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STABILIZATION AND STRUCTURAL ADJUSTMENT IN INDONESIA: AN INTERTEMPORAL GENERAL EQUILIBRIUM ANALYSIS

by

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RÉSUMÉ

L'Indonésie, comme la plupart des pays producteurs de pétrole, a connu au début des années 80 une sérieuse détérioration dans les conditions de ses exportations. Ce choc exogène — compte tenu de la dépendance marquée du pays à l'égard des taxes pétrolières et d'un revenu par habitant relativement faible — a gravement compromis les plans de développement et a introduit dans l'économie des politiques d'ajustements structurels importantes. L'Indonésie a cependant pris plus d'initiatives que d'autres pays pour stabiliser son économie et réduire les risques de politiques expansionistes héritées du boom pétrolier. Le succès qu'elle a connu découle et de son désir d'instaurer une stabilisation volontaire et d'une cote de crédit relativement favorable. Ce document technique utilise un modèle d'équilibre général inter-temporel pour évaluer la politique d'ajustement menée entre 1980 et 1986, en s'intéressant particulièrement à la croissance et aux conséquences distributives de l'ajustement. Les conclusions de la recherche montrent que des politiques plus efficaces auraient pu être mises en oeuvre, qui se seraient attachées à plus de restrictions que cela n'a été le cas au début des années 80 et qui auraient porté une attention plus grande à l'évolution de sa structure des échanges. Les politiques alternatives simulées qui sont ici discutées cherchent à indiquer comment l'Indonésie pourrait mieux se protéger de sa dépendance aux exportations primaires et de l'instabilité des termes de l'échange.

SUMMARY

Like most petroleum producing countries, Indonesia experienced a sharp deterioration in its export conditions during the early 1980s. Given the country's heavy reliance on oil taxation and relatively low per capita income, this exogenous shock seriously disrupted development plans and induced extensive structural adjustments in the economy. Indonesia has taken greater initiative than some to stabilize its economy and reduce the distortionary threat of expansionist policies inherited from the oil boom. Its success in this regard was due to an eventual willingness to implement voluntary stabilization and relatively favorable credit rating. In this study, a calibrated intertemporal general equilibrium model is used to evaluate the Indonesian adjustment policy of the period 1980-86 with particular attention to the growth and distributional implications of adjustment. The findings of this report indicate that more efficacious policies could have been implemented. These policies would rely on more restraint than the country exhibited in the early 1980s and more detailed attention to the evolution of its trade patterns. The simulated alternative policies discussed below are intended to give some indication about how the country might better moderate primary export dependence and terms of trade instability.

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I. INTRODUCTION

The Indonesian economy entered the 1980s on the crest of a sustained boom in world oil export earnings. For a predominantly agrarian economy at the early stages of modernization, burgeoning petroleum income held the promise of accelerated growth and a rapid transition to the path of industrialization which had proved so successful to other nations in the Pacific basin. In the 1970s, the government set about expanding capacity in the oil sector and reinvesting its earnings in development infrastructure and public services. The early results were steady increases in per capita incomes, food self-sufficiency, and greater articulation of the market economy throughout this geographically dispersed island nation of over 150 million people.

Most demographic and economic indicators of welfare were on sustained upward trajectories when the oil market began to collapse in the early 1980s. Buy that time, however, the economy was extremely dependent on petroleum revenues, which represented over two thirds both total export earnings and government revenues. When oil prices began to come down, with them came the stable growth of government-driven final demand and income. The government was slow to revise its export earnings projections in the first slump, and thus did not take remedial action in time to stem a plummeting trade and fiscal balances. Thanks to extensive sovereign borrowing and graduated devaluations, however, the situation was stabilized and adjustments were initiated which probably softened the ultimate impact of the next oil slump later in the decade.

Despite its eventual recognition of and adjustment to adverse external conditions, the economy of Indonesia remained dangerously over-dependent on non-renewable primary exports for its short and medium term solvency and for the capital resources to realize its considerable development potential. In this study, the micro-macro general equilibrium model MAQM, developed by Bourguignon, Branson, and de Melo, is used to evaluate the economy of the early 1980's from two perspectives.[1] First, a variety of external conditions is simulated with the historical economic policies in place. This is intended to evaluate the robustness of the government's development strategy to the apparent uncertainty in the external environment. The second set of counterfactual experiments evaluates alternative government policies with respect to the historically observed external conditions. These are intended to evaluate the efficacy of the government's approach to what actually happened.

Two main conclusions emerge from this study. First, the government's chosen policy appears to perform adequately under a variety of conditions. Ironically, although their belated fiscal retrenchment and devaluations were tailored to recessionary external conditions, they would have worked well under a booming export scenario as well. This is because crowding in by private investment and depreciation of the rupiah appear more beneficial than a larger government role in demand and a strong currency. Secondly, a variety of policies might have been more beneficial to the economy under the conditions which faced the government during the period under study. Among these would have been adherence to planned expenditure in the early 1980's, which instead was expanded to conform with overly optimistic oil earnings projections. Our simulation of the lower, planned current and capital expenditure policy indicates that this would have increased real aggregate income and consumption and improved their distribution significantly. Another policy approach would have been a more methodical development program designed to target private investment and export incentives toward sectors with improving terms of trade. As opposed to macroeconomic management of expenditures and exchange rates, this policy works at the sectoral level, utilizing private investment to re-orient the country's trade patterns toward greater diversity and flexibility. This policy also appears to yield higher and more egalitarian paths for domestic income and consumption than did the policy actually carried out by the government.

The next section surveys the structure of the Indonesian economy at the beginning of the reference period. Section 3 discusses the observed trends in macroeconomic indicators and trade patterns which follow for the next six years. Sections four and five present the simulation results for variations in external conditions and policy regimes, respectively. The last section contains summary and concluding remarks.

II. AN OVERVIEW OF INDONESIAN ECONOMIC STRUCTURE

This section provides a survey of the composition of domestic output, demand, and trade patterns which prevailed in Indonesia at the beginning of the reference period for the study, 1980-86. Indonesia has been extensively studied by development economists, and only an overview of the structure of the economy is warranted to preface the simulation studies which follow.[2] The structure of the economy changed somewhat over the first half of the 1980's, but Indonesia remained by 1986 a predominantly agrarian nation at the early stages of industrialization. Petroleum output dominates export earnings and revenues from taxing this sector provide more than two thirds of public sector income. This sector operates in a virtual enclave, however, and its links to the rest of the economy are largely indirect, channeled through expenditure of the considerable capital income and tax revenue it generates. Thus to understand the problems the economy experienced during the oil slump of the early 1980's, it is necessary but not sufficient to understand the oil sector itself.

A broader perspective in the economy can be gained by looking at the basic information set for the base year calibration of the simulation model, a social accounting matrix (SAM) for Indonesia.[3] The SAM provides a detailed and closed form accounting of the composition of national income and expenditure, and is an indispensable tool to calibrate multi-sectoral, economy-wide CGE models like the one used in this study.[4] The SAM in table 2.1 is an aggregation of one constructed by the Indonesian Central Bureau of Statistics for 1980, and details six productive sectors, four labor and capital good categories, six household types, and accounting institutions including capital accounts, government, and the rest of the world.[5] While the nominal flows in the SAM are themselves of independent interest, tables 2.2-2.4 present a variety of share estimates which elucidate the structure of the economy.

Table 2.1: Social Accounting Matrix for Indonesia, 1980

Millions of Current Rupiah

		1	2	3	4	5	6	7	8	9	10	11	12
1	Agric	2791	0	5023	77	537	97	0	0	0	0	0	0
2	EnrgMin	5	419	556	1763	0	5	0	0	0	0	0	0
3	LitMfg	210	96	1592	119	590	385	0	0	0	0	0	0
4	HvyMfg	604	457	3682	3426	803	1129	0	0	0	0	0	0
5	Informal	2879	392	1268	2942	192	713	0	0	0	0	0	0
6	Services	687	551	475	745	653	718	0	0	0	0	0	0
7	AgLab	5356	0	0	0	0	0	0	0	0	0	0	0
8	MfgLab	68	192	2154	526	609	1017	0	0	0	0	0	0
9	ClerLab	51	94	133	113	3899	1789	0	0	0	0	0	0
10	ProfLab	18	49	72	106	67	2219	0	0	0	0	0	0
11	Land	5251	0	0	0	0	0	0	0	0	0	0	0
12	PrivCap	564	152	1917	852	2787	2332	0	0	0	0	0	0
13	PubCap	291	3033	350	939	479	1110	0	0	0	0	0	0
14	ForCap	205	8899	173	308	288	48	0	0	0	0	0	0
15	SmFarm	0	0	0	0	0	0	3303	374	365	70	1422	937
16	LgeFarm	0	0	0	0	0	0	698	42	50	20	3151	447
17	RurLow	0	0	0	0	0	0	1280	2043	1628	203	471	991
18	RurHigh	0	0	0	0	0	0	46	130	537	814	147	124
19	UrbLow	0	0	0	0	0	0	23	1797	2113	245	35	1486
20	UrbHigh	0	0	0	0	0	0	7	182	1387	1181	24	677
21	Company	0	0	0	0	0	0	0	0	0	0	0	3590
22	Govt	0	0	0	0	0	0	0	0	0	0	0	0
23	CapAcct	0	0	0	0	0	0	0	0	0	0	0	0
24	IndTax	124	20	402	-590	299	148	0	0	0	0	0	0
25	R O W	333	696	773	7033	477	574	0	0	0	0	0	351
	Total	19437	15050	18569	18359	11681	12286	5356	4568	6079	2532	5251	8603

Table 2.1 Continued

		13	14	15	16	17	18	19	20	21	22	23	24	25
1	Agric	0	0	2588	1197	2187	407	1137	509	0	10	282	0	2593
2	EnrgMin	0	0	21	9	16	3	9	5	0	0	903	0	11333
3	LitMfg	0	0	2039	1072	2148	529	1341	845	0	235	6953	0	417
4	HvyMfg	0	0	380	388	532	221	710	501	0	444	3756	0	1324
5	Informal	0	0	265	284	420	148	802	579	0	677	0	0	117
6	Services	0	0	785	601	922	322	1374	1009	0	3068	0	0	377
7	AgLab	0	0	0	0	0	0	0	0	0	0	0	0	0
8	MfgLab	0	0	0	0	0	0	0	0	0	0	0	0	0
9	ClerLab	0	0	0	0	0	0	0	0	0	0	0	0	0
10	ProfLab	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Land	0	0	0	0	0	0	0	0	0	0	0	0	0
12	PrivCap	0	0	0	0	0	0	0	0	0	0	0	0	0
13	PubCap	0	0	0	0	0	0	0	0	0	0	0	0	0
14	ForCap	0	0	0	0	0	0	0	0	0	0	0	0	0
15	SmFarm	0	0	31	12	18	4	19	12	0	121	0	0	52
16	LgeFarm	0	0	12	7	11	2	11	7	0	54	0	0	25
17	RurLow	0	0	20	11	29	4	20	12	93	154	0	0	33
18	RurHigh	0	0	1	1	2	1	5	2	129	27	0	0	6
19	UrbLow	0	0	29	15	26	5	36	18	197	286	0	0	28
20	UrbHigh	0	0	2	7	2	3	4	9	936	152	0	0	23
21	Company	6062	7895	0	0	0	0	0	0	268	0	0	0	75
22	Govt	123	0	123	104	133	37	158	155	7808	1174	0	402	22
23	CapAcct	0	0	443	829	547	284	711	930	8314	3113	0	0	0
24	IndTax	0	0	0	0	0	0	0	0	0	0	0	0	0
25	ROW	17	2025	0	0	0	0	0	0	145	724	3278	0	0
	Total	6202	9920	6740	4538	6993	1971	6337	4594	17890	10240	15172	402	16426

The figures in table 2.2 show sectoral composition of production, income, and international trade flows. The formal commodity sectors (1-4) are relatively equal in terms of total supply or gross output, but significant exports in agriculture and oil mean higher shares of domestic supply, while the import dependence of the heavy manufacturing sector means it actually contributes only 14 per cent to domestic supply. Domestic value added is even more unequally distributed, with import dependent and intermediate intensive heavy industry falling from 19 per cent of gross output to a GDP contribution of only about 5 per cent. The sectors which contribute the most to labor are agriculture, with half again as much as its gross output share, and the informal and service sectors, whose labor income share is double their share of gross output. The energy sector dominates the other sources of capital income in the economy, with a 40 per cent share. Although this is heavily taxed by the government, it still represents an extreme bias in the the functional income distribution for a country attempting to pursue balanced modernization.

Figures for indirect taxation and subsidies indicate very unequal incidence, with light manufacturing and the informal sector bearing twice the economy-wide tax share they represent in domestic output. These figures are somewhat deceptive, since the most heavily taxed sector is actually oil, which pays via retained profits of the public energy monopoly. In any case, informal sector taxation, which covers wholesale and retail intermediaries, is rather high for a developing country, and its indirect incidence is undoubtedly much more diffuse since this sector can easily pass taxes along.

Trade shares are what one would expect for a primary exporter in the early phase of modernization. Imports are dominated by finished industrial products, exports by resources and agriculture. Indonesia achieved rice self-sufficiency during the 1980's, and its agricultural imports have declined as a share of total imports ever since. Agricultural exports are primarily plantation products and timber, although the latter has been shifted to light manufacturing during the 1980's by raw timber export prohibitions. Exports are dominated by the energy sector, although considerable potential still exists in agriculture and light manufacturing. The informal and service sectors were essentially nontradeables at the outset of the 1980's.

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Table 2.2: Sectoral Composition of Production, Income, and Trade
Percentage Shares Across Sectors

	Agricult	EnrgyMin	Lt Mfg	Hvy Mfg	Informal	Services	Total
	1	2	3	4	5	6	
Total Supply	20	16	19	19	12	13	100
Domestic Supply	22	17	20	14	13	14	100
Nominal GNP	24	26	10	6	17	18	100
Value added							
Labor	30	2	13	4	25	27	100
Other Factors	21	40	8	7	12	12	100
Indirect Taxes	12	2	41	0	30	15	100
Producer Subsidy	0	0	0	100	0	0	100
Trade							
Imports	3	7	8	71	5	6	100
Exports	16	70	3	8	1	2	100
Share of Output							Wgt Ave
Imports	2	5	4	38	4	5	10
Exports	13	75	2	7	1	3	17
Value Added Shares							
Labor	47	3	49	26	56	59	40
Other Factors	53	97	51	74	44	41	60

The trade orientation of each sector is given by imports and exports as a per centage of total output. Economywide trade dependence is relatively low for this large and populous nation. Individual sectors do rely heavily on exports or imports, however, and these are sectors with high income earning capacity (oil) or leading growth potential (agriculture, manufactures). Thus the economy remains sensitive to international market conditions, and these can influence sectoral incentives in the domestic economy.

Shares of value added between labor and nonlabor inputs are relatively balanced in most sectors, but quite disproportionate in the energy and heavy manufacturing. These figures indicate that employment oriented growth policies should be targeted to nontradeables, light manufactures, or agriculture. The service sector is rather deceptive, however, since is represents the largest proportion of high wage employment and is thus has a lower employment/output elasticity than might be surmised from its labor value added share.

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Table 2.3 further decomposes domestic output into sectoral expenditure shares, indicating the composition of sectoral outlays on intermediate goods, factors, and payments to government and the rest of the world. The economy has a 42 per cent average level of intermediate use, allocated primarily to heavy equipment and market intermediation (informal sector). Agriculture relies primarily upon its own output and on marketing services from the informal sector. Oil has the lowest level of intermediate dependence, reflect the high levels of retained profits in this sector. Light manufacturing relies upon agriculture for its food processing activities and heavy industry for its mechanization. The heavy industry sector buys intermediates mainly from itself and marketing services from the informal sector. Informal activities have relatively low and uniformly distributed intermediate requirements, as does the service sector.

Table 2.3: Sectoral Expenditure Shares
Percentage

Domestic Supply	1	2	3	4	5	6	Ave
1 Agriculture	15	0	29	1	5	1	8
2 Energy Min	0	3	3	15	0	0	3
3 Light Mfg	1	1	9	1	5	3	3
4 Heavy Mfg	3	3	21	29	7	10	12
5 Informal	15	3	7	25	2	6	10
6 Services	4	4	3	6	6	6	5
Total Intermed	38	13	72	76	25	26	42
Labor	29	2	14	6	42	43	23
Nonlabor	33	84	14	18	33	30	35
Total	100	100	100	100	100	100	100
Total Supply							
Dom Supply	98	95	94	62	93	94	90
Indirect Tax	1	0	2	0	3	1	4
Prod Subsidy	0	0	0	3	0	0	0
Imports	2	5	4	35	4	5	0
Total	100	100	100	100	100	100	100

Sectoral expenditures on labor and nonlabor factors mirror the results of table 2.2 and need no elaboration. The same can be said for the shares of total supply, which can be inferred from the above results and are included in table 2.3 only for completeness.

The composition of demand is detailed in table 2.4 below. Five sectors have relatively focused downstream intermediate linkages. Agriculture delivers over half its intermediate product to light manufacturing, oil ships 64 per cent of its intermediates to heavy manufacturing, light manufacturing is over 53 per cent self-contained in intermediate linkages. Heavy manufacturing delivers 70 per cent of its intermediate products to one of the two manufacturing sectors, and the informal sector serves mainly agriculture and manufacturing. Intermediate deliveries of the service sector are almost uniformly distributed, but the bilaterally dominant links for other sectors is indicative of an industrial structure with a relatively low level of articulation, just as one would expect for Indonesia. On an economy-wide basis, light manufacturing absorbs the most intermediates (33 per cent), followed by heavy manufacturing (26 per cent), agriculture (16 per cent), and the others.

The composition of sectoral demand by household depends upon three factors: population, average income, and budget composition of each household group. The farm and low income groups are the largest, but have the lowest average incomes. The farm and rural groups have the greatest direct dependence on agriculture, while urban groups consume a large proportion of food from the light manufacturing (food processing) and service industry. High income group budgets are less focused on primary goods.

Overall demand composition consists of about 39 per cent intermediate, 27 per cent household, 6 per cent government, and 11 per cent investment demand, but about half this investment demand is also by the government. Judging from the shares on household demand by sector, Indonesia is still a long way from developing a consumption and savings driven economy. Government current expenditure, as in many countries, is focussed on the service sector. In developing countries, incomes are relatively high in this sector and government expenditure tends to worsen rather than improve income distribution, unless it is targeted expressly to transfers. The investment rate is relatively good for an economy without highly articulated capital markets, but the private component is only about 6 per cent, and only part of this is financed by domestic savings. Investment good sources are the usual ones, led by the highly import dependent heavy equipment sector, but the destination of these goods is still mainly the energy and mineral enclaves. As will be seen in the simulation experiments, a reorientation of investment toward more extensive development would have beneficial effects on absolute and relative incomes in the economy.

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Table 2.4: Shares of Intermediate and Final Demand
Percentages

Intermediate	1	2	3	4	5	6	Ave
1 Agriculture	33	0	7	6	34	18	16
2 Energy Min	0	15	3	5	5	14	7
3 Light Mfg	59	20	53	36	15	12	33
4 Heavy Mfg	1	64	4	34	35	19	26
5 Informal	6	0	20	8	2	17	9
6 Services	1	0	13	11	9	19	9
Total	100	100	100	100	100	100	100
Household							
SmFarm	32	33	26	14	11	16	22
LgFarm	15	15	13	14	11	12	13
RurLow	27	25	27	19	17	18	22
RurHigh	5	5	7	8	6	6	6
UrbLow	14	14	17	26	32	27	22
UrbHigh	6	8	11	18	23	20	14
Total	100	100	100	100	100	100	100
Overall							
Intermediate	44	18	16	55	72	31	39
Household	41	1	43	15	21	41	27
Govt	0	0	1	2	6	25	6
Investment	1	6	37	20	0	0	11
Exports	13	75	2	7	1	3	17
Total	100	100	100	100	100	100	100

Tables 2.5 and 2.6 present data on the financial side of the 1980 Indonesian economy.[6] These are SAMs of financial stocks and flows for the economy, and they were used to calibrate the financial side of the simulation model. The patterns of stock and flow distribution are conformal, so descriptive remarks are confined to the stocks. The levels of stocks depend mainly upon incomes of the groups being considered, while their composition (or diversity) depends on the nature of the institutions involved. Productive sectors have balances of money and other financial assets essentially proportional to their level of activity, and stocks of fixed capital which are determined by scale and technology. Land is considered to be a factor exclusive to agriculture in these accounts.

Table 2.5: Indonesian Financial Stock SAM, 1980
Millions of Current Rupiah

		1	2	3	4	5	6	7	8	9	10	11	12
1	Agric	0	0	0	0	0	0	0	0	0	0	0	0
2	EnrgMin	0	0	0	0	0	0	0	0	0	0	0	0
3	LitMfg	0	0	0	0	0	0	0	0	0	0	0	0
4	HvyMfg	0	0	0	0	0	0	0	0	0	0	0	0
5	Informal	0	0	0	0	0	0	0	0	0	0	0	0
6	Services	0	0	0	0	0	0	0	0	0	0	0	0
7	SmFarm	0	0	0	0	0	0	0	0	0	0	0	0
8	LgeFarm	0	0	0	0	0	0	0	0	0	0	0	0
9	RurLow	0	0	0	0	0	0	0	0	0	0	0	0
10	RurHigh	0	0	0	0	0	0	0	0	0	0	0	0
11	UrbLow	0	0	0	0	0	0	0	0	0	0	0	0
12	UrbHigh	0	0	0	0	0	0	0	0	0	0	0	0
13	Company	0	0	0	0	0	0	0	0	0	0	0	0
14	ComBank	0	0	0	0	0	0	0	0	0	0	0	0
15	CenBank	0	0	0	0	0	0	0	0	0	0	0	0
16	Govt	0	0	0	0	0	0	0	0	0	0	0	0
17	ROW	0	0	0	0	0	0	0	0	0	0	0	0
18	Currency	0	0	0	0	0	0	591	259	487	199	358	275
19	DemDep	356	65	99	263	114	154	269	323	292	165	296	446
20	TimeDep	53	2	89	172	165	62	132	248	0	154	137	308
21	ForDep	119	39	59	156	58	69	0	235	0	146	0	293
22	Equity	0	0	0	0	0	0	13455	19309	5321	4394	15998	25718
23	ForBor/Res	161	53	80	212	79	94	0	319	0	118	0	478
24	FixCap	16150	20113	5996	12558	19043	38124	0	0	0	0	0	0
25	Land	22802	0	0	0	0	0	0	0	0	0	0	0
	Total	39641	20272	6323	13361	19459	38503	14447	20693	6100	5176	16789	27518

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Table 2.5 Continued

		13	14	15	16	17	18	19	20	21	22	23	24
1	Agric	0	526	0	0	0	0	0	0	0	39115	0	0
2	EnrgMin	0	17	1849	0	0	0	0	0	0	18406	0	0
3	LitMfg	0	885	0	0	0	0	0	0	0	5438	0	0
4	HvyMfg	0	1718	51	0	0	0	0	0	0	11592	0	0
5	Informal	0	1654	507	0	0	0	0	0	0	17298	0	0
6	Services	0	626	47	0	0	0	0	0	0	37830	0	0
7	SmFarm	0	0	0	0	0	0	0	0	0	0	0	14447
8	LgeFarm	0	0	0	0	0	0	0	0	0	0	0	20693
9	RurLow	0	0	0	0	0	0	0	0	0	0	0	6100
10	RurHigh	0	0	0	0	0	0	0	0	0	0	0	5176
11	UrbLow	0	0	0	0	0	0	0	0	0	0	0	16789
12	UrbHigh	0	0	0	0	0	0	0	0	0	0	0	27518
13	Company	0	0	0	0	0	0	0	0	0	0	0	7434
14	ComBank	0	0	1722	707	0	0	2842	1522	1174	0	0	916
15	CenBank	0	1105	0	3292	0	2169	0	0	0	0	0	1826
16	Govt	0	0	0	0	9387	0	0	0	0	0	0	13205
17	ROW	0	0	0	0	0	0	0	0	0	0	8161	20681
18	Currency	0	0	0	0	0	0	0	0	0	0	0	0
19	DemDep	0	0	0	0	0	0	0	0	0	0	0	0
20	TimeDep	0	0	0	0	0	0	0	0	0	0	0	0
21	ForDep	0	0	0	0	0	0	0	0	0	0	0	0
22	Equity	7434	0	0	18593	19455	0	0	0	0	0	0	0
23	ForBor/Res	0	2352	4216	0	0	0	0	0	0	0	0	0
24	FixCap	0	0	0	0	0	0	0	0	0	0	0	0
25	Land	0	0	0	0	0	0	0	0	0	0	0	0
	Total	7434	8883	8392	22592	28842	2169	2842	1522	1174	129678	8161	134786

Table 2.6: Indonesian Financial Flow SAM, 1980
Millions of Current Rupiah

		1	2	3	4	5	6	7	8	9	10	11	12
1	Agric	0	0	0	0	0	0	0	0	0	0	0	0
2	EnrgMin	0	0	0	0	0	0	0	0	0	0	0	0
3	LitMfg	0	0	0	0	0	0	0	0	0	0	0	0
4	HvyMfg	0	0	0	0	0	0	0	0	0	0	0	0
5	Informal	0	0	0	0	0	0	0	0	0	0	0	0
6	Services	0	0	0	0	0	0	0	0	0	0	0	0
7	SmFarm	0	0	0	0	0	0	0	0	0	0	0	0
8	LgeFarm	0	0	0	0	0	0	0	0	0	0	0	0
9	RurLow	0	0	0	0	0	0	0	0	0	0	0	0
10	RurHigh	0	0	0	0	0	0	0	0	0	0	0	0
11	UrbLow	0	0	0	0	0	0	0	0	0	0	0	0
12	UrbHigh	0	0	0	0	0	0	0	0	0	0	0	0
13	Company	0	0	0	0	0	0	0	0	0	0	0	0
14	ComBank	0	0	0	0	0	0	0	0	0	0	0	0
15	CenBank	0	0	0	0	0	0	0	0	0	0	0	0
16	Govt	0	0	0	0	0	0	0	0	0	0	0	0
17	ROW	0	0	0	0	0	0	0	0	0	0	0	0
18	Currency	0	0	0	0	0	0	4	2	3	2	3	2
19	DemDep	126	23	35	94	40	55	96	115	103	59	105	158
20	TimeDep	10	0	22	43	39	18	30	56	0	35	31	71
21	ForDep	51	17	25	67	25	29	0	101	0	63	0	126
22	Equity	0	0	0	0	0	0	313	236	406	43	462	206
23	ForBor/Res	161	53	80	212	79	94	0	319	0	118	0	478
24	FixCap	1033	1162	767	2038	1831	5064	0	0	0	0	0	0
25	Land	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1381	1255	929	2454	2014	5259	443	829	512	320	601	1041

Table 2.6 Continued

		13	14	15	16	17	18	19	20	21	22	23	24
1	Agric	0	88	0	0	0	0	0	0	0	1293	0	0
2	EnrgMin	0	-1	-26	0	0	0	0	0	0	1282	0	0
3	LitMfg	0	217	0	0	0	0	0	0	0	712	0	0
4	HvyMfg	0	431	37	0	0	0	0	0	0	1986	0	0
5	Informal	0	396	259	0	0	0	0	0	0	1359	0	0
6	Services	0	190	21	0	0	0	0	0	0	5048	0	0
7	SmFarm	0	0	0	0	0	0	0	0	0	0	0	443
8	LgeFarm	0	0	0	0	0	0	0	0	0	0	0	829
9	RurLow	0	0	0	0	0	0	0	0	0	0	0	512
10	RurHigh	0	0	0	0	0	0	0	0	0	0	0	320
11	UrbLow	0	0	0	0	0	0	0	0	0	0	0	601
12	UrbHigh	0	0	0	0	0	0	0	0	0	0	0	1041
13	Company	0	0	0	0	0	0	0	0	0	0	0	7434
14	ComBank	0	0	593	387	0	0	1009	355	504	0	0	168
15	CenBank	0	228	0	1518	0	16	0	0	0	0	0	712
16	Govt	0	0	0	0	1098	0	0	0	0	0	0	3386
17	ROW	0	0	0	0	0	0	0	0	0	0	4650	-3552
18	Currency	0	0	0	0	0	0	0	0	0	0	0	0
19	DemDep	0	0	0	0	0	0	0	0	0	0	0	0
20	TimeDep	0	0	0	0	0	0	0	0	0	0	0	0
21	ForDep	0	0	0	0	0	0	0	0	0	0	0	0
22	Equity	7434	0	0	2580	0	0	0	0	0	0	0	0
23	ForBor/Res	0	1467	1590	0	0	0	0	0	0	0	0	0
24	FixCap	0	0	0	0	0	0	0	0	0	0	0	0
25	Land	0	0	0	0	0	0	0	0	0	0	0	0
	Total	7434	3016	2474	4485	1098	16	1009	355	504	11680	4650	11894

Households are assumed to have the usual domestic banking assets. Equity holdings have been imputed to them based on assumptions about the demographics of proprietorship in the country. Foreign assets are assumed to be held only by higher income groups.

Asset composition of private companies, financial institutions, and the government were obtained from statistics of the Indonesian central bank. Finally, equity and fixed capital allocations (columns 22 and 24) were made in proportion to asset valuations and published capital requirements.

III. TRENDS IN MACROECONOMIC AGGREGATES AND EXTERNAL CONDITIONS

As a preface to the counterfactual simulations which follow, this section surveys the main trends in the Indonesian economy over the period of study. The general impression one gathers from looking at the path of macroeconomic aggregates and changing trade patterns for the period 1980-86 is that the government managed a stable transition through a turbulent period. External conditions were characterized by strong and conflicting trends in sectoral terms of trade, significant shifts in the composition of imports and exports, and rapidly fluctuating fiscal and current account balances. Despite this, the government's adjustment program, including revisions of current and capital expenditure plans and graduated devaluation, kept aggregate real income and consumption growing throughout the period.

Figure 3.1: **Cumulative Macroeconomic Flows**
(Current Rp billions)
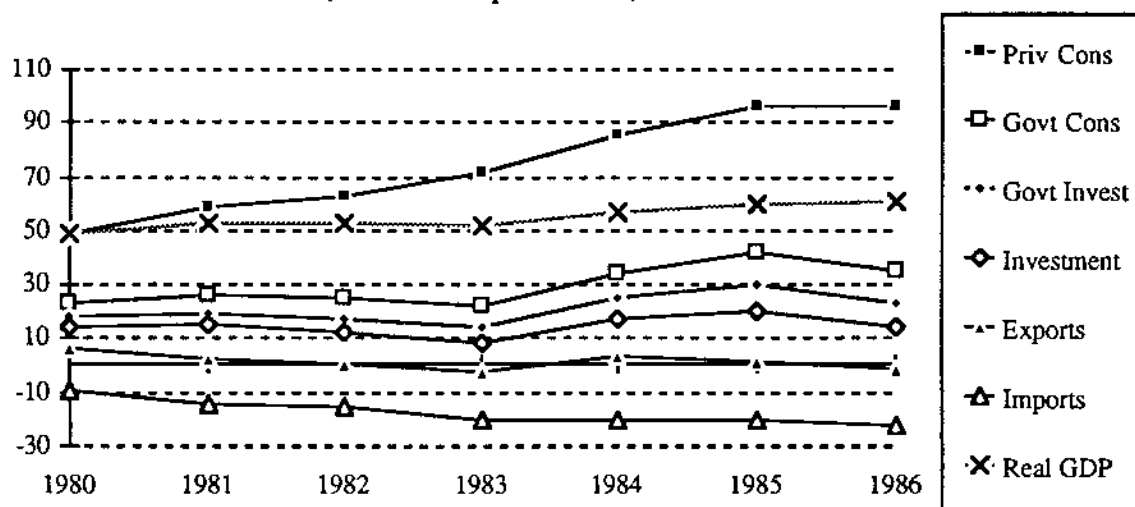
The path of macroeconomic aggregates is traced in figure 3.1, where the components of nominal GDP are graphed in a cumulative fashion (i.e. GDP = C+I+G+E-M). Real (1980 based) GDP is superimposed on this for reference as a gray line. The sum of (negative) imports and exports indicates that the trade balance went into deficit as soon as oil prices dropped substantially in 1983, rose in response to devaluation measures, and fell again in the next oil slump.

The four components of domestic final demand, private investment, government investment, government current expenditure, and private consumption (whose trend corresponds to nominal GDP in this cumulative graph). Public sector

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shares of nominal GDP declined after 1981, remained relatively constant from 1983 to 1985, and then fell again with new austerity measures. The key to rising real incomes and consumption was apparently devaluation and its stimulating effect on private investment. The latter was declining in anticipation of the oil slump (over 40 per cent the capital value added in the economy in that sector), but began to rise in response to new opportunities for export diversification and import substitution. The accumulation of capital this realized essentially powered the economy though the end of 1986, although the growth rate of real GDP had flattened by this time and private investment had already fallen again in response to the next oil price decline.

Figure 3.2: Balance of Payments (SDR bns)
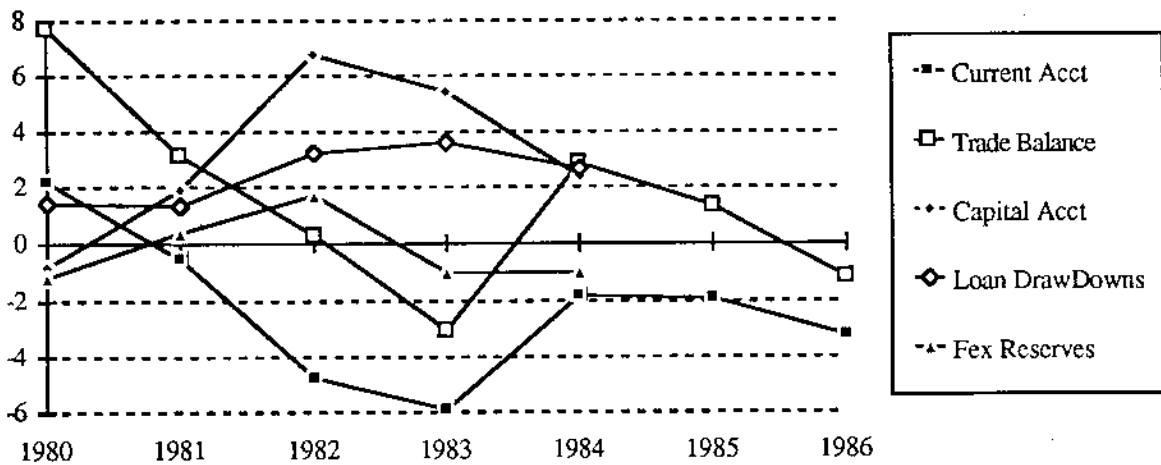
Meanwhile, more dramatic fluctuations were ocurring in the external balance accounts. Indonesia began the 1980s with quite a favorable balance of payments inherited from the sustained oil boom of the previous decade. The trade and current account balances were in surplus and the country was already a net investor overseas. Conditions began to change rapidly with the decline of oil prices, however. Both the trade and current accounts fell rapidly until 1983. Indonesia began a program of sharply increased foreign borrowing to cover its external liabilities and maintain domestic expenditure commitments. The country accumulated foreign exchange reserves to defend the currency and domestic purchasing power for imports until 1982, when it conceded to a graduated series of devaluations of the rupiah.

The trade balance began to recover in 1983, but started down again in 1984 and went into deficit in 1986. At this time the government began to implement more significant cuts in current and capital expenditure and accelerated devaluation to

reduce absorption. Full convertibility was also instituted at this time to forestall capital flight. Despite these measures, the current account situation worsened significantly in 1986.

While the government took prompt and decisive financial measures to improve the balance of payments, their domestic expenditure policies were based during the mid-1980 on overly optimistic oil price expectations. Unlike the latter half of the decade then, the government was slow to implement its fiscal austerity and structural adjustment program and this reticence probably intensified the downturns of 1983 and 1986.

The consequences of domestic and international conditions for the price level and exchange rates are depicted in figure 3.3. Two values are given for nominal exchange rates, rupiahs per U.S. dollar and per SDR.[7] The country's oil revenues are tied to the dollar, but 40 per cent of its trade is tied to other currencies, including many which appreciated against the dollar after 1985. Thus the average nominal exchange rate would be somewhere between these two trends, both of which shows steady and substantial depreciation. The rupiah had lost half its 1980 purchasing power by 1986.

Figure 3.3: Exchange Rates and Price Levels
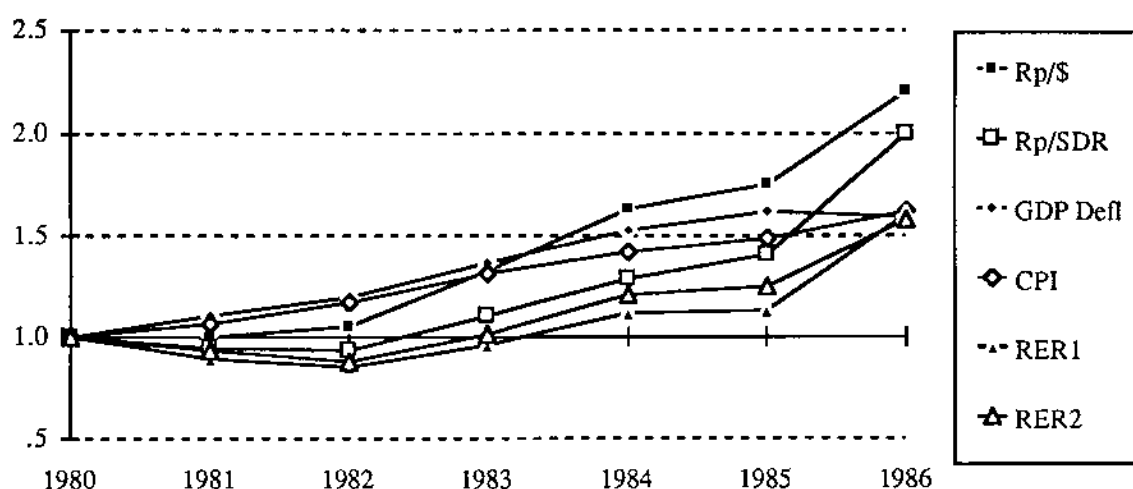
The domestic price level is represented by two indicators, a GDP deflator and a consumer price index.[8] These series are quite comparable, although the greater nontradeable composition of consumption moderates its price inflation somewhat during the devaluation intervals. The last two series are real exchange rates computed by the macroeconomic definition, i.e. the nominal exchange rate minus the rate of domestic inflation. The series RER1 represents the dollar nominal

rate less the GDP deflator, while RER2 uses the SDR rate. Both these trends indicate that the devaluations of the government succeeded in depreciating the real exchange rate, by over 50 per cent by 1986. This implies a number of real effects of the nominal fiscal and financial policies were likely to ensue, including increased import substitution, more broadly based export competitiveness, and resource pulls from nontradeable sectors. The last effect is essentially a reversal of Dutch disease, and would have been quite appropriate at the time in light of the over-dependence of the economy on nonrenewable primary exports.

Figure 3.4: Export Value Shares (percent)
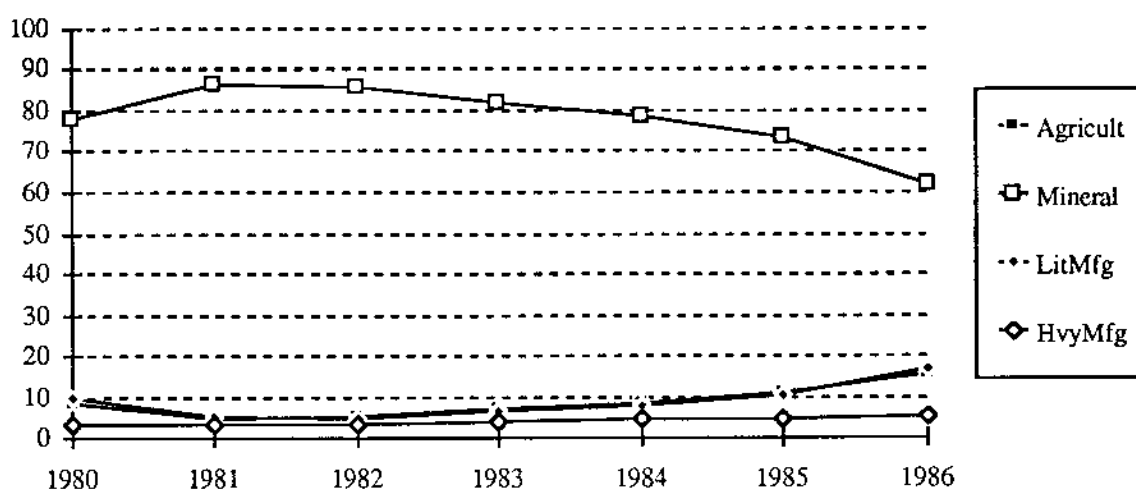
The actual adjustment path of exports is indicated in figure 3.4 and shows the relative export shares of the four main tradeable sectors over the reference period.[9] Shares of export value in current rupiah are graphed, and the combined effects of declining oil prices and real exchange rate depreciation are immediately apparent. The share of oil revenues in tradeable exports declines from a a peak of 87 per cent in 1981 to 62 per cent in 1986, a drop of almost 30 per cent in relative terms. At the same time, increasingly competitive other tradeables such as agriculture and light manufacturing expand their individual share of export earnings from below 5 per cent to over 15 per cent. Despite the contractionary effect of foregone oil earnings then, changing external conditions and exchange rate depreciation led the economy to diversify its export activities and reduce its dependence on exports of nonrenewable resources.

The time path of tradable import shares, depicted in figure 3.5, is less systematic. Declining world energy prices reduce the share of these goods in the total import bill after a sustained increase until 1983. The shares of other goods

are relatively flat, but this is hardly surprising at this level of aggregation. Substitution between export activities is a matter of resource allocation and market diversion, while changing the composition of import demand implies not intersectoral substitution, but sector by sector import substitution. Apparently the degree of this substitutability is relatively uniform for the non-energy sectors. It is apparent from figure 3.1 that aggregate demand is growing faster than total imports, however, so the exchange rate depreciation is inducing some import substitution.

Figure 3.5: Import Value Shares (percent)
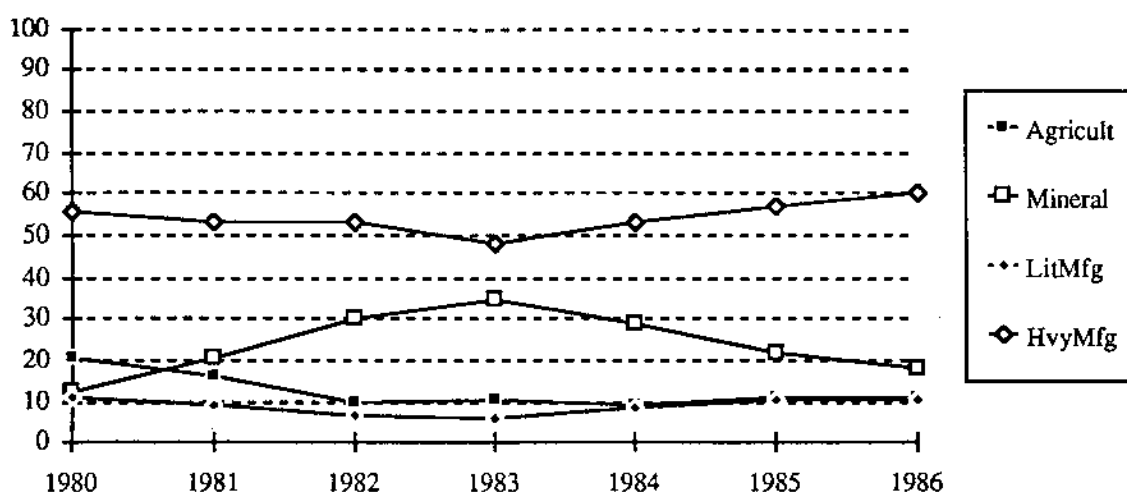
The last figure, 3.6, shows the trend in terms of trade for the four main tradeable sectors. The decline in oil export prices is quite apparent, but the the most arresting feature of this diagram is the upward trend in terms of trade for light manufactures. This sector is of course one of the most prominent stepping stones to economic modernization for the successful export oriented economies of the post war era. Its main advantages are high labor demand, relatively low entry level skills, high labor and management learning curves, and extensive non-pecuniary externalities for the rest of the economy. The trend in terms of trade for light manufactures is an open invitation to export diversification and more balanced economic growth for Indonesia, yet the government failed to take this opportunity by restructuring public investment and private incentives to expand capacity in this leading non-primary sector. As will be apparent in the simulations of section 5, policies of this kind would have improved both aggregate and compositional indicators for the economy.

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Figure 3.6: Sectoral Terms of Trade

Legend: Agricult, Mineral, LitMfg, HvyMfg
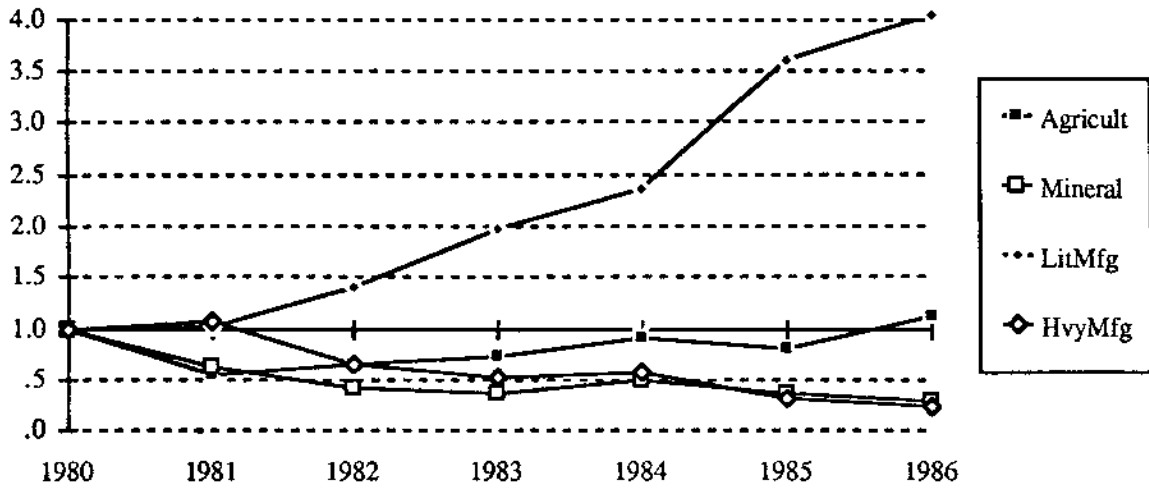
IV. SIMULATION OF EXTERNAL CONDITIONS

In this section, we apply the calibrated intertemporal general equilibrium model MAQM to simulate the effects of alternative external conditions on the Indonesian economy. We begin with a brief discussion of the model and its calibration, and then present a set of four counterfactual simulations. The analytical model used in this study was developed by Bourguignon, Branson, and de Melo [1989, 1990] and implemented for computer based simulation by Bourguignon and Suwa [1990]. The model has been applied to a variety of countries, including Morocco (Morrisson [1989], Bourguignon and Morrisson [1992]) and the Ivory Coast (Lambert and Suwa [1990]) and is intended to synthesize macroeconomic and microeconomic components in a multisectoral, intertemporal general equilibrium framework for empirical simulation. The model maintains detailed information on the composition of domestic income, product, demand, factor use, and trade flows, and is designed specifically to study the distributional implications of external events and policies.

The model was calibrated to the Indonesian economy for the period 1980-86, with the 1980 SAM as the reference data set for the first year. Using information from a combination of Indonesian, international agency, and private sources (these are discussed in the previous section), the model was then solved sequentially for the years 1981-1986 and calibrated to be consistent with observed components of GDP. The calibration results are presented in figure 4.1 and its companion table. The GDP components are displayed in the figure as ratios of observed to simulated values, and they indicate that the solutions of the model track their observed values closely. The maximal deviation is just over 5 percent and the weighted average about 2 percent.

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Figure 4.1: Calibrated Macro Aggregates (Actual/Model)
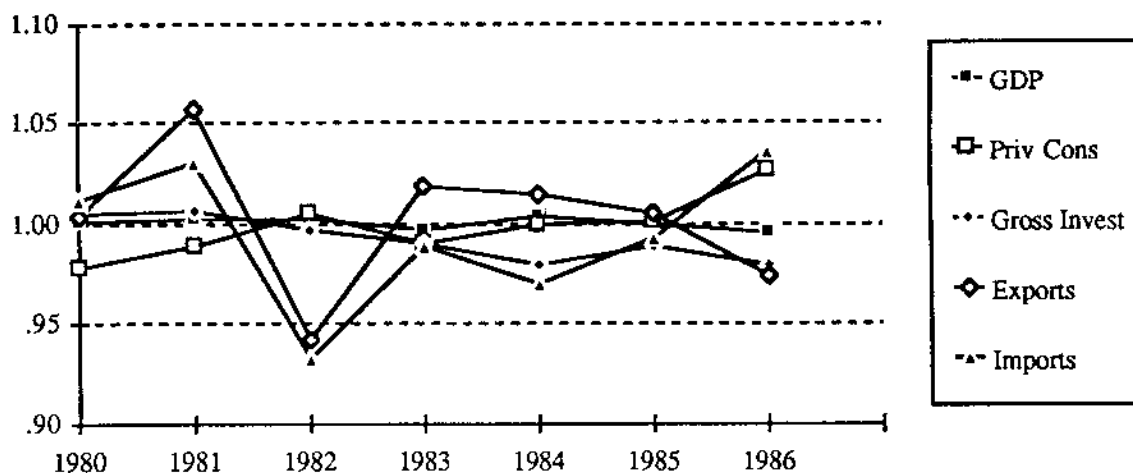
The larger deviations are in the trade flows, and this is due to a combination of factors: external instability at this time, high noncompetitive import dependence, and the equilibrium conditions of the model. The conditions in the external environment during the early part of the period 1980-86 were changing rapidly, as discussed in section 3 above. A relatively high proportion of noncompetitive imports has been assumed for Indonesia, averaging about 65 percent across sectors on a year to year basis. This is consistent with a largely agrarian primary exporter at the early stages of development. Because of the relative inflexibility of imports, the response of the model to external terms of trade shocks was more limited than would have been desirable. This result arises in the MAQM calibration because the model imposes temporary general equilibria at each annual interval, while the actual economy was undoubtedly in some disequilibrium at this time. In any case, the deviation in trade flows is small. The calibrated model provides an intertemporal reference case for evaluating counterfactual exogenous conditions in this section and alternative policies in section 5.

Table 4.1: Intertemporal Calibration
Figures in billions of current rupiah

	1980	1981	1982	1983	1984	1985	1986
GDP							
Actual	48.91	58.42	62.65	71.21	85.45	96.07	96.49
Model	48.88	58.31	62.50	71.44	85.15	96.15	96.88
Govt Cons							
Exogenous	5.15	6.45	7.23	7.79	8.94	11.42	11.33
Govt Invest							
Exogenous	3.85	4.65	5.16	5.56	8.08	9.41	8.90
Priv Cons							
Actual	25.60	32.29	37.92	49.23	51.40	54.60	61.68
Model	26.18	32.65	37.74	49.71	51.44	54.53	60.11
Gross Invest							
Actual	11.90	17.31	17.24	17.19	22.11	28.47	25.29
Model	11.84	17.21	17.29	17.36	22.56	28.79	25.81
Exports							
Actual	16.16	16.40	15.33	17.73	23.38	21.77	20.04
Model	16.10	15.51	16.27	17.41	23.05	21.66	20.58
Imports							
Actual	9.89	14.03	15.07	20.73	20.37	20.19	21.86
Model	9.78	13.62	16.15	20.96	21.00	20.33	21.10
Trade Balance							
Actual	6.38	2.78	-.83	-3.23	2.38	1.44	-1.06
Model	6.32	1.89	.12	-3.55	2.05	1.33	-.52

The calibrated MAQM was run under four scenarios of external conditions which might have prevailed instead of those which actually took place. In the first scenario, it was assumed that export prices of the energy and mineral sector remained constant at 1980 levels throughout 1980-86, i.e. the oil price slump did not occur. In every other respect, this specification is identical to the observed or reference one. In the second alternative, Indonesia's terms of trade, indeed the absolute levels of both sectoral import and export prices, remain constant at 1980

values over the entire period. Thus, not only to oil prices remain completely stable, but the terms of trade deteriorations experienced in both agriculture and heavy manufacturing are assumed away. In the third scenario, the effects of a prolonged global recession are simulated by specifying declining export prices and demand. In the fourth and final alternative, a sustained global upswing is simulated by specifying rising price and volume profiles for Indonesian sectoral exports.

1. Oil Price Stability

The world price of Indonesia's leading export, petroleum, declined steadily over the period 1982-86, and this sector's share of total export earnings declined about 30 percent during the same period. Indeed, the drop in oil earnings was the main impetus for the structural adjustment program initiated by the government, which relied for almost 70 percent of its revenue on oil taxation. In this simulation, we attempt to isolate the role of the oil price drop from other external forces, including the other recessionary components of world demand at the time. Had oil prices remained stable, our results indicate that the contractionary effects on the economy would have been significantly offset, but that the composition of domestic income would have shifted regressively. Thus, oil price stability would have increased the rate of growth of the economy of the period under study, but it might have had unwelcome distributional effects.

The actual process of adjustment under stable oil prices is driven by two main forces, aggregate income gains and resource pulls to the energy sector. The percent changes in macroeconomic aggregates are depicted in figure 4.1.1 and detailed in the accompanying table. These indicate a brief drop in nominal GDP in 1981, when oil prices actually would have been higher, followed by a sustained upward trend. This is mirrored in all demand components of GDP except gross investment, which actually falls because of the combined effects of declining relative profitability in other sectors and high interest rates induced by (now) relatively tight money. Had the government targeted the monetary base against growth in real income, investment would have been more pro-cyclical and real growth rates in the economy would have been even greater.

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Figure 4.1.1: Change in Macroeconomic Components
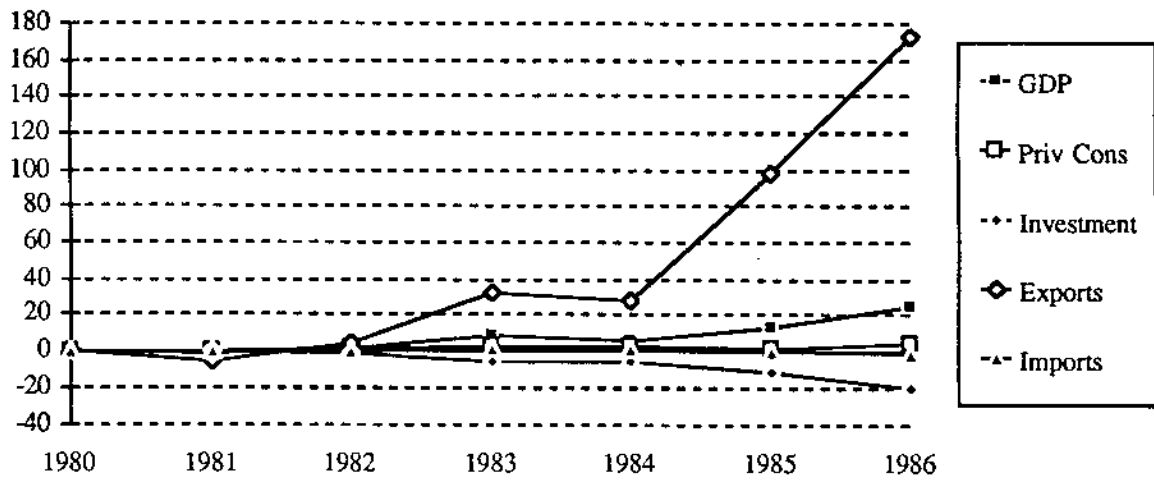
Table 4.1.1: Macroeconomic Components Under Oil Price Stability
Flows In billions of current rupiah

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Investment	11.84	17.21	17.29	17.38	25.72	38.54	35.76
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 1							
Real GDP	48.88	57.63	63.35	77.47	89.76	108.80	115.70
Priv Cons	26.18	32.76	38.17	51.36	51.11	57.33	61.50
Investment	11.84	17.32	16.99	16.34	24.19	34.08	28.31
Exports	16.10	14.56	17.13	23.11	27.92	34.41	43.78
Imports	9.78	13.67	16.27	21.25	22.49	28.49	29.36
Fiscal Deficit	.95	6.53	2.04	6.83	11.51	14.59	21.39
trade Balance	6.32	.89	.85	1.86	5.43	5.93	14.42
Interest	12.10	11.77	13.07	17.33	12.52	10.30	13.80
Percent Change							
GDP	0	-1	1	8	7	13	25
Priv Cons	0	0	1	3	3	1	5
Investment	0	1	-2	-6	-6	-12	-21
Exports	0	-6	5	33	28.	98	172
Imports	0	0	1	1	1	0	-1
Interest	0	-1	5	20	20	35	77

Table 4.1.1 gives an indication of the difference in structural adjustments which would have followed from more oil price stability. The upper half of the table shows the percentage changes in nominal GDP arising from each sector over the seven year period. The first year in both scenarios is the same, but after this the composition of nominal GDP begins to shift. In particular, resources are pulled toward the oil sector to sustain its export expansion and take advantage of its improved relative prices. Other tradeable sectors decline sharply because of declining relative prices and investment.

Nontradeable sectors expand nominally, but actually contract in real terms because of the real exchange rate depreciation. This effect is a result of the fixed

exchange rate devaluations over the reference period, and it contradicts the usual Dutch Disease effects which occur for flexible rates and expansion of primary exports. As the fiscal and trade balance series in table 4.1.1 indicate, the reference policy under stable oil prices leads to massive accumulation on the government budget and foreign reserve accounts, and real equilbrium is sustainable only by enforcing accounting disequilibrium with an undervalued exchange rate and fiscal repression. This kind of strategy might be feasible in a dynamic and relatively high income country like Taiwan, but would not last long in Indonesia. For this reason, oil price stability would require a deliberate policy measures to mitigate the adverse effects of exchange rate depreciation on the other sectors of the economy.

The real sectoral consumption effects of stable oil prices are given in the second half of table 4.1.2 and these reflect changing household budget composition in response to relative price adjustments. In particular, the relative price of oil is higher over the period under consideration, and thus households shift toward other commodities, especially food, consumer goods, and informally marketed goods and services. The end result of these adjustments is a 5 percent rise in real aggregate consumption.

The sectoral consumption figures indicate rising living standards, but these aggregate gains are not uniformly distributed. As the nominal household results in figure 4.1.2 and table 4.1.3 indicate, consumption only rises for the wealthier households, whose incomes are tied to the capital intensive energy and mineral sector. The most affluent household group, Urban Households, experiences a 25 percent rise in 1986 consumption, and Rural High income households see consumption rise 12 percent. By contrast, the most populace Small Farm households and other low income groups see their consumption decline byt the end of the period, after small initial improvements. These adverse distributional effects are reinforced by the inequality indicators, which show a long term trend toward increased inequality (the Theil coefficient). The vulnerability of the low income groups to poverty, as measured by the poverty gap, is relatively stable, since distributional losses are somewhat offset by aggregate income gains.

Table 4.1.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	0	1	2	-1	-5	-8
Energy Min	0	-11	1	36	27	124	349
Light Mfg	0	6	3	1	0	-27	-28
Heavy Mfg	0	9	3	-8	-4	-28	-36
Informal	0	1	1	1	1	4	1
Services	0	0	1	3	2	5	6
Real Consumption							
Agriculture	0	0	-1	1	2	1	4
Energy Min	0	0	-14	-30	-25	-42	-59
Light Mfg	0	-1	0	2	2	6	7
Heavy Mfg	0	1	2	2	2	3	2
Informal	0	0	0	3	2	2	8
Services	0	0	1	2	2	1	5
Total	0	0	2	2	3	3	5

Summing up the results of the first simulation, stability of oil prices could certainly have been advantageous to the Indonesian economy, but it would have represented a new challenge to policy makers. The windfall gains of robust primary export markets carry with them the threat of over-dependence and distortions of the in countries which have experienced Dutch Disease. Moreover, the factor ownership patterns in the country would mean a more regressive income distribution as energy and mineral export income increases. Given the large share of oil revenue which accrues to the government, the means do exist to stabilize relative prices and the distribution of income. Careful but expedient action will be required, however, to minimize the distortionary effects of rapidly accumulating budgetary and foreign exchange surpluses.
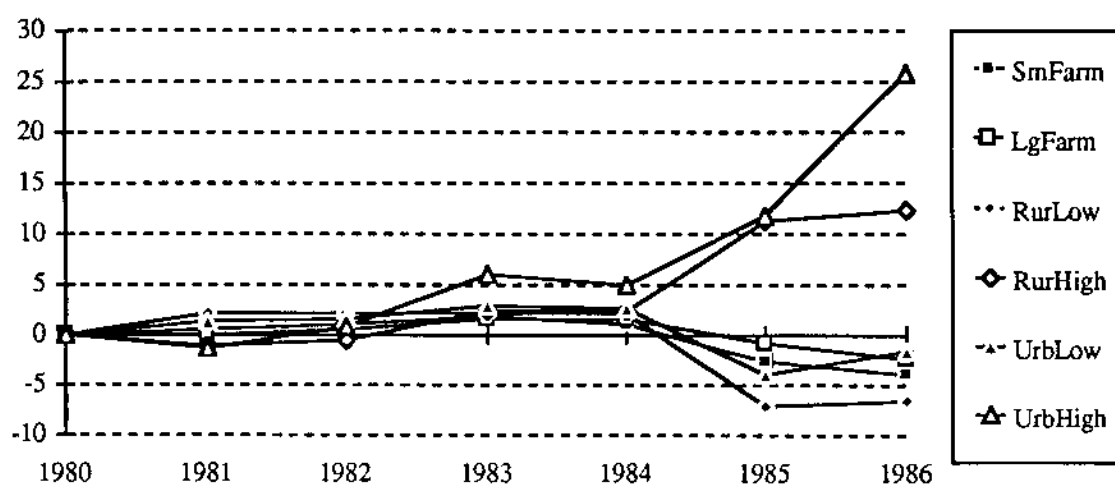
Figure 4.1.2: Nominal Household Consumption Changes

Table 4.1.3: Household Consumption and Distributional Changes
Percentages

| Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	0	1	2	1	-3	-4
LgFarm	0	0	0	1	2	-1	-2
RurLow	0	2	2	2	2	-7	-7
RurHigh	0	-1	-1	2	2	11	12
UrbLow	0	1	2	3	3	-4	-2
UrbHigh	0	-1	1	6	5	12	26
Inequality Measures							
Theil	0	-1	0	0	2	11	20
Pov Gap	0	0	-1	0	1	-3	1

2. Stable Terms of Trade

In this simulation, import and export prices of all sectors are frozen at their 1980 levels, fixing the terms of trade for the economy across the board. This represents a scenario where uncertainty is removed from the real side of the external sector. As one might expect, this stability is beneficial to a trade dependent economy like Indonesia. Given the prominence of oil in total trade of the country, one might expect these results to resemble those of the previous

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experiment. This is indeed the case, but stable terms of trade yield even greater aggregate benefits, more balanced real growth, and more egalitarian income effects.

Nominal GDP in the economy grew over 50 percent faster than in the previous experiment, with substantial increases in aggregate nominal (12.94 percent in 1986) and real (12 percent in 1986) consumption. Investment declines again because of the repressive effect of the reference monetary policy, but this could be offset by graduated monetary expansion.

Figure 4.2.1:   Change in Macroeconomic Aggregates
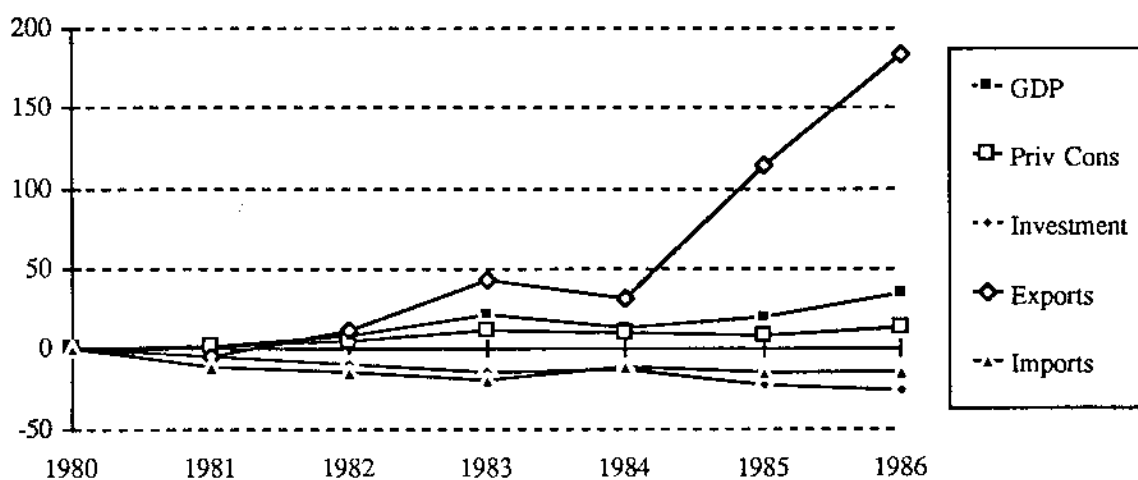
The sectoral information in table 4.2.2 presents a more balanced picture of growth in value added and consumption. The relative decline in the heavy manufacturing sector is due primarily to the repression of investment demand. The energy sector is again a leading contributor to domestic value added, but the agricultural and service sectors also increase their contribution to GDP. Light manufacturing experienced the largest terms of trade gain of any sector historically, and thus suffers in this alternative specification.

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Table 4.2.1: Macroeconomic Aggregates
Flows in Billions of Current Rupiah

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Investment	11.84	17.21	17.29	17.38	25.72	38.54	35.76
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 2							
Real GDP	48.88	59.15	67.49	86.78	95.22	115.76	124.43
Priv Cons	26.18	33.27	40.08	55.83	54.76	61.18	65.99
Investment	11.84	16.45	15.77	14.98	22.27	30.07	26.46
Exports	16.10	14.88	18.10	24.91	28.86	37.35	45.68
Imports	9.78	12.01	13.78	16.82	19.67	24.37	25.15
Fiscal Deficit	.95	6.74	2.88	8.85	14.75	18.44	27.27
trade Balance	6.32	2.87	4.32	8.10	9.19	12.88	20.53
Interest	12.10	12.86	15.75	22.36	14.89	13.01	16.55
Percent Change							
GDP	0	1	8	21	13	21	35
Priv Cons	0	2	6	12	10	8	13
Investment	0	-4	-9	-14	-13	-22	-26
Exports	0	-4	11	43	33	114	184
Imports	0	-12	-15	-20	-11	-14	-15
Interest	0	9	26	54	43	70	112

Sectoral consumption figures indicate a distinct elevation of living standards occurs during this period of stable terms of trade. Except for energy and heavy manufactures, which are a minute part of final consumption demand in Indonesia, sectoral real consumption improves by 1986 and aggregate real consumption expands steadily in every period after 1981. It is particularly significant that consumption rises most in non-subsistence sectors, such as light manufactures and services, indicating that income is rising and consumption is shifting toward luxuries.

Table 4.2.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	13	18	37	28	23	13
Energy Min	0	-11	2	37	27	124	351
Light Mfg	0	3	8	13	5	-23	-19
Heavy Mfg	0	-3	-12	-19	-18	-34	-36
Informal	0	3	9	7	-3	1	1
Services	0	3	10	19	12	13	18
Real Consumption							
Agriculture	0	-1	0	-2	0	0	5
Energy Min	0	17	0	-20	-13	-42	-53
Light Mfg	0	2	8	13	12	18	23
Heavy Mfg	0	-2	4	4	3	1	-2
Informal	0	0	2	8	10	8	17
Services	0	0	2	4	5	5	12

The household situation is just as favorable from a distributional perspective. Since terms of trade stabilizat..n protects the export potential of agriculture, the lower income groups whose incomes are tied to trade also benefit. The result is balanced increases in consumption for all households, with substantial and sustained advances for high income groups and those whose incomes are tied directly to farming. The situation for the rural and urban low income classes, who have no entitlements to capital goods to offset the higher prices of agricultural foodstuffs, is ultimately less favorable. Their consumption rises by as much as ten percent in 1983, but falls back to the reference levels by the end of the interval under consideration.

Theil inequality indicators reveal more egalitarian trends early in the interval, when the individual gains to the smaller tradeable sectors are most significant. Generally speaking, the stabilization of all terms of trade spreads the benefits of trade more evenly. The income distribution becomes more regressive, however, as the oil sector begins to dominate the country's gains from trade. In every year of the new international price regime, however, more individuals move out of poverty. This is an indication that, relative income gains aside, the overall growth of the economy is raising the living standards of the poorest.

As might be expected, this pro-trade scenario leads to substantial trade and fiscal surpluses, and these must be managed in a responsible and equitable manner to realize the full potential of terms of trade stability. Fiscal surpluses could be channeled in part into food subsidies for poor nonfarm households, as well as subsistence energy use subsidies. The country's foreign exchange reserves will also require careful management. If reserves are held too long, the domestic currency will be artificially undervalued. If the exchange rate appreciates too rapidly, however, the country's competitive position will change abruptly, leading to steeper adjustment costs.

Figure 4.2.2:   Change in Household Consumption
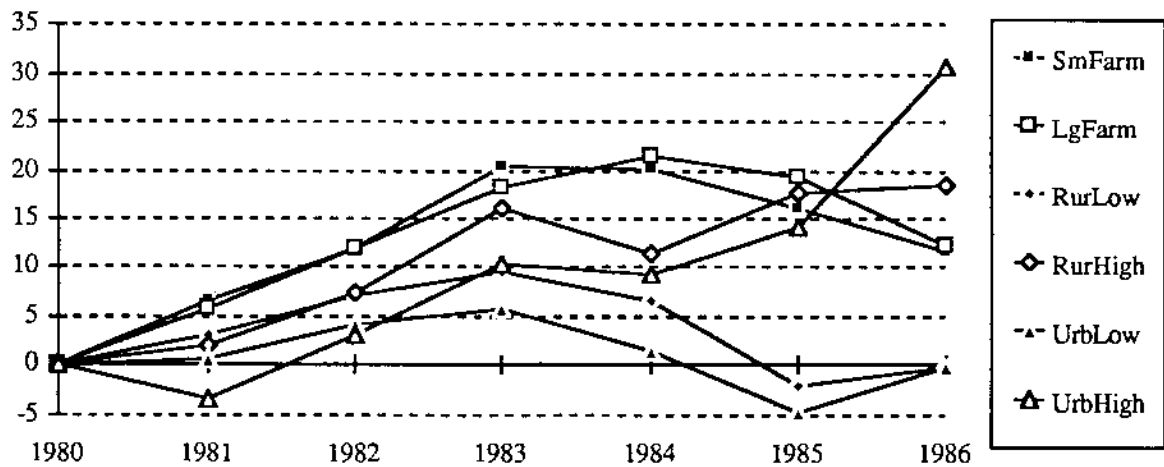
Table 4.2.3: Household Consumption and Inequality

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	7	12	20	20	16	12
LgFarm	0	6	12	18	21	19	12
RurLow	0	3	7	10	7	-2	0
RurHigh	0	2	7	16	11	18	18
UrbLow	0	1	4	6	1	-5	0
UrbHigh	0	-3	3	10	9	14	31
Inequality Measures							
Theil	0	-3	-2	-3	-3	5	13
Pov Gap	0	-23	-32	-43	-31	-42	-44

As a general rule, the government might consider managing both surpluses as buffer stocks for reducing economywide distortions. Fiscal surpluses can be used to minimize distortions in income distribution or the effects thereof. Accumulated foreign exchange reserves might serve as a buffer stock against fluctuations in export prices, particularly that of oil, and the distortions they induce in the intertemporal path of relative prices and the real exchange rate. Since oil, for example, is a non-renewable resource, revenues must be channeled into productive infrastructure. If this is done under a regime of medium term exchange rate appreciation, however, Dutch Disease or under-investment in export diversification is the inevitable result. Thus the reserve accumulation under rising oil prices should be used to moderate real exchange rate movements and the export surplus directed towards balanced expansion of export capacity.

3. Prolonged Global Recession

The next simulation was designed to elucidate the effects of a deep and pervasive decline in world trade. A prolonged global recession was simulated by specifying 12.5 percent per annum declines in both the price and volume of each sector's exports. Over the six year period 1981-86, these reductions total a 50 percent decline in each component of export earnings and thus a 75 percent

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decline in total export earnings, representing a rather extreme but instructive counterfactual. The overall marcoeconomic results, given in figure 4.3.1 and table 4.3.1, are not really as bad as one might suspect. Ironically, the external adjustments imposed on the economy in this counterfactual are of the same order of magnitude of those actually experienced in the reference period, so the outcome is qualitatively similar. What the overall results indicate is an acutely deflationary trend, but something less than a catastrophe. The volume and value of trade is of course reduced substantially, but investment simply varies with interest rates and consumption actually rises in every period. Declines in export revenues appear to dominate the overall GDP effect, which is relatively small in any case.

Figure 4.3.1:   Change in Macro Aggregates
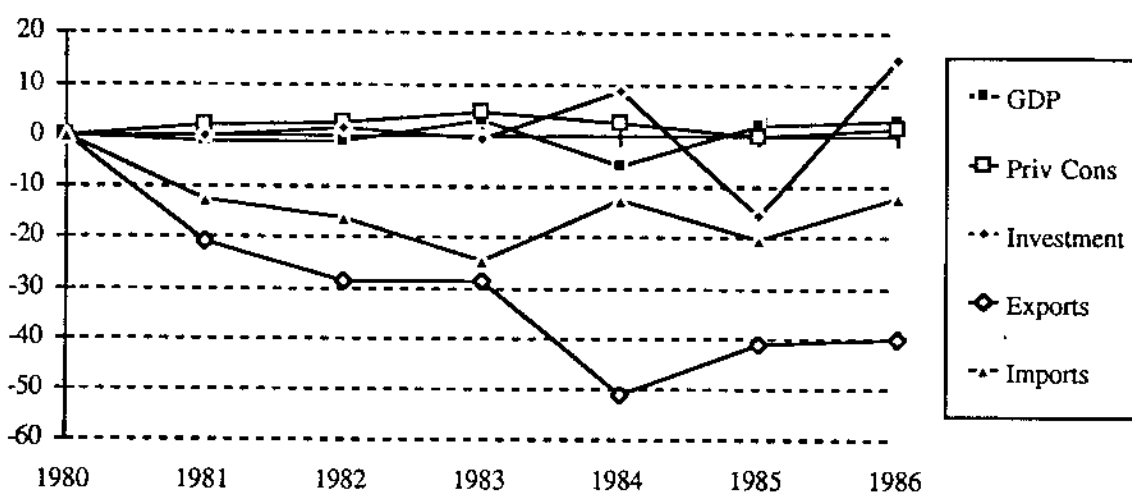
Table 4.3.1: Macroeconomic Aggregates

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Investment	11.84	17.21	17.29	17.38	25.72	38.54	35.76
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
Trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 3							
Real GDP	48.88	57.59	61.72	73.64	79.46	98.00	95.40
Priv Cons	26.18	33.38	38.79	51.95	50.94	56.50	59.25
Investment	11.84	17.17	17.55	17.26	27.99	32.51	41.21
Exports	16.10	12.30	11.60	12.46	10.71	10.27	9.66
Imports	9.78	11.95	13.53	15.86	19.39	22.68	25.99
Fiscal Deficit	.95	5.35	-1.19	.65	.62	.97	-2.56
Trade Balance	6.32	.35	-1.93	-3.40	-8.69	-12.41	-16.33
Interest	12.10	12.04	12.36	14.74	8.28	8.63	6.27
Percent Change							
GDP	0	-1	-1	3	-6	2	3
Priv Cons	0	2	3	5	3	0	1
Investment	0	0	2	-1	9	-16	15
Exports	0	-21	-29	-28	-51	-41	-40
Imports	0	-12	-16	-24	-13	-20	-12
Interest	0	2	-1	2	-20	13	-20

The aggregate results do mask more dramatic compositional changes. Strong shifts in the sectoral sources of value added (table 4.3.2) induce a sustantial realignment of resources in the economy. This would inevitably lead to substantial adjustment costs, but it does allow aggregate employment levels to remain relatively stable. The combined effect of stable overall employment and deflation means that real consumption actually increases in every period. A number of interesting adjustments appear in more detailed results. For example, the decline in export prices and volumes makes the domestic market more attractive to domestic producers, and in many cases exports are diverted to substitute for

imports (whose prices have not fallen). The extent of this is of course limited by real substitution possibilities, but even with the stringent noncompetitive import assumptions in the present model, substantial import substitution is undertaken in the light manufacturing sector.

Table 4.3.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	9	15	31	23	35	7
Energy Min	0	-26	-36	-30	-51	-33	16
Light Mfg	0	18	26	30	42	9	18
Heavy Mfg	0	1	-6	-17	4	-22	-21
Informal	0	0	6	-5	-12	-4	-6
Services	0	2	4	9	3	7	3
Total	0	0	7	0	-11	-50	5
Real Consumption							
Agriculture	0	1	0	-2	0	-4	2
Energy Min	0	17	29	20	50	17	0
Light Mfg	0	0	5	10	7	13	30
Heavy Mfg	0	6	5	10	6	8	14
Informal	0	1	0	9	10	4	31
Services	0	1	2	4	5	3	21
Total	0	1	2	5	4	4	18

If such a situation were sustainable, it would be relatively beneficial to Indonesian households. Total real household consumption rises through the deflationary trend in domestic prices, peaking in 1986 at 18 percent above the reference case. The distribution of consumption effects is less than egalitarian, however, but this time it is the high income groups who suffer more. Since their incomes are more closely tied to tradeables, they tend to bear the main burden of declining export earnings. This process of course improves the equality of the income distribution, as can be seen in the Theil coefficient declines in every year of the recession. Even more encouraging is the sharp decline in the poverty gap. This comes about because of declining living costs. Low income workers tied to nontradeable sectors inevitably benefit from increased relative purchasing power.
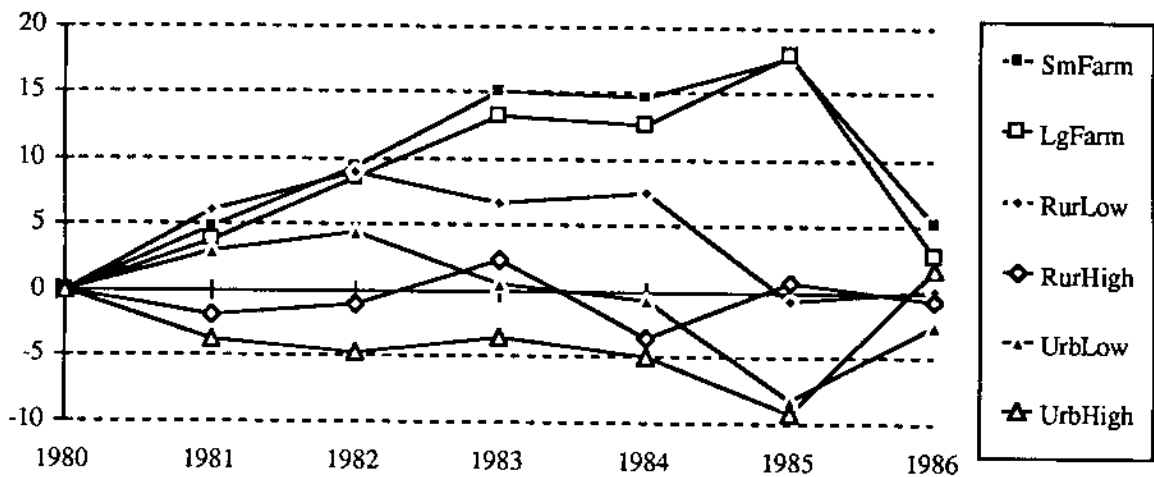
Figure 4.3.2: Change in Household Consumption

Table 4.3.3: Household Consumption and Inequality
Percentages

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	5	9	15	15	18	5
LgFarm	0	4	8	13	13	18	3
RurLow	0	6	9	7	7	-1	0
RurHigh	0	-2	-1	2	-4	1	-1
UrbLow	0	3	5	1	-1	-8	-3
UrbHigh	0	-4	-5	-3	-5	-9	2
Inequality Measures							
Theil	0	-3	-5	-9	-11	-12.	-1
Pov Gap	0	-17	-30	-45	-35	-50	-48

Looking at the fiscal and trade balances in table 4.3.1, it is natural to ask if this situation could be sustained under the reference policies. The fiscal deficit is not much worse than the reference case since, as already emphasized, the export market for oil was just about as bad as in the counterfactual and this is the government's main revenue source. The trade balance is shifting into the negative, but again only moderately more so than in the reference case. This leads one to conclude that the policies of the period 1980-86, including significant reductions in

absorption and extensive recourse to external borrowing, could have been serviceable in more extreme circumstances.

4. Sustained Upswing in Export Markets

The last of the counterfactual simulations of external conditions is in a sense the reverse of experiment 3. It also contradicts the unfortunate historical experience of Indonesia during this period and represents the dream of an export oriented, developing economy. For this simulation, 12.5 percent increases have been specified for both export prices and volumes in each of the six years 1981-86. This is intended to correspond to a sustained upswing in the world economy. To make this a most favored scenario, it is further assumed that import prices are fixed at their 1980 levels throughout the simulation period.

Table 4.4.1: Macroeconomic Aggregates
Flows In billions of current rupiah

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Investment	11.84	17.21	17.29	17.38	25.72	38.54	35.76
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
Trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 4							
Real GDP	48.88	60.96	73.84	101.87	113.82	141.72	175.63
Priv Cons	26.18	33.38	42.59	62.12	63.82	72.62	88.10
Investment	11.84	15.12	13.25	11.89	14.28	17.41	19.01
Exports	16.10	17.73	24.22	37.02	45.76	63.38	84.88
Imports	9.78	11.85	13.56	17.10	19.27	23.38	27.88
Fiscal Deficit	.95	7.90	5.52	15.55	24.89	34.80	56.17
Trade Balance	6.32	5.88	10.66	19.92	26.49	40.00	57.00
Interest	12.10	14.45	21.67	25.00	25.00	25.00	25.00
Percent Change							
GDP	0	5	18	43	35	48	90
Priv Cons	0	2	13	25	29	29	51
Investment	0	-12	-23	-32	-44	-55	-47
Exports	0	14	49	113	110	264	428
Imports	0	-13	-16	-18	-13	-18	-6
Interest	0	22	74	73	140	227	221

Exports of course take the lead in the growth of macro aggregates, and investment is again constrained by the tight monetary policy of the reference case. Even with negative gross investment, however, nominal GDP rises by 90 percent by the end of the simulation period and aggregate consumption has grown 51 percent. Although aggregate demand expansion puts inflationary pressure on the economy, the fixity of import prices keeps terms of trade rising and moderates the cost of living. If monetary growth were paced to such an expansionary scenario, domestic capacity would expand steadily, raising real output and keeping inflation in check.

Table 4.4.1 is of course reminiscent of the first experiment, where oil prices were maintained at their historically high 1980 level, and some of the macro effects of the present counterfactual are qualitatively similar. This is especially so for the fiscal and trade balances, which accelerate rapidly into surplus in the present case. The same problems of sustainability arise, and the needs for distribution oriented policies are at once more and less acute. Sectoral distribution effects, that is to say resource pulls induced by the expansion of export dominant sectors, are very strong in this simulation. As the sectoral value added figures in table 4.4.2 indicate, manufacturing sectors, which play a minor role in exports and are susceptible to substitution by imports in domestic demand, are the ones which contract most. This is a very dangerous trend in a country already overly reliant on exports of nonrenewable resources for most of its external and fiscal income.

**Figure 4.4.1:** **Change in Macro Aggregates**

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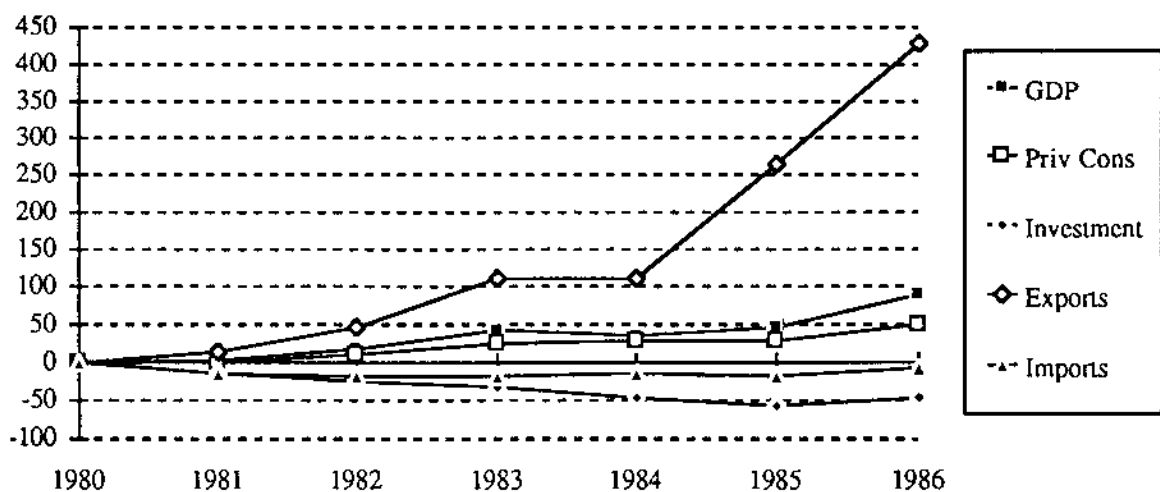
Table 4.4.2: **Sectoral Changes in Value-added and Consumption**
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	25	55	86	85	86	91
Energy Min	0	2	22	83	67	215	615
Light Mfg	0	-13	-10	-3	-22	-52	-38
Heavy Mfg	0	-11	-23	-31	-41	-58	-49
Informal	0	3	10	10	12	22	41
Services	0	4	14	28	21	22	39
Total	0	0	7	112	0	-5	0
Real Consumption							
Agriculture	0	-5	-6	-10	-7	-9	-5
Energy Min	0	0	-14	-30	-25	-50	-65
Light Mfg	0	4	10	14	16	22	25
Heavy Mfg	0	4	5	4	4	0	-8
Informal	0	-2	1	7	5	-1	4
Services	0	-1	2	4	7	8	15
Total	0	-1	2	3	5	5	8

The sectoral reallocation trend shown here looks like one leading to complete specialization, and although this would only be approximated under extreme terms of trade conditions, compositional changes like this leave the economy dangerously limited in flexibility. Some of this kind of specialization is inevitable, and thus the Indonesian oil sector has consumed a disproportionate share of the country's investment capital over the past two decades. If this kind of trend is not moderated, Indonesia will be much more vulnerable to terms of trade shocks and seriously handicapped in its hoped-for transition to diversified export orientation. The needs to promote more balanced sectoral development could be advanced substantially by proper use of the government's budgetary surpluses for direct investment and sectoral incentive policies. As indicated in the evaluation of experiment 2, management of the accrued foreign exchange surplus can also be oriented to more balanced development.

Figure 4.4.2: Change in Household Consumption
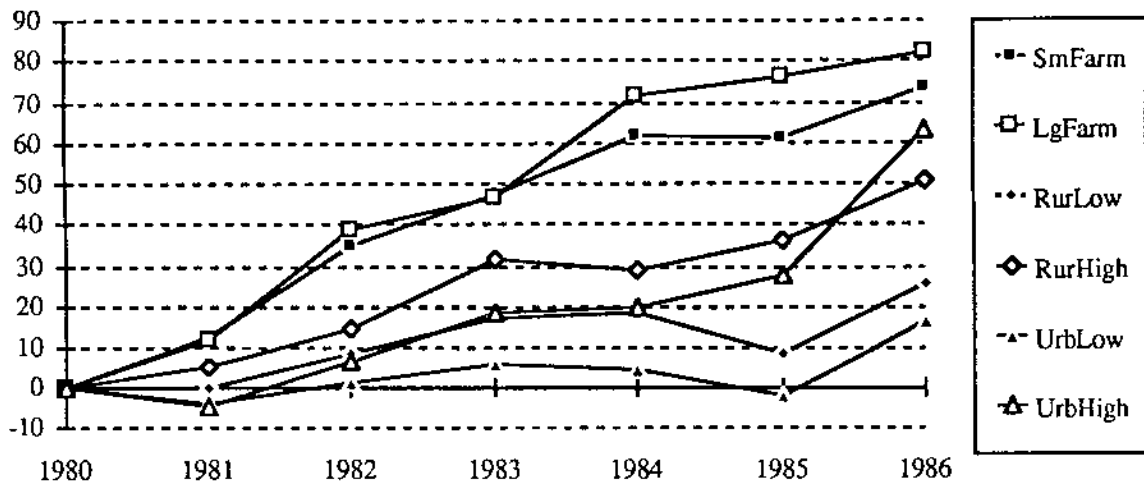
On the other hand, in this scenario fiscal surpluses will be less essential for correcting disparities in domestic income distribution. As the real consumption trends in table 4.4.2 indicate, household consumption rises steadily and substantially over the reference trend, except in the inessential categories of primary resources (oil and minerals) and heavy machinery. More importantly, the incidence of consumption gains is relatively uniform across households. Figure 4.4.2 reveals that the export upswing will benefit every type of household in terms of consumption and income, and that their percentage gains are relatively uniform. This observation is further sustained by the almost universal decline in indicators of poverty and inequality. Only in the final year, when the oil sector has a sharp upswing, is the domestic income distribution adversely affected. Regardless of the ultimate composition of income in every year substantial average income gains for the economy raise more people above the poverty line.

Table 4.4.3: Household Consumption and Inequality
Percentages

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	13	35	47	62	61	74
LgFarm	0	12	39	47	72	76	82
RurLow	0	0	9	17	19	9	26
RurHigh	0	6	15	31	29	36	51
UrbLow	0	-4	1	6	5	-2	17
UrbHigh	0	-4	7	19	20	28	63
Inequality Measures							
Theil	0	-4	-6	-2	-9	1	15
Pov Gap	0	-33	-50	-47	-43	-43	-49

V. SIMULATIONS OF ALTERNATIVE POLICIES

The global recession of the early 1980's had acute effects on primary export oriented developing countries, particularly those, like Indonesia, whose government finance was dominated by export earnings. Indonesia was fortunate among emerging economies at the time not to have a heavy debt burden, but the government was relying on oil taxation for over half its revenue at the time the oil market began its downturn in 1982. The government's reaction to the revenue shortfall was not immediate, but within a year they had begun to implement a voluntary stabilization program of spending cuts and limited structural reforms. By the mid-1980's, external conditions were becoming increasingly unstable and the government turned to more drastic fiscal measures and more extensive reforms to remove trade distortions and institutional inefficiencies. In this section, we focus attention on the early phase of instability and adjustment and evaluate a set of three alternative approaches to Indonesian adjustment policy. In the previous section, we evaluated the robustness of the reference policy regime under changing external conditions. Now alternative policies are evaluated over the same reference external conditions for 1980-86. Our overall conclusion is that somewhat different policies might have improved the outcome for the economy.

Three alternative policy regimes are considered, one based on status quo fiscal instruments, one based on trade reorientation, and one based on monetary policy. The first might be termed a no-adjustment policy, i.e. the government carries out the expenditure plans it set forth for the period 1980-86. This policy proves to be more contractionary in the early phase than the actual policy, but leads eventually to sustained increases in consumption and substantial redistribution in favor of poorer households. The second policy scenario reflects a deliberate attempt to shift the export orientation of Indonesia toward more diversified and sustainable trade patterns. This leads to short term aggregate losses but eventual gains in aggregate consumption and equity. The aggregate gains are not as great as those of the first policy, but the redistribution effects are more favorable to the poor and the resulting orientation of the economic structure is more consistent with sustainable and balanced long term growth. The third and final policy experiment uses monetary policy to reduce absorption without fiscal restraint. This policy is extremely deflationary and leads to very detrimental aggregate and compositional effects.

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1. Status Quo Fiscal Policy

During the first half of the 1980's, Indonesia was still experiencing rapidly rising expectations from the oil boom, swelling government revenues from oil taxation led to upward revisions of planned government consumption and investment in every year from 1980 to 1985. The government has been widely recognized for its flexibility and restraint during the second half of the decade, but Indonesia would have been better advised to follow its planned, more restrained, expenditure path in the early 1980's. Indeed, the government raised current expenditure an average of 54 percent above planned levels during 1981-85 and increased investment spending 38 percent over the same period. The evidence from this simulation indicates that the revised and more expansionary expenditure trends, which continued despite substantial declines in oil prices, led to lower real incomes, expenditure, and a more regressive income distribution. One of the main reasons for this was a crowding out of private investment, which is also shown to be detrimental in the third policy simulation.

The path of macro aggregates is depicted in figure 5.1.1 and detailed in its accompanying table, with the two components of government expenditure included this time since they are changed exogenously. Private investment is also separately to highlight the contrapuntal of "crowding out" in aggregate demand. Despite the government's heavy foreign borrowing and foreign exchange depletion, government spending adjustments were large enough to influence domestic interest rates substantially, and with them private investment and asset holding. If the government had stayed on its planned expenditure trajectory, interest rates would have declined with public outlays and the latter would have been partially offset by private investment, i.e. crowding in would have taken place. New private investment would generally have been channelled into a reorientation of trade patterns, as domestic deflation promoted both import substitution and export expansion.

Figure 5.1.1: Change in Macro Aggregates
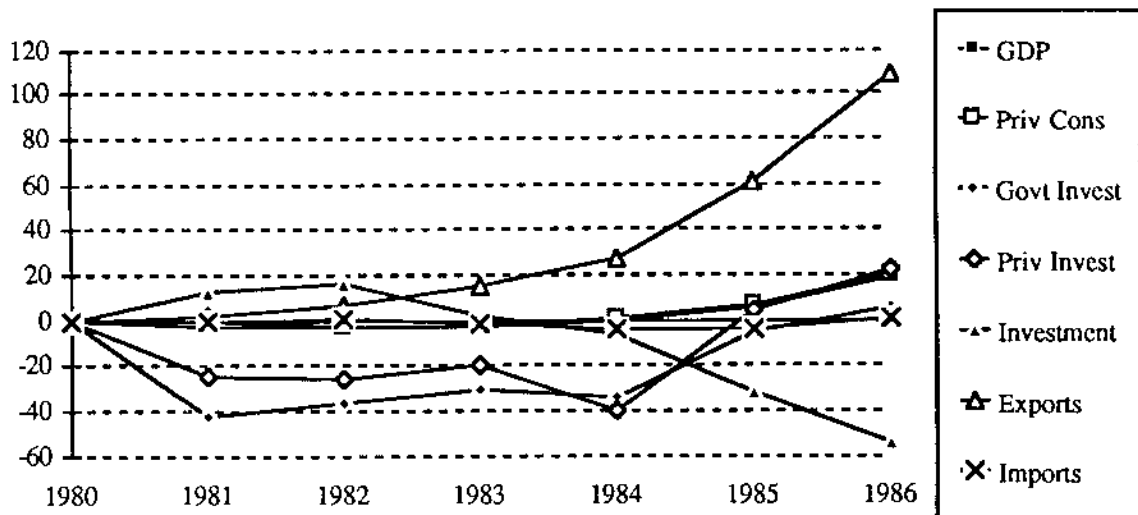
Despite some contraction in the middle period, the eventual effects of expanding capacity are beneficial. The trend toward expansion runs into an interest rate bottleneck by 1985, but this could have been mitigated by accommodating monetary policy. Planned government investment is the culprit in the last period, when it jumps 23 percent. This was the first contractionary adjustment by the government, and appears from our evidence to be justified. It is only regrettable that such restraint was not more forthcoming in the early 1980's.

As the figures in table 5.1.2 indicate, the "privatization" of investment appears to promote more diversified sectoral expansion, especially in manufactures. Of course the model has no way to measure the social productivity of public infrastructure which might be foregone with reductions of public investment, but the direct income and linkage effects of private investment appear to be more balanced. Despite the importance of investment in social infrastructure, the biggest beneficiary of government total expenditure (35 percent) is the service sector. For this reason, the offsetting rise in private investment shifts demand towards more long term productivity by accelerating capital accumulation. Thus table 5.1.2 reveals a steady decline in the informal and service sectors and a rise in manufactures during the period of fiscal restraint.

Table 5.1.1: Macroeconomic Aggregates
Flows In billions of current rupiah

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Govt Cons	4.43	6.45	7.23	7.79	8.94	11.42	11.33
Govt Invest	3.85	4.65	5.16	5.56	8.08	9.41	8.90
Priv Invest	7.99	12.56	12.13	11.82	17.64	29.13	26.86
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
Trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Money Sup	34.04	36.76	40.59	49.63	57.07	67.35	67.35
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 5							
Real GDP	48.89	56.55	60.38	69.80	83.85	101.54	109.38
Priv Cons	26.18	32.59	36.56	48.38	50.04	60.16	70.29
Govt Cons	4.43	3.74	4.61	5.40	5.91	10.77	11.94
Govt Invest	3.85	3.54	3.83	4.44	4.88	9.78	10.93
Priv Invest	7.99	14.20	14.10	12.08	16.46	19.77	12.35
Exports	16.10	15.82	17.28	20.12	27.72	28.04	33.64
Imports	9.78	13.55	16.20	20.73	21.25	27.21	29.83
Fiscal Deficit	.95	10.78	5.96	7.08	13.96	3.51	-.13
Trade Balance	6.32	2.27	1.09	-.61	6.47	.83	3.81
Money Sup	34.04	36.76	40.68	49.63	57.07	67.35	67.35
Interest	12.10	9.76	9.90	13.09	10.66	12.72	23.10
Percent Change							
GDP	0	-3	-3	-2	0	6	18
Priv Cons	0	0	-3	-3	1	6	20
Govt Cons	0	-42	-36	-31	-34	-6	5
Govt Invest	0	-24	-26	-20	-40	4	23
Priv Invest	0	13	16	2	-7	-32	-54
Exports	0	2	6	16	27	61	109
Imports	0	-1	0	-1	-4	-4	1
Money Sup	0	0	0	0	0	0	0
Interest	0	-17	-21	-10	2	66	197

Table 5.1.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	4	5	9	16	17	35
Energy Min	0	1	2	2	1	-3	-9
Light Mfg	0	5	3	0	18	28	46
Heavy Mfg	0	17	26	20	18	8	20
Informal	0	-6	-10	-10	-14	-9	2
Services	0	-21	-20	-18	-18	-2	7
Total	7	-13	-7	12	17	-25	11
Real Consumption							
Agriculture	0	1	-2	-3	-2	-1	-1
Energy Min	0	0	0	0	12	0	24
Light Mfg	0	1	0	-1	-2	-3	-1
Heavy Mfg	0	-1	-4	-4	-2	-3	-3
Informal	0	4	4	2	6	4	4
Services	0	10	8	6	8	1	5
Total	0	3	1	0	1	-1	1

This generally optimistic scenario is clouded somewhat by rather flat real consumption profiles, indicating that the tradeoff between public and private investment did not yield much real aggregate growth in the medium term. This is in part due to the choking effect of sharply rising interest rates at the end of the period. The level aggregate consumption profile masks larger, but still moderate, adjustments in its sectoral composition. Real consumption of service sector output rises significantly in almost every period, first because of falling prices and rising private demand, and then because of the reassertion of government demand.

Figure 5.1.2:   Change in Household Consumption
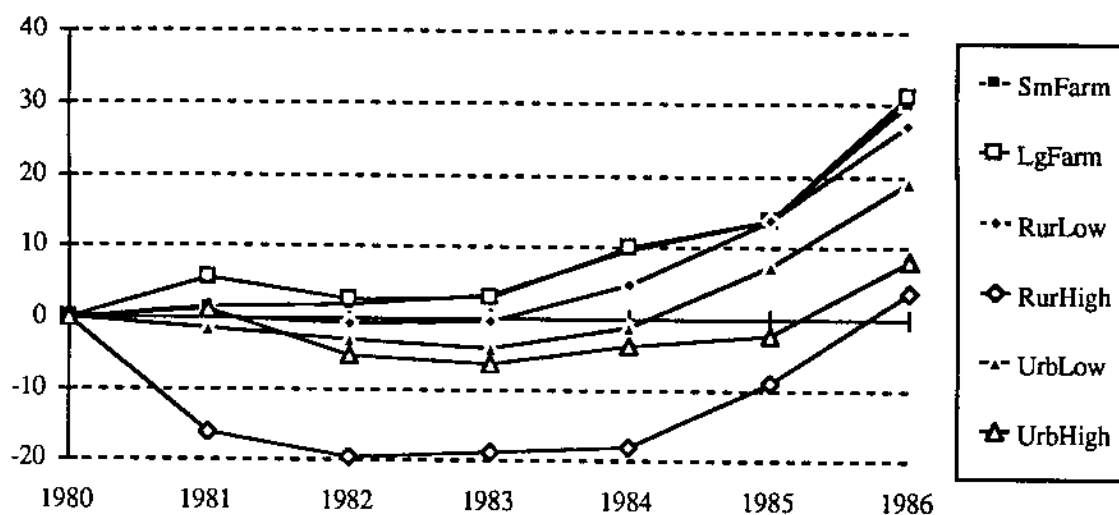
Table 5.1.3:   Household Consumption and Inequality Percentages

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	2	2	3	10	14	30
LgFarm	0	6	3	3	10	14	31
RurLow	0	0	-1	0	5	14	27
RurHigh	0	-16	-20	-19	-18	-9	4
UrbLow	0	-1	-3	-4	-1	7	19
UrbHigh	0	1	-5	-6	-4	-2	8
Inequality Measures							
Theil	0	-1	-21	16	-22	-18	-26
Pov Gap	0	-9	-60	56	-22	-41	0

The most dramatic consumption shifts are between households. Figure 5.1.2 and table 5.1.3 indicate that extensive income redistribution takes place under this policy regime. A reduction in nominal consumption is experienced by wealthier households as a result of reduced government outlays, indicating that distributional objectives were not served by the observed spending policy of the early 1980s.[10] The distributional effects of reduced government expenditure

appear to be quite pervasive as well as progressive. Incomes of those tied directly and indirectly to public expenditure, mainly high income and urban groups, lose ground to those whose livelihood is tied to agricultural activities and eventually, urban low wage employment. Thus it appears that privatization leads to redistribution in favor of subsistence groups, a conclusion which is consistent with the relative composition of private investment and combined government current and capital outlays. A full 94 percent of the former is focused on agriculture and manufacturing industries, with extensive populations of low wage workers, while the latter devotes more than a third of its expenditure on relatively high wage services and direct government employment.

The government certainly can achieve redistribution by other means, but the present evidence indicates that expenditure has regressive economywide effects. Thus the Theil coefficient falls in six of the seven years for the status quo simulation, and the poverty gap declines an average of 22 percent during the same years.

2. Trade Reorientation

Specialized primary exporters in general and oil exporters in particular have been preoccupied over the last decade with the concept of Dutch Disease. This syndrome arises from over-reliance on the foreign exchange earnings of one or a few primary sectors. The symptoms are intensified export specialization and strong upward pressure on the real exchange rate. This trend invariably weakens the country's basis for sustainable growth, particularly in the case of nonrenewable primary exports like fossil fuels, and reduces diversity in its domestic productive capacity. Most prescriptions for the disease include foreign exchange sterilization schemes and investment diversification programs.[11] In the present simulation, we evaluate a policy of indirect incentives to diversify Indonesian exports. We use light manufacturing as one example of a sector whose export promotion would lead Indonesian trading patterns and domestic resource allocation to a more stable and sustainable path.

The choice of light manufacturing is made for three reasons. First and foremost, this sector experienced the most favorable trends in terms of trade during the period under study. Thus we give and example of a more general policy rule of thumb: Use flexible incentives to promote sectoral development along terms of trade trends. The government can often use a moderate subsidy or tariff to tip the

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balance in favour of expanding domestic capacity in a tradeable sector.[12] If this is done with conservative but adaptive expectations about terms of trade shifts, the private sector can adjust to international market opportunities faster than it otherwise might, particularly when operating from a distorted or capital constrained domestic market. The use of indirect incentives is preferable to direct investment, since the latter usually entails administrative infrastructure which can be inefficient and inflexible. Export promotion to follow medium term trends in terms of trade is also best suited for industries with low fixed capital and other market entry costs, and light manufacturing is the appropriate choice for this reason. Lastly, this sector is a leading one in recent histories of the most successful growth economies. Light manufactures have relatively large and low skilled employment requirements, but their expansion is associated with relatively steep managerial and worker learning curves and extensive non-pecuniary externalities.

In the present simulation, we model a simple trade reorientation policy in the form of a 10 percent export subsidy on light manufactures, beginning in 1981 and continuing throughout the reference period. We also specify a ten percent annual growth rate for export demand of this sector, reflecting the relatively elastic world demand for its products. An incidental component of the policy is removal of a 5 percent production subsidy on the heavy industries sector to alleviate a resource allocation bias. Another way to promote domestic capacity expansion, for export or otherwise, would be to apply tariffs to selected sectors. This was not done in the present simulation to preserve transparency of the results. Also, because of the high level of noncompetitive import dependence, it is likely that the distortionary costs of tariffs would outweigh their incentive effects.

The overall macroeconomic consequences of this simple export promotion policy appear to be quite beneficial, despite the small size of the sector promoted. Most of the aggregate income gains are driven by export earnings, and these are more robust through the oil price decline because of the induced diversification of the economy in the direction of improving terms of trade. Expansion of the economy is hindered somewhat by declining aggregate investment, but this is simply a result of imposing the reference monetary policy. Especially in light of the growing trade and fiscal surpluses which result from this policy, it is likely that the government could promote expanded private investment with little risk of domestic inflation. Nominal GDP and aggregate consumption grow at about the rate of inflation, but their composition shifts noticeably in the direction of more diversified and advanced production structure and more equal income distribution. In addition to interest rate sensitivity, investment declines because of price increases in light

and heavy manufacturing. The former occurs because of output diversion to the export market, the latter is due to the removal of the production subsidy. These two sectors accounted for 88 percent of base year investment demand.

Figure 5.2.1:   Change in Macro Aggregates
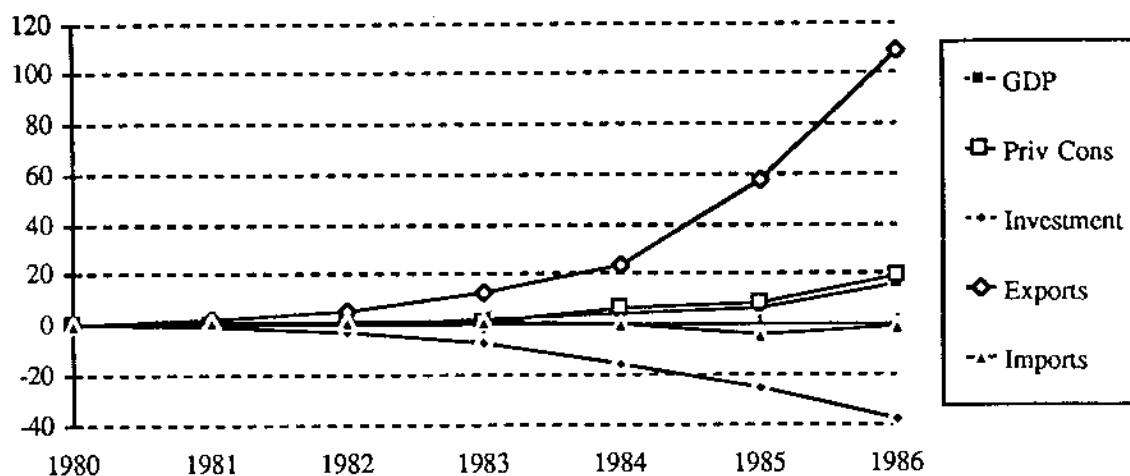
The figures in table 5.2.2 indicate that resources are pulled strongly into the light manufacturing sector and its primary intermediate supplier, agriculture. This occurs without a general contraction in output or unemployment, and represents exactly the kind of domestic modernisation and value added expansion which characterises successful export orientation.   Exports of the target sector expand over 700 percent by 1986, overtaking agriculture as the second largest export after oil.   The agricultural sector actually reduces exports somewhat to divert more output to domestic intermediate demand in the expanding light manufacturing. The heavy manufacturing sector expands GDP a little faster than the rate of inflation, despite the removal of its producer subsidy. This is because this sector delivers more of its output to light manufacturing than to any other. In other words, the best way to expand capacity in heavy manufacturing is not to use a subsidy for import substitution, but to promote the end uses of heavy industry output in an export oriented policy.

Table 5.2.1: Macroeconomic Aggregates

Base	1980	1981	1982	1983	1984	1985	1986
GDP	48.88	58.31	62.50	71.43	84.11	95.91	92.34
Priv Cons	26.18	32.65	37.74	49.71	49.64	56.50	58.43
Investment	11.84	17.21	17.29	17.38	25.72	38.54	35.76
Exports	16.10	15.51	16.27	17.41	21.78	17.42	16.07
Imports	9.78	13.62	16.15	20.96	22.22	28.37	29.56
Fiscal Deficit	.95	7.47	1.98	3.34	7.28	1.84	-1.42
Trade Balance	6.32	1.89	.12	-3.55	-.44	-10.95	-13.50
Interest	12.10	11.83	12.46	14.48	10.40	7.64	7.79
Experiment 6							
Real GDP	48.88	58.43	62.88	72.98	88.01	102.02	107.15
Priv Cons	26.18	32.82	37.93	50.53	52.67	61.35	69.42
Investment	11.84	17.02	16.84	16.19	21.73	28.73	21.88
Exports	16.10	15.79	17.12	19.64	26.86	27.53	33.61
Imports	9.78	13.75	16.37	21.29	22.19	27.30	29.25
Fiscal Deficit	.95	7.50	2.19	3.79	7.82	2.86	1.56
Trade Balance	6.32	2.05	.75	-1.65	4.67	.23	4.36
Interest	12.10	11.96	12.90	16.26	14.45	13.17	21.30
Percent Change							
GDP	0	0	1	2	5	6	16
Priv Cons	0	1	1	2	6	9	19
Investment	0	-1	-3	-7	-16	-25	-39
Exports	0	2	5	13	23	58	109
Imports	0	1	1	2	0	-4	-1
Interest	0	1	4	12	39	72	173

Table 5.2.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	1	2	8	14	16	33
Energy Min	0	0	0	-1	-2	-5	-11
Light Mfg	0	0	0	1	22	24	42
Heavy Mfg	0	13	19	21	21	6	20
Informal	0	-3	-2	-2	-4	-3	0
Services	0	0	-1	-1	0	2	4
Total	0	0	0	0	-6	-5	0
Total	.00	.00	.00	.00	-5.56	-5.00	.00
Real Consumption							
Agriculture	0	1	-2	-2	0	0	-1
Energy Min	0	0	0	0	12	0	18
Light Mfg	0	1	0	-1	-2	-2	-1
Heavy Mfg	0	-2	-4	-4	-3	-3	-3
Informal	0	2	1	0	3	2	4
Services	0	1	0	0	2	1	5
Total	0	1	-1	-1	0	-1	1

Like the previous policy, this export promotion strategy has very progressive income and consumption effects. Unlike the previous policy, it strongly promotes food self-sufficiency by drawing resources into the agricultural sector and actually reducing its direct tradeability. The main beneficiaries of expanding the more labor (agriculture) and low wage (light manufacturing) intensive sectors, are the poor. Although the profile of aggregate real income and consumption is rather flat by comparison to the reference policy, the composition of these shifts strongly towards farm and lower income rural households. In every year the policy is in place, Theil coefficients decline and the poverty gap is reduced.

Figure 5.2.2: Change in Household Consumption
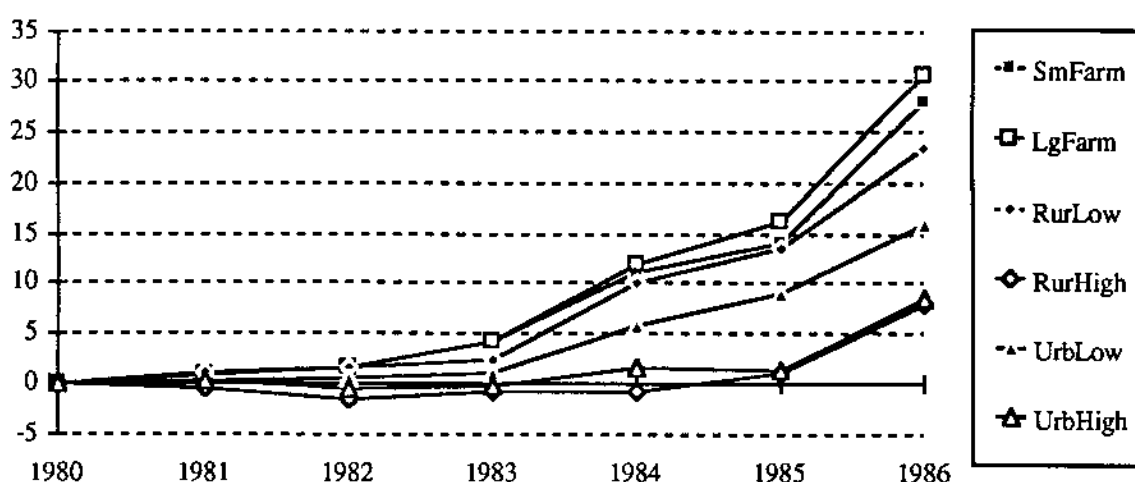
Table 5.2.3: Household Consumption and Inequality
Percentages

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	1	2	4	11	14	28
LgFarm	0	1	2	4	12	16	31
RurLow	0	1	2	2	10	14	23
RurHigh	0	-1	-2	-1	-1	1	8
UrbLow	0	0	1	1	6	9	16
UrbHigh	0	0	-1	0	2	1	9
Inequality Measures							
Theil	0	0	-1	-5	-7	-7	-9
Pov Gap	0	-3	-4	-7	-13	-5	-35

What is most remarkable about this simulation is the size of the target sector relative to the gains the economy experiences. Light manufacturing only accounts for about 10 percent of value added among the six sectors. Moreover, it begins the reference period with just over 2 percent of total exports, providing very limited leverage for the proposed policy. The achievements of promoting export diversity are a testament to the now conventional wisdom of the most rapid growth post-war economies, that value added capture and nonpecuniary externalities should be

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maximised and modernisation should be financed, where possible, by international demand rather than the domestic market or government.

3. Stabilization via Monetary Policy

The third and final policy in this study simulates reductions in domestic absorption which are accomplished by monetary repression. During its later stabilization program, the Indonesian government recognized the need to reduce absorption and accomplished this by retrenchment in public current and capital expenditure. If one recognizes Indonesia's medium term borrowing ability and assumes that government expenditure is given a higher social value than private investment, one might consider fulfilling the stabilisation objective by tightening credit and crowding out private investment while holding public spending constant. In this simulation, the rate of growth of the money supply is cut from an annual average of 10 percent to 6 percent, with public expenditure on consumption and investment fixed at the reference policy values.

The result of monetary repression, as can be seen in figure 5.3.1, is a steep reduction in private investment and strong deflationary pressure on the rest of the macroeconomic aggregates. The aggregate price level falls by about 16 percent in 1986, so this policy causes significant real contractions in aggregate real income, consumption, and trade. Monetary deflation is in some sense the reverse of the policy of fiscal restraint analysed in section 5.1, so it is perhaps not surprising that the results are reversed also. The intertemporal effects of reduced money supply growth are of course cumulative. Since investment falls subatantially in every year, the shortfall in real output and consumption is larger in every year. Real wages fall to offset unemployment somewhat, but capital formation cannot keep pace with population and factor substitution possibilities are limited, so unemployment is larger in every year but the last (when exports surge).
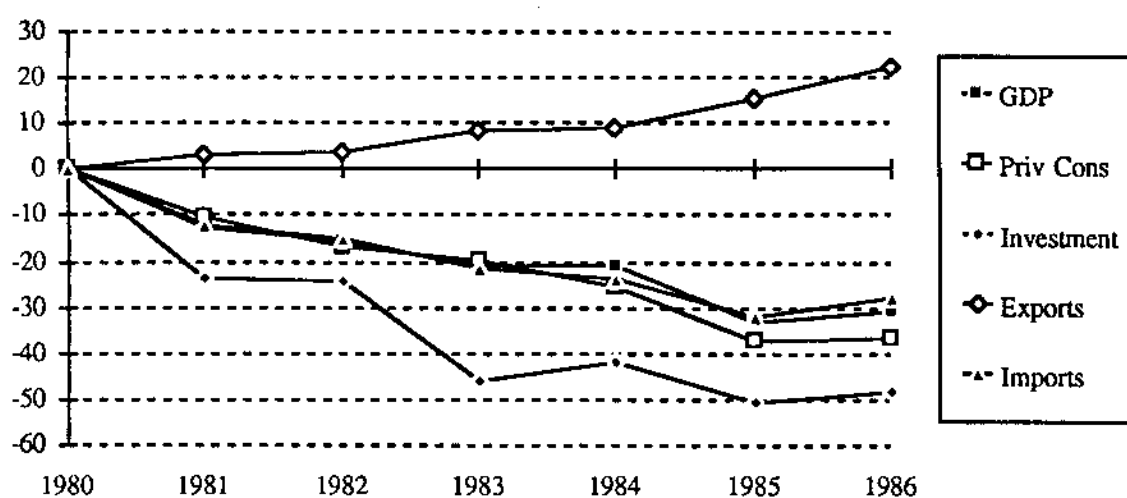
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Figure 5.3.1: Change in Macro Aggregates

## Table 5.3.2: Sectoral Changes in Value-added and Consumption
Percentages

Nominal GDP	1980	1981	1982	1983	1984	1985	1986
Agriculture	0	-5	-10	-19	-26	-38	-33
Energy Min	0	2	2	4	2	4	6
Light Mfg	0	-23	-34	-40	-44	-63	-56
Heavy Mfg	0	-18	-18	-32	-27	-42	-35
Informal	0	-10	-22	-28	-31	-35	-33
Services	0	-22	-27	-29	-17	-28	-25
Total	0	-11	-16	-21	-21	-33	-31
Real Consumption							
Agriculture	0	-2	-8	-1	-8	-12	-14
Energy Min	0	0	-14	-10	-12	-33	-35
Light Mfg	0	5	-1	0	-7	-8	-13
Heavy Mfg	0	5	1	3	-4	-6	-11 ·
Informal	0	1	3	4	-1	-11	-14
Services	0	7	5	3	-10	-15	-18
Total	0	3	-1	1	-7	-11	-15

In sectoral terms, the only real beneficiary is the oil industry, which increasingly diverts output to the more lucrative international marketplace. Overall,

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the fall in capital accumulation is disasterous for the productive capacity of the economy, and its income generating potential is dramatically reduced. Real consumption declines by 7, 11, and 15 percent in the last three years of the reference interval, reflecting a substantial reduction in living standards for an already low income country.

Not only is the rate of capital accumulation drastically reduced when public spending offsets private investment, but income falls for the poor faster than for the rich. Capital becomes relatively scarce over time, and its share of factor income increases in per capita terms. This leads to very regressive distribution of the losses, and Theil coefficiencts increase in almost every year. The poverty gap rises in four years and falls in two, depending upon the interplay of wages and the domestic price level.

Figure 5.3.2:   Change in Household Consumption

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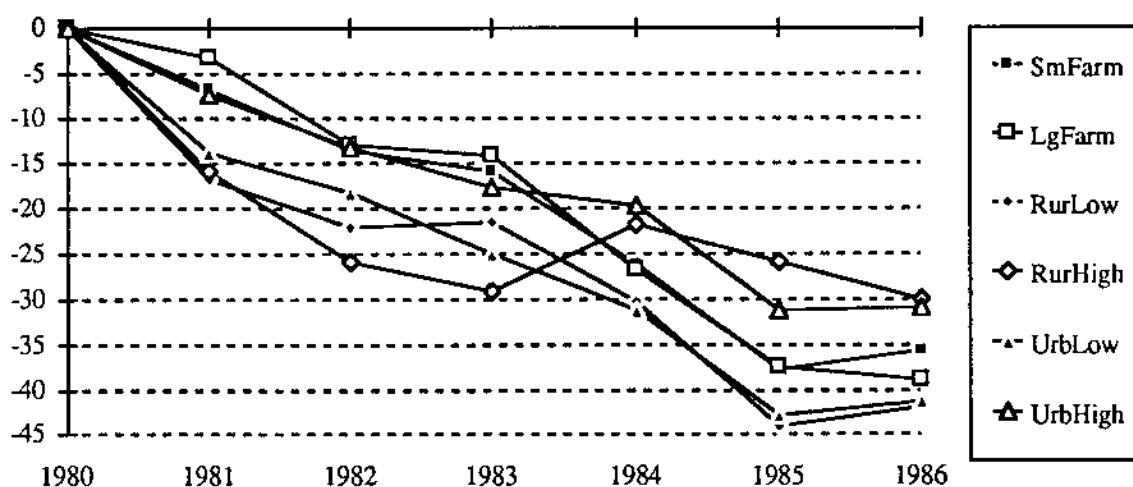
Table 5.3.3: Household Consumption and Inequality
Percentages

Nominal Consumption	1980	1981	1982	1983	1984	1985	1986
SmFarm	0	-7	-13	-16	-26	-38	-36
LgFarm	0	-3	-13	-14	-27	-38	-39
RurLow	0	-17	-22	-22	-30	-44	-42
RurHigh	0	-16	-26	-29	-22	-26	-30
UrbLow	0	-14	-18	-25	-31	-43	-41
UrbHigh	0	-7	-13	-18	-20	-31	-31
Inequality Measures							
Theil	0	3	4	2	10	7	5
Pov Gap	0	-8	2	-10	41	64	28

In any case, it is apparent that reducing absorption by monetary restraint or crowding out of private sector investment could have disasterous consequences for a growing economy. The loss of capital affects not only aggregate income and the income of capitalists, but it reduces economywide employment possibilties and the basis for sustainable growth. The general conclusion of all these simulations is that monetary policy should play a more passive, accomodating role in concert with carefully devised policies for the real side of the economy, preferably those which promote diversification towards external demand, value added capture, and the externalities associated with decentralized modernization. These ends appear to be best fulfilled not by public control of aggregate demand and resource allocation, but by restrained provision of infrastructure and fostering balanced growth in the private sector.

VI. SUMMARY AND CONCLUSIONS

Entering the 1980's, Indonesia was a robust developing economy whose future seemed assured by its large and lucrative petroleum reserves. Earnings from its energy sector represented over two thirds of export income and total government revenue, and these funds were financing what promised to be a southeast Asian economic miracle. Over the next decade, however, the dream of rapidly accelerating modernization was dispelled as the oil market declined and other external conditions became increasingly unstable. The government made extensive efforts to adapt to these new and difficult circumstances, and its voluntary structural adjustments achieved a measure of success in stabilizing the economy.

The purpose of this study was to evaluate the government's adjustment policies during the first half of the 1980's. This was done by counterfactual simulation experiments with a intertemporal general equilibrium model calibrated to detailed empirical information on the Indonesian economy. Two types simulations were carried out. The first type tested the robustness of the government's historical policies by subjecting them to varying external conditions. The second group of experiments evaluated alterative economic policies over the same historical conditions.

In the first set of experiments, the historical policy performed adequately, if not optimally, under a variety of specifications of external conditions. This indicates that the government might follow simple adaptive rules of thumb without dramatic misalignments, subject to an adequate degree of liberalization and flexibility in the private sector. If stable oil prices had prevailed in the early 1980s, the reference policy would have been accompanied by continued real growth, although a more liberal monetary policy would have improved the outcome. The same generally held true when stable terms of trade prevailed in all sectors. In an external scenario where export prices and demand fell continuously over the period, the reference policy did not aggravate the situation but did little to mitigate it. In the case of a sustained export boom, the reference policy was accompanied by significant expansion but its monetary component again appeared to be a hindrance.

The results of alternative policy approaches to the historical conditions are more variegated and interesting. If the government had adhered to its initial spending plans from the outset of 1980, it would have offset the effects of the oil price downturn more effectively, achieving higher real incomes and consumption

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and more equitable distributions of the two. Had the government devised a more detailed development policy, targeted to re-orient trade patterns along trends in of terms of trade, real incomes and consumption would have risen even more and been more egalitarian than under fiscal austerity. Moreover, this type of sectorially focussed policy represented a much better prospect for diversified, stable, and sustainable growth. The last policy alternative sought to reduce absorption by monetary repression of private investment, holding the public sector's outlays constant. This "de-privatisation" of aggregate demand had severe deflationary, contractionary, and adverse distributional effects on the economy.

From these experiments we can conclude, among other things, that an activist approach to economic policy in general and adjustment policy in particular is essential to sustain a developing economy's progress in an uncertain external environment. It is also apparent from the above results that fiscal conservatism and more attention to detailed, trade oriented sectoral policies are the more promising approaches. Monetary policy should play a relatively passive, accommodating role. Heavy reliance on primary sector exports is almost inevitable in the early stages of development, particularly in case of large endowments of oil and minerals. It is essential, however, that the earnings of these depletable resources be channelled into carefully devised plans for the real side of the economy, preferably those which promote diversification towards external demand, value added capture, and the externalities associated with decentralized, labor intensive modernization.

NOTES

1   The analytics of the model are presented in Bourguignon, Branson, and de Melo [1989] and summarized in Bourguignon, Branson, and de Melo [1990. The version of the model used in this study was developed for computer simulation by Bourguignon and Suwa [1990].

2   More detailed background on the economy can be found in Keyzer and van Veen [1990] and World Bank [1989].

3   For an introduction to SAM methodology, see King [1982] and Pyatt and Round [1985].

4   SAM based calibration methods are discussed in detail in Roland-Holst [1991] and Reinert and Roland-Holst [1990].

5   The full 106 institution Indonesian SAM is published in BPS [1986].

6   This data was provided by Biyung Kim and Erik Thorbecke.

7   These were obtained from the IMF Balance of Payments Statistics, vol. 39.

8   The former was obtained from the EIU [1990], the latter from Keyzer and van Veen [1990].

9   This data and that for figures 3.5, 3.5, and 3.7 were obtained from Indonesian government trade statistics.

10   This subject is treated in greater detail in Roland-Holst [1990].

11   See van Wijnbergen [1988] for a extended discussion of Dutch Disease.

12   See de Melo and Roland-Holst [1990] for a more detailed discussion of trade policy incentives.

ANNEX 1
DEFINITIONS

Table A.1 Sector, Factor, Household, and Institution Definitions

No.	Label	Definition
1	Agric	Agriculture
2	EnrgMin	Petroleum and other minerals
3	LitMfg	Light manufactures
4	HvyMfg	Heavy manufactures
5	Informal	Informal, wholesale, and retail trade
6	Services	Personal, business, and administrative services
7	AgLab	Agricultural labor
8	MfgLab	Manufacturing labor
9	ClerLab	Clerical labor
10	ProfLab	Professional labor
11	Land	Agricultural land
12	PrivCap	Private domestically owned capital
13	PubCap	Publically owned capital
14	ForCap	Foreign owned resident capital
15	SmFarm	Farm households living on less than 1 hectare
16	LgeFarm	Large farm households
17	RurLow	Rural nonfarm low income households
18	RurHigh	Rural nonfarm high income households
19	UrbLow	Urban low income households
20	UrbHigh	Urban high income households
21	Company	Private enterprises
22	Govt	Central and regional government authority
23	CapAcct	Capital accounts
24	IndTax	Indirect tax account of government
25	ROW	Rest of the world

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