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THE IMPACT OF INCOME REDISTRIBUTION ON THE COMPOSITION OF OUTPUT DEMAND

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This study employed the 1979 Input-Output Table, the 1975 Family Income and Expenditures Survey, and the National Income Accounts of 1979 to study the effect of income redistribution on the composition of output demand. It was hoped that a significant amount of redistribution from the rich to the poor could make the whole economy less import-dependent and more labor-intensive. The results, however, did not come up to expectations. The positive effects on exports, labor-intensiveness and balance of trade were miniscule, if any.

To explain the study's results the authors have put forward the following reasons, namely: 1) the static nature of the input-output framework that precludes dynamic and structural changes on backward and forward linkages in the economy; 2) the offsetting effects of a rise in the demand for industrial import-dependent goods as low income groups rise up in stature; and 3) the assumption that investment demands are not affected by income redistribution and changes in output demand.

Introduction

The failure of the export-led industrialization scheme implemented by the previous regime culminated in the near-economic collapse and recession that has lasted up to this day. There has been much work explaining the poor performance of the strategy. The reasons concentrate on: a) the protectionist policies that the previous government continued to implement, b) cronyism and corruption in government that led to misuse of funds, luxury spending and hidden wealth, and c) a weak external market that made growth of Philippine exports difficult, as well as deteriorating terms of trade wherein relative prices of oil and industrial inputs increased while prices of our top agricultural exports — particularly coconut and sugar — fell.

This paper provides an initial attempt to determine the effect of income distribution on the export and import character of our economy, as well as on the degree of labor-intensiveness of our output. The initial hypothesis is that a lopsided income distribution will contribute to a high demand for import-dependent products

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(whether dependent on imported inputs or final consumer imports) and a low domestic market for products with export potential (and high labor-intensiveness). An export-led strategy will find it more difficult to succeed since it has to contend with this internal pressure of perennial trade deficits.

The approach of this project will be to analyze the input-output production structure and the consumption patterns of various income groups (as revealed in household surveys). After shopping around for the best sources of data, we decided to rely on the 1979 input-output table and the 1975 Family Income and Expenditures Survey. We were hoping to use the 1985 NCSO Household Survey as well as the new 1983 Input-Output table. The latter, however, has not yet been released, and we found the 1975 FIES to correspond better with the 1979 I-O table than the 1985 NCSO Survey.

The 1975 FIES is said to be plagued with serious problems of under-reporting. We therefore decided to use only the ratios in the survey and assume that the amount of under-reporting is proportional across all income classes.

This study encountered some problems arising from the fact that, in the framework of the input-output analysis, it would be difficult to capture the dynamic effects of income redistribution. Some of these problems are:

1. Our procedure uses a partial analysis and is not a general equilibrium one. It therefore does not take into consideration price and supply responses. The strictly demand-determined system is similar to the "excess capacity", "fixed-price" Keynesian system.
2. The model cannot capture the changes in investment patterns due to the changes in demand. The model assumes investments to be the same exogenous values as those incurred in 1979. This of course would not be the case if the structure of demand has been changed due to redistribution.
3. Finally, the input-output analysis is necessarily static in nature. The process of forward and backward linkages caused by a stronger domestic market cannot be captured in the analysis.

Data Source and Methodology

The following is a listing of the data we used in this study and how, through certain assumptions, we manipulated them for our needs.

1. 1975 Family Income and Expenditure Data

A. Income

The 1975 FIES classifies private households into 17 income groups as shown in Table 1. Since we do not put much weight on the income figures, we only present the ratios y_j and f_j. Y_j is the percentage of total income that accrues to group j. f_j is the percentage of total families that belong to group j. We shall assume that this distribution holds for both 1975 and 1979.

Table 1 – Percentage Distribution of Income

Income group	(Y_j) % distribution of Income	(f_j) % distribution of Families
1	0.00312	.00933
2	0.00739	.01880
3	0.01876	.04184
4	0.03347	.06633
5	0.04878	.08965
6	0.05694	.09504
7	0.12243	.17391
8	0.10363	.13076
9	0.08869	.09344
10	0.12152	.10933
11	0.08145	.06006
12	0.10407	.05904
13	0.05653	.02405
14	0.04550	.01443
15	0.02316	.00554
16	0.01567	.00292
17	0.06890	.00554
Total	1	1

B. Savings

The 1975 survey also calculates the savings of the various income groups. What is shown in Table 2 is the per cent of total savings that is supposed to have come from a particular income group j. Call this s_j. The assumption here is that the percentage contribution of each income group to total savings is constant and follows the ratio obtained in the 1975 survey.

Table 2 — Per Cent Distribution of Savings

Income Group	(s_j) % distribution of Savings
1	0
2	0.00006
3	0.00053
4	0.00160
5	0.00530
6	0.00880
7	0.02738
8	0.03911
9	0.04288
10	0.07912
11	0.07977
12	0.13363
13	0.09196
14	0.09994
15	0.07771
16	0.06031
17	0.25191
total	1

C. Expenditures Categorized into Consumption Groups

Table 3 shows the percentage share of expenditure of a particular income group j on consumption good i. That is,

$$C_{ij} = C_{ij}/C_j$$

where:

C_{ij} : expenditure of income group j on consumption good i.

C_j : total consumption expenditure of income group j.

Again the assumption here is that each income group will follow the same consumption behavior as expressed in the C_{ij} ratios.

Table 3 reveals that lower income groups spend a higher share of their total consumption expenditures on cereals, fish, roots, miscellaneous food, tobacco and fuel. Higher income groups spend a higher proportion for housing, transport, recreation, education, personal and miscellaneous goods. There are some goods, such as clothing, that caters more to the middle income groups.

Table 3 — Consumption Goods by Income Groups
(in per cent)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
cereals	0.278	0.302	0.248	0.238	0.236	0.236	0.219	0.214	0.2	0.187	0.171	0.146	0.132	0.109	0.122	0.087	0.046
fish	0.103	0.09	0.107	0.1	0.1	0.1	0.099	0.097	0.088	0.089	0.08	0.07	0.067	0.058	0.056	0.04	0.026
meat & eggs	0.049	0.054	0.064	0.053	0.059	0.06	0.063	0.068	0.07	0.076	0.078	0.079	0.079	0.084	0.076	0.069	0.049
milk	0.008	0.013	0.012	0.015	0.017	0.017	0.02	0.02	0.02	0.023	0.026	0.022	0.023	0.025	0.025	0.023	0.015
roots	0.103	0.104	0.102	0.1	0.093	0.087	0.079	0.073	0.07	0.063	0.058	0.049	0.045	0.04	0.04	0.032	0.02
miscellaneous	0.065	0.064	0.062	0.06	0.068	0.063	0.061	0.059	0.059	0.058	0.052	0.05	0.044	0.04	0.041	0.03	0.019
food outside	0.014	0.005	0.006	0.009	0.007	0.006	0.006	0.006	0.007	0.012	0.018	0.012	0.012	0.015	0.017	0.016	0.095
beverages	0.017	0.015	0.017	0.017	0.017	0.015	0.018	0.019	0.018	0.019	0.016	0.014	0.016	0.015	0.02	0.012	0.011
tobacco	0.033	0.026	0.026	0.027	0.03	0.028	0.027	0.026	0.026	0.026	0.024	0.02	0.019	0.019	0.019	0.011	0.008
housing	0.085	0.072	0.083	0.071	0.079	0.079	0.081	0.089	0.096	0.094	0.102	0.112	0.126	0.126	0.12	0.178	0.154
fuel	0.061	0.053	0.052	0.059	0.051	0.052	0.051	0.056	0.046	0.043	0.046	0.044	0.039	0.047	0.042	0.035	0.032
HH furnishing	0.012	0.014	0.018	0.015	0.019	0.015	0.019	0.018	0.019	0.025	0.023	0.029	0.034	0.033	0.033	0.035	0.016
HH operations	0.026	0.023	0.021	0.023	0.021	0.02	0.021	0.021	0.02	0.021	0.021	0.023	0.021	0.025	0.03	0.032	0.03
clothing	0.056	0.059	0.069	0.081	0.077	0.081	0.086	0.078	0.077	0.08	0.088	0.083	0.071	0.076	0.073	0.068	0.06
personal care	0.019	0.015	0.018	0.019	0.018	0.018	0.019	0.02	0.018	0.02	0.02	0.021	0.02	0.018	0.017	0.016	0.014
medical care	0.008	0.013	0.015	0.017	0.014	0.017	0.017	0.018	0.018	0.019	0.017	0.02	0.023	0.023	0.017	0.021	0.014
transport	0.015	0.021	0.021	0.023	0.024	0.026	0.034	0.027	0.034	0.033	0.04	0.052	0.074	0.06	0.072	0.075	0.084
recreation	0.005	0.009	0.011	0.008	0.011	0.009	0.012	0.013	0.021	0.016	0.018	0.026	0.025	0.031	0.035	0.024	0.019
education	0.011	0.016	0.016	0.021	0.022	0.024	0.028	0.031	0.039	0.042	0.053	0.056	0.051	0.062	0.053	0.066	0.037
personal effects	0.005	0.003	0.005	0.007	0.006	0.009	0.007	0.007	0.008	0.009	0.007	0.012	0.017	0.016	0.014	0.016	0.016
misc goods & serv	0.027	0.029	0.027	0.037	0.031	0.038	0.033	0.04	0.046	0.045	0.042	0.06	0.062	0.078	0.078	0.114	0.235
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

2. *National Income Accounts, 1979*

The following are data from the National Income Accounts of 1979, deflated to 1975 prices since we are using the 1975 FIES.

A. Y — National Income

It is assumed that national income can be reallocated into the 17 income groups. A strong assumption here is that corporate income, not just personal income, can be allocated to the 17 income groups. It is assumed that corporate income would accrue more to the higher income groups and personal income to lower income groups in such a way that total national income is allocated as in the 1975 FIES survey. The rationale for including corporate income in the analysis is that it is a significant portion of income that can be reallocated to the lower income groups. The allocation is done using the rates (Y_j) as explained in the previous section. Thus

$Y_j = Y_j Y$ where Y_j = total income accruing to income group j.

B. S — National Savings

National savings taken from the National Income Accounts is allocated to the 17 income groups using the rates s_j derived from the previous section. We therefore assume that the savings from the national income for the 17 income groups follow the same proportion as in the 1975 FIES. Thus,

$$S_j = S_j S$$

where S_j = savings accruing from income group j. The savings rate $(1 - C_j)$ for each income group j is calculated as:

$$(1 - C_j) = S_j / Y_j$$

From this, expenditure of each income group can be derived:

$$C_j = C_j Y_j$$

From the derivation of $C_j = C_j Y_j$, we can now compute the consumption of each income group j of consumption

good *i*. That is:

$$C_{ij} = C_{ij}C_j$$

where C_{ij}'s are those shown in Table 3.

Table 4 summarizes the expenditure, savings and income data allocated to the 17 income groups for 1979 assuming the rates based on the 1975 FIES.

3. Input-Output Table

Table 5a gives us the input-output table for 1979, while Table 5b gives the input-output coefficients.

4. Transformation Matrix

The input-output table provides information on intersectoral linkages among various industries. Note that the industries in the input-output table differ substantially from the consumption goods categories presented in the last section. In order for these to be compatible, a transformation matrix had to be derived that would translate the 21 consumption goods into the 18 input-output production sectors. The transformation matrix was based on Cielito Habito's (1984) dissertation. It must be pointed out that a lot of "subjective adjustments" and "ad-hoc" assumptions were done in order to come up with this matrix. [See Dr. Habito's dissertation (1984, p. 53) for more details concerning this matrix.] We made some minor modifications on the matrix to reduce the errors (mainly we assumed education consumption to use more of transportation and less of paper in our matrix). Let us call this transformation matrix T, which is an 18 x 21 matrix. Table 6 reproduces the transformation matrix that we used.

The Base Run

We now have the tools to come up with a base-run solution. Let us summarize the steps of the procedure followed:

1. The national income Y is deflated into 1975 prices.

2. Y_j is derived for each income group j using the Y_j ratios we got from the 1975 FIES.

3. a) The savings of each group can then be calculated with $S_j = (1 - C_j)Y_j$.

**Table 4 — Consumption, Income and Savings, 1979
By Income Group and by Consumption Goods
in 1975 Prices**

	1	2	3	4	5	6	7	8	
ıditures		936326	2118376	3765691	5443847	9315539	13451536	11145257	939644
s	98095	252570	524861	896234	1284701	1490467	2945886	2385085	1879316
	38345	75269	226452	376569	544365	631554	1331702	1081090	826896
& eggs	17290	45162	135448	199582	321175	378932	847447	757877	657715
	2923	10872	25397	56485	92542	107364	269031	222905	187916
	36345	86978	215870	376569	506259	549452	1062671	813604	657715
llaneous	22936	53525	131215	225941	370168	397879	820544	657570	554116
outside	4940	4182	12698	33891	38106	37893	80709	66872	65715
ages	5999	12545	35978	84017	92542	94733	242128	211760	169116
co	11844	21744	55026	101874	163309	176835	363191	289777	244116
ng	29993	60215	175659	267364	430048	498928	1089574	991928	902160
	21524	44325	110052	222176	277626	328408	686028	624134	431116
ırnishing	4234	11709	38095	56485	103429	94733	255579	200615	178116
perations	9174	19236	44444	86611	114317	126311	282482	234050	187916
ing	19760	49343	146030	305021	419161	511559	1156832	869330	723116
ınal care	6704	12545	38095	71548	97986	113680	255579	222905	169116
cal care	2823	10872	31746	64017	76211	107364	228676	200615	169116
port	5293	17563	44444	86611	130648	164204	457352	300922	312916
ation	1764	7527	23280	30126	59880	56840	161418	144888	197116
ation	3881	13381	33862	79080	119760	151573	376643	345503	360916
ınal effe	1764	2509	10582	26360	32662	56840	94161	78017	73116
goods	9527	24253	57142	139331	168753	239990	443901	445810	432116
)ME	352860	837164	2124394	3789765	5523551	6448319	13864499	11735149	10044116
INGS	0	838	8018	24074	29903	132780	412963	589892	644116
ıgs rate	0.00%	0.10%	0.38%	0.64%	1.45%	2.06%	2.98%	5.03%	6.41%

10	11	12	13	14	15	16	17	to
12568074	8071695	9769777	5014249	3645083	1450652	864966	4002806	981601
2350230	1371807	1426387	661881	397314	176980	75252	184120	184009
1118559	641688	583884	335955	211415	81237	34599	104068	83416
955174	625645	771812	396126	306187	110250	59683	196128	67816
289066	208548	214935	115328	91127	36266	19894	60039	20105
791789	465224	478719	225641	145803	58026	27679	80052	65784
728948	417097	488489	220627	145803	59477	25949	76050	53966
150817	144380	117237	60171	54676	24661	13839	380248	12910
238793	128338	136777	80228	54676	29013	10380	44029	16510
326770	192506	195396	95271	69257	27562	9515	32021	23758
1181399	818152	1094215	631795	459280	174078	153964	616401	95750
540427	368970	429870	195556	171319	60927	30274	128083	46719
314202	184485	283324	170484	120288	47872	30274	64042	21583
263930	168443	224705	105299	91127	43520	27679	120078	21493
1005446	705856	810891	356012	277026	105898	58818	240156	77606
251361	160422	205165	100285	65611	24661	13839	56036	17600
238793	136359	195396	115238	83837	24661	18164	56036	18655
414746	320844	508028	371054	218705	104447	64872	336219	38654
201089	144380	254014	125356	112998	50773	20759	76050	16684
527859	425118	547108	255727	225995	76885	57088	148096	37540
113113	56148	117237	85242	58321	20309	13839	64042	9063
565563	336886	586187	310883	284316	113151	98606	940612	51971
13761514	9224281	11785480	6401413	5152565	2622743	1774670	7802339	11324392
1193440	1203186	2015703	1387165	1507482	1172091	909704	3799733	1509375
8.67%	13.04%	17.10%	21.67%	29.26%	44.69%	51.26%	48.70%	13.32

b) The consumption of each income group j can also be calculated with $C_j = C_j Y_j$

c) Total Consumption Expenditure and Total Savings can then be calculated:

$$S = \Sigma_j S_j$$
$$C = \Sigma_j C_j$$

4. The consumption of each income group j of consumption good i can now be derived by:

$$C_{ij} = C_{ij} C_j$$

An important assumption here is that each income group j would spend the same percentage of consumption on consumption good i in 1979 as in the 1975 survey.

5. The level of consumption needs for good i can now be translated into the input-output product sectors using the transformation matrix: $(P_{kj}) = T\ (C_{ij})$ where (P_{kj}) is the matrix of production of input-output sectors allocated to the income groups. T is the transformation matrix (here having an 18 x 21 dimension since we have 18 production sectors and 21 consumption sectors.) The allocation of the production sectors' output to the income groups is shown in Table 7; we also include here the total for each production sector which we compare with the actual input-output table results. It must be pointed out that industries that are a bit overestimated are metals and banking while industries that are underestimated are mining and textiles. Table 7 transforms the consumption goods expenditures of the income groups into expenditures on the input-output production sectors. By dividing each column in Table 7 by total expenditures of that income group, we can get the share of expenditure spent for each production sector. This is shown in Table 8. Table 8 is consistent with Table 3 and shows that low income groups spend a higher proportion of their income on agriculture, processed food and electricity, gas and water. Higher income groups spend a higher proportion on most of the other sectors except textiles, petroleum, construction and trade. Textiles seem to comprise more of the expenditures of middle income groups while petroleum, construction and trade seem to have a rather stable percentage for all income groups.

Table 5a — Philippines 18-Sector Input-Output Table, 1979

SECTOR		agric 1	forestry 2	mining 3	proc. food 4	textiles 5	wood etc. 6	paper 7	chem prods 8	petroleum 9	cement 10
agriculture & fish.	1	4,482,785	0	0	29,012,835	1,006,226	269,917	0	4,877,629	0	0
forestry	2	6,949	325,437	22,081	25,180	3,081,205	319,109	0	13,011	0	0
mining	3	4,576	0	0	0	0	5,660	24	165,726	9,191,068	247,697
processed food	4	353,127	0	0	7,839,069	95,303	4,130	63,647	101,557	0	0
textiles	5	52,403	3,499	7,383	234,515	4,685,992	848,158	8,689	8,891	265	4,637
wood, rubber & plastic	6	187,260	13,516	24,590	569,352	128,330	1,612,097	420,864	213,012	27,069	119,770
paper, printing	7	5,678	635	2,724	58,250	311,917	24,239	53,848	66,121	1,067	4,146
chem. prods	8	3,765,405	11,333	157,009	927,651	1,516,735	946,204	102,905	5,806,300	58,042	88,515
petroleum prods	9	879,418	279,330	690,212	1,342,695	845,751	435,705	20,772	838,930	31,208	734,205
cement & non-met. pr.	10	9,518	19,556	0	225,795	2,698	6,699	14	113,933	726	204,867
metals, mach & misc.	11	3,101,535	94,552	390,627	777,010	373,416	218,976	16,195	280,270	16,627	106,273
transp. eqpt	12	22,447	13,186	3,896	59,127	6,459	18,622	782	7,506	1,317	1,578
elect, gas, h_2O	13	124,027	4,050	45,003	330,201	222,966	234,016	25,189	255,503	62,976	101,468
construction	14	20,562	9,554	64,936	36,796	32,645	31,240	8,040	78,528	5,550	16,369
trade	15	1,997,213	116,535	194,096	4,460,235	1,585,352	611,485	103,953	1,836,294	775,117	272,034
banking	16	273,845	11,570	39,838	471,561	344,180	217,802	23,878	693,961	145,054	47,074
transp, stor & comm	17	576,506	63,552	61,938	690,053	352,179	179,991	12,782	382,707	218,887	91,138
services	18	299,642	58,238	147,053	483,430	199,590	112,462	26,996	434,859	342,144	136,169
total int. inputs		16,162,896	1,024,543	1,851,386	47,643,755	14,790,944	6,097,512	888,578	16,174,738	10,877,117	2,175,940
compensation of emp		21,179,640	1,241,183	1,574,207	5,808,710	3,319,329	944,649	243,931	1,961,762	192,220	426,935
depreciation		2,315,198	883,745	549,079	2,624,622	1,025,878	526,664	57,801	1,198,979	185,147	237,264
ind. taxes – sub		1,677,765	407,748	591,067	2,925,417	1,620,568	595,021	77,891	711,941	3,887,882	120,488
other VA		23,765,842	2,329,812	3,193,570	7,966,587	2,403,306	723,572	228,722	3,545,158	1,759,920	746,372
total primary inputs		48,938,445	4,862,488	5,907,923	19,325,336	8,369,081	2,789,906	608,345	7,417,840	6,025,169	1,531,059
TOTAL INPUTS		65,101,341	5,887,031	7,759,309	66,969,091	23,160,025	8,887,418	1,496,923	23,592,578		

SECTOR	metals 11	trsp. eqpt 12	el/gas/ h_2O 13	construc 14	trade 15	banking 16	trsp. st/com 17	services 18	subtotal
agriculture & fish.	777,922	0	0	0	0	0	157,942	877,116	41,462,372
forestry	11,347	0	29,342	316,868	0	0	0	3,565	4,153,912
mining	574,256	403	0	594,575	0	0	108	3,638	10,787,731
processed food	884,062	0	0	0	0	0	217,164	2,176,089	11,734,148
textiles	93,677	5,261	470	2,188,693	23,550	9,199	27,989	145,708	8,348,979
wood, rubber & plastic	196,149	144,262	5,739	469,689	545,902	95,942	519,702	273,654	5,566,899
paper, printing	15,390	3,136	9,585	56,773	142,392	121,256	81,644	117,596	1,076,397
chem. prods	1,041,536	59,686	67,812	997,863	112,691	36,652	76,793	609,430	16,382,562
petroleum prods	901,814	59,903	2,318,071	728,725	799,897	7,071	3,020,868	233,250	14,167,825
cement & non-met. pr.	45,907	3,442	20,742	2,653,884	9,654	992	9,477	23,023	3,350,927
metals, mach & misc.	8,472,540	400,309	72,307	5,294,771	52,045	87,770	194,563	172,003	20,121,789
transp. eqpt	12,163	1,175,052	413	33,305	6,929	1,338	519,699	27,398	1,911,217
elect, gas, h_2O	321,150	22,611	55,093	134,501	894,495	178,175	51,357	385,732	3,649,513
construction	96,937	15,424	7,974	386,717	1,118,025	111,649	152,714	415,948	2,709,608
trade	1,643,847	268,703	277,841	1,277,255	171,237	72,300	1,079,611	385,946	17,129,054
banking	628,143	35,784	19,389	780,260	2,022,273	273,766	304,838	568,63	6,901,586
transp, stor & comm	484,756	105,559	40,227	606,635	718,328	154,371	615,094	390,249	5,744,952
services	347,179	79,523	26,266	978,906	917,843	781,437	393,679	1,316,265	7,081,681
total int. inputs	16,548,775	2,379,058	2,951,271	17,499,238	7,535,261	1,931,918	7,423,242	8,325,253	182,281,422
compensation of emp	2,377,660	1,004,805	531,061	6,357,208	13,097,160	2,369,880	4,429,347	14,954,620	82,014,307
depreciation	1,093,630	251,790	389,827	1,882,437	2,735,170	440,469	2,141,210	924,611	19,463,521
ind. taxes – sub	1,315,757	229,126	279,605	1,227,084	3,234,722	897,288	1,277,091	1,279,492	22,355,953
other VA	2,663,354	858,843	891,186	16,570,138	16,065,791	4,708,924	2,853,962	5,760,848	97,035,910
total primary inputs	7,450,401	2,344,564	2,091,679	26,036,867	35,132,843	8,416,561	10,701,610	22,919,571	220,869,691
TOTAL INPUTS	23,999,176	4,723,622	5,042,950	43,536,105	52,668,104	10,348,479	18,124,852	31,244,824	403,151,113

Table 5a (Continued)

SECTOR		PCE	GCE	GFOF	ch. invty	EXPORTS		IMPORTS		total output
agriculture & fish.	1	21,614,377	227,141	0	1,010,537	2,499,366	25,351,921	(1,712,952)	23,638,969	65,101,341
forestry	2	858,375	3,130	0	31,984	982,974	1,776,465	143,344)	1,733,119	5,887,031
mining	3	108,256	5,107	0	1,389,596	5,102,431	6,605,390	19,633,812)	(3,028,422)	7,759,309
processed food	4	50,622,243	467,325	0	1,994,540	4,022,300	57,106,408	(1,971,465)	55,234,943	66,969,091
textiles	5	10,034,652	184,638	91,325	1,420,068	5,429,241	17,159,924	(1,345,878)	14,811,046	23,160,025
wood, rubber & plastic	6	2,396,356	519,297	188,298	719,743	1,129,819	4,952,507	(1,632,988)	3,320,519	8,887,418
paper, printing	7	383,832	212,496	0	93,105	170,458	359,891	(439,365)	420,526	1,496,923
chem. prods	8	5,292,875	665,567	0	1,415,664	5,672,740	13,046,846	(5,836,830)	7,210,016	23,592,578
petroleum prods.	9	3,590,646	371,726	0	665,780	277,391	4,905,543	(2,171,082)	2,734,461	16,902,286
cement & non met pr.	10	299,191	55,633	0	205,225	196,204	756,253	(400,181)	356,0722	3,706,999
metals, mach & misc.	11	2,515,721	874,869	12,073,666	2,461,928	4,159,630	22,085,814	(18,208,427)	3,877,387	23,999,176
transp. eqpt	12	1,518,334	174,481	5,927,685	47,253	214,750	7,882,602	(5,070,197)	2,812,405	4,723,622
elect, gas, h_2o	13	1,212,355	181,082	0	0	0	1,393,437	0	1,393,437	5,042,950
construction	14	7,329,023	971,329	32,412,495	0	223,590	40,936,437	(109,940)	40,826,497	43,536,105
trade	15	15,052,149	1,086,933	5,477,638	0	3,922,331	25,539,050	0	25,446,623	10,348,479
banking	16	2,195,466	543,997	0	0	788,840	3,528,303	(81,680)	3,446,623	10,348,479
transp, stor &	17	8,645,461	938,752	1,289,409	0	2,882,308	13,755,930	(1,376,030)	12,379,900	18,124,852
services	18	12,186,660	10,794,497	0	0	3,886,676	26,867,833	(2,704,690)	24,163,143	31,244,824
total int. inputs		145,856,465	18,278,000	57,460,516	11,455,522	41,461,049	274,511,552	(53,641,861)	220,869,691	403,151,113
compensation of emp										82014307
depreciation										19463521
ind. taxes - sub										22355953
other VA										97,035,910
total primary inputs										220,869,691
TOTAL INPUTS		145,856,465	18,278,000	57,460,516	11,455,522	41,455,049	274,505,552	153,641,861)	220,862,691	

ble 5b — Technical Coefficients, 1979

	1	2	3	4	5	6	7	8
ulture & fish.	0.05886	0.00000	0.00000	0.43323	0.04345	0.03037	0.00000	0.20674
stry	0.00011	0.05528	0.00285	0.00038	0.13304	0.03591	0.00000	0.00055
ng	0.00007	0.00000	0.00000	0.00000	0.00000	0.00064	0.00002	0.00702
essed food	0.00542	0.00000	0.00000	0.11708	0.00411	0.00046	0.04252	0.00430
iles	0.00080	0.00059	0.00095	0.00350	0.20233	0.09543	0.00580	0.00038
d, rubber, plastic	0.00288	0.00230	0.00317	0.00850	0.00554	0.18139	0.28115	0.00903
r, printing	0.00009	0.00011	0.00035	0.00087	0.01347	0.00273	0.03597	0.00280
n. prods	0.05784	0.00193	0.02023	0.01385	0.06549	0.10647	0.06874	0.24611
oleum prods	0.01351	0.04745	0.08895	0.02005	0.03652	0.04902	0.01388	0.03556
ent & non met pr	0.00015	0.00332	0.00000	0.00337	0.00012	0.00075	0.00001	0.00483
als, mach & misc.	0.04764	0.01606	0.05034	0.01160	0.01612	0.02464	0.01082	0.01188
sp. eqpt	0.00034	0.00224	0.00050	0.00088	0.00028	0.00210	0.00052	0.00032
t, gas, h_20	0.00191	0.00069	0.00580	0.00493	0.00963	0.02644	0.01683	0.01083
struction	0.00032	0.00162	0.00837	0.00204	0.00141	0.00352	0.00537	0.00333
le	0.03068	0.01980	0.02501	0.06660	0.06845	0.06880	0.06944	0.07783
king	0.00421	0.00197	0.00513	0.00704	0.01486	0.02451	0.01595	0.02941
sp, stor & comm	0.00886	0.01080	0.00798	0.01030	0.01521	0.02025	0.00854	0.01622
ices	0.00460	0.00989	0.01895	0.00722	0.00862	0.01265	0.01803	0.1843

able 6 — Consumption Transformation Matrix

	cereals	fish	meat & eggs	milk & dairy	roots & veg	misc food	outside home	beverage	tobacco	housing
culture	0.0275	0.8637	0.3735	0	0.6581	0.0414	0	0	0	0.0442
stry	0	0	0	0	0	0	0	0	0	0.0749
ing	0	0	0	0	0	0	0	0	0	0.0055
c food	0.8695	0.0409	0.5267	0.8968	0.2447	0.8321	0.3202	0.8968	0.8968	0
iles	0	0	0	0	0	0	0	0	0	0
od	0	0	0	0	0	0	0	0	0	0.0419
er	0	0	0	0	0	0	0	0	0	0
micals	0	0	0	0	0	0.0202	0	0	0	0.0148
roleum	0	0	0	0	0	0	0	0	0	0.03
ient	0	0	0	0	0	0	0	0	0	0.0078
tals	0	0	0	0	0	0	0	0	0	0.0238
qpt	0	0	0	0	0	0	0	0	0	0
/w	0	0	0	0	0	0	0	0	0	0
ist	0	0	0	0	0	0	0	0	0	0.3541
de	0.0859	0.0866	0.0862	0.0859	0.0864	0.0891	0.0306	0.0859	0.0859	0.0775
aking	0	0	0	0	0	0	0	0	0	0.079
/c	0.0171	0.0088	0.0136	0.0173	0.0108	0.0172	0.0062	0.0173	0.0173	0.0323
vices	0	0	0	0	0	0	0.643	0	0	0.2142
	1	1	1	1	1	1	1	1	1	1

Table 5b (Continued)

9	10	11	12	13	14	15	16	17	18
0.00000	0.00000	0.03241	0.00000	0.00000	0.00000	0.00000	0.00000	0.00871	0.02807
0.00000	0.00000	0.00047	0.00000	0.00582	0.00727	0.00000	0.00000	0.00000	0.00011
0.54378	0.06682	0.02393	0.00009	0.00000	0.01366	0.00000	0.00000	0.00001	0.00012
0.00000	0.00000	0.03684	0.00000	0.00000	0.00000	0.00000	0.00000	0.01198	0.06985
0.00002	0.00125	0.00390	0.00111	0.00009	0.05027	0.00055	0.00089	0.00154	0.00466
0.00160	0.03231	0.00817	0.03054	0.00114	0.01079	0.01279	0.00927	0.02867	0.00876
0.00006	0.00112	0.00064	0.00066	0.00190	0.00130	0.00334	0.01172	0.00450	0.00376
0.00343	0.02388	0.04340	0.01264	0.01345	0.02292	0.00264	0.00354	0.00424	0.01950
0.00185	0.19806	0.03758	0.01268	0.45967	0.01674	0.01875	0.00068	0.16667	0.00747
0.00004	0.5526	0.00191	0.00073	0.00411	0.06096	0.00023	0.00010	0.00052	0.00074
0.00098	0.02867	0.35303	0.08475	0.01434	0.12162	0.00122	0.00848	0.01073	0.00551
0.00008	0.00043	0.00051	0.24876	0.00008	0.00076	0.00016	0.00013	0.02867	0.00088
0.00373	0.02737	0.01338	0.00479	0.01092	0.00309	0.02096	0.01722	0.00283	0.01875
0.00033	0.00442	0.00404	0.00327	0.00158	0.00888	0.02620	0.01079	0.00843	0.01331
0.04586	0.07338	0.06850	0.05688	0.05509	0.02934	0.00401	0.00699	0.05957	0.01235
0.00858	0.01270	0.02617	0.00758	0.00384	0.01792	0.04740	0.02645	0.01682	0.01820
0.01295	0.02459	0.02020	0.02235	0.00798	0.01393	0.01684	0.01492	0.03394	0.01249
0.02024	0.03673	0.01447	0.01684	0.00521	0.02248	0.02151	0.07551	0.02172	0.04213

Table 6 (Continued)

fuel	HH furn	HH opn	cloth	personal care	medical care	transport	recre	educ	personal effects	misc services
0	0	0	0	0	0	0	0.102	0	0	0.2
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0.0125	0	0	0.2159
0	0.1101	0	0.6236	0	0	0	0	0	0	0
0	0.1558	0	0.0715	0	0	0.0099	0.001	0	0	0
0	0.0009	0.0299	0	0.0078	0	0	0.0602	0.01	0	0
0	0	0.4268	0	0.4782	0.1568	0	0.0088	0	0	0.1617
.31	0	0.1857	0	0	0	0.0965	0	0	0	0
0	0.0839	0	0	0	0	0	0.0034	0	0	0
0	0.41	0	0	0.0099	0	0	0.1825	0.0497	0.0.8157	0.0236
.0	0	0	0	0	0	0.2548	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0
29	0.2069	0.1823	0.1227	0.1349	0.0429	0.1461	0.0695	0.0551	0.17	0.089
0	0	0	0	0	0	0	0	0	0	0.2922
24	0.0139	0.0191	0.005	0.017	0.0055	0.04927	0.0964	0.316	0.0143	0.0132
0	0.0185	0.1562	0.1772	0.3522	0.7948	0	0.4637	0.5692	0	0.0044
1	1	1	1	1	1	1	1	1	1	1

Table 7 — Consumption of Producer Goods By Income Groups, 1979 in 1975 and 1979 (Baserun)

	1	2	3	4	5	6	7	8	9	10
agri	68825	156560	429674	724363	1032817	1181907	2434443	1992834	1613794	2124584
forestry	2246	4510	13157	20026	32211	37370	81609	74295	67564	88487
mining	165	331	966	1471	2365	2744	5993	5456	4961	6498
pfood	145880	159467	820059	1420507	2102196	2391386	4912891	4032628	3292712	4332014
textiles	12789	32060	95259	196430	272776	329436	749540	564202	470847	661590
wood	3383	8057	24200	42700	65457	73923	172875	138099	120704	174650
paper	475	1270	3400	5803	9078	9686	24154	21095	22643	27519
chemicals	10028	21874	56858	112534	169253	179834	384538	339268	283787	395720
petroleum	9787	20814	51928	101337	132802	156076	341947	295742	226783	292009
cement	595	1478	4645	6927	12236	12033	30491	25061	22686	36260
metals	4695	11016	36088	64449	101116	121775	268711	225840	222085	327975
tr eqpt	1349	4475	11324	22068	33289	41839	116533	76675	81403	105677
e/g/w	3760	7744	19226	38814	48501	57373	119849	109036	75512	94413
const	14710	29744	83111	136887	205029	239068	516164	469827	401543	521015
trade	34890	82169	209209	376455	540459	626688	1345618	1109790	924798	1241246
banking	5153	11844	30574	61834	83283	109540	215784	208628	197562	258588
t/s/c	11841	31090	78414	149728	218356	262433	628317	503234	474679	629183
services	22288	51825	148284	283359	402423	482425	1102080	953547	892370	1249748
	352860	836326	2116376	3765691	5443647	6315539	1345136	11145257	9396431	12568074

Table 7 (Continued)

	11	12	13	14	15	16	17	Total in 1975 Prices	Total in 1979 Prices	IO Total	Baserun/10 Ratio
agri	1267321	1444948	716835	498565	192362	102177	447156	16429165	24412142	21644877	1.12941387
forestry	61280	81957	47321	34400	13038	11532	46168	717171	1065647	858375	1.24147021
mining	4600	6018	3475	2526	957	847	3390	52663	78252	108256	0.72284014
pfood	2604819	2856261	1385450	545551	395185	188309	798347	32983662	49010515	50622243	0.96816167
textiles	460484	536866	240779	185997	71308	40012	156812	5077188	7544208	1003452	0.75181561
wood	116813	153252	82287	60070	23409	16036	56381	1332294	1979660	2396350	0.82611459
paper	19397	29337	14188	12407	5362	2783	10144	218741	325028	383832	0.84679680
chemicals	246265	347736	176162	140125	56755	40210	250258	3191203	4741818	5292875	0.89588697
petroleum	201167	256839	134937	104915	42271	25404	112942	2507697	3726194	3590646	1.03775041
cement	22351	33169	19658	14059	5547	3811	10440	261446	388484	299191	1.29844781
metals	197927	327249	198384	147035	56338	36455	137159	2484297	3691424	2515721	1,46734245
tr eqpt	81751	129446	94545	55726	26613	16529	85669	984912	1463483	1518334	0.96387442
e/g/w	64459	75098	34164	29929	10644	5289	22376	816187	1212775	1212355	1.00034644
const	359812	469137	260874	195182	73217	60271	242604	4278194	6356980	7329023	0.86737076
trade	791992	980737	508560	368624	147792	87289	382971	9760187	14502690	15052148	0.96349636
banking	163072	257727	140752	119360	46815	40976	323543	2275036	3380482	2195466	1.53975621
t/s/c	459513	630868	367132	259503	107355	67985	289246	5168876	7680447	8645461	0.88837911
services	898173	1153134	588745	471110	175683	119049	627002	9621244	14296233	12186660	1.17310512
	8021095	9769777	5014249	3645083	1450652	864966	4002606	98160164	145856463	145856465	

Table 8 — Consumption of Producer Goods in per cent (Baserun)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
agri	0.195049	0.187199	0.203023	0.192358	0.189728	0.187142	0.180978	0.178805	0.171745	0.169046	0.157998	0.147899	0.142959	0.136777	0.132603	0.118128	0.111716
forestry	0.006366	0.005392	0.006216	0.005317	0.005917	0.005917	0.006066	0.006666	0.007190	0.007040	0.007639	0.008388	0.009437	0.009437	0.008988	0.013332	0.011534
mining	0.000467	0.000396	0.000456	0.000390	0.000434	0.000434	0.000445	0.000489	0.000528	0.000517	0.000561	0.000616	0.000693	0.000693	0.00066	0.000979	0.000847
p food	0.413421	0.429816	0.387482	0.377223	0.386174	0.378651	0.365229	0.361824	0.350421	0.344684	0.324746	0.292356	0.276302	0.259404	0.272419	0.217706	0.199456
textiles	0.036242	0.038333	0.045010	0.052163	0.050109	0.052163	0.055721	0.050622	0.050109	0.052640	0.057409	0.054951	0.048019	0.051026	0.049156	0.046258	0.039177
wood	0.009588	0.009633	0.011434	0.011339	0.012024	0.011705	0.012851	0.012390	0.012845	0.013896	0.014563	0.015686	0.016410	0.016479	0.016136	0.018539	0.014086
paper	0.001347	0.001519	0.001606	0.001541	0.001667	0.001533	0.001795	0.001892	0.002409	0.002189	0.002418	0.003002	0.002829	0.003403	0.003696	0.003217	0.002534
chemicals	0.028417	0.026154	0.026865	0.029883	0.027417	0.028474	0.028586	0.030440	0.030201	0.031486	0.030702	0.035593	0.035132	0.038442	0.039123	0.046487	0.062523
petroleum	0.027735	0.024887	0.024536	0.026910	0.024395	0.024713	0.025420	0.026535	0.024135	0.023234	0.025079	0.026289	0.026910	0.028782	0.029139	0.029369	0.028217
cement	0.001686	0.001766	0.002195	0.001839	0.002247	0.001905	0.002266	0.002248	0.002414	0.002885	0.002786	0.003395	0.003920	0.003856	0.003823	0.004406	0.002608
metals	0.013306	0.013171	0.017052	0.017114	0.018575	0.019281	0.019976	0.020263	0.023635	0.026095	0.024675	0.033496	0.039564	0.040337	0.038836	0.042146	0.034267
tr eqpt	0.003822	0.005350	0.005350	0.005860	0.006115	0.006624	0.008663	0.006879	0.008663	0.008408	0.010192	0.013249	0.018855	0.015288	0.018345	0.01911	0.021403
e/q/w	0.010656	0.009259	0.009084	0.010307	0.008909	0.009084	0.008909	0.009783	0.008036	0.007512	0.008036	0.007686	0.006813	0.008210	0.007337	0.006114	0.005590
const	0.041688	0.035565	0.039270	0.036351	0.037663	0.037853	0.038372	0.042154	0.042733	0.041455	0.044858	0.048019	0.052026	0.053546	0.050472	0.069679	0.060611
trade	0.098877	0.098250	0.098852	0.099969	0.099282	0.099229	0.100034	0.099575	0.098420	0.098833	0.098738	0.100384	0.101423	0.101129	0.101879	0.100916	0.095680
banking	0.014604	0.014161	0.014446	0.016420	0.015299	0.017344	0.016041	0.018719	0.021025	0.020575	0.020330	0.02638	0.028070	0.032745	0.032271	0.047372	0.080833
t/s/c	0.033555	0.037174	0.037051	0.039761	0.040112	0.041553	0.046709	0.045152	0.050516	0.050062	0.057288	0.064573	0.073217	0.071192	0.074004	0.078599	0.072264
services	0.063164	0.061967	0.070064	0.075247	0.073925	0.076387	0.081929	0.085556	0.094969	0.099438	0.111976	0.118030	0.117414	0.129245	0.121106	0.137634	0.156648
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

6. We can now sum up the rows of the matrix (P_{kj}) in order to set the total personal consumption demand for production sector k. Call this P_k. This now becomes the consumption demand for production sector k. We further assume that exports and imports for each production sector are a fixed percentage of total output. That is, α_k and β_k are fixed parameters measuring the proportion of total output that goes to exports, and imports, respectively. This is a rather strong assumption, but this is the most convenient way for us to retain the export character, and import dependence of each industry. The proportions α_k and β_k are based on the 1979 Input-Output matrix. Let α be the column vector of (α_k) and β the column vector of (β_k). These figures are shown in Table 9. Note that the strong net export industries are forestry, textiles and transport, storage and communications. Agriculture, processed food, cement and nontradeables [electricity, gas, water, construction, trade, banking and services] are the industries that are not very dependent on tradeables. The rest of the industries are quite import-dependent [particularly transport equipment, metals and mining]. Table 9 also shows the share of labor in each industry is a gauge of labor-intensiveness. The sectors that use labor intensively seem to be services, agriculture, trade, transport, storage and communications, banking, transport equipment, forestry, mining, construction and textiles. The sectors that have a low labor share are processed food, chemical products, petroleum products and metals, machineries and miscellaneous manufactures.

Now let M be a diagonal matrix wherein the values in the diagonal are the values of $\alpha - \beta$ or $(\alpha_k - \beta_k)$. Then the input-output solution to total output X_k is given by:

$$X = (I - A - M)^{-1} (P_k + I_k + G_k) = (X_k)$$

where :

- I : identity matrix
- A : input-output coefficient matrix
- M : defined above
- P_k: final personal consumption demand for sector k
- I_k : final investments demand for sector k
- G_k: government expenditure for sector k
- X_k: total output demand for sector k

Table 9

	export-output ratio	import-output ratio	labor-output ratio	net export output ratio
agriculture & fish.	0.03839	−0.02631	0.32533	0.01208
forestry	0.14999	−0.00736	0.21083	0.14262
mining	0.65759	−1.24158	0.20288	−0.58399
processed food	0.06006	−0.02795	0.08674	0.03212
textiles	0.23442	−0.10142	0.14332	0.13300
wood, rubber & plastic	0.12713	−0.18374	0.10629	−0.05662
paper, printing	0.11387	−0.29351	0.16295	−0.17964
chem. prods	0.24045	−0.24740	0.08315	−0.00696
petroleum prods	0.01641	−0.12845	0.01137	−0.11204
cement & non met pr.	0.05293	−0.10795	0.11517	−0.05502
metals, mach & misc.	0.17332	−0.75871	0.09907	−0.58539
transp. eqpt	0.04546	−1.07337	0.21272	−1.02791
elect, gas, h_2O	0.00000	0.00000	0.10531	0.00000
construction	0.00514	−0.00253	0.14602	0.00261
trade	0.09193	0.00000	0.30695	0.09193
banking	0.07623	−0.00789	0.22901	0.06833
transp, stor & comm	0.15903	−0.07592	0.24438	0.08311
services	0.12439	−0.08656	0.47863	0.03783

The results of the base run as compared to the input-output figures are shown in Table 10.

Redistribution of Income

We will now attempt to determine the effects of income redistribution on the demand composition of output. The various new distributions to be simulated are shown in Table 11. All of the distributions are improvements (or have a more equitable distribution) over the base-run distribution.

The first allocation was loosely derived by taxing the richest group by 55 per cent and the next five income groups by 25 per cent. The tax revenues were used to advance the income levels of groups 1 to 3 by two notches and groups 4 to 10 by one notch. The top income groups would decrease their income level by one notch. When we reach group 11, there is a merging of groups that have increased in stature (from group 10) and those that have decreased their income levels (from group 12). We assume that as income groups change their position from one level to another, they will adopt the consumption patterns (as expressed by the C_{ij}'s) of the new income level they are in.

Table 10 – Total Output (Baserun in 1975 Prices)

	input output	baserun results	BR/10
agriculture & fish.	43,812,731	45,093,771	102.92%
forestry	3,961,891	3,676,821	92.80%
mining	5,221,954	5,146,336	98.55%
processed food	45,069,822	43,920,419	97.45%
textiles	15,586,425	12,964,955	83.18%
wood, rubber & plastic	5,981,135	5,591,808	93.49%
paper, printing	1,007,416	945,683	93.87%
chem. prods	15,877,507	15,223,845	95.88%
petroleum prods	11,375,082	11,190,935	98.38%
cement & non met pr.	2,494,792	2,507,305	100.50%
metals, mach & misc.	16,151,207	16,712,266	103.47%
transp. eqpt	3,178,956	3,144,394	98.91%
elect, gas, h_2o	3,393,864	3,374,759	99.44%
construction	29,299,434	28,630,882	97.72%
trade	28,715,394	27,951,517	97.34%
banking	6,964,408	7,742,189	111.17%
transp, stor & comm	12,197,937	11,409,761	93.54%
services	21,027,515	22,534,737	107.17%
	271,317,467	267,762,382	98.69%

The second allocation uses about the same amount of subsidy differing only in that the seven lowest income classes can achieve the income level of group B.

The third allocation is just a continuation of the first allocation wherein the top five income groups in the first allocation are taxed further (again around 25 per cent) and the proceeds are used to allow the lower income groups to improve their income level by one notch.

Finally the fourth allocation is an ideal one where all families are concentrated on the two average income groups (groups 9 and 10). This is an allocation which approximates perfect equity.

We apply exactly the same procedure (steps 1 to 6) to derive the total output demand resulting from the hypothetical distributions shown in Table 11. Table 12 presents a comparison of the final consumption demand for consumption goods for each sector between the allocations and the base-run solution. Table 13 presents a similar comparison, this time translated into output of the production sectors. Table 14 presents a comparison of the total output

Table 11 — Distributions used by the study

baserun	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	savings rate
real y 1979	352860	837164	2124394	3789765	5523551	6448319	13864499	11735149	10043217	13761514	9224281	11785480	6401413	5152565	2622743	1774670	7802339	13243923	0.133197
% distn	0.003115	0.007392	0.018759	0.033465	0.048775	0.056941	0.122430	0.103627	0.088686	0.121520	0.081454	0.104071	0.056527	0.045499	0.023160	0.015671	0.068898	1	
expenditures	352860	836326	2116376	3765691	5443647	6315539	13451536	11145257	9396431	12568074	8021095	9769777	5014249	3645083	1450652	864966	4002606	98160164	
savings	0	838	8018	24074	79903	132780	412963	589892	646786	1193440	1203186	2015703	1387165	1507482	1172091	909704	3799733	15083759	
no. fam 1979 = 7821	73	147	327	519	701	743	1360	1023	731	855	470	462	188	113	43	23	43	7821	
% distn	0.009329	0.018804	0.041836	0.066326	0.089650	0.095043	0.173906	0.130758	0.093440	0.109329	0.060058	0.059037	0.024052	0.014431	0.005539	0.002915	0.005539	1	
y/fam 1979	4836	5692	6493	7306	7878	8675	10194	11475	13743	16094	19638	25524	34029	45651	60539	77830	180096	535692	
First distn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	savings rate
income	0	0	474419	1075438	6662571	6082387	7577245	15607617	14054236	11761508	34860742	4801060	3864424	1967057	1331003	3511052	0	113630759	0.108609
% distn	0	0	0.004175	0.009464	0.058633	0.053527	0.066683	0.137353	0.123683	0.103506	0.306789	0.042251	0.034008	0.017310	0.011713	0.030898	0	1	
expenditure	0	0	472628	1068607	6566190	5957142	7351552	14823068	13149139	10141514	30313616	3979921	3027016	1391557	736184	1711270	0	101289405	
savings	0	0	1791	6832	96380	125245	225693	784549	905097	1019993	4547126	821139	837408	575500	594818	1799782	0	12341355	
no. of fam	0	0	73	147	846	701	743	1360	1023	731	1787	188	113	43	23	43	0	7821	
% distn	0	0	0.009342	0.018821	0.108132	0.089646	0.095039	0.173899	0.130752	0.093436	0.228452	0.024051	0.014430	0.005539	0.002915	0.005539	0	1	
y/fam	–	–	6493	7306	7878	8675	10194	11475	13743	16094	19510	25522	34238	45404	58373	81043	–		
Second distn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	savings rate
income	0	0	0	0	0	0	0	56404709	10043217	13761514	18063392	4801060	3864424	1967057	1331003	3261053	0	113497428	0.101607
% distn	0	0	0	0	0	0	0	0.496969	0.088488	0.121249	0.159152	0.042301	0.034048	0.017331	0.011727	0.028732	0	1	
expenditures	0	0	0	0	0	0	0	53569409	9396431	12568074	15707259	3979921	3027016	1391557	736184	1589421		101965273	
savings	0	0	0	0	0	0	0	2835300	646786	193440	2356132	821139	837408	575500	594818	1671631	0	11532155	
no. of fam	0	0	0	0	0	0	0	4894	731	855	931	188	113	43	23	43	0	7821	
% distn	0	0	0	0	0	0	0	0.625672	0.093436	0.109324	0.119091	0.024051	0.014430	0.005539	0.002915	0.005539	0	1	
y/fam	–	–	–	–	–	–	–	11526	13743	16094	19393	25522	34238	45404	58373	75272	–		
Third distn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	savings rate
income	0	0	0	533838	1159653	7336646	7147248	8529896	18691978	50056812	12079295	2898318	1475293	998252	2633289	0	0	13539517	0.089990
% distn	0	0	0	0.004701	0.010213	0.064617	0.062949	0.075127	0.164629	0.440875	0.106379	0.025526	0.012993	0.008792	0.023192	0	0	1	
expenditure	0	0	0	530447	1142877	7185573	6934363	8101123	17488209	45715734	10502840	2402610	1155602	706194	1456485	0	0	103322058	
savings	0	0	0	3391	16775	151072	212886	428773	1203769	4341078	1575455	495707	319691	292058	1176804	0	0	10217460	
no. of fam	0	0	0	73	147	846	701	743	1360	3097	631	113	43	23	43	0	0	7821	
% distn	0	0	0	0.009342	0.018820	0.108131	0.089645	0.095038	0.173897	0.396022	0.080676	0.014430	0.005539	0.002915	0.005539	0	0	1	
y/fam	–	–	–	7306	7878	8675	10194	11475	13743	16161	19142	25679	34053	43780	60782	–	–		
Fourth distn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	total	savings rate
income	0	0	0	0	0	0	0	0	73812959	39430389	0	0	0	0	0	0	0	113243348	0.072172
% distn	0	0	0	0	0	0	0	0	0.651808	0.348191	0	0	0	0	0	0	0	1	
expenditures	0	0	0	0	0	0	0	0	69059382	36010867	0	0	0	0	0	0	0	105070249	
savings	0	0	0	0	0	0	0	0	4753576	3419523	0	0	0	0	0	0	0	817309	
no. of fam	0	0	0	0	0	0	0	0	5371	2450	0	0	0	0	0	0	0	7821	
% distn	0	0	0	0	0	0	0	0	0.686742	0.313257	0	0	0	0	0	0	0	1	
y/fam	–	–	–	–	–	–	–	–	13743	16094	–	–	–	–	–	–	–		

Table 12 — Comparison of Final Consumption Demand: Consumption goods in 1975 prices

	Baserun	first	Diff	ratio	second	Diff	ratio	third	Diff	ratio	fourth	Diff	ratio
	98160164	101289405	3129241	103.19%	103322058	5161893	105.26%	101965273	3805109	103.88%	105070248	6910084	107.04%
cereals	18400957	19302302	901344	104.90%	19944483	1543526	108.39%	19739719	1338762	107.28%	20545908	2144951	111.66%
fish	8341635	8785407	443772	105.32%	9174221	832586	109.98%	9065176	723541	108.67%	9282193	940558	111.28%
meat & eggs	6781667	7248558	466891	106.88%	7483323	701656	110.35%	7316869	535201	107.89%	7570983	789315	111.64%
milk	2010551	2226014	215462	110.72%	2258053	247502	112.31%	2203701	193150	109.61%	2209438	198886	109.89%
roots	6578431	6773299	194868	102.96%	6893342	314910	104.79%	6738330	159899	102.43%	7102841	524410	107.97%
miscellaneous	5396607	5682710	286102	105.30%	5951601	554994	110.28%	5726424	329816	106.11%	6163134	766526	114.20%
outside home	1291095	1138646	−152449	88.19%	1084210	−206885	83.98%	963642	−327453	74.64%	915546	−375549	70.91%
beverages	1651070	1727224	76154	104.61%	1858251	207181	112.55%	1835885	184815	111.19%	1927275	276205	116.73%
tobacco	2375805	2533865	158060	106.65%	2654132	278327	111.72%	2535878	160073	106.74%	2731826	356021	114.99%
housing	9575052	9778619	203567	102.13%	9704186	129134	101.35%	9827025	251973	102.63%	10014722	439670	104.59%
fuel	4671937	4847852	175915	103.77%	4769060	97123	102.08%	5140207	468270	110.02%	4725199	53262	101.14%
HH furnishing	2158381	2209177	50796	102.35%	2312097	153716	107.12%	2162432	4051	100.19%	2212400	54019	102.50%
HH operations	2149334	2149084	−250	99.99%	216889	17555	100.82%	2169510	20176	100.94%	2137416	−11918	99.45%
clothing	7760664	8256247	495583	106.39%	8310801	550137	107.09%	8102456	341791	104.40%	8198442	437777	105.64%
personal care	1865560	1957221	91661	104.91%	2003964	138404	107.42%	2013143	147583	107.91%	1963286	97726	105.24%
medical care	1760033	1796028	35994	102.05%	1888446	128412	107.30%	1866321	106287	106.04%	1927275	167242	109.50%
transport	3865431	3707037	−158394	95.90%	3561974	−303458	92.15%	3495550	−369881	90.43%	3536378	−329054	91.49%
recreation	1668467	1703278	34811	102.09%	1721995	53527	103.21%	1663751	−4716	99.72%	2026421	357954	121.45%
education	3754019	4168862	414843	111.05%	4127245	373225	109.94%	3994906	240886	106.42%	4205772	451753	112.03%
personal effects	906317	831309	−75008	91.72%	885523	−20795	97.71%	830441	−75876	91.63%	876573	−29744	96.72%
misc goods & serv	5197149	4466666	−730483	85.94%	4568264	−628885	87.90%	4573909	−623240	88.01%	4797221	−399928	92.30%

Table 13 — Comparison of Final Consumption Demand: Producer goods in 1975 prices

	Baserun	first	ratio w/BR	second	ratio w/BR	third	ratio w/BR	fourth	ratio w/BR
agri	16429165	17018160	103.59%	17568395	106.93%	17295693	105.27%	17948128	109.25%
forestry	717171	732419	102.13%	726844	101.35%	736044	102.63%	750103	104.59%
mining	52663	53782	102.13%	53373	101.35%	54049	102.63%	55081	104.59%
pfood	3298362	34514371	104.64%	35724252	108.31%	35015811	106.16%	36612268	111.00%
textiles	5077188	5391826	106.20%	5437178	107.09%	5290775	104.21%	5356133	105.49%
wood	1332294	1382639	103.78%	1398038	104.93%	1364255	102.40%	1387534	104.15%
paper	218741	225738	103.20%	227438	103.98%	222624	101.78%	245262	112.12%
chemicals	3191203	3131552	98.13%	3196918	100.18%	3196627	100.17%	3219546	100.89%
petroleum	2507697	2553007	101.81%	2515656	100.32%	2628473	104.82%	2503432	99.83%
cement	261446	267414	102.28%	275532	105.39%	263736	100.88%	270625	103.51%
metals	2484297	2459423	99.00%	2548279	102.58%	2427927	97.73%	2571954	103.53%
tr eqpt	984912	944553	95.90%	907591	92.15%	890666	90.43%	901069	91.49%
e/g/w	816187	846920	103.77%	833155	102.08%	897994	110.02%	825492	101.14%
const	4278194	4383701	102.47%	4342374	101.50%	4456389	104.17%	4444001	103.88%
trade	9760187	10051844	102.99%	10234526	104.86%	10134697	103.84%	10355908	106.10%
banking	2275036	2077671	91.32%	2101478	92.37%	2112831	92.87%	2192911	96.39%
t/s/c	5168876	5288896	102.32%	5226784	101.12%	5179587	100.21%	5291442	102.37%
services	9621244	9965489	103.58%	10004249	103.98%	9797095	101.83%	10139360	105.39%

Table 14 – Total Output Demand for the Four Allocations and Comparison with Baserun (in 1975 prices)

	baserun output	first	second	third	fourth
agriculture & fish.	45,093,771	46,693,766	48,041,199	47,283,525	48,995,750
forestry	3,676,821	3,790,089	3,800,470	3,771,337	3,815,947
mining	5,146,336	5,226,856	5,244,194	5,261,712	5,269,167
processed food	43,920,419	45,776,217	47,221,647	46,354,430	48,293,366
textiles	12,964,955	13,481,795	13,566,569	13,335,898	13,466,479
wood, rubber & plastic	5,591,808	5,706,403	5,755,588	5,690,237	5,778,027
paper, printing	945,683	963,323	970,008	959,849	989,270
chem. prods	15,223,845	15,391,425	15,633,059	15,517,813	15,768,069
petroleum prods	11,190,935	11,410,468	11,451,101	11,507,137	11,511,220
cement & non met.pr.	2,507,305	2,530,522	2,543,968	2,534,180	2,551,277
metals, mach.& misc.	16,712,266	16,804,536	16,945,612	16,812,435	17,028,822
transp. eqpt	3,144,394	3,127,186	3,107,338	3,095,512	3,106,481
elect, gas, h_2o	3,374,759	3,451,940	3,466,542	3,508,674	3,481,842
construction	28,630,882	28,768,194	28,744,189	28,845,106	28,863,167
trade	27,951,517	28,580,641	28,980,354	28,734,622	29,260,038
banking	7,742,189	7,617,629	7,698,615	7,670,527	7,842,310
transp, stor.& comm.	11,409,761	11,624,666	11,605,725	11,517,145	11,718,340
services	22,534,737	22,964,706	23,050,154	22,799,978	23,240,219
Total	267,762,382	273,910,363	277,826,333	275,200,117	280,979,790

Table 14 (Continued)

Ratio of allocations with baserun	first	second	third	fourth
agriculture & fish.	103.55%	106.54%	104.86%	108.65%
forestry	103.08%	103.36%	102.57%	103.78%
mining	101.56%	101.90%	102.24%	102.39%
processed food	104.23%	107.52%	105.54%	109.96%
textiles	103.99%	104.64%	102.86%	103.87%
wood, rubber & plastic	102.05%	102.93%	101.76%	103.33%
paper, printing	101.87%	102.57%	101.50%	104.61%
chem. prods.	101.10%	102.69%	101.93%	103.57%
petroleum prods.	101.96%	102.32%	102.83%	102.86%
cement & non met.pr.	100.93%	101.46%	101.07%	101.75%
metals, mach. & misc.	100.55%	101.40%	100.60%	101.89%
transp. eqpt	99.45%	98.82%	98.45%	98.79%
elect., gas, h_2o	102.29%	102.72%	103.97%	103.17%
construction	100.48%	100.40%	100.75%	100.81%
trade	102.25%	103.68%	102.80%	104.68%
banking	98.39%	99.44%	99.07%	101.29%
transp, stor. & comm.	101.88%	101.72%	100.94%	102.70%
services	101.91%	102.29%	101.18%	103.13%
Total	102.30%	103.76%	102.78%	104.94

(after implementing step 6 discussed earlier) for each production sector between the allocations and the baserun.

Results

Before we interpret the results, we must emphasize two points. First, the analysis is a partial analysis. As stated earlier, we have simply looked at the effects on demand and we have completely disregarded price and supply responses. Second, we started out with a national income for 1979 which is related to the Gross National Product of 1979. Now the total output for the four allocations as shown in Table 14 may not be consistent with the original national income that we started with. This is so because each improvement in distribution brings about an increase in total consumption expenditures (and a fall in total savings) due to a redistribution from the high savings group to groups with lower savings. Because of the demand-determined system, total output increases from the original 1979 level.

The results have both their expected and unexpected aspects. As shown in Table 11, total savings and aggregate savings rate fall. Tables 12, 13 and 14 show that the increase in demand is heaviest on food products (except food outside home), affecting mainly the

production of agriculture and processed food. Both sectors are net savers of foreign exchange in the sense that their export-output ratios less import-output ratios are positive (see Table 9).

The results on the new allocations also show an adequate increase in demand for textiles (a net export sector). The demand for trading and electricity, gas, and water increases, while that for banking and construction suffers or grows much more slowly than the other sectors. There is also some growth in net import sectors such as wood, rubber, plastic, paper, chemical products, and petroleum, while transport equipment falls.

It must be pointed out however, that the increases in total output demand are not very substantial (growth rates from the base-run solution in Table 14 are only in single digits even in the fourth allocation scheme). This is further corroborated in Table 15 which presents the share of each production sector in the total output. Again, there seem very little changes in the share of each production sector from the baserun. There are slight increases in agriculture and processed food with better distribution. There are very small decreases in mining, wood, rubber, plastic, chemical

Table 15 — Per Cent Share of Production Sectors to Total Output for the Four Allocations

	baserun	first alloc	second alloc	third alloc	fourth alloc
agriculture & fish.	0.16841	0.17047	0.17292	0.17182	0.17437
forestry	0.01373	0.01384	0.01368	0.01370	0.01358
mining	0.01922	0.01908	0.01888	0.01912	0.01875
processed food	0.16403	0.16712	0.16997	0.16844	0.17187
textiles	0.04842	0.04922	0.04883	0.04846	0.04793
wood, rubber & plastic	0.02088	0.02083	0.02072	0.02068	0.02056
paper, printing	0.00353	0.00352	0.00349	0.00349	0.00352
chem. prods	0.05686	0.05619	0.05627	0.05639	0.05612
petroleum prods.	0.04179	0.04166	0.04122	0.04181	0.04097
cement & non met.pr.	0.00936	0.00924	0.00916	0.00921	0.00908
metals, mach & misc.	0.06241	0.06135	0.06099	0.06109	0.06061
transp. eqpt.	0.01174	0.01142	0.01118	0.01125	0.01106
elect, gas, h_2o	0.01260	0.01260	0.01248	0.01275	0.01239
construction	0.10693	0.10503	0.10346	0.10482	0.10272
trade	0.10439	0.10434	0.10431	0.10441	0.10414
banking	0.02891	0.02781	0.02771	0.02787	0.02791
transp, stor.& comm ,	0.04261	0.04244	0.04177	0.04185	0.04171
services	0.08416	0.08384	0.08297	0.08285	0.08271
	1	1	1	1	1

roducts, cement, metals, transport equipment, construction and ervices. The very small differences seem to point to offsetting actors leading to this result. The fall of the high income groups into lower income bracket increases the portion of their income spent n essential goods and less on luxury goods. But the rise in the ncome levels of the lower income groups has a counteractive tendency, wherein a smaller proportion of essential goods, and more of ndustrial and luxury-type goods, are purchased.

If we look at the overall export-output ratio and import-output ratio (Table 16), the changes are again insubstantial. There is a

Table 16 – Export and Import Shares for the Four Allocations

	baserun	first alloc	second alloc	third alloc	fourth alloc
Export-output ratio	0.10122	0.10106	0.10076	0.10078	0.10012
Import-output ratio	−0.13419	−0.13282	−0.13194	−0.13238	−0.13082
Labor-output ratio	0.20681	0.20686	0.20681	0.20662	0.20626
Net Exp-output ratio	−0.03296	−0.03176	−0.03118	−0.03160	−0.03069
Exports	40,273,077	41,131,340	41,594,690	41,211,457	41,934,053
Imports	(53,388,755)	(54,057,435)	(54,467,199)	(54,132,166)	(54,788,708)
Wage bill	82,282,550	84,194,176	85,375,929	84,490,590	86,386,431
Trade balance	(13,115,678)	(12,926,095)	(12,872,509)	(12,920,709)	(12,854,655)
Output	397,868,660	407,003,956	412,822,703	408,920,404	418,821,426

slight decrease in both ratios but the fall in the import share is stronger. Thus if we look at total exports, total imports and total trade balance, there are slight improvements in the current account due to improved distribution of income.

The change in the labor-intensiveness of the output is again minimal as shown in Table 16.

The results, though disappointing, should be seen in light of the constraints in the methodology we have used. The effects are partly obscured by the lack of a complete general equilibrium model wherein output prices and factor prices will be affected by the redistribution of income. There may be a negative effect in the short run if there are bottlenecks to food production which could lead to decreased purchasing power for fixed income groups as food prices rise. But the increase in agricultural prices and agricultural incomes where the majority of the populace live may also create a multiplier effect not captured in the model.

With this multiplier effect, the increased domestic production of previously imported items may arise, thus changing the import character of the production sectors. The entire process of backward and forward linkages brought about partly by a multiplier expansion of a domestic market is a long-run possibility that is beyond the scope of even a general equilibrium analysis.

Another problem in our analysis may be caused by the classification of sectors. Many sectors are both exporters and importers as seen in Table 9 (metals, mining, wood, rubber and plastic, chemical products, textiles, etc.) and combine both capital- and labor-intensive products in one sector (wood, rubber, plastic, textiles, etc.). It would be more difficult to detect changes in consumption patterns on export- or import-dependent industries as well as labor- or capital-intensive industries if these are all lumped together. One improvement to this study may be a further refinement of the sectors in the input-ouput sector and a more defined way of classifying sectors. This however, will take much more money and time than what we had asked for.

Summary and Conclusions

This study concentrated on the effect of income distribution on the composition of output demand. It was hoped that a significant amount of redistribution can change the composition of demand in such a way as to make the whole economy less import-dependent and more labor-intensive.

The results, however, did not come up to expectations. Although there was a clear increase in the demand for agriculture and processed food output as well as textiles, (industries which are net exporters and, except for processed food, more labor-intensive than the others), the overall effects of redistribution are not strong. There are indications that overall trade balance will improve but only very slightly. Labor-intensiveness doesn't seem to be affected at all.

Notwithstanding the differences shown in consumption patterns across income groups, the total effect of redistribution doesn't seem to be so strong, one main reason for this being the countervailing effects of high income groups falling in rank and low income groups rising. The subsequent effects on essential and luxury goods work in two opposing directions, thus partially offsetting each other. This may have significant repercussions. Improving the lot of low in-

:ome groups may also increase the demand for import-dependent goods thus offsetting the gains of a decrease in high luxury consumption of the rich.

The important policy implications of this study are:

1. The effect of a redistribution puts in focus the food production capacity of the economy. The gains of any redistributive scheme should be accompanied by an increased capacity for food production. Kalecki (1971) pointed to this problem and demonstrated how inflationary pressures due to scarcity of essential goods — particularly food — will in turn cause income distribution to deteriorate. The need to improve agricultural production is vital to any redistribution scheme.
2. Any redistributive scheme will have to anticipate a possible fall in total savings and in the savings rate. The anticipation of this should call for a policy of efficient taxation and expenditures policy, the enhancement of financial intermediation and services, and wise usage and planning on the role of foreign loans.
3. It must be pointed out that our redistributive policies here do not distinguish between rural and urban incomes. The results, however, provide very conducive conditions for the agricultural sector to grow and to expand (with terms of trade most likely to turn towards agriculture). This effect on agriculture is not completely described in our model so that we would expect distribution to improve even better and for the domestic market to grow more than what we have shown.
4. Finally, even if redistribution did not conclusively show strong positive effects on growth and efficiency, it must be pointed out that equity and elimination of poverty are overriding goals by themselves which should be undertaken even if there are no positive effects on growth and efficiency. Our study, however, cautions many of us not to rely too much on redistribution to bring about an economic miracle. A more equitable distribution is an important goal of our society (particularly since the distribution of wealth and income is so lopsided), but policies that would enhance the productive capacity and efficiency of our economy are perhaps equally important and should never be neglected.

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