-66	60-66	53-60	53-60
Lima-Callao	80	60-100	60	60-75

Source: Ministerio de Trabajo, Oficina de Remuneraciones, Perú.

[a]There are variations also within departments—between provincas and sometimes districts—and that is the reason for giving a range in the tabla. The figures are adjusted evary two years but not all departments are adjusted at the same time. The 1972 data rafar to the wages and salaries in affect at the end of the year, while the 1974 figures refer to mid-year.

product: neither the private value of the output generated nor the market cost of the complementary inputs is equal to its social valuation. For example, in export production the private price of the output usually falls short of its social marginal utility since the shadow exchange rate is higher than the market rate. Import-substituting output, in turn, may be over-valued or undervalued at private prices, depending on the level of its protection in comparison with the ratio of the shadow to the market exchange rate.

When demand in the protected sub-sectors is joined to the supply originating from the unprotected sub-sector, it is apparent that any increase in the demand for labour in the protected sub-sectors will necessarily spill over into the unprotected sector (see figure III). Depending on where the curves cut, two plausible situations may arise. The less likely of these is that the demand curve, D, cuts the supply curve in the range where the unprotected sub-sector releases labour by reducing its own employment level (i.e. moving up its demand curve) as well as by increased total supply (to the right of point G). In this case, the marginal social cost of labour is given in the unprotected market and by a weighted sum of the marginal utility of leisure of the newly employed and the marginal social productivity of those released from their previous jobs. The more likely alternative, however, is that the demand

curve, D, intersects the excess supply curve in a range (to the left of G) where labour is drawn only from the ranks of the unemployed. In this case the marginal cost of unskilled labour should again be taken from the unprotected market but purely from the supply side as equal to the leisure foregone.

As noted before, the market wage in the unorganized sector will not be an adequate measure of the value placed on leisure by the offerers of labour, in view of the income transfers that the society requires of them. In addition, however, an increase in demand for labour in the protected sub-sector will not necessarily result in the hiring of the labourers with the lowest supply price. Such would be the natural outcome in a competitive market in which labourers could vie with one another for the job and the employer would have an incentive for paying the lowest wage. Under the condition of a minimum wage constraint, however, employers are not allowed to take advantage of competition between suppliers or labour, except above the minimum; thus below the minimum there is no natural selection mechanism that would give preference to those individuals with a lower cost of leisure.[18] Indeed, there is no reason to believe that those people already employed are the ones occupying the left-most part of the supply curve. The actual marginal social cost of labour in such circumstances will correspond to the cost of leisure of those individuals in fact hired. Since that cannot generally be ascertained, the weighted average of the cost of leisure of those individuals eligible for employment is an appropriate proxy for the marginal social cost of labour, with the weight being each individual's probability of employment. In the absence of more concrete information on these probabilities they can all be taken as equal, whereupon the economy's shadow price of unskilled labour would be the average of the supply prices of all unskilled workers adjusted by the difference between their supply prices and their marginal incomes.

In the market for skilled labour, a demand curve reflects the derived demand from the outputs using this kind of labour, and a total supply curve consists of the sum of *(a)* a supply curve of the existing stock of skilled labour which reflects their marginal utility of leisure, and *(b)* a supply curve of potentially skilled labour which reflects the excess supply of unskilled labour and the cost of training. The market wage will settle at a point at which the quantity of skilled labour demanded exceeds the supply of labour from the existing stock of skilled workers by the supply of labour from individuals moving from the unskilled market into the skilled market through the training system. The excess supply of unskilled workers is transformed through training into the marginal supply source of trained labour. The cost of training is typically borne in part by the trainee and in part by the trainer. This implies that the cost of labour exceeds the marginal product of the trainee for a time and later falls short of it. For such investment in training to be worthwhile for the employers, however, there must be a strong presumption that the trainee stay on the job long enough to allow the employer to recoup the investment. Indeed, labour mobility is much reduced by the legislation governing tenure and firing (i.e. firing only for cause after the 90-day trial period, payment of high severance allowance etc.) and by the legislation establishing participation in ownership (e.g. workers who leave a firm before their industrial community owns 50 per cent of the shares get only one half of their contribution paid out in cash, the contribution being a function of their time of service with the firm).

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[18] The author is indebted to Arnold Harberger for pointing this out.

In the market for skilled labour the demand price does not measure the marginal social productivity of labour for the same reason that the analogous demand price does not measure the marginal social productivity of unskilled labour, i.e. output and co-operating factor prices diverge from their shadow prices. In turn, the supply price does not measure the marginal cost of labour since the supply price of unskilled labour overstates its opportunity cost, and the market cost of training is also not equal to its shadow cost. Moreover, the same divergences between wages, cost of labour and labour income exist in this market as in the protected sub-markets for unskilled labour.

In these circumstances the marginal social cost of skilled labout to the economy will be a mix of two elements. In the very short term, additions to the demand for skilled labour will have to be satisfied by withdrawing labour from other uses; thus its shadow price will equal the value of its marginal social product foregone elsewhere.[19] Over the somewhat longer term, however, labour will be drawn in from the unskilled ranks and trained. As soon as that occurs, the marginal social cost of labour will no longer be the output foregone elsewhere, but the leisure foregone by the newly employed unskilled labour plus the cost of its training. In a process in which the demand for skilled labour grows at a fairly steady rate, the migration process from unskilled labour to skilled labour will be synchronized with the growth in demand of the latter; thus, there will be no loss of output in the short term and the shadow price can be derived purely from the supply of unskilled labour and the cost of training. It is only when there is a significant jump in the demand for labour that output loss will occur and will need to be taken into account in the shadow price. Such situations are rare since large projects, which are most likely to cause shocks of this sort, typically include an explicit training effort.

The market for professionals is very similar to that for skilled labour. One main difference lies in the much longer time lag required to bring unskilled labour up to the professional level. While to train skilled labour may require a few months, for professionals the time needed is a few years. Furthermore, the time lag in adaptation of the supply of professional labour to the skill-mix demanded implies that there is a very minor feedback effect. In consequence, the shadow cost of using a professional in a new project must be taken to equal the value of the output foregone elsewhere in the economy.

It is relevant to remember for the calculation of such an opportunity cost that as in the other labour markets the demand price for professional labour does not adequately measure the marginal social product of such labour, since the respective demand curve is a derived demand dependent on the prices of output and on all other co-operating factors which are not equal to the respective shadow prices. Furthermore, distinct from the market for skilled labour, the market for professional labour is characterized in Peru by a strong monopsonistic position of the Government. This monopsony is enforced in government agencies by means of maximum wage legislation and civil service pay scales. It is less effectively enforced in government enterprises, but mobility between the v ious sub-sectors of the public sector is severely restricted. Finally, wages and employment are held down in the private sector by a ceiling on the wages allowed as cost items in the calculation of taxable profits.

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[19] If the stock of skilled labour has a supply curve with a non-zero elasticity, the shadow price will be a weighted average between the value of output foregone and of leisure newly given up.

In summary, the market for unskilled and skilled labour is characterized by excess supply; only the market for professionals is one in which excess demand prevails. In consequence, the shadow price of unskilled and of skilled labour is appropriately derived from the supply side; for unskilled labout it is the average of the supply price of labour willing to work at the income associated with the minimum wage, as adjusted by the income transfers required by the social system; for skilled labour, it is the shadow price of unskilled labour plus the shadow-priced cost of training. In turn, the shadow price of professionals is given by the value of their output foregone elsewhere, which is equal to their income corrected for monopsony elements and for the market shadow price differences of the outputs in which their labour is embodied, and of the inputs complementary to the use of their labour.

The social discount rate

The purpose of the social discount rate is to indicate how much less society values future benefits compared with present benefits, usually standardized for an annual period. Alternatively, one could regard the social discount rate as the amount by which the beneficiaries of projects discount values of the future benefits. In competitive equilibrium, both these descriptions of the social discount rate would be equal, since with perfect capital markets everybody would save at the same interest rate and thus each individual's time preference would become equalized and be indicated by the risk-free interest rate.[20]

The savings market in Peru, as has been noted in section I, is far from being a perfect market. Indeed, its segmentation is considerable. As a result individuals make savings decisions at widely differing rates of return. Pure households are in large measure faced with negative real interest rates. On the other hand, the various types of business households have high and positive rates of return on their savings. In such circumstances it is inappropriate to point to any single interest rate as reflecting all the income units' time preferences. In addition, it is often quite difficult to ascertain the actual rate faced by individual savers. In the case of business households, to the extent that explicit rates of return are calculated, they are obviously not public knowledge; for pure households the range of markets in which they operate is such that extremely detailed inquiries would be necessary to ascertain the average return earned at the margin by any unit.

The tempting alternative of calculating the social discount rate by observing the pre-tax private rate of return on investment would yield incorrect results precisely because supply and demand prices differ so considerably in the savings and investment market, and because the interest rates available to the pure households are fixed by the Government. This latter feature is also the reason why an average of supply and demand prices would be an inappropriate measure of consumer preferences.[21]

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[20] Marglin [28] has indicated that if externalities exist in the savings function, the competitive interest rate would not represent the social discount rate. Whereas it is true that in the presence of externalities individuals might be willing to save more if they all saved together, as long as such joint saving decisions are not implemented, the lower individual levels of saving and their associated interest rates indicate the evaluation of the present and of the future reflected in the savers' decisions.

[21] See Harberger [21] and Feldstein [13] for conflicting views on this point.

There is thus no alternative but to measure a social discount rate by starting from the supply of savings. Two problems immediately emerge: (a) how to ascertain the rates applicable to each saver and (b) how to weight the different rates obtained. The most direct way of obtaining information on the first point is through a survey; however, as has been mentioned earlier, the diversity of circumstances in Peru is so great that it is unrealistic to expect a survey to be successful in providing enough information. The second alternative is to base the determination of the household time preferences on consumption rather than savings information. This alternative is based on the realization that consumption and savings decisions are simultaneous and thus that either one will contain as much information as the other. Yet consumption data, particularly at the aggregate level, are much easier to obtain than savings data, and they are also much more reliable since the magnitudes are larger. Extracting information on the time preference from consumption data is no easy matter, but it is definitely feasible if one is willing to assume additivity of the utility function. According to this assumption, the elasticity of the marginal utility of income is derivable from the information on price elasticities, income elasticities and budget shares contained in the consumption data, by the use of procedures suggested by Frisch [16].

With regard to the appropriate weighting scheme for aggregating individual preferences, it would seem obvious that consumption weights are appropriate, since aggregate benefits are defined in consumption terms as *numéraire*. It is precisely the relative valuation by the consumers of the project's benefits that are being measured, thus making consumption again the logical weighting system. Fortunately, the use of aggregate consumption data to determine the elasticity of marginal utility of income implies weighting individual preferences by the size of individual consumption, through the device of the "representative consumer".

When the elasticity of the marginal utility of income has been calculated, the estimation of the social discount rate is quite straightforward [11, 12]: the discount rate may be calculated by multiplying the *per capita* annual rate of growth of consumption by the absolute value of the elasticity of the marginal utility of income.[22]

In summary, then, under conditions in Peru it is appropriate to measure the social discount rate from the time preferences of consumers as revealed in their consumption behaviour.

Shadow price of investment

Definition and estimation of the shadow prices of investment are the necessary complement to the use of the social time preference form of the social discount rate [29]. In the case of Peru, this is highly appropriate since the savings and investment market shows wide divergence between the cost of savings and the return on investment. What is more, the degree of segmentation in the market makes it desirable to calculate a separate shadow price of investment for each major sector and in some cases even for major firms. Such is the consequence of the limited extent to which the capital market is integrated. It would be inappropriate to compare an investment project in steel to one in detergents; except when undertaken by the

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[22]Somewhat more complicated formulae have been suggested by Frisch [17] and Feldstein [14].

central Government, these would not be realistic alternatives. However, some private conglomerates might be able to consider a soap factory and a biscuit factory as alternatives. In the same way, the state mining enterprise can realistically consider alternative mining ventures as comparable, even if they involve different minerals, although it would be unrealistic to use its available investment funds for the construction of a shoe factory, however desirable that project might appear.

There are two circumstances, however, in which the use of an overall shadow price of investment for the economy as a whole is both desirable and necessary. The first of these relates to the yield on reinvestment in any project. Savings generated in a project are not exclusively under the control of the enterprise executing the project; at a minimum, wage earners and the Government will generate savings as well; at a maximum, savings will be generated by economic units outside the executing firm. The income from Government and wage-earner savings will tend to become diffused throughout the economy by means of the government budget mechanism and the granting of loans by the banking system. Hence an overall shadow price of investment is more appropriate for the valuation of reinvestment than one specific to a sector or firm.[23] The second circumstance in which the use of an overall shadow price of investment would be desirable would be when it would be advantageous to break through the segmentation of the capital market. Thus, for example, if a particular project seems profitable in terms of sectoral shadow pricing but not in terms of national shadow pricing, it becomes relevant for the Government to consider adopting special measures to transfer the savings out of the sector concerned. Indeed, a comparison of sectoral shadow prices of investment gives an important indication of the direction in which savings should be transferred. The overall shadow price of investment thus gives a convenient average bench-mark against which to measure the performance of the individual sectors.

In order to estimate the sectoral or overall shadow prices from the private pre-tax rate of return, correction has to be made for the social time preference and the reinvestment rate [29, 39].

These traditional corrections serve to convert private income units into present value of consumption units. In addition, however, it is necessary to introduce three corrections that are less commonly made.[24] All three corrections relate to the fact that the private pre-tax rate of return is the residual difference between the value of the output at private prices and the value of all other inputs also at private prices. However, when private prices differ from shadow prices, private profit will misstate the annual contribution of capital to the availability of goods and services. For example, if the output is an export, its market value will understate the social marginal utility of foreign exchange; when the output is an import substitute, the private value will misstate the marginal contribution to welfare depending on the relationship between the tariff level and the shadow price of foreign exchange. Hence, whenever output is an export or import substitute, its valuation must be adjusted and that adjustment must be included in the private rate of retu   along with the adjustments by the reinvestment coefficient and the social time preference. The same naturally applies to any material input which may plausibly be regarded as

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[23] One could argue that a weighted average between the sector or firm-specific shadow price and the government-specific and bank credit-specific price would be more appropriate, with the weights varying from project to project. The problems of calculating such an approach would be formidable, however.

[24] For an extensive discussion as well as computational formulae, see Schydlowsky [33, 34].

foreign exchange.[25] Moreover, the private return to capital is a residual after paying the market wage. With the shadow price of labour below the market wage, private return to capital understates the marginal social productivity of that capital, and the difference between the market and shadow wage bill must then be added on to the pre-tax profits in much the same way as the tax is added to after-tax profitability in order to undertake conversion to the shadow price of investment. Finally, an adjustment must be included for the value of the transfers caused between the private and government sectors.

The three adjustments just discussed are complementary to the two traditional ones since they adjust the private annual income flow into the social annual income flow. The two traditional adjustments then convert income to consumption units (adjustment for reinvestment) and future consumption to present consumption (present value taken with the social time preference).

In summary, under the conditions pertaining in Peru, it is appropriate to calculate one general and several sector-specific shadow prices of investment. In all cases this involves adjustments to the private rate of return in order to take into account: *(a)* the effect of a discrepancy between private and social value added due to shadow pricing of foreign exchange; *(b)* the discrepancy between the market and the shadow price of labour; *(c)* the welfare effects of changes in the fiscal situation, i.e. net transfers to the Government valued at the shadow price of fiscal resources; *(d)* reinvestment; and *(e)* the social time preference.

Shadow price of central Government funds

Every investment activity, as indeed most activity, causes resources to flow between the enterprise and household sectors, on the one hand, and to and from the central Government on the other. The effect of these flows of taxes and subsidies on welfare are only neutral when taxation is optimal. Yet in Peru there is every reason to believe that taxation is not optimal. Indeed, it has been argued many times that taxes fall far short of their desired levels (although this argument is much less heard today than it was in the past) [23, 32]. On the other hand, it is also said that much of government expenditure is wasted, and that therefore taxation could be significantly lowered along with government expenditure without signifying any loss of real performance of services on the part of the central Government. In the presence of the lack of optimization of taxation levels, a value for the transfer of funds from the private to the public sector should be defined, and it is clear that such a shadow price of government funds will be greater than zero.

It is useful to think of the shadow price of government as the difference between the welfare generated by a sol in the private sector and by a sol in government hands. This difference will be composed of the differences in the value to the consumer of a sol's worth of government consumption and a sol's worth of private consumption and of the differences between the respective marginal productivities of investment, all weighted by the government and private propensities to consume and save.[26]

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[25] Another way of expressing the interdependence between the shadow price of investment and one of the other shadow prices is to note that capital is used to produce foreign exchange, hence the marginal productivity of investment, i.e. the shadow price of investment, cannot but reflect the shadow price of foreign exchange and indeed must be a function of that shadow price.

[26] For a calculation formula see Schydlowsky [33].

Whether the resulting price will be positive or negative is hard to predict *ex ante*. One might assume that government consumption has a greater value than private consumption, although that would be contradicted by the assertion that a good part of current government expenditure is sheer waste. One might also expect the government sector to have a higher savings rate than the household and enterprise sectors, yet the salary obligations of the central Government as well as the size of the subsidies to the enterprise sector may well show such an expectation to be mistaken.

However the case may be, it is quite clear that in Peru a unit of resources in the hands of the central Government has a different value from that same unit of resources in the household or enterprise sector and that this difference must be taken into account in the analysis of projects through a suitable shadow price of government funds.

Shadow price of foreign exchange

The shadow price of foreign exchange is defined as the increase in goods and services available domestically as a result of the addition to the economy of a unit of foreign exchange. This increase naturally depends on how that unit of foreign exchange is spent and how the goods acquired are incorporated in the economy. Both these factors depend on the balance of payments adjustment mechanism pertaining in the country.

In Peru, as has been discussed in section I, the balance of payments adjusts principally through the absorption of imports; a minor contribution is made by the reduction in those exports for which there is significant net off-take. The fundamental mechanism by which this increase in the absorption of traded goods takes place is through reflation of the economy, which involves an increase in the domestic level of activity and an increase in investment.[27] The policies producing this reflation are essentially expansionary credit and fiscal policies.

In such circumstances, the shadow price of foreign exchange is equal to the shadow price of the importable and exportable goods absorbed as a result of the domestic reflation. These cover the full range of traded goods: consumption goods, mainly food; intermediate goods, i.e. the raw materials needed for the higher level of domestic production; and capital goods demanded as a result of an increase in credit for investment purposes and of the reinvestment generated by the higher level of activity. In consequence, the shadow price of foreign exchange will be the weighted sum of the shadow prices for each category of traded goods absorbed, the weights being the marginal share of each category in the total foreign exchange absorption. Such shares will result from the marginal propensity to absorb traded goods which, in turn, reflects the income elasticities of domestic consumers when faced with the final consumption goods in the domestic market at the domestic market prices.[28]

The shadow price of tradables for consumption is given directly by the domestic market price of such goods. This price will include the import duties and scarcity premiums resulting from the licensing system. Since the main item involved is food, no tariffs are in fact levied on such imports, and only meat commands a domestic scarcity premium. Thus, the shadow price of foreign exchange spent on importables

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[27] Increases in expenditure on consumption as a direct result of the policy followed may or may not occur, depending on the precise policy-mix adopted.

[28] Where investment is concerned, consumer preferences are reflected in the derived demand functions.

Figure V.   The absorption of imported intermediate goods
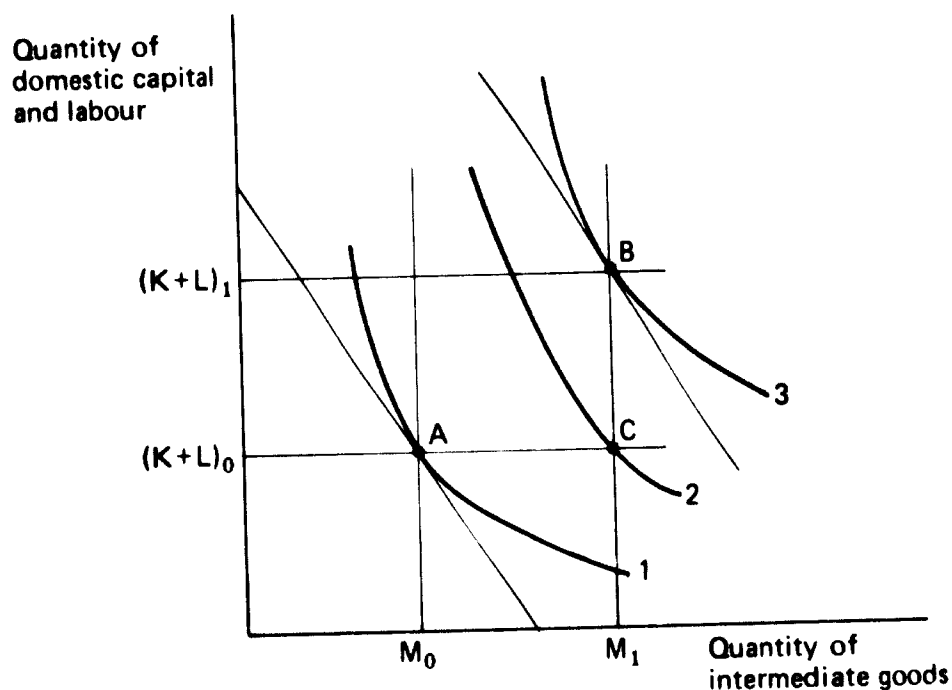
is very close to the official rate. The shadow price of intermediate tradables reflects the addition to domestic output resulting from the availability of such inputs, minus the cost of the complementary domestic factors of production. The resulting shadow price is very significantly above the market demand price for such goods. Why this occurs can be seen from figure V. Consider an initial situation in which M_0 of imported intermediate goods are available. At the ruling domestic prices, producer equilibrium will take place at A, with $(K + L)_0$ of domestic complementary factors employed. If the availability of imported intermediate goods rises to M_1, the activity level expands involving a greater use of domestic capital and labour. This is possible because labour is unemployed and excess capacity exists in the economy. There will be no change in the relative price of importables with regard to domestic factors. Equilibrium will thus take place at B with an expansion of output from isoquant 1 to isoquant 3. The shadow price of the importables will then measure that increase in output minus the cost, at its shadow price, of the additional labour used (the excess capacity put to use will have a positive shadow price only if the user cost of capital is important). This result contrasts to what would happen if there were no excess capacity or if labour were fully employed. In that case, equilibrium would occur at C with the amount of domestic capital or labour used in production staying unchanged and the relative price of importables falling. The segment AC measures the conventionally defined marginal productivity of imports and thus would be reflected in a change in the demand price attached to those goods.

The shadow price of imported capital goods is also not given by their demand price, since that price reflects only the private rate of return to capital. An adjustment thus needs to be incorporated reflecting the shadow price of investment, i.e. the conversion of private rates of return to social marginal productivity of investment.

When the shadow price of foreign exchange is constructed on the basis of the weighted sum of the components, a shadow price is obtained involving an adjustment that is substantially higher than a ratio of domestic to world prices. This results from the incorporation of the "macro-effect" in the pricing of intermediate imports and from the incorporation of the excess of the social over private value of investment. Finally, an adjustment needs to be included for the changes in the fiscal balance occurring as a result of the availability of more foreign exchange. That change obviously needs to be valued at the shadow price of government resources. It follows therefore that the shadow price of foreign exchange depends on the shadow price of labour, the shadow price of capital and the shadow price of government resources.[29]

In summary, under conditions in Peru, the shadow price of foreign exchange is appropriately calculated on the basis of the marginal use of such foreign exchange and should reflect *(a)* additions to present direct consumption and *(b)* additions to present and future consumption through increased investment.

The time profile of shadow prices

In the preceding section, the nature of the shadow prices appropriate to the Peruvian situation was discussed with regard to a single moment in time. However, projects normally have a lifetime of several years and the values of inputs and outputs do not remain static over such periods. In consequence, it is necessary to have a time series of shadow prices that reflects the conditions at the times when benefits are obtained or costs are incurred.

Projecting shadow prices across time involves analysing two types of changes: *(a)* changes in the structure of the markets and in the excess demands or supplies in them, and *(b)* changes in government policy affecting the distortions existing in the market. It is useful to summarize briefly what evolution might be expected in the various Peruvian markets over the next decade or so.

In the market for labour two events will be of particular importance. The first concerns the evolution of the unemployment rate. Policy makers are clearly concerned with this issue and the reduction in unemployment is one of the objectives of the current development plan. At the same time, current investment incentives and investment mix lean towards greater rather than less capital intensity. This results from the relative prices of factors and the property-sharing arrangements in the private sector, and from the great and increasing importance of public-sector investments which are capital-intensive because of their size.

Thus it is questionable whether major progress will in fact be made on this front. It is rather to be expected that the unemployment of unskilled labour will continue and that insofar as this aspect is concerned the nature of the market for labour will remain unchanged. The second major development will be the growth of the social property sector, which so far is still extremely small. Financial resources are being increasingly made available to this sector and within a decade it should be of considerable size.[30] The impact of this development on the markets for labour and the resulting shadow price will come less from its labour-absorbing capacity, which is likely to be moderate, than from its impact on institutional wage setting. Much will

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[29] An appropriate equation for the incorporation of all these adjustments is given in Schydlowsky [34].

[30] For an effort to assess what growth of this sector might be like see Abusada-Salah [1].

naturally depend on how the National Commission for Social Property regulates these enterprises. The most likely outcome appears to be that this sector will become one of the protected sectors for labour and will simply take its place alongside the other five protected sub-sectors of this kind. On the basis of these considerations, it is not to be expected on this account that there will be major changes in the ratio of the market to the shadow wage. Major changes that might occur would therefore have to come from changes in the institutional arrangements under which income is shared with the unemployed and decisions are made to enter the labour market.[31]

Changes in the discount rate will depend on changes in the distribution of consumption, in the *per capita* growth rate and in the way in which interest rates are set. Redistribution of income and consumption are an important government objective, and although much has been done in this area, redistribution towards the really poor appears to be quite difficult.[32] One would therefore expect only very slow evolution in this regard. Changes in the growth rate would most likely be the result of the development of the social property sector and of the continued development of the Andean Common Market. The potential here is for increases as well as reductions of growth rates dependent principally on what foreign trade policy is followed. With regard to interest rates, it is to be hoped that opportunities to earn competitive returns will be widened, and measures leading in that direction would not be inconsistent with declared government policy. The development of a more effective capital market, be it at the Peruvian level or at the Andean level, would also make a contribution in this regard. On balance, the forecast in this market would be for little or no change.

The shadow price of investment is likely to fall over the intermediate term, principally as a result of the increased preponderance of capital-intensive projects which are financially attractive, or which tend to preserve property rights, provide high returns to members of co-operatives, or are easier to manage for government officials. At the same time, they have lower yields than competing, more labour-intensive investments when appraised at shadow prices. Hence a reduction in a shadow price of investment will not be the consequence of a decline in the yield to investment available, but rather a result of the choice of projects to be undertaken. However, the actual value of the shadow price of investment depends on shadow prices of labour, government and foreign exchange, and changes in these other prices may well outweigh the changes in the quality of investment itself.

It is no easier to forecast change in the shadow price of government resources than it is to calculate that price at any time. One can hazard the guess, however, that the shadow price of government resources will increase as a result, on the one hand, of increased demand for public goods arising from the greater integration of the population into the national economy and national polity and, on the other, of the greater saving effort that the Government can be expected to make.

The shadow price of foreign exchange in all likelihood will move closer to the official rate over the longer term after a period of increasing deviation. In the short term, as attempts are made to stiffen import restrictions and bolster the control network, the shadow price will rise as a multiple of the official exchange rate, both as a direct result of the tightened import restrictions and through the growth of the macro-effect, for as the shadow price of foreign exchange rises, so will the shadow

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[31] By mid-1977 the importance of the social property sector already appears to have peaked.

[32] See Figueroa [15] and Webb [40] for some assessments.

price of capital, and this will feed back on to a higher level of the shadow price of foreign exchange in the simultaneity that links both prices. In the longer term, the balance of payments exigencies will be such that it will be necessary to move towards an exchange system which provides export incentives more in accordance with domestic cost levels and which regulates imports in a more automatic manner. When that system is adopted, the gap between shadow and market exchange rates will narrow, and as the Andean common external tariff comes into force it is likely to narrow quite considerably. Once the common external tariff is adopted, the crucial determinant of the gap between shadow and market exchange rates will be given by the macro-effect, and that in turn will depend on the extent to which capacity is underutilized in the economy. If a policy of capital utilization is pursued, i.e. if industrial export promotion to third countries is an important element of the balance of payments strategy, then it is probable that utilization will be high and the macro-effect will be correspondingly low. On the other hand, if third country exports are neglected, the macro-effect will not become much less sizeable. On balance, therefore, one can expect a short- to medium-term rise in the shadow price of foreign exchange and a decline later as the common external tariff comes into effect, with the ultimate level depending on the extent to which installed capital and existing labour are utilized.

Summary

The shadow prices appropriate for the Peruvian situation are interdependent shadow prices which reflect the disequilibria in each of the markets concerned: they are properly general disequilibrium prices.

The shadow price of labour, both unskilled and skilled, depends fundamentally on the marginal utility of the leisure foregone. The social discount rate depends fundamentally on the *per capita* rate of growth and the elasticity of the marginal utility of income; it is emphatically a time preference concept. The shadow price of investment is a measure of the social marginal productivity of capital; it is a function of the shadow price of labour, the shadow price of foreign exchange, the social discount rate, the reinvestment rate and the shadow price of government resources. The shadow price of government resources, in turn, is a function of the shadow price of investment, and it also reflects the relative valuation of private and public consumption. Finally, the shadow price of foreign exchange measures the marginal contribution to the availability of goods and services of an additional unit of foreign exchange; it is a function of the shadow price of labour, the shadow price of capital, and the shadow price of government resources, as well as of the manner in which marginal foreign exchange availabilities are absorbed in the import intensity of domestic output.

IV. Implications for the form of the benefit-cost criterion

It is well established in the literature that when all benefits and costs are taken into account and all of them are properly priced, it makes no difference what form of the benefit-cost criterion is used to distinguish between desirable and undesirable projects: There is only one "good" package of projects and proper shadow pricing will insure that that package is chosen no matter what the form of the choice

criterion (see, for example, Bruno [8]). In fact, however, the decision-maker is often confronted with a situation in which a ranking rather than a package is needed. Such would be the case, for example, when the size of the available capital budget is uncertain. In these situations, the choice of the form of the benefit-cost criterion is very important since the order in which projects are ranked will depend on the form of the criterion, and thus the criterion will affect the preference for some projects over others. It should be noted that different rankings by criterion are not inconsistent with the same choice of packages, given a fully specified set of constraints: rankings will be different within the intra-marginal and the extra-marginal projects; however, each of these two groups will have the same composition. At the same time the question is really important only when the discrimination between these two groups is unclear.[33]

In the following section the nature of the project evaluation problem is examined in the Peruvian context in order to answer the fundamental questions of whether there is rationing, what it is that is being rationed and what the effect of the rationing decision is. Five common proposed forms of the benefit-cost criterion are then examined to assess their applicability and relevance to the Peruvian situation. The section concludes with a recommendation on the formulation that should be used.

Fundamentals of the question of project selection in Peru

The first question that needs to be clarified is whether in the Peruvian situation there is rationing that requires project ranking or whether there is simply the need to assure that the benefits of the project shall exceed the cost.[34] The answer to this question can be deduced from the nature of the savings-investment market. It will be recalled from section 1 that the marginal private yield of investment is far above the time preference of at least a significant portion of consumers. Conversion to shadow prices does not narrow this spread. Hence it follows that the savings level is suboptimal in the Peruvian economy. In turn, this implies that for a project to be desirable it is not enough that it yield a positive rate of return; that rate of return must be above the rate of return that would be realized if the investment decision were left to the market. In fact, it is precisely this circumstance which requires the definition of a shadow price for investment.

The second fundamental question refers to what is being allocated. There are two possible answers: either real resources, i.e. savings, are being allocated, or financial resources, i.e. money to buy investment goods, are being allocated.

In the first of the situations the Government allocates physical resources (domestic materials or foreign exchange) to the investment programme. Hence the volume and value of real resources used by each project is directly determined. When financial resources are allocated, the volume of real resources used depends on their market price, and the same amount of financial expenditure may imply widely differing values of real resources. Thus, for example, one million soles of investment spent on hiring unskilled labour implies a very different use of real resources than the same million spent on foreign exchange for imported machinery. Evidently, the real investment cost is very sensitive in this case to the mix of real resources on which the

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[33] See Schydlowsky [31] for some discussion of this problem.

[34] Costs are here defined to include investment outlays valued at the shadow price of the materials used, i.e. labour at its shadow price, materials at their shadow price etc.

financial investment is spent. Correspondingly, whether real or financial resources are allocated is a question of major importance.

Which form the investment allocation takes in a given situation is an institutional matter. In Peru, a significant fraction of the projects that come before the Government involve the request to use the petitioner's own financial resources for investment purposes with the award of tax or other privileges. In these projects the licensing of investment is at issue, not the allocation of real resources. Hence, the quantity of real resources used by a licensed investment of given financial size will depend on what the financial resources are spent on. Such is the situation of all private sector investment and of a good part of public enterprise investment. General government investment is controlled in a more direct fashion by the Government, but even here the allocation is of budgetary appropriations, which are by tradition in financial terms rather than in the direct assignment of real resources. Again, a given amount of financial resources may signify very varying amounts of real resources depending on how these financial resources are spent. It follows therefrom that the government investment budget is limited by financial cost and not by the direct assignment of limited real resources.[35] It would appear then that in all cases financial resources are being allocated.

Since the investment budget is determined in monetary terms, the return that must be maximized is the return to that financial budget. It follows that, excluding indivisibilities, the return to the monetary budget will be maximized through the maximization of the return on each sol's worth of financial investment.

The third question concerns the effect of an investment decision on the welfare level of the economy. With the allocation of resources basically a function of the expenditure of money income at market prices, and not a function of direct government allocation of real resources, investment consists of moving real resources from one (consumption) use to another (investment) use, with the hope that there will be an increase in welfare along the way. The benefit of an investment activity therefore consists of the difference between the consumption foregone by moving the resources out of the previous use, i.e. present consumption, and the future consumption generated in the new use. The effect of investment activity can thus be regarded as the net present value of gross benefit minus current costs and investment costs.

Alternative forms of the benefit-cost criterion

The "social-marginal-productivity-of-capital" criterion

The social-marginal-productivity (SMP) criterion, originally suggested by Chenery [9], is typically defined as the ratio of the present value of benefits minus current costs to the present value of investment, where all values are shadow priced:

$$SMP = \frac{PV(B-C)}{PV(I)}$$

where PV is present value, B is benefits, C is current costs, and I is investment cost.

UNIDO [39] advocates this measure in the section on income-denominated benefits; Little and Mirrlees [26] do likewise. However, there is some question about

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[35] Note that real resources are scarce for the economy as a whole but not for the investment programme.

whether the views of these authors are fully equivalent since there are differences in the precise conceptualization of the relevant discount rate.

The shortcomings of this ratio for the situation at hand are:

(a) Benefits are defined in income terms rather than in consumption terms; this implies that the present value of investment is equal to the present consumption foregone, an assumption clearly contradictory to the reality in Peru;

(b) It is assumed that real investment resources are being allocated rather than financial ones; therefore real resources appear in the denominator.

It would appear therefore that this formulation is not appropriate to the situation in Peru.

The "marginal-contribution-to-growth" criterion

This criterion was first suggested by Eckstein [12] and was designed to remedy the exclusion of the reinvestment features from the social-marginal-productivity-of-capital criterion. Thus, marginal contribution to growth (MCG) is a generalization of the SMP which includes the adjustments necessary to take into account the effects of reinvestment pointed out by Galenson and Leibenstein [18]. The formula has as numerator the present value of gross benefits minus current costs, adjusted for reinvestment, and in the denominator the present value of investment with all values shadow priced:

$$MCG = \frac{PV[(B-C)(1-s) + (B-C)\,sP_k}{PV(I)}$$

where s is the marginal propensity to save $(0 \leqslant s \leqslant 1)$ and P_k is the shadow price of a unit of capital.

UNIDO, as Marglin earlier, also advocates this measure when taking reinvestment effects into account.

Its drawback for the case at hand is the assumption that real resources rather than financial resources are being allocated.

The "internal-rate-of-return" criterion

This criterion is advocated by Harberger [19] and by Squire and van der Tak [36]. It involves converting all input and output values to shadow prices and discounting these to present value. The discount rate which makes present value equal to zero is known as the internal rate of return.

The disadvantages of using the internal rate of return instead of present value are well known; however, for the case at hand the most relevant objections are:

(a) The violation of consumer sovereignty implicit in discounting at a rate that does not reflect the marginal rate of substitution of consumption over time;

(b) The assumption of complete reinvestment of product during the lifetime of the project;

(c) The assumption that real resources are being allocated.

The "domestic-resource-cost-of-foreign-exchange" criterion

This criterion was first proposed formally by Michael Bruno [8, 7]. It has in the numerator the annual cost of capital plus the annual cost of labour and in the denominator, the foreign exchange saved or earned. The domestic resources are shadow priced in order to represent their social cost. Furthermore, it is customary to use direct and indirect domestic resource costs (DRC) in the numerator and direct and indirect foreign exchange in the denominator:

$$DRC_i = \frac{DC_i}{NFE_i}$$

where DRC_i is domestic resource cost of earning or saving foreign exchange in activity i, DC_i is total cost, in local currency, of domestic resources used in activity i, and NFE_i is net foreign exchange earned or saved, in foreign currency, in activity i.

The shortcomings of this measure for the situation at hand are:

(a) By using annualized flows, the DRC does not allow inclusion of gestation periods of different lengths;

(b) Annualization of flows also does not allow differences in the time of the income stream generated by a project to be adequately reflected;

(c) It has no way of adjusting for different lengths of life of projects;

(d) It is unable to cope with changing shadow prices over time;

(e) It assumes that the resources allocated consist of bundles of capital and labour, both in real rather than financial terms;

(f) The use of direct and indirect domestic inputs and direct and indirect foreign exchange earnings implies constancy in the sourcing patterns observed in the input/output table; this is inconsistent with the nature of the trade policy adopted by Peru which currently emphasizes backward integration [3, 4, 6, 25].

It would appear that the DRC criterion is more appropriate for economy-wide real planning rather than for project evaluation in circumstances in which the rationing of capital, either real or financial, is at issue.

Semi-input-output method

This method was first suggested by Tinbergen [38] and is quite similar in concept to the DRC measure and indeed can be thought of as a form of direct domestic-resource-cost or social-effective-rate-of-protection index [3]. Its difference from the DRC is that it excludes from both numerator and denominator the indirect resource costs embodied in traded goods and the indirect foreign exchange earnings embodied in those same traded goods. Thus, the direct domestic resource cost has in the numerator only the domestic resource requirements of the manufacturing stage at issue and of the non-traded goods it requires directly and indirectly, and in the denominator it has the foreign exchange saved or earned by this stage and its required non-traded inputs.

As a result of its close kinship with the DRC, this semi-input-output method has the same drawbacks for application to Peru as has the DRC with the exception of *(f)* above, for which it specifically compensates.

Programming methods

Programming methods are traditional tools of optimization and thus have also been proposed for use in project choice [10]. Their application to the Peruvian situation has a number of drawbacks. First and most important is that programming methods are usually used to simulate the workings of a perfectly competitive market. However, project evaluation in Peru must proceed in a kind of second-best world in which markets do not clear and in which distortions of various sorts abound. Building these restrictions into programming models is extremely difficult since they are not designed to produce sub-optimal results. Secondly, programming models are more suited for economy-wide allocations than for the assignment of a particular resource, although such modifications are of course possible. Furthermore, information restrictions make it difficult to achieve a level of disaggregation adequate for effective project choice in the context of an economy-wide model. Finally, a number of specific modelling difficulties exist which relate to the incorporation of increasing returns to scale, avoidance of excessive specialization in open economy models, difficulty with the formulation of consistent and integratable demand functions etc. It would appear from all these considerations that a programming approach would not be particularly fruitful for application in Peru at this time.[36]

Recommendation

The form of benefit-cost criterion most closely suited to the conditions under which Peruvian project evaluation and investment decisions are undertaken is a version of the marginal contribution to growth in which financial investment is put in the deonominator and real investment at the shadow price of the resources used is subtracted from the numerator:

$$MCG_F = \frac{PV[(B-C)(1-s) + (B-C) s \, P_k] - PV(I)}{PV(Fin. \ I)}$$

where MCG_F is marginal contribution to growth adjusted to reflect financial investment and Fin. 1 is financial investment.

As will be noted, in this form of the marginal contribution to growth, the net present value of the project is in the numerator and it is related to the financial expenditure necessary to accomplish the bidding away of resources from their previous uses to their present uses.

It should be noted that when projects are ranked in this manner, it is desirable to execute them from the best to the worst, i.e. from that having the highest MCG_F ratio to that having the lowest, and that the marginal project built will be the one that exhausts the budget. In the circumstances pertaining in Peru, there are numerous

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[36] For a general criticism of the use of programming methods and their associated shadow prices for project evaluation, see Weckstein [41].

budgets at issue and thus it is often not clear *ex ante* what the cut-off point is for each budget. This uncertainty makes it particularly important to have a benefit-cost criterion that is consistent with the institutional situation.

V.   A digression on distributive considerations

In this section three issues are treated that bear on the incorporation of distributive considerations into benefit-cost analysis as these relate to the Peruvian situation: *(a)* what kind of distribution is it appropriate to look at; *(b)* what types of distributional impact do projects have; and *(c)* what technique appears most promising for deriving distributional weights.

The relevant distributions

Peruvian policy-makers have manifested their concern for both the size distribution of income and the regional distribution of income. Indeed, size distributional equity has been a cornerstone of the economic policy of the current administration, and it has been cited as an important consideration in the adoption of a good many measures of public policy. Thus, for example, agrarian reform has been justified in part as an income distribution measure, as has the creation of different types of enterprises, the extension of profit sharing, and the takeover by the State of a number of private enterprises. Regional distribution has also been given considerable emphasis. The Industrial Law specifies differential tax rates and differential access to credit and to government support, according to the location of the enterprise. Furthermore, formal regionalization of the country has been undertaken in order to provide a more even geographical spread of the development, and, preceding that, the economic development plan was regionalized and regional offices were established for the national planning system.

Concern with the size distribution and with the geographical distribution of income overlaps to a large extent, since one of the main reasons for concern with the geographical distribution arises from the fact that *per capita* income is much lower outside the capital. Thus, fundamentally both distributional concerns respond to the desire to increase equity in the distribution of the benefits from economic activity. Therefore adjustments should be made only for one kind of distribution and not for both, since otherwise double counting will ensue.

From a strictly analytical point of view, an adjustment on distributional grounds is appropriate whenever the marginal utility of income differs between individuals. Such is indeed the foundation of the theory of taxation, in which the progressivity of the income tax is justified precisely by the lower marginal utility of income as income rises. Whereas such reasoning leads to the conclusion that the optimal distribution of income is a uniform one, differences in the savings rate at different levels of income preclude such a result in Peru. Rather, the optimal income distribution will be one in which incomes are unequal, although not as unequal as at present. Indeed, one could conceive of a weighting system that would transform the private marginal utility of income into its contribution to economic welfare, with its coefficient being related to the savings rate. The optimal income distribution will then be one in which the marginal contribution of each individual's income to the

economic welfare of the whole will be equal, and this will occur when the private marginal utility of income as transformed by its contribution to social welfare will be equal among all individuals.

Distribution impact of projects

Investment projects have two major kinds of impact in Peru: direct impact and macro-activation impact. The direct impact is the result of the direct addition to the availability of goods and services provided by the project, and of the generation of factor incomes in the project. The macro-activation impact results from the macro-effect of the greater availability of foreign exchange and, while an integral part of the project benefits it nonetheless occurs externally to the project.

One sol's worth of macro-activation impact has a given distributional composition, no matter what project causes the macro-activation to take place. Hence, it is possible to develop a single adjustment parameter to incorporate distributional considerations arising from such activation. Inndeed, macro-activation could be disregarded altogether were it not for the fact that the mix between direct impact and macro-activation impact varies across projects.

A third kind of distributional impact is not usually present in Peru, namely that caused by changes in prices. Indeed except in projects that are intensive in non-traded goods and of a large size compared with their local markets, prices change little or not at all as a consequence of the execution of a project. Where price changes are important there will be major redistribution effects outside the project itself, since the price change caused by the project is perceived as a modification in the terms of trade of pre-existing buyers and sellers who become richer or poorer as a result of the project impact. It should be noted that in markets in which price elasticities are low, even a medium-sized project can have a major redistributional impact that is far greater than the combined total of the direct and macro-activation effects.

The derivation of weights

The choice is between two alternative methods: revealed preference and postulation of the welfare function. The former of these requires a fairly high level of consistency in decision making and consistency in the preferences revealed. It is not well suited to a situation in which emphases change fairly rapidly and in which the welfare function of the administration is in flux. Since this is currently the situation at the beginning of the "second stage" of the Peruvian revolution, the revealed preference approach would not seem to be appropriate.

Postulating a welfare function offers one of two options. One can either assume that private and marginal utilities are equal, which implies that the optimal income distribution would be uniform, or one can attempt to construct a weighting system related to the contributions to savings occurring at different income levels. If the first alternative is chosen, money income levels can be standardized into a utility numerator by using the elasticity of the marginal utility of income derived to calculate the social time preference. It would seem that under Peruvian conditions this would be a fruitful first approximation.

VI. Summing up

This section contains a brief summary of the principal characteristics that a benefit-cost methodology applicable to Peru should incorporate.

The first characteristic which stands out quite clearly is that project evaluation in Peru takes place in a second-best context. The country's macro-policies are clearly not Pareto-optimal;[37] on the other hand, their improvement does not lie within the jurisdiction of the project analysts. Thus, minimum wage laws and other labour legislation, active and passive interest rate regulation, exchange rates and trade regime etc. are all to be taken as given at each moment in time, even if they change (exogenously) over time.

As a consequence, the margin from which change (i.e. consequences of an investment project) is measured is one that is characterized by numerous and lasting departures from competitive markets and Pareto-optimality.

The second major characteristic is that markets adjust more often by quantity movements than by price movements. In some cases (e.g. labour and savings) the explicit mechanism is rationing; in others (e.g. foreign exchange) induced shifts of the demand curve (i.e. reflation and deflation) play an overwhelming role.

The third characteristic is that the distortions in different markets interact strongly and thus it becomes impossible to segment the interdependent system and deal with each distortion separately from the other.

The fourth characteristic is the likely stability of the system over time. Changes are evidently to be expected and require the development of time profiles of shadow prices; however, fundamental changes in the characteristics of the system seem unlikely at this time.

The fifth characteristic is that the investment allocation mechanism is not based on the direct assignment of real resources (savings). Rather it is based on the granting of permission to spend financial resources on investment projects, both in the private and public sectors.

Some of these characteristics of a system appropriate to Peru are shared by other countries; however in many of the details Peru is *sui generis* (labour legislation is an obvious example). Transferability of the Peruvian experience therefore may exist with regard to some but not to all of the constituent modules of a modular country-specific project evaluation system. In other words, while it is essential to recognize that no two countries are exactly alike, it is also true that they may be very similar in some respects but not in others. Thus some of the building blocks (modules) of the country-specific project evaluation system of Peru would be usable in another country's system. The extent to which this would occur depends on the degree of similarity of the major characteristics of the two economies.

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[37] The term Pareto-optimal (the optimum described by V. Pareto) is defined in D. M. Winch, *Analytical Welfare Economics* (Harmondsworth, Penguin, 1971), p. 77, as follows: "There are three aspects of optimum performance of an economic system, associated respectively with the three basic functions: the transformation (or production) function, the utility (or consumption) function and the welfare (or distribution) function. The unique optimum economic situation requires perfect performance in all three respects, but the term 'Paretian Optimum' has come to mean the simultaneous fulfilment of the first two regardless of the third. There are accordingly an infinite number of Paretian optima, any one of which is commonly called *an* optimum, while *the* optimum is sometimes distinguished by calling it the *optimum optimorum* (the best of the best)."

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Books

INDIA'S INDUSTRIALIZATION AND TRADE POLICIES: A NOTE ON THE OECD AND NBER STUDIES

India: Planning for Industrialization
by J. N. Bhagwati and P. Desai
London, Oxford University Press, 1970

Foreign Trade Regimes and Economic Development: India
by J. N. Bhagwati and T. N. Srinivasan
New York, Columbia University Press, 1975

Two very important series of country studies of economic development, Industry and Trade in Some Developing Countries, sponsored by the Organization for Economic Co-operation and Development (OECD), and Foreign Trade Regimes and Economic Development, sponsored by the National Bureau of Economic Research (NBER), were published in the early and mid 1970s respectively.[1] The first title given above is that of a study in the OECD series and the second, of one in the NBER series. These two studies are examined here for the purpose of showing changes in Indian industrialization and trade policies in the late 1960s[2] and the difference in approach taken in the two studies.[3]

The general approach of Bhagwati and Desai is to describe the inconsistencies and complexities of the various components of Indian economic policy as of the mid 1960s, in particular, planning through target-setting, industrial investment licensing and quantitative controls on trade, and to provide empirical data on the costs, mainly in terms of static efficiency, of the industrial and trade structure resulting from such policies. The authors consider that Indian planning was negligent and inefficient and they provide a wealth of evidence to support this assessment.

For example, in import licensing allocations of foreign exchange were made to various industries on the basis of at least four criteria (industry grouping, product, size and eligibility for special schemes). In most cases, different administrative agencies were involved. There were three authorities who issued licences; the Chief Controller of Imports and Exports, which issued the bulk of them, divided licences into eight categories some of which, in turn, were broken down into subcategories. The licences were issued according to two major criteria: *(a)* essentiality, and

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[1] The OECD series comprises studies on six countries as well as a synthesis volume by I. Little, T. Scitovsky and M. Scott, *Industry and Trade in Some Developing Countries: A Comparative Study* (London, Oxford University Press, 1970). The NBER series comprises studies on nine countries as well as synthesis volumes by J. N. Bhagwati, *Anatomy and Consequences of Exchange Control Regimes* (Cambridge, Mass., Ballinger, 1978) and by A. O. Krueger, *Liberalization Attempts and Consequences* (Cambridge, Mass., Ballinger, 1978).

[2] For analyses of more recent changes in Indian economic policy see for example various articles in *Economic and Political Weekly* and the article by Joshi elsewhere in this issue of *Industry and Development*.

[3] Bhagwati having co-authored both books provides of course consistency at the country study level. The OECD series has been reviewed by W. Malenbaum, "Modern development activities in poor lands", *Economic Development and Cultural Change*, vol. 21 (October 1972). A review of the NBER series is forthcoming in the *Economic Journal*.

(b) indigenous non-availability. Imports could only be cleared if they had been certified essential and some agency had already cleared then from the viewpoint of indigenous availability. Thus, in addition to the licence-issuing authority, there was a sponsoring agency certifying essentiality and a clearing agency for indigenous clearance.

Bhagwati and Desai go on to show that:

> "The import regime had the following adverse economic effects: (1) delays; (2) administrative and other expenses; (3) inflexibility; (4) lack of co-ordination among different agencies; (5) absence of competition; (6) bias towards creation of capacity despite under-utilization; (7) inherent bias in favour, *ceteris paribus*, of industries with imported, as distinct from domestically produced inputs; (8) anticipatory and automatic protection afforded to industries regardless of costs; (9) discrimination against exports; and (10) loss of revenue."[4]

In terms of one quantitative (but partial and imperfect) indicator of economic costs, the effective rate of protection (a measure of the difference in domestic value added with and without import restrictions), the cost of Indian import policy was shown to be both very high on average and to vary considerably from industry to industry.

In their preface, Bhagwati and Srinivasan state that their work may, in some ways, be regarded as a sequel to that of Bhagwati and Desai. It may indeed. The NBER series attempts to provide an analysis of *(a)* exchange control; *(b)* trade liberalization; and *(c)* growth relationships. Since for India, the analysis of exchange control had already been documented by Bhagwati and Desai, that presented by Bhagwati and Srinivasan is mainly a summary and updating of the earlier work. However, Bhagwati and Srinivasan examine at great length the liberalization episode initiated by the June 1966 devaluation and analyse several issues relating to growth i.e. the impact on savings, innovation and inducement to invest, which are considered to be important in reaching an overall judgement on the desirability of the economic policy framework.

The June 1966 devaluation of the rupee by 57.5 per cent, from Rs 4.76 to Rs 7.50 to the United States dollar, was part of a policy package that also included reduction of incentives for non-traditional exports, imposition of duties on some traditional exports and reduction of high import duties and more liberal import licensing. The package also included an increase in foreign exchange provided by the Consortium of Western aid-donors headed by the World Bank. Taking the whole package into account, the net devaluation on the trade account is estimated by Bhagwati and Srinivasan to be 21.6 per cent for exports and 42.3 per cent for imports and on the current account (including invisibles) 22.3 per cent for receipts and 44.8 per cent for payments.

Bhagwati and Srinivasan show that the June 1966 devaluation was a failure mainly for political and economic reasons exogenous to the package itself. At the economic level they conclude that:

> "Price rises were caused by the drought; the recession in production was also induced by the drought . . . ; and the investment decline was largely the result of complex factors interacting on the Indian economic scene."[5]

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[4] J. N. Bhagwati and P. Desai, *India: Planning for Industrialization* (London, Oxford University Press, 1970), p. 312.

[5] J. N. Bhagwati and T. N. Srinivasan, *Foreign Trade Regimes and Economic Development* (New York, Columbia University Press, 1975), p. 97.

At the political level much resentment arose from the widespread view that the Government had been pushed into devaluation by the World Bank Consortium. Mrs. Gandhi's Government was still new and relatively weak, and was in a pre-election year. Furthermore, the effects of the changes in trade restrictions accompanying devaluation were little understood, and the Government had failed to build political support for the devaluation.

The liberalization period was therefore short-lived. The experience of the 1966 devaluation provides several lessons for other countries (such as, as of 1978, Portugal): proper timing is essential; devaluation works better after a good harvest than it does after a bad one; internal political support is necessary; devaluation should not be seen as forced by organizations such as the World Bank or the International Monetary Fund.

In their analysis of growth effects of Indian trade and industrial policy, Bhagwati and Srinivasan attempt first to measure domestic resource cost of earning or saving foreign exchange (although their estimates are really of effective protection) and degree of capacity under-utilization. As in Bhagwati and Desai they conclude that policies led to "wasteful misallocation of investable resources among alternative industries and also accentuated the under-utilization of investments within these industries."[6] The authors support this use of one version of the Eckaus-Parikh planning model for India, although, owing to the nature of the model,[7] such support must be considered weak. Regression analysis is used to assess the impact of trade policy on savings and foreign investment, but the results are inconclusive, as is their analysis of the effect of such policies on domestic investment and innovation. Overall then, Bhagwati and Srinivasan do not contribute much to understanding growth effects. Perhaps this may be taken as the subject of a future study.

To conclude, the Bhagwati and Srinivasan study adds substantially to the Bhagwati and Desai study through analysis of trade liberalization, i.e. the 1966 devaluation, and growth relationships, although the Bhagwati and Srinivasan book is only partly successful regarding the latter. The analysis of changes in Indian economic policy in the mid and late 1960s should provide useful lessons for Indian and other policy makers.

J. CODY

BOOK REVIEWS

The Industrialization of Egypt, 1939-1973, Policy and Performance
by Robert Mabro and Samir Radwan
Oxford, Clarendon Press, 1976, 278 pages

This book, a comprehensive study of Egypt's industrial development, provides an analysis of recent output growth and structural change, productivity and export and import performance, set against the background of industrialization going back to

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[6] *Ibid.*, p. 191.

[7] R. Eckaus and K. Parikh, *Planning for Growth* (Cambridge, Mass., Massachusetts Institute of Technology Press, 1968).

the 1820s. Several topics are raised in the work. One is that successful industrialization requires the satisfaction of certain pre-conditions, an idea that runs counter to many grandiose plans for industrialization now being carried out in several developing countries.

A country study can provide only partial answers as to what these pre-conditions are and to what degree they must be satisfied. Mabro and Radwan find that these pre-conditions involve the level of resources (natural and human), their efficient utilization, the concentration of agricultural production as a consequence of development in the colonial period and pressures external to the Egyptian economy. The authors argue that the same pre-conditions must be satisfied regardless of the economic system adopted. The statistics and analytical techniques marshalled by the authors are convincing—in so far as a case study can be used to substantiate a hypothesis.

A second topic, which develops from the first, is that the policy framework, though important, is only one of several elements influencing industrial performance. Policies are no more than tools that must be fashioned to the hands that use them. The sharp distinctions drawn by economic theory between best and second-best policies become secondary issues in a real-world economy. Thus, for example, Egypt's experiments with private enterprise and public ownership receive mixed evaluations depending on the environment and the economic conditions prevailing at the time. The industries that emerged under the free-enterprise system prior to 1930 were efficient but offered limited growth prospects, and had weak linkages with the rest of the economy. Although industry is essential for long-term development, it is often slow to impart its benefits because of the adverse conditions under which it occurs. Investment in human capital, research on domestic raw materials for imaginative processing and vocational training are necessary to increase industry's contribution to economic progress. Despite short-term successes, the economic system failed to equip Egypt for the tasks of long-run development.

Subsequent decades saw the transition from private enterprise to an expanded role for publice ownership of industry. During the 1950s and early 1960s the transition was accompanied by high rates of output growth, structural change and export diversification. However, new economic and external forces brought severe balance-of-payments difficulties, and industry, more than other sectors, suffered owing to its crucial reliance on foreign exchange. These conditions forced the imposition of import controls and restrictions particularly damaging to an industrial sector that was still dependent on imports.

A third topic concerns the now familiar argument that the development priorities attached to industry are misguided and result in the neglect of the agricultural sector. In the authors' opinion, the issue is not merely "if industry, not agriculture". The failure of many countries to succeed in developing their agricultural sectors cannot be attributed simply to the diversion of investment funds to industry because the same basic set of pre-conditions or constraints affects the performance of both sectors. Allocative policies, project appraisal etc. are necessary but are not sufficient without an attack on the structural problems that account for the failure to meet appraisal criteria or for the failure of projects to yield their expected returns.

In conclusion, both students of the Egyptian economy and readers with an interest in industrial development should find the book useful. The first group will

find well-substantiated opinions, focused on industrial policy and the appropriateness of the political system at various stages in Egypt's history. The second group should find some interpretations of industrial performance relevant to the history of other developing countries which will be helpful in understanding that sector's role in the development of other countries.

R. H. BALLANCE

RECENT UNITED NATIONS PUBLICATIONS PREPARED BY THE INTERNATIONAL CENTRE FOR INDUSTRIAL STUDIES, UNIDO

Industrial Priorities in Developing Countries: The Selection Process in Brazil, India, Mexico, Republic of Korea and Turkey
Sales No. 78.II.B.12. Price: $US 7.00

To achieve their national industrial goals the developing countries need to consider carefully to allocate resources within the industrial sector, that is, how to select industrial priorities. This study examines and assesses the process of selecting industrial priorities in practice, rather than in theory, in the hope that improved empirical knowledge of the selection process will aid decision makers and lead to more realistic theoretical analysis. Considerable emphasis is placed on the institutional background of decision makers, their aims and the nature of constraints that influence decisions and choice of policy instruments. Unlike most development studies it is the process of selecting industrial priorities rather than the outcome that is the main concern. The selection process is examined in Brazil, India, Mexico, Republic of Korea and Turkey, all of which have fairly advanced industrial sectors. These countries encompass a wide spectrum of industrial development experience, the analysis of which should be of general interest to economists, administrators and others concerned with the industrialization of the developing countries.

Guide to Practical Project Appraisal: Social Benefit-Cost Analysis in Developing Countries
Sales No. 78.II.B.3. Price: $US 6.00

This book, written by John R. Hansen, is a working guide based primarily on the UNIDO *Guidelines for Project Evaluation* (United Nations publication, Sales No. E.72.II.B.11. Price: $US 10.00). It provides a succinct introduction to a difficult subject and this makes the Guidelines accessible to a wider number of readers, including the practitioner with little or no formal training in economics who is interested in deriving an adequate measure of the net economic and social benefits of a particular industrial project, the analyst with some formal training in economics who would like to do more detailed socio-economic analysis and the economist who would like a relatively brief introduction to the UNIDO approach to industrial project evaluation. The analysis is divided into five stages: *(a)* calculation of financial profitability at market prices; *(b)* shadow pricing of inputs and outputs in terms of

economic efficiency to obtain net economic benefit; *(c)* adjustment for the project's impact on savings and investment; *(d)* adjustment for the project's impact on income distribution; and *(e)* adjustment for the project's production or use of goods whose social "merit" values are greater or less than their economic values. Each of these stages is based on modifications of integrated standard tables which, combined with graphic analysis, lead in logical steps from standard financial analysis to a complete economic evaluation of a project and its quantifiable social impacts.

Manual for the Preparation of Industrial Feasibility Studies
Sales No. 78.II.B.5. Price: $US 9.00

This publication should assist industrial development banks, consulting firms and expert teams in drawing up industrial project studies according to a clearly arranged step-by-step approach. The Manual contains chapters on project summary, project background and history, market and plant capacity, material and inputs, location and site, project engineering, plant organization and overhead costs, manpower, implementation scheduling and financial and economic evaluation. The concept of the Manual is based on cash flow analysis and the calculation of the internal rate of return. Accordingly, all chapters are designed in line with the data requirements of cash flow tables and the supporting sub-tables. This arrangement makes it easier for the project planner to identify origin and flow of project data. A project case study illustrates the concept of the Manual.

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