THE POSSIBILITIES OF SUSTAINABLE GROWTH IN THE PHILIPPINES: A THREE–GAP ANALYSIS

By Manuel F. Montes, Joseph Y. Lim, and Ma. Agnes R. Quisumbing*

This paper presents a three-gap model which allows the writers to do exercises which will determine how much foreign inflows (or reduction of foreign outflows) will be required to sustain a satisfactory growth rate for the Philippines given the binding foreign exchange and fiscal constraints. The results show that using the 1988 structure of the economy, the Philippines would need much more foreign exchange inflows than have been forthcoming to sustain a 5 percent or higher growth rate.

1. Foreign Financing Controversies

In 1988, the Philippines achieved a real GNP growth rate of 6.7 percent. This growth rate, unremarkable by the standards of the region, created an atmosphere of euphoria in the country. This euphoria was quickly erased as 1989 ushered in serious balance of payments and inflation problems, a lower growth rate, as well as serious bottlenecks in transportation and power generation. Finally, the December 1, 1989 coup attempt and the renewed political instability put into question the entire growth plan for the nineties.

The signs of the unsustainability of growth were evident to professional observers, although officially the government interpreted the 1988 performance as replicable indefinitely. In 1988, international reserves fell below two months of imports and until the Paris Club restructuring of May 1989 the country had fallen behind by $940 million in debt service to official creditors. The overall balance of payments position for 1988, using the standard *International Financial Statistics* method, turned from a positive $264 million in 1987 to a negative $935 million in 1988.

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*This paper is based on Manuel Montes' earlier paper of the same title. Dr. Manuel Montes, Associate Professor of Economics at the University of the Philippines, is at present a Visiting Research Fellow at the Resource Systems Institute, East-West Center in Hawaii. Drs. Joseph Y. Lim and Ma. Agnes R. Quisumbing are Associate Professor and Assistant Professor of Economics, respectively, at the University of the Philippines. The latter is currently a Visiting Fellow at the Economic Growth Center, Yale University.

In November 1988, the Philippine government initiated nego-
tiations for a new IMF 3-year Extended Fund Facility (EFF) precisely
to provide the basis for an accelerated borrowing program of about $4
to $6 billion for 1989 through 1992. These talks were broken off over a
disagreement on the targeted overall growth rate: the IMF suggesting
6.0 percent and the government insisting on 6.5 percent.

The apparent skirmishing over 0.5 percentage points in the growth
rate was mostly an indication of the struggle within the Aquino govern-
ment as officials who had sought a more forthright treatment of the
foreign debt problem took a last stand against those who sought to
continue a Lusinschi-type strategy[1] of compliance as a means to obtain
accommodation from commercial banks.

In March 1989, with the more conservative group of officials
effectively in control, the government signed an EFF program, which
went into effect in June 1989. The program is based on a 6.5 percent
real GNP growth rate, but the proportions of foreign financing and the
public sector deficit are equivalent to those proportions in the IMF
November program based on a 6.0 percent growth rate.

The growth exercise reported here provides a glimpse of the
prospective realities over which the struggles over the most effective
method of finding foreign financing to sustain growth rate were fought
within the Aquino government. The exercise utilizes marginally less
optimistic parameters than that utilized by either wing within the
government, or by the IMF. The point of view we take here is that long-
term structural change and not just the method of foraging for foreign
financing is the issue in the Philippines.

2. The Model

In the medium term, the question of sustainability of the growth
process is analyzed in a model that pays particular attention to the
issue of whether sufficient productive capacity is being installed in the
process of growth.

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[1] Here we refer to the strategy followed by Jaime Lusinchi, president of Venezuela
from 1984 to early 1989, who attempted to obtain new loans and investments by
pursuing a more "responsible" debt strategy. The strategy has failed, as bankers re-
sponded by gently refusing to provide geuinely new financing.

2.1 Specification

The level of economic activity is measured as gross domestic product plus noncompetitive imports.[2] The variables in the model are stated as proportions of the potential output analog of the activity variable. The ratio of actual activity to potential output is called "capacity utilization," and represented by the variable u.

The variables utilized in this exercise are explained in Table 1.

The equations of the model are given in Table 2. In Equation 1, investment is the sum of private, i_p, and public, i_g, investment. Equation 2 hypothesizes that private investment is (linearly) determined through an "animal spirits" parameter, i_o, as a response to the level of government investment through the parameter α and through an accelerator term, βu. Equation 3 is the total investment behavioral equation, after substituting Equation 2 into 1.

Total savings available for investment is given in Equation 4, as the sum of private, government, and foreign (ϕ) savings. Equation 5 proposes a private sector savings schedule as a linear function of the activity variable.

The "fiscal effort," variable z, of the government, measured as revenues minus current expenditures except for debt service on foreign debt, is hypothesized as a linear function of the level of economic activity in Equation 6. Equation 7 expresses total government savings as the fiscal effort less interest payments on foreign debt. The parameter μ is the share of foreign interest payments due from the government and j^* is the amount of total interest payments on foreign debt. Equation 8 states that the public sector borrowing requirement as a proportion of potential output, τu, is equal to the amount by which government investment exceeds government savings.

Equation 9 expresses the level of foreign savings available for the economy, being basically the current account deficit plus increases in international reserves, dR.

The level of intermediate inputs is a linear function of the activity variable and the level of exports (Equation 10). In the financing exercises, we would like to study the possibility of increasing exports; the

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[2]In the tradition of the analysis of semi-industrialized countries. See, for example, Bruno (1981) or Taylor (1983).

Table 1– Variable Definitions

Variable Symbol	Variable Name	Explanation
u	Capacity Utilization	The ratio of actual economic activity to potential economic activity. Actual economic activity in 1988 was GDP (P821,839 in current pesos) plus non-competitive imports (P87,124) or P908,963. Potential output was estimated from applying the output capital ratio of 1977-80 on updated capital stock based on net investment from 1986. Estimated potential output for 1988 was P1,044,785.
i	Investment	Total investment, including depreciation, as a ratio to the level of potential output. In 1988, total value in current pesos was P148,753. The same variable as a percent of actual GNP was 18.2 percent.
i_g	Government Investment	As a proportion of potential output. Estimated from government construction investment in 1988.
i_p	Private Investment	Residually estimated from the difference between total investment and government investment.
s_g	Government Savings	Current budget surplus of the government, as a proportion of potential output.
$\emptyset$	Foreign Savings	Current account deficit, converted to current pesos, at the average exchange rate, divided by potential output.

Table 1 (continued)

Variable Symbol	Variable Name	Explanation
s_p	Private Savings	As a proportion of potential output. Private savings was estimated as the residual from total savings (equals total investment) minus government and foreign savings.
j^*	Foreign Interest Payments	Total foreign interest payments in 1988, equal to $2,179 million and 4.4 percent of potential output.
τ	PSBR	The public sector borrowing requirement as a proportion of actual output. Since u is the ratio of the actual to potential output, τu is the public sector borrowing requirement as a proportion of potential output.
m_r		Imports of raw materials and intermediate goods as a proportion of potential output. Included in this estimate is the current peso value of the following imports: mineral fuels, base metals, manufactures of metals, textile yarns, chemicals, plastic resins, and imports on consignment. In 1988, the value of current imports under this heading was P92,864. Imports on consignment is a dynamic item indicating the strong growth of bonded warehouse manufacturing for re-export.
m_k		Imports of capital goods, as a proportion of potential output. The following import categories were included in the estimate of this variable: electrical and non-electrical machinery, transport equipment.

Table 1 (continued)

Variable Symbol	Variable Name	Explanation
m_o		Other imports, as a proportion of potential output. These are mostly medical goods and consumer goods.
x	Exports	Total of merchandise and non-merchandise export earnings, as a proportion of potential output. The most significant non-merchandise export earnings are the remittances of overseas workers.
na	Net Aid	Net transfers in the current account, converted at the average exchange rate, as a proportion of potential output. The value for 1988 was 0.0159, or 1.6 percent of potential output.
dR		Change in international reserves as a proportion of potential output.

Table 2- Equations of the Model

(1)	i	=	$i_p + i_g$
(2)	i_p	=	$i_o + \alpha\, i_g + \beta u$
(3)	i	=	$i_o + (1 + \alpha)\, i_g + \beta u$
(4)	s	=	$s_p + s_g + \phi$
(5)	s_p	=	$\sigma_o + \sigma_1\, u$
(6)	z	=	$z_o + z_1\, u$
(7)	s_g	=	$z - \mu j^*$
(8)	τu	=	$i_g - s_g$
(9)	ϕ	=	$(m_r + m_k + m_o) - x + j^* - na + dR$
(10)	m_r	=	$a_o + a_1 u + a_2 x$
(11)	m_k	=	$(1 - \theta)\, i$
(12)	g	=	$g_o + k\, i$

possibilities of this strategy are significant in the light of the Pacific regional restructuring, but sufficient attention should be put on the import-increasing effects of such a strategy.

Equation 11 expresses the idea that only $(1-\theta)$ of the level of investment, i, must be imported, the rest being sourced from domestic production.[3] Finally, Equation 12 expresses the growth rate of potential output as a function of the inverse of the incremental capital-output ratio, k. The parameter g_o represents both the influence of depreciation of capital assets in the economy and underlying growth prospects of the economy.

2.2. Calibration

To utilize the model for financing calculations, values must be assigned to its parameters. The model was calibrated on 1988 data. Calibration involved starting with reasonable values for some of the parameters and then determining if the implied values for the other parameters based on the 1988 data set were reasonable. The evaluation of reasonability also hinged on the stability of the whole model.

The parameters for all the linear functions were determined by hypothesizing a reasonable elasticity for the relationship. Given the data, the elasticity was used to determine the slope and the intercept term for the equation. Table 3 summarizes the assumptions and resulting parameter values for the base model.

Here we point to some of the underlying considerations behind the assumptions. Estimates of the tax elasticity have ranged from 0.6 to 1, with a typical value of 0.9. The value of 0.8 is a recognition of heavy demands for increases in current expenditures and government wages in the recent years.

The rather high elasticity of 1.5 for intermediate imports is a well accepted figure, even before the recent import liberalization episode. The elasticity with respect to exports is based on the experience of the years since 1985.

The assumed elasticity of private savings of 0.5 might be considered rather high for a poor country. While data inadequacies could be a factor, elasticities of this magnitude are implied in recent macroecon-

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[3] If all capital investment had to be imported then the "savings gap" would not be identified distinctly from the "foreign exchange gap".

Table 3- Assumptions and Parameters

Assumption		Resulting Parameters		
Elasticity of fiscal effort	0.8	z_1	=	0.0120
		z_0	=	0.0026
Elasticity of private saving	0.5	σ_1	=	0.0692
		σ_0	=	0.0602
Elasticty of intermediate imports on overall activity	1 5	a_1	=	0.1533
		a_0	=	- .0871
Elasticity of intermediate imports on exports	0.48			
		a_2	=	0.2
Accelerator term, β	0.05			
Private response, α	0.5			
		i_0	=	0.0639
ICOR	3.5			
		k	=	0.2857
		g_0	=	-0.0007
Proportion of investment sourced domestically		θ	=	0.763

omic models. The high elasticity can be interpreted as a reflection of the highly skewed income distribution in the Philippines. An increase in political will to implement an agrarian reform program could lower this elasticity in the medium term.

The assumption of a 0.05 accelerator coefficient is constrained by stability requirements. The coefficient of private sector responsiveness to public investment of 0.5 is meant to capture some crowding-out of the private sector by public sector spending and is meant to be conservative. The parameter α could be negative, if financial crowding-out is strong. If an equation such as Equation 2 provided the basis for the current EFF private investment assumptions, the implied value of α under the present IMF program is about 2. This is an indication of the degree of optimism contained in that program.

Table 4 provides the details of the equilibrium outcome for 1988, which was used to calibrate the model.

Table 4- Equilibrium Values of 1988
(values as a ratio to potential output, growth rates in percent)

Variable Symbol	Variable Definition	Value
u	Capacity utilization	0.87
	Growth rate of actual economic activity	6.6
	Growth rate of potential economic activity	4.0
i	Total investment, also equal to total savings rate	0.1424
i_g	Government investment	0.0233
i_p	Private investment	0.1191
s_g	Government savings	-0.000065
s_p	Private savings	0.1204
ϕ	Foreign savings	0.0220
τu	PSBR as a proportion of potential	0.0234
τ	PSBR as a proportion of actual	0.0269
j^*	Foreign interest payments	0.0440
μ	Government share in foreign interest payments	0.298
nl	Net lending	0.0081
m_r	Imports of raw materials and intermediate goods	0.0889
m_k	Imports of capital goods	0.0337
m_o	Other imports	0.0823
x	⌈Merchandise exports	0.1401
	⌊Non-merchandize export earnings	0.0729
na	Net foreign aid	0.0159

3. Growth and Financing Tradeoffs in the Basic Model

Equations 1 through 11 plus the savings equal investment condition:

(13) $i = s$

provide us with the "gaps" which, given the savings rate, the export ratio, the level of capacity utilization, the level of foreign financing, and

so on provide the maximum level of total investment that the economy can undertake.[4]

The savings gap is based on Equations 4, 7 and 13 and can be written as:

$$(14) \quad i_s = (\sigma_o) + z_o - \mu j^* + \phi) + (z_1 + \sigma_1) u$$

an increasing function of the marginal propensity to save, r_1, and the marginal fiscal effort, z_1, and a decreasing function of foreign interest payments.

The fiscal gap is based on Equations (6) through (8) and Equations (1) through (3). The equation is:

$$(15) \quad i_f = i_o + (1 + \alpha)(z_o - \mu j^*) + [(1 + \alpha)(\tau + z_1) + \beta] u$$

The foreign exchange gap is based on Equations (9) through (11) and Equation (2):

$$(16) \quad i_e = (\phi + (1 - a2) x - j^* - a_o - m_o + na - dR)$$
$$[1 / (1 - \theta)] - a_1 [1/ (1 - \theta)] u$$

which is unambiguously negative with respect to the activity variable u through the marginal propensity to import on intermediate goods (a_1).

The total investment that the economy can undertake will then be the smallest value provided by the three gaps.

Appendix A applies the above model to two crucial years 1978 and 1985. Graph 1 summarizes the information contained in the investment gap equations for 1988.

The equilibrium of 1988 is depicted in Graph 1 as point A, where the fiscal gap, i_f, the savings gap, i_s, and the external gap, i_{eo}, intersect. At point A, the observed equilibrium of 87 percent capacity utilization and total investment of 14.2 percent of potential output is reproduced.

As noted above, however, the growth in 1988 was accompanied by

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[4]The classic reference on gap analysis is Chenery and Bruno (1962). Other recent references are Taylor (1988), Rattso (1988), Bacha (1989), and Taylor (1989).

.16

iif0(uc),iis0(uc)
investment ratio

.1

.7   uc 1
Capacity utilization
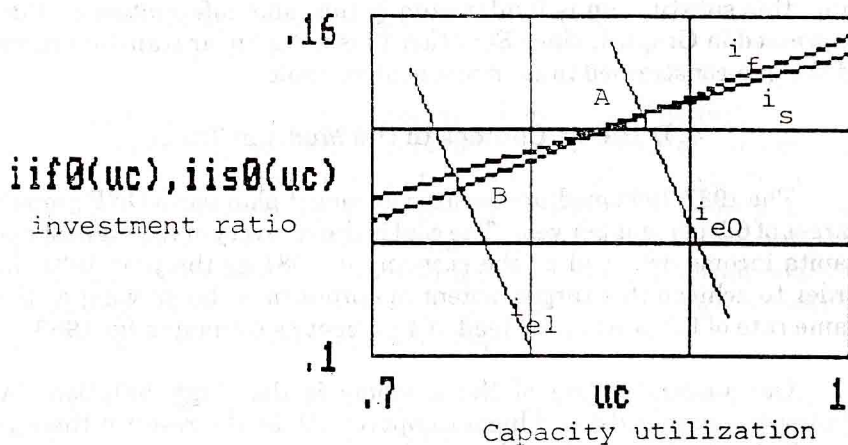
Graph 1 — Basic Equilibrium in 1988

an insufficient international reserve buildup. [5] If the country had pro-
vided for the required reserve buildup, the available foreign financing
schedule would only be at the curve i_{e1}. At that situation, the foreign
exchange gap and the fiscal gap would be binding, and investment
would be limited to 13.2 percent of potential output and capacity
utilization would be at 77 percent.

The actual level of foreign savings utilized in 1988, as a propor-
tion of potential output, was 2.2 percent. The additional financing
needed for the reserve buildup of about $1 billion was equivalent to
2.04 percent of potential output, or 9.6 percent of goods and services
exports.

The 1988 performance can also be interpreted as non-sustainable
on the basis of the relationship between the growth rate of actual and
potential output. The 1988 growth rate of potential output was 4.0
percent, against the growth of the activity variable of 6.6 percent.

Substitution of the investment variables of Equations 14 through
16 into Equation 12 provides three equations of overall capacity growth
rates for the economy as a function of the key exogenous variables such
as the marginal propensity to save, interest on foreign debt, and the
level of foreign financing (See Appendix B). The information derived

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[5]And some arrears in official debt service, which we shall not factor in here.

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from this substitution is fundamentally the same information as that expressed in Graph 1, since Equation 12 is but a linear transformation of the gap-constrained total investment variable.

4. Difficult Choices in the Medium Term

The 1987-1992 medium term development plan sets a GNP growth target of 6.5 percent per year. The goal is the recovery of the highest per capita income achieved by the economy in 1981 by the year 1991. In order to achieve this target, potential output must be growing at the same rate of 6.5 percent, instead of 4 percent as estimated for 1988.

Our understanding of the economy is that high inflation (by Philippine standards) and higher imports will be the result if there is an effort to push capacity utilization beyond 90 percent, which is about the situation the Philippines is in now. In addition, higher inflation reduces the purchasing power for consumption and, given the immature capability of the economy to orient its manufacturing production toward exports, will reduce domestic demand and the growth rate.

These considerations are already evident in the performance of the economy in 1989. Inflation reached 8 percent in 1988, in spite of the fact that there were three rollbacks in the domestic price of oil products. Inflation has exceeded 10 percent in the first half of 1989 and is going to average around 10 percent for the whole year. The GNP growth rate for the first half of 1989 was 5.3 percent, clearly below the target and the achieved growth rate in 1988 of 6.7 percent.

In order to achieve a sustainable 4, not a 6.5, percent growth rate of potential output, the information in Graph 1 tells us that additional foreign financing in the amount of at least 2.0 of potential economic activity is required. In comparison to the foreign interest payments representing 4.4 percent of potential output, financing growth at 4 percent will require a halving of these payments. This would represent an additional commitment, applicable to the current account, on the part of foreign creditors of U.S.$1 billion in 1988 values. This could mean either subjecting creditors to the market test[6] via a write-off according to the discount on Philippine debt or capping interest on foreign debt between 4 and 5 percent.

Here, using the calibrated model, we discuss the requirements of

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[6]With the "thin-ness of the market not counting as a valid excuse, of course. Unfortunately such a test would be vexatious even for the money banks.

two possible scenarios: one pegged on a 6.5 percent growth rate and the other on a 5 percent growth rate.[7]

Appendix B details the procedure of one way of getting an additional 1 percent potential output (which is equivalent to our target 5 percent growth in potential output). It also details one way to get an additional 2.5 percent growth in potential output (equivalent to our target 6.5 percent growth in potential output). It is assumed that exports increase as much as the requirement to keep international reserves equivalent to three months worth of imports. We will therefore not need additional financing to build up the reserves.

As summarized in Table 5, a sustainable growth of 6.5 percent requires an investment ratio of 23 percent, while a 5 percent rate of growth requires a 17.8 percent investment ratio. Furthermore, a sustainable growth rate of 6.5 percent requires public investment of 7.7 percent of potential (almost 9 percent of actual) output. This will require raising the public investment rate *more than 3 times* from its 1988 value.

A target of 5 percent will require a near-doubling of the public investment rate, still a significant effort. The required increase in public investment will be lower if the responsiveness of private sector investment to public investment, the parameter α now set at 0.5, were stronger.[8] This will require reforms in the nature of public investment, and the drawing in of new types of investors (possibly foreign investment, but certainly domestic investors) whose investment response parameters are qualitatively different from those embodied in the 1988 data set.

In any case, a serious government must be judicious about the effects of its investment on the private sector. Even if one might quarrel about the parameterization in this exercise, there is still an argument that a more conservative growth target, by representing more feasible planning, will attract investors with longer time horizons. Such a more conservative macroeconomic approach must, however, be accompanied

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[7]The 6.5-percent-as-target scenario can be interpreted as a strategy which sees that, as long as the overall growth rate is sufficient, its benefits will be felt even at the poorest strata in the economy, though historical experience would not support this presumption. A 5-percent-as-target scenario must necessarily wrestle with social issues and worry about how a 2.2 percent per year capita income growth will be shared by the population.

[8]In a recent article, Robert Barro uses a value of 1 for this parameter.

Table 5- Required Investment, Capacity Utilization and Foreign Savings for Various Growth Rates
(percent of potential output)

	1988	Growth Rate Targets	
Growth Rate	6.7	6.5	5
Total Investment	14.2	23.0	17.8
Public Investment	2.3	7.7	4.3
Capacity utilization (u)	0.87	1.0	0.987
Foreign savings as a percent of potential output (in billions of dollars)	2.2 ($1.09)[a]	7.7 ($3.79)[b]	4.8 ($2.37)[b]
Additional increase in the fiscal effort (z_o)	—	2.23	—

[a]This does not include the additional $1 billion shortfall of the international reserves.
[b]These figures assume exports will grow to maintain the required international reserves equivalent to three months of imports.

by closer attention to social expenditures, rural development, and human resource development.

With no change in the ratio of interest payments to potential output,[9] $3.8 billion per year is required for 6.5 percent growth and $2.4 billion is required for a 5 percent growth rate. A similar result will occur if foreign interest payments are reduced by the same amount (which is practically a write-off of most interest payments). Furthermore for a 6.5 percent growth rate, an additional increase in fiscal effort (assuming an increase in z_o) amounting to .022 of potential output is needed.

Given a starting debt level of $27 billion, it will be impossible to raise all of such financing as debt, since this would imply a growth rate for foreign debt of close to 15 percent per year for an economy growing

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[9]This will decline if interest rates stay constant and positive growth rates in potential output are achieved.

at 6.5 percent or, alternatively, debt growing at 9 percent per year for an economy growing at 5 percent per year. For the 6.5 percent scenario, the required ratio of foreign savings to potential output exceeds even that of 1978 when foreign credit was still very much available (See Table A.2 of Appendix A).

There is a need to look seriously at *net* foreign investment of between $800 million to $1 billion per year, a not-insignificant target for the Philippines. In 1987, $205 million (of which $166 million were debt-equity conversions), and in 1988, $618 million (of which $437 million were debt-equity conversions) of net direct investment were recorded in the balance of payments.

These considerations point to a preferred scenario in addressing the foreign debt issue. A combination of reduction in interest payments and new money are needed to provide the indication of foreign exchange condition consistent with sustainable medium-term growth. Such a condition would itself be required for new foreign investment to occur.[10] Simply growing out from under the debt is not indicated.

Under the present program, an average of $659 million per year in new loan commitments has been identified for 1989 to 1992, and an additional $881 million per year is under negotiation. This would only total $1.5 billion per year, $0.9 billion less than even the one needed for 5 percent growth.

A $0.9 billion gap could reasonably be filled by increased direct investments and a more aggressive debt negotiation strategy as long as positive developments in the region continue and the present political instability is overturned. But even at this rate of borrowing of $1.5 billion per year, GNP and debt would both be growing at more than 5 percent per year. These considerations provide further indication about the infeasibility of the 6.5 percent growth rate target of the present program.

The issue of direct foreign investment as gap financing is itself a complicated issue.[11] Even before the question of profit remittances in the medium term, in the first years of location foreign investment operations are likely to be more dependent on imported capital and

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[10]There is also the signalling function provided by official aid from Japan that tends to bring in Japanese foreign investment.

[11]Naya and Ramstetter (1988) provide a discussion of the effects of direct foreign investment on the trade of host countries.

inputs than the domestic economy. Thus additional net financing from new foreign investment *per se* is likely to be limited. Where it will be helpful is in diversifying the export structure[12] of the Philippines.

The dollar value of merchandise exports increased 18 percent in 1987, 21 percent in 1988 and is projected, in the EFF projections, to grow by around 15 percent in 1989. If we assume that exports should grow only as much as to cope with increased requirements for international reserves equivalent to around three months worth of imports (additional foreign exchange to finance the growth is assumed to be gotten by increased foreign savings), the exercise points to the need of exports to grow from around 21.3 percent of potential output to more than 24 percent of potential output to achieve both the 5 percent and 6.5 percent growth rates. (This includes covering the initial shortfall of reserves that was experienced in 1988).

The question of export reorientation can be very subtle in the Philippine context. Export orientation has been used since the early 1960s as a reason to exempt land planted to export crops from agrarian reform. In the wake of a very poor international market for sugar, vast tracts of sugar land have been converted to ponds producing prawns for export since 1985. Welfare economics suggests that a tax be levied on such farms for the damage the brackish water technology inflicts on the local environment, even ignoring for the moment the problem that this shift imposes a relatively permanent change into a technology that absorbs less labor than other alternative uses of the land. In contrast, under the Aquino government, all export-oriented enterprises are now eligible for incentives. Prawn farms can therefore apply for Board of Investments subsidies.

The abrupt loss of ten years of growth in per capita income in 1985 has convinced the urban manufacturing elite that the domestic market does not provide a reliable footing for their capital investment. While rhetorically this elite now has some devotion to exports, it has not thought through what this reorientation requires. From another perspective, the memory among workers of the union and wage repression in the 1970s –explained as being necessary for export orientation– is also an obstacle to be dealt with.

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[12]See Urata (1989) for a discussion of the possibilities of the growth of intra-firm trade in the region.

5. Conclusion

For the medium term, the scenario that we prefer is one in which the government manages the macroeconomy not too aggresively,[13] engages in carrying out permanent improvements in the fiscal effort, utilizes the more feasible plan to take a stronger stand on the foreign debt servicing problem, carries out reforms in economic incentives in the context of a less ambitious overall growth rate target, and pays greater attention to social expenditures and policies of asset redistribution. The 5 percent scenario that we have outlined above is probably in the upper edge of this scenario.

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[13]In the context of Philippine politics, one hesitates to use the word conservative.

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Appendix A

Application of the Model to Previous Years

Using the same assumptions of elasticities in the paper (as well as the same assumptions of α and β), the model was applied to the years 1978 and 1985. 1978 was a year wherein foreign credit and inflows were relatively abundant and cheap, and wherein political and economic stability were deemed by investors to be quite good. Growth rate of real GDP and GNP was close to 6 percent. 1985 was a year wherein the economy reached its lowest ebb due to a continuing foreign debt crisis, recessionary measures and political and economic instability. GDP and GNP fell by more than 4 percent. The same assumption in the main model for 1988 was used wherein, based on the capital-output ratio, capacity utilization was assumed to average 1 for the years 1977-1980. The result is that for 1978, $u=1$ and for 1985, $u=0.75$. Table A.1 gives the parameter estimates, while Table A.2 gives us the equilibrium values of key variables as a ratio of potential output. These tables should be compared to Table 3 and 4, respectively, of the main text.

Graph A. 1 gives us the picture of how our equations behaved during the years 1978, 1985 and 1988.

The shift downwards in the three curves from 1978 to 1985 is clearly due to the big fall of foreign savings ϕ, the tremendous increase in foreign interest payments j^*, together with the subsequent increase in μj^*, the fall in the fiscal parameters z_1 and z_0, the savings parameters σ_1 and σ_0, and more importantly i_0, (the "animal spirit" parameter in our investment function.) (See Tables A.1 and A.2.) The effect of these on the curves can clearly be seen from our savings, fiscal and foreign exchange equations (equations 14, 15 16 of the main text).

It must be pointed out that μ (in Table A.2) is grossly underestimated for 1985. Much of the government's assumption of foreign debt interest payments in 1985 was in the form of net lending to public corporations in order to bail them out from their massive debt burden, the majority of which is made up of foreign loans. Table A.2 shows this. Net lending as a proportion of potential output shot up from nil in 1978 to 2.48 percent of potential output in 1985. (This is to fall to 0.81 percent of potential output in 1988.) Unfortunately, it is difficult to ascertain how much net lending really went to foreign debt payment so we prefer to leave direct government interest payment for foreign loans separate from net lending.
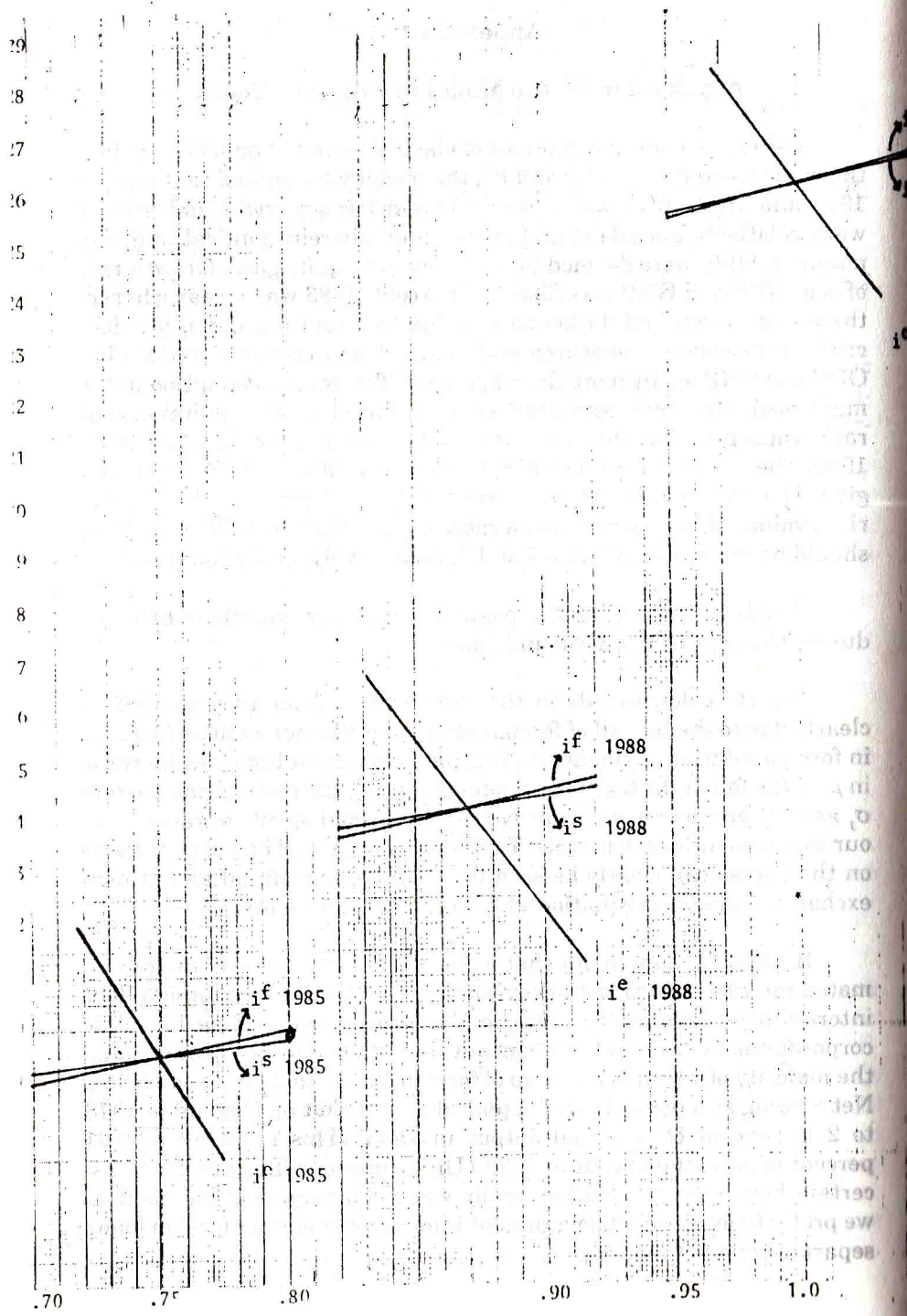
The above emphasizes the drastic effect of the fiscal measures. Due largely to the net lendings, government savings fell from 4.3 percent of potential output in 1978 to 0.8 percent in 1985. To maintain almost the same PSBR ratio to potential output for the two years, i_g had to be cut from 5.4 percent of the potential output in 1978 to 2 percent in 1985 resulting in a significant decline in total investments. Investments further fell with a deterioration in the "animal spirit" parameter i_o reflecting the lack of confidence in the economy at a time of extreme economic and political instability. Investments fell from 26.3 percent of potential output in 1978 to 9.5 percent in 1985.

The effect of the painful fiscal pill on current economic and social services is seen by the fact that in a recessionary year, tax and non-tax revenues as a proportion of potential output is bound to fall. It fell from 12.3 percent of potential output in 1978 to 7.6 percent of potential output in 1985. (This is also reflected in the fall of z_o and z_1.) The squeeze from a fall in government revenue on one hand, and an increase in government debt payment and net lending to public corporations on the other, means a smaller amount for current economic, social and administrative services as well as government investments.

Table A. 1 - Parameter Estimates

Resulting Parameters	1978	1985
z_1	0.0364	0.0132
z_o	0.0091	0.0025
σ_1	0.0766	0.0522
σ_o	0.0766	0.0391
a_1	0.1363	0.1351
a_o	-0.0891	-0.0662
a_2	0.2358	0.1976
i_o	0.1311	0.0264
θ	0.7960	0.8320

Table A. 2 - Equilibrium Values of 1978 and 1985
(values a ratio of potential output, growth rates in percent)

Variable Symbol	Variable Definition	1978	1985
u	Capacity utilization	1	0.75
	Growth rate of actual economic activity	5.8	-.4.20
i	Total investment, equal to total savings rate	0.2627	0.0952
i_g	Government investment	0.0544	0.0208
i_p	Private investment	0.2083	0.0743
s_g	Government savings	0.0433	0.0077
s_p	Private savings	0.1532	0.0783
ϕ	Foreign savings	0.0662	0.0091
$\tau\mu$	PSBR as a proportion of potential	0.0111	0.0131
τ	PSBR as a proportion of actual	0.0111	0.0174
j^*	Foreign interest	0.0166	0.0466
μ	Government share in foreign interest payments	0.1287	0.1001
nl	Net lending	0	0.0248
m_r	Imports of raw materials and intermediate goods	0.0909	0.0675
m_k	Imports of capital goods	0.0536	0.0160
m_o	Other imports	0.0970	0.0472
x	⌈Merchandise exports	0.1291	0.0959
	⌊Non-merchandise export	0.0559	0.0681
na	Net foreign aid	0.0118	0.0079

The recovery in 1988 (which started in 1987) is to a large part a result of pump-priming a depressed economy, although a significant increase in ϕ, and merchandise exports from the 1985 level helped push i^s and i^e to move outwards as well. The pump-priming is reflected by a higher PSBR ratio to potential output (from 1.3% in 1985 to 2.3% in 1988). The high 6.7 percent growth in real GNP surpasses the growth rate in 1978, but it is to some extent a recoupment of the capacity utilization lost in 1984 and 1985 and not mainly an increase in the potential capacity of the economy. This is partly illustrated by the fact that total investments are only 14.2 percent of potential output in 1988 as compared to 26.3 percent in 1978. Using our assumptions, capacity utilization increased from 75 percent in 1985 to 87 percent in 1988. There is therefore a significant difference in the nature of the growth rates of 1978 and 1988.

The fact that foreign inflow in the eighties has diminished (ϕ is only 2.2% of potential output in 1988 as opposed to 6.6% in 1978) and foreign interest payment has increased (from 1.6% of potential output in 1978 to 4.4% in 1988 — not different from the ratio in the "bad" year 1985) means that the foreign exchange constraint will limit the growth of investments. Imports of capital goods form 3.4 percent of potential output in 1988 as compared to 5.4 percent in 1978. The fiscal constraint also keeps government investment from reaching the 1978 level since the government has assumed a larger share of a larger debt burden. Government investment has fallen from 5.4 percent of potential output in 1978 to 2.3 percent in 1988. (The 1988 figure is not much different from the figure of 1985.) The savings constraint will also bite as ϕ remains limited and μj^* remains unduly large (see equation 14 of the main text).

The above is another illustration of what was said in the main text. The government's wish to maintain a higher growth rate in the forthcoming years as capacity utilization approaches unity is tantamount to going back to the seventies when easy credit and low interest rates prevailed. This can only be approximated now if the international financial system is forced to cough up new money facilities and to substantially reduce the interest and principal payments on foreign debt of Third World countries. Otherwise, investments and capacity buildup in these countries will continue to suffer and their long-run economic development will remain endangered.

Appendix B - Exercises in Increasing the Growth Rate of Potential Output

How to Get a 1% Additional Growth Rate in Potential Output

In trying to find out how potential growth rate g can be increased by 1 percent, we solve the following set of equations which are the "growth" versions of the savings and foreign exchange equations, respectively:

$$(17) \quad g + \Delta g = g_o + k \left[\sigma_o + z_o - \mu j^* + (\phi + \Delta\phi) \right] +$$

$$k \left(z_1 + \sigma_1 \right) (u + \Delta u)$$

$$(18) \quad g + \Delta g = g_o + [k/ (1 - \theta)] [(\phi + \Delta\phi) +$$

$$(1 - a_2)x - j^* - a_o - m_o + na - \Delta R]$$

$$[a_1/ (1 - \theta)] [u + \Delta u]$$

(17) and (18) were derived by substituting (14) and (16) into (12), respectively. We let $\Delta g = 0.01$ and $\Delta\phi$ and Δu were determined by solving (17) and (18) simultaneously given the parameters and exogenous variables of 1988. These were solved to be:

$$\Delta\phi = 0.0259 \quad \text{or} \quad \phi = 0.0479$$

$$\Delta u = 0.1163$$

This means that one way to achieve a one percent higher growth rate for potential output is for foreign savings to increase by 2.6 percent of potential output, i.e. $1.283 billion, and for capacity utilization to increase by 0.1163. It is very clear here that for 1988 an increase in foreign capital inflows will increase capacity utilization much more than capacity growth. The Philippines during its recession in the mid-eighties and the subsequent recovery in 1987 and 1988 could have met its social needs better had net foreign capital inflows been higher than what they were. In fact, the increase in capacity utilization which is brought about by the extra foreign exchange required for one percent capacity growth for 1988 is enough, according to our model, to have brought the Philippines into full capacity utilization ($u = 0.9863$) during that year. This,

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however, would also mean that inflationary pressures on the economy would be strong as we attempt to increase potential output by 1 percent.

Using equations (14), (16) and (3), the above implies that

$$\Delta i = 0.0353 \text{ and}$$
$$\Delta i_g = 0.0193$$

Both figures are expressed as ratios of potential output. Note that the above means that government investment as a ratio to potential output will just about have to double its size in 1988.

Next, we present two scenarios. One is the unlikely situation wherein the government does not get any of the increased foreign savings. We use the following "growth" version of the fiscal equation:

$$(19) \quad g + \Delta g = g_o + k \, [i_o + (1 + \alpha) \, (z_o - \mu j^*)] +$$

$$k \, [(1 + \alpha) \, (\tau + z_1) + \beta] \, (u + \Delta u)$$

which was derived by substituting (15) into (12). Given our Δu calculated above, we can get the required τ (the PSBR as a ratio of actual output) in order to close the fiscal gap brought about by the changes in the savings and foreign exchange equations.

The result is:

$$\tau = 0.042012 \text{ or } \tau (u + \Delta u) = 0.0414$$

which means $\Delta \tau = 0.015145$

Since the government does not capture any of the increased capital inflow, the required increase in government investment will require a much higher government deficit than in the base run (especially since the sensitivity of the fiscal effort to increased activity is quite weak.) Given a Δu that brings capacity utilization close to unity, this terribly high PSBR ratio will definitely create an inflationary crisis in the country.

If the government captures all of the capital inflows, then we can assume that z_o increases by $\Delta \phi = 0.0259$, so that (19) yields $\tau = 0.015752$ and $\Delta \tau = -0.01111$, $\tau (u + \Delta u) = 0.015537$. It is reasonable that if all the capital inflows go to the government, the government deficit will de-

crease from that of the base run, i.e. the increased capital inflow is more than enough to finance the increased government investment required by a higher growth rate. This scenario has the advantage of alleviating somewhat the inflationary tendencies brought about by trying to increase the growth rate of potential output.

Finally, it should be pointed out that using equations (17) and (18) can also achieve very similar figures if we reduce foreign debt interest paid (i.e. j^*). This can be achieved by a write-off of part of the foreign debt or by decreasing the interest rate paid on the foreign debt. j^* can decrease by 0.0259 of potential output (the rounding off makes it equal to the $\Delta\phi$ derived earlier) in order to achieve the 1 percent growth rate in potential capacity. This means more than halving the foreign debt interest payment of 1988. This yields a very similar $\Delta u = 0.1163$ as we had gotten earlier. The main difference is that in plugging the necessary changes into the fiscal equation (19), we get:

$$\tau = 0.034186 \text{ and } \Delta\tau = 0.007319$$

$$\tau \ (u + \Delta u) = 0.033717$$

PSBR has to increase since the reduction in j^* reduces government foreign interest payments less than the reduction in j^* (since $\mu < 1$). The required increase in government investment due to the higher growth rate offsets the reduced burden of interest payment. This scenario also aggravates the inflationary tendency, but is not as bad as the scenario where there is more capital inflow but it is not at all appropriated by the government.

It seems therefore that the easiest way to get the 1 percent additional capacity growth rate is to have a higher capital inflow that is captured by the government. The advantage of this over a reduced interest burden (reducing j^*) may, however, be offset if we consider that capital inflows will result in higher interest and principal payments in the future. The best, most likely, will be a mixture of new money and reduction of foreign debt interest payment.

How to Get a 2.5% Additional Growth in Potential Output

In this scenario, u will definitely reach full utilization ($u = 1$). We therefore let $u = 1$ and let $\Delta g = 0.025$ in equation (18) and solve for ϕ, the amount of foreign savings required to get a 6.5 percent growth rate in the foreign exchange constraint. The required ϕ is then plugged into

equation (17) (together with $u = 1$) to get the additional fiscal effort z_o to get the savings equation to achieve 6.5 percent. The result is:

$\Delta \phi = 0.0546$ or $2.7 billion additional foreign savings

$\Delta z_o = 0.022337$

Even with this increase in Δz_o, equation 19 reveals that the additional 2.5 percent growth will increase PSBR to $\tau = 0.037$. If the increase in foreign savings goes entirely to increased fiscal revenues, then there will be a budget surplus ($\tau = -0.04$).