A SIMULATION OF THE MACROECONOMIC IMPACT OF ODA WITH THE DEBT FACTOR: THE PHILIPPINE EXPERIENCE

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ABSTRACT

Foreign aid (interchangeably used in this paper as official development assistance or ODA) has always been treated as "cheap monies." In the past, aid studies almost always implicitly assumed that the economic impact of ODA loans is negligible. This paper, however, takes an opposite view and presents that ODA debt implications do matter. It is proposed in the discussion that while aid carries "softer" terms that reduces the burden of a given debt, it may not always be intuitively obvious that these "softer" repayment terms will also produce a larger debt out of a given flow of loans and give rise to higher interest charges. The Philippine experience with ODA in the past two decades is examined and used as a country case study.

INTRODUCTION

The dramatic digression of the Philippine economy from the scenario originally visualized by international aid agencies during the 1960s (Rostow

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1960; Fei and Paauw 1965; Chenery and Strout 1966) makes the country a distinct and an important case study. During the time of economic and political transformation, foreign finance, particularly ODA, was an important ingredient. The aggressive growth strategy of the government was dependent on the flow of foreign funding, thus, aid flows were relatively significant. However, despite efforts to achieve growth, the Philippines did not achieve economic dynamism.

In contrast with other foreign flows, ODA is defined as flows in the form of official grants and concessional loans, in currency or in kind, which broadly aim to transfer resources from developed countries (DCs) to less developed countries (LDCs) solely for the promotion of economic development and welfare of the latter. It is comprised of flows provided either directly by DC governments, including its state and local governments, or through subscriptions to multilateral institutions.

ODA grants are given in a variety of ways: as emergency relief; as physical investments in part or in whole, as a preproject development component, and as technical assistance in the form of technical advice, training, and others. ODA loan, on the other hand, is a concessional (soft) loan, which contains a grant element of at least 25 percent. Unlike the former, the latter has to be repaid depending on the agreed credit terms.

One important factor that precipitated weakness in the Philippine economic development process was its ballooning external debt. Philippine external debt rose from 10 percent of its gross national product (GNP) in 1965, to 19 percent in 1970, to 54 percent in 1980, and finally, to 65 percent in 1990. Interestingly, data showed a corresponding increase in the flow of ODA during the same period but was accompanied by a reversal in the ODA loan/grant mix. From a loan- grant mix of 14-86 percent in 1952-1961, the ratio changed to 45- 55 percent in 1962-1969, and finally reversed to 87-13 percent in 1990-1991.

The purpose of this paper is to answer the question: What are the effects of aid on the economy's performance? While a range of explanations of the country's performance including economic mismanagement, administrative ineptness, poor investment decision, and corruption had been

addressed in various reports and studies, none of them attempted to look into the role of ODA. In this paper, the macroeconomic impact of ODA and its implications in debt are examined using a simultaneous multi-equation economic model. This simple general equilibrium model incorporates two important features: (1) establishment of interdependence between the financial and real economic sectors with international transactions; and (2) determination and illustration of foreign aid effects on government budget and how budget restraint affects macroeconomic performance.

THEORETICAL CONSIDERATIONS

The study of Gupta (1975) using a simultaneous equation model sets an important tone in analyzing the macroeconomic impact of foreign aid. Gupta's model of 9 linear structural equations with 9 endogenous variables, applied on the 1960 data of selected developing countries including the Philippines, yielded results which are richer than those of single equation models. His basic finding was that the total negative impact of foreign aid is actually smaller than what is derived from single saving equation models (such as those prescribed by aid critics). The difference, according to Gupta, is accounted for in the indirect effect of aid on savings via growth.

In other words, the weakness of using single equation model is that the negative effect of foreign aid on the savings rate is exaggerated. Likewise, Gupta raised the possibility of difference between direct and the total effect in terms of the direction (sign) of the relationship. This, according to Gupta, depends on the extent of the separate effects of external capital on savings and growth.

Gupta's findings posed a challenge on the Chenery and Strout model (1966) that posits aid as a necessary ingredient for economic growth. Presented under the rubrics of the stages of growth thesis, Chenery and Strout espoused that in each of the growth stages, a country is bound to face a growth-restricting factor which can be relieved by the flow of foreign assistance and, hence, accelerate growth. The model was applied to 31

developing countries from 1957 to 1962 and cited the case of the Philippines as a successful case of foreign aid.

The present model intends to extend Gupta's model from a simple growth-savings impact analysis to a general equilibrium analysis which includes recent findings using partial equilibrium analysis of ODA growth impact. These are briefly discussed in the succeeding paragraphs.

Leff and Sato (1980) pointed out that foreign aid may affect the growth in income not only by providing additional savings and complementary imported input to the real sector of the economy (as advanced by the gap models) but also by helping determine the expansion of domestic real credit and the supply of working capital for productive processes. The implication is that foreign aid affects both the monetary and real sectors of the economy, which is tantamount to saying that any changes in foreign aid movements will have a significant impact on the economy.

According to Khan and Knight (1982), the interdependence between monetary and fiscal policies occurs because changes in the money supply (which is affected by the supply of foreign aid) are, by definition, equal to changes in credit to the government, changes in credit to the private sector, and variations in international reserves.

Although the inflow of foreign aid is expected to increase domestic absorption, Stillson said that it also depends on the adjustment of the economy to the expansion of the monetary sector as a result of the inflow. He said that in the case of long-term cash loans, if foreign resources are used to supplement domestic investment and are profitably invested, they may result in trade surplus from which the loans can be repaid. But then, the specific policies used to facilitate this desired reallocation of resources are important. For instance, if foreign capital is allowed to lead to an excess monetary expansion and, ultimately, a reallocation of domestic resources from trade to nontraded goods, the economy and the balance of trade will adjust to the inflow in such a way as to be less able to pay back the loan. This instance can only be reversed if nontradeable goods industries increase excess or surplus that will allow the repayment of loans.

Allen (1962) proposed that tax collection should increase relative to income. A similar idea was suggested by Duguay and Rabeau (1988). The stimulative effect of an increase in government deficit has a short-term duration when supply constraints are taken into account. In an economy where supply constraints exist and where the public debt is perceived as private wealth, there is a significant crowding-out effect in the long-run when the government increases its demand for resources.

According to Fry (1980), the crowding-out effect of government expenditures on private investment may be transmitted via interest rate and credit availability. As inflation sets in and real deposit rate of interest falls, an increasing proportion of the declining supply of real domestic credit is expropriated by government to finance current expenditures. Hence, funds for both working and fixed capital investment are doubly squeezed. While an inflow of foreign aid would tend to reduce the domestic interest rate, an additional wealth effect may likewise be produced which may cause savings to drop. This decrease likewise results in a reduced supply of real domestic credit.

With government budget restraint taken into account in the macroeconomic model, Christ (1979) proposed that the most fundamental implication of this assumption on government budget restraint (GBR) in the macroeconomic model is that the authorities cannot fix arbitrary paths for all of the macroeconomic policy variables at once. At least one policy variable must achieve its path endogenously determined by the joint action of the GBR and the economy's structure (Ogura and Yoshino 1988, Yoshino 1993a, and Yoshino 1993b).

The important argument of the Christ model is that when public debt rises to cover a deficit, the deficit increases due to interest payments which then requires a subsequent rise in borrowing, and so on and so forth. What the model suggests is that changes — in the money stock, the debt, government purchases, transfers, and taxes — all produce effects depending on which variables are fixed and which ones are allowed to vary endogenously.

MODEL STRUCTURE

The macroeconomic model is a four-sector, 12 simultaneous system of equations estimated using the instrumental variable method. The four sectors are: (1) central government including the central bank and other government institutions, (2) private financial institutions, (3) nonbank private, and (4) the rest-of-the-world (or overseas sector). Secondary data are used and the study covers the period 1971-1989.

The model is structured in such a way that the rates of return on the assets (or funds) determined in the financial market and the quantities to which they refer are "fed back" into the expenditure equations. This kind of relation signifies the interdependency between the expenditure and the financial theory which is built around interest rates and financial flows (Cohen 1968; Yoshino 1993b). That is, the interest rates determined in the financial market and the quantities to which they refer both influence and are influenced by the real sector, and vice-versa (Fig. 1).
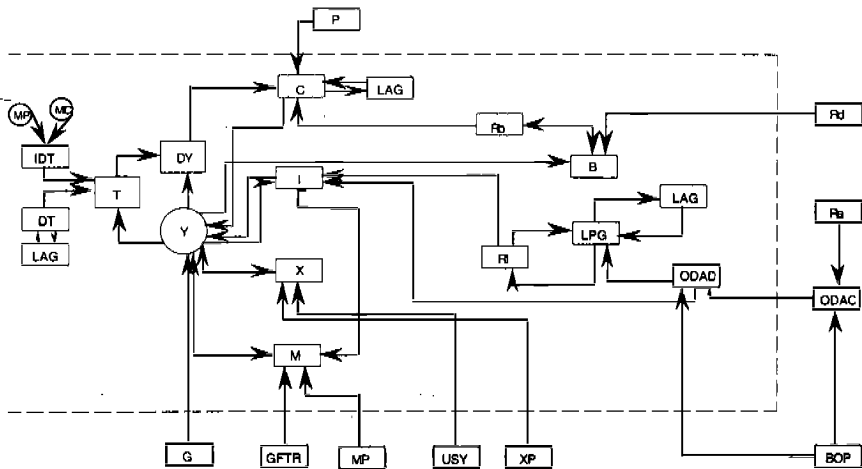

Fig. 1 Interdependence Between Financial and Real Sectors

The system of equations is given as follows:

Table 1. System of Simultaneous Equations

$$(1)\ Y = C + G + I + X - M$$

$$(2)\ C = a_1 + a_2 DY + a_3 C_{t-1} + a_4 P - a_5 R_b / P$$

$$(3)\ I = b_1 + b_2 Y - b_3 R_1 - b_4 ODA / P + b_5 I_{t-1}$$

$$(4)\ X = c_1 + c_2 USY + c_3 Y - c_4 XP$$

$$(5)\ M = d_1 + d_2 Y + d_3 GFTR + d_4 I - d_5 LMP$$

$$(6)\ DT = e_1 + e_2 Y + e_3 DT_{t-1}$$

$$(7)\ IDT = f_1 + f_2 MC - f_3 MP + f_4 P$$

$$(8)\ DY = Y - T$$

$$(9)\ T = DT / (P / 100) + IDT / (P / 100)$$

$$(10)\ ODAD = g_1 + g_2 Y + g_3 BOP - g_4 R_a$$

$$(11)\ LPG = h_1 + h_2 R_1 R_a - h_3 ODAPESO + h_4 LPG_{t-1}$$

$$(12)\ B = k_1 + k_2 Y + k_3 R_b - k_4 R_d$$

where:

Y	= national income	G	= government expenditures
RI	= domestic interest rate	GFTR	= official transfers (ODA grants)
Rb	= (government) bond rate	P	= GNP implicit price index
C	= personal consumption	RRb	= bond rate in real terms
I	= investment	ODA/P	= ODA loans disbursed in real terms
X	= exports		
M	= imports	USY	= United States GNP
B	= (government) bonds	XP	= export price index
LPG	= domestic loans	MP	= import price index
ODAD	= official development assistance (loans)	Rd	= interest rate on deposit
		Ra	= ODA loan interest rate
IDT	= indirect taxes	BOP	= balance of payments overall balance
DT	= direct taxes		
MC	= imports at current prices		

INFL = CPI index   ODAPESO = ODA loan commitment
DY   = disposable income   in local currency
LMP   = log of import prices MP   = import price index
T   = total taxes $R_1 R_a$ = difference between the
                                           two rates

Lagged variables are represented by subscripts (t-1)

At this point, it is imperative to mention that two types of ODA flows were observed: ODA grants and ODA loans. The observed values of these variables were those reported by the monitoring office of the National Economic and Development Authority (NEDA). ODA grants refer to grants received from official sources without financial obligation. ODA loans, on the other hand, were the so-called "soft" loans because they have an imputed grant element of at least 25 percent and have to be repaid based on credit terms which have been agreed upon. Compared to regular foreign loans, the credit terms have basically longer maturity period and lower interest rate. One should note that it is not customary to decategorize the imputed grant element from the loan.

The loan market is assumed to be two-tiered, composed of a foreign loan market and a domestic loan market. In the foreign loan market, the supply of ODA is exogenous while the demand for ODA incorporates a "feedback" mechanism from the domestic economy. The domestic loan market, on the other hand, assumes that the supply of domestic loans is equal to the volume of bank deposits, which in turn is predetermined. Demand for domestic loans, on the other hand, is sensitive to the difference between the cost of domestic and foreign loans (that is, investors see them as complements), real income and the inflow of ODA. Hence, the total loan market is perceived as the totality of both domestic and external funds.

Personal consumption is assumed to be positively determined by the income net of taxes, the consumption level of the previous year, and inflation rate while inversely by the real bond rate. The investment function moves positively with real income, is influenced by past investment level and the inflow of ODA valued at real prices, while inversely related to the lending

rate. Government expenditures are exogenous. Exports are dependent on the real income of the country's principal trading partner (the United States) and the country's real income while inversely related to export prices. Demand for imported goods are related to the level of real income, official transfers, investment level, and the import prices.

The model assumes constant capacity, predetermined prices and exchange rate, government budget restraint, and foreign capital inflows in the form of foreign aid. The constant capacity assumption is important to isolate the impact of ODA inflow in the country's aggregate demand (this allows the examination of the impact on government budget). On more general terms, this assumption is relaxed in the next section.

The budget restraint is given as follows:

$$G + INT = DT + IDT + B + ODAD + GFTR \qquad [1]$$
$$G = DT + IDT + B + ODAD + GFTR - INT \qquad [2]$$
$$INT = [(R_a * STOCKODA) * XR / (P / 100)] + (R_b * STOCKB) / (P / 100)] \qquad [3]$$

This simply means that government purchases (G) plus interest payments (INT), both domestic and foreign, must be financed through a combination of revenues and possible sources of financing such as taxes (DT & IDT), bonds including domestic borrowing (B), foreign loans (ODAD) and official transfers (GFTR). Unlike in past aid studies where ODA is assumed as a gap filler and adjusts accordingly under unstable conditions, the inelasticity of the supply of ODA is recognized in this study. Thus, the supply of ODA is assumed exogenous while the demand for ODA is internally determined. The point of departure is that ODA comes into the domestic economy and affects both the real sector through investment demand and G, and the money sector through the loans market.

ESTIMATION RESULTS

The resultant equations using instrumental variable method of estima-
tion are as follows:

Consumption (C):   [4]
$1819.02 + 0.268DY^* + .583C_{t-1}^* + 234.075INFL - 221.338Rb/P$
(2.03)   (5.04)   (6.19)   (1.63)   (1.50)
         $+3873.06D868788^* + 3879.19D89^*$
                    (4.52)   (4.69)
Adj. $R^2 = 0.99$ D.W. = 2.14   Durbin h = -.33

Investment (I):   [5]
$3453.37 + 0.237FY^* - 782.881FR_{I^*} - 14.825ODAD/P + 0.504I_{t-1}^*$
   (1.51)   (6.20)   (-9.21)   (-1.18)   (5.65)
         $+ 2965.698D76^{**} - 5639.988D868788^*$
                 (2.28)   (-4.03)
         Adj. $R^2 = 0.96$ D.W. = 2.17   Durbin h = -.40

Exports (Goods and nonfactor services, X):   [6]
$- 22002.753 + 0.009USY^* + 0.086FY^{**} - 25.719XP$
   (-12.71)   (11.28)   (2.27)   (-1.13)
            Adj. $R^2 = -.97$ D.W. = 2.14

Imports (Goods and nonfactor services, M):   [7]
$7052.338 + 0.241FY^* + 76.703GFTR^* + 0.523I^* - 7656.954LMP^*$
   (2.21)   (3.65)   (9.04)   (6.83)   (-4.62)
            $- 4569D8384^* + 3126.781D87^{**}$
                 (-5.03)   (2.45)
            Adj. $R^2 = 0.97$ D.W. = 2.09

Government Bonds (B):

$$-24375.934+0.307FY^* +1716.555FRb^* -1825.338Rd^* +2$$
$$+28806.502D868788^* \quad [8]$$

(-3.96)   (2.92)   (3.50)   (-3.10)   (7.96)

Adj. R^2 = 0.93   D.W. = 2.84

Demand for Domestic Loans (LPG):   [9]

$$- 26624.974 + 3746.374FR_IRa^* + 0.843LPGt\text{-}1^* - 1.854ODAPESO^*$$

(-9.03)   (10.97)   (21.87)   (-3.77)

$$- 32170.77^*D82^*$$

(-5.82)

Adj. R^2= 0.99   D.W. = 2.59   Durbin h = -1.31

Demand for ODA-Loans (ODAD):   [10]

$$67.560 + 0.005FY^* + 0.075BOP^* - 53.793Ra^* - 126.152D77^{**}$$

(0.826)   (6.51)   (6.23)   (-4.21)   (-2.67)

$$+ 103.331D8386^* + 335.959D89^*$$

(2.89)   (2.89)

Adj. R^2 = 0.90   D.W. = 1.61

Direct Taxes (DT):   [11]

$$- 520.265 + 0.013(IPIN^*FY)^{**} + 0.749DT_{t\text{-}1}^*$$

(-1.28)   (2.70)   (4.26)

Adj. R^2 = 0.99   D.W. = 1.41   Durbin h = 2.0

Indirect Taxes (IDT):   [12]

$$- 3324.597 + 0.574MC^{**} - 42.751MP + 77.837P^*$$

(-1.31)   (2.74)   (-0.74)   (16.34)

Adj. R^2 = 0.98   D.W. = 2.79

Notes: level of significance: * = 1%   ** = 5%   *** = 10%
Other variables not defined elsewhere:

IPIN   = GNP implicit price index
TF   = tax effort

Dummy variables:
    D76   = adoption of an expansionary fiscal and monetary policy
    D77   = low absorptive capacity
    D82   = financial difficulties and slowdown in economic activities
    D8384 = financial crunch in both domestic and international financial
            markets
    D8386 = adoption of structural reforms
    D868788 = change in administration, renewed confidence
    D87   = renewed confidence of the international community;
            support for People Power Revolution
    D89   = debt overhang; calamity damage

Except for inflation and the prices of bonds, all other specified determi-
nants of the consumption function were found significant at 1 percent level
of confidence interval. The low t-values for inflation and bond prices
manifested the speculative behavior of individuals during unstable times.
Smoothing out past consumption levels out of limited income was favored
over saving for future consumption.

For the investment function, all determinants were found significant
except ODA loans. While the t-value for ODA loans was low, the negative
sign however was noted. An alternate investment function using total ODA
(grants and loans) reversed the result (becomes significant) with the
negative sign. The first equation, however, was adopted in favor of the
second because of better statistical performance. The unexpected sign for
ODA may be explained as follows:

(1) The increased participation of government in the investment activity
allowed by ODA may have choked off finances available to the private
sector thereby crowding out private investments.

(2) The inflow of ODA tended to reduce the domestic interest rate which created additional wealth effect thereby causing a drop in savings out of current measured income. This savings decrease resulted in a reduced supply of real domestic credit and further aggravated tightness in investment funds.

(3) Majority of ODA funds were invested in infrastructure which did not create any synergistic effects on related investment. The situation was further complicated by the innumerable problems that beset project development thereby resulting to a low availment rate of ODA. This implied low absorptive capacity.

(4) While ODA was intended to supplement domestic investment (a positive relationship between ODA inflow and investment may be therefore expected), this did not happen. The reason may either be that ODA may have been consumed or ODA supplanted (or substituted) domestic investment. In the aid jargon, this is referred to as "aid fungibility." Although the former may seem highly possible, it is however speculative because, strictly speaking, the use of ODA is usually monitored by both goverments (the donor and the recipient) following an agreed allocation pattern. Thus, diversion of ODA funds should not happen unless there was a connivance between the two governments. It is more probable, however, that ODA enabled the government to divert local funds originally intended for investment to other use.

(5) Any combination of the above will therefore make investment less likely to increase despite the inflow of ODA.

The income of the United States was a significant determinant of exports. The export price index has reasonable sign but was not significant. Inclusion of the foreign exchange rate and the export price expressed in domestic prices were both found insignificant. This implied that Philippine exports faced fierce competition in the international market. In a separate equation, relative export prices were added as explanatory variables but had been dropped because of multicollinearity with the income variables.

All the determinants for imports were found significant. The significance of foreign official transfers as a determinant of import reinforced the suspicion that a portion of import demand was induced by its receipt. In other words, ODA grants, whether in the form of project assistance or commodities, entailed a demand for complementary imported input called *induced import demand* or alternatively referred to as *derived demand from tied aid*. The impact of ODA loans on import was not tested separately because its effects were presumed to have been implied in the impact of investment on total imports, which was positive and significant.

The tax functions have all significant variables except for import prices which were a potent source of indirect taxes in view of the import levy. Apparently, it was too early to demonstrate its impact.

The demand for bonds was negatively related to the interest rate on deposit, implying the portfolio choice of savers. Demand for domestic loans were found to be positively influenced by its previous demand level and the loan interest rate difference between domestic and foreign sources of finance. This implied that given accessibility to ODA, investors will prefer it over domestic loans. The demand for ODA showed a positive relationship between income and ODA, and balance of payments and ODA.

The model was validated using statistical measurements and an ex-post simulation test (Table 2). Generally, the model exhibited good performance as evidenced by the small root mean square simulation errors of the variables. In percentage terms, most variables showed comfortable low levels of percent error, particularly income, domestic interest rate, and the bond rate.

Further validation of the model in terms of dynamic stability as it evolved backward in time was conducted through a historical or ex-post simulation test (that is, a simulation through the estimation period). Two things were given particular attention: first, how well the model matched the original values of the variables, and second, the model's ability to reflect important events or turning points that took place in the past. When the results of this historical simulation were plotted, it showed that the simulated series closely reproduced both the short- and long-run behavior of the actual

TABLE 2
A Test of the Model's Goodness-of-Fit

Variable	rms error	rms percent error	Theil's Inequality Coefficient
Y	2528.97	2.74	0.015
RI	0.64	4.29	0.019
Rb	0.94	7.00	0.035
C	306.44	0.55	0.003
I	3314.06	19.70	0.085
X	1005.00	5.90	0.028
M	1967.37	11.65	0.081
DT	1088.27	16.83	0.038
IDT	2917.15	5.75	0.037
B	2993.55	18.0	0.074
LPG	3958.40	10.15	0.021
ODA	46.35	21.1	0.089

Note: Theil's Inequality Coefficient: U = 0 (perfect fit); U = 1 (bad fit)

series. Although some of the turning points of variables have been missed during the early 1970s, the model generally made a good record in tracking the actual behavior. The simulated and actual values of income (gross national product), the domestic interest rate and the bond rate were shown on Figures 2, 3, and 4.

FIGURE 2

**The pattern of actual income level (Y) was closely simulated
by the model (PFY) except for the rise and fall in income
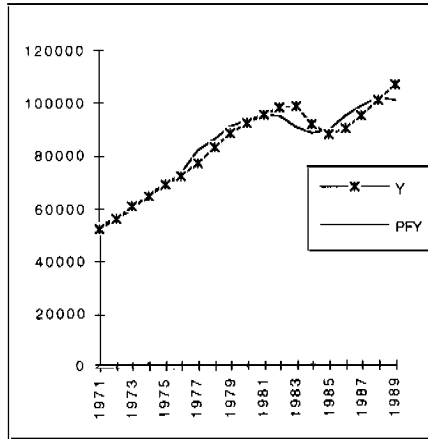in 1983 and 1985, respectively.**

FIGURE 3

**The simulated values of nominal lending rate (PFRL)
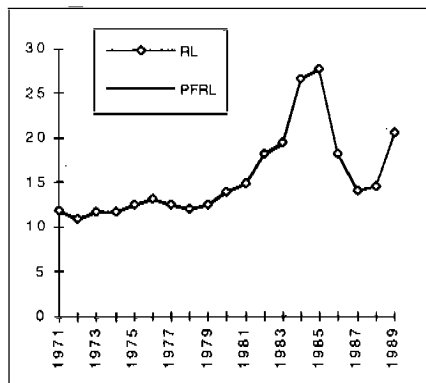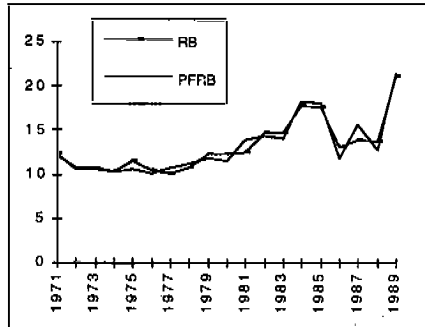closely exhibited the actual rate of lending (RL).**

FIGURE 4
Some fluctuations in nominal bond rate (RB) were not captured by the model (PFRB).

POLICY SIMULATION

Using the model for policy simulation and comparing the first period changes in income under various monetary/fiscal policy mixes showed that when government constraint was not considered (Case G), the income multiplier of an increase in government spending was overstated by about six times than when government constraint was considered (Cases A to F, Table 3). The high-impact multiplier in Case G may be attributed to the inability of the model to simulate the likely impact of government budget on growth since other variables were allowed to adjust accordingly.

It was also observed from the policy simulation exercise that a policy mix of a 10 percent increase in government spending financed by flotation of government bonds (Case C) has an income multiplier not significantly different than when such spending was financed by ODA loans (Case A). However, if ODA grants were used to cover the 10 percent increase in government spending, the income multiplier was lower (Case B). This may be attributed to the induced import demand associated with aid grants which exert pressure on the external account and on the growth of income.

TABLE 3

First Period Impact Multiplier of Real Aggregate Demand For a Given 10% Increase in Government Expenditures, (1980-1989)

Policy Mix	First Period Multiplier ($\Delta Y/\Delta G$)
A. Expenditures financed by an equivalent increase in ODA loans	1.57
B. Expenditures financed by an equivalent increase in ODA grants	1.27
C. Expenditures financed by an equivalent increase in government bonds	1.59
D. Expenditures financed by a combination of 5% increase in ODA loans and 5% increase in ODA grants	1.33
E. Expenditures financed by a combination of 5% increase in taxes and 5% increase in ODA grants	1.33
F. Expenditures financed by a combination of 5% increase in ODA loans and 5% increase in government bonds	1.53
G. Expenditures assuming a balanced budget (model ignoring budget restraint)	7.37

The Ricardian Equivalence was likewise confirmed by the model. A policy mix of ODA loans and ODA grants to cover an increase in government spending brought the same impact multiplier as a policy mix of an equivalent increase in the level of ODA grants and taxes (Cases D and E). This means that ODA loans were perceived to be "future tax," thus, the people behaved correspondingly as if they were faced with a tax increase.

Further findings of the simulation exercise (not shown in the table), revealed that the income multiplier of an increased financial resource through aid loans can keep both the consumption and investment levels higher than when the government tries to siphon off private cash holdings through bond flotation. This simply reflects the money supply expansion effect of aid monies. The model also showed that with an inflow of ODA, bond rates correspondingly increased. At this instance, the "perpetual dependence" phenomenon becomes apparent — as borrowing increases, bond rate increases, thereby resulting in higher foreign and domestic debt obligation. Without sufficient funds generated internally to service the debt obligation, it will trigger another round of demand for foreign capital (or ODA).

AID IMPACT ANALYSIS USING THE IS-LM FRAMEWORK

In this section, the aid impact analysis with a supply function is presented in more general terms using the IS-LM framework. The intention is merely illustrative to show the impact of ODA through the movement/shifts in the IS-LM curves and thus the aggregate demand and supply.

The IS curve is determined from the following equality:

$$S + T = I + G + X - M \qquad\qquad [13]$$

Substituting the corresponding estimated equations from [16-22] and the estimated savings function below to the equality,

$$S = -30939.79 + 0.40FY^* + 6267.92R_d/P^* - 408.11R_b{}^{**} + \qquad [14]$$
$$\quad (-5.13) \quad (14.53) \qquad (7.50) \qquad\quad (-2.70)$$
$$107516.4TF^* + 10.43ODAD^{**} + 2936.79D77^{**} - 2411.34D83^{***}$$
$$\quad (3.85) \qquad\quad (2.85) \qquad\qquad (2.51) \qquad\quad (-2.01)$$
$$+ 3336.35D88^{**}$$
$$\quad (2.54)$$

$$\text{Adj. } R^2 = 0.93 \qquad \text{D.W.} = 2.02$$

the IS function is derived as:

$$Y = \frac{1}{(-.166 + .013\ IPIN)}\ [23287\ .\ 6 - 782\ .\ 88\ R_1 - 14\ .83\ ODAP + ...x]$$ [15]

where: x = all other variables in the equation

IS represents the combinations of interest rate (R_l) and income (Y) that satisify the condition I=S. The slope of the IS function (which is $\partial R/\partial Y$) is negative as attested by the negative sign of the interest rate (R_l).

The LM function, on the other hand, is derived by the equality of the demand for money,

$$M / P = L\ (R,\ Y)$$ [16]

$$M / P = 173779\ .53 + 7860\ .49R1^{**} - 58569\ .60\ R_a{}^* - .98\ DY + 56\ .0\ FTRP^{***} + .912\ INTP$$ [17]

    (1.40)   (2.67)   (-3.81)   (-1.16)   (2.06)   (3.03)

and the supply for money:

$$M_s = currency + deposits$$ [18]

where deposits were estimated as follows:

$$deposits = 1649.75 + 1046.87*R_d{}^* + 4.51*ODAP^*$$ [19]
                    (2.90)   (10.05)
                Adj. R^2 = 0.86   D.W. = 1.21

The LM function is:

$$Y = \frac{1}{5.05}\ [3145\ .82 + 1046\ .8R_d - 10\ .70R_b + 4.51\ ODAP + curr]$$ [20]

From the variable relationships shown above, ODA appears as a determinant in both the real (savings and investment) and money sectors (supply of money). Projecting this relationship in Figure 5, an inflow of ODA shifts the LM curve to the right (from LM_0 to LM_1), showing an increase in money supply. Likewise, the IS curve shifts to the right (from IS_0 to IS_1) signifying an increase in investment. For most of the partial equilibrium models, the analysis of ODA impact stops at this point and concludes that ODA increases income. However, under a general equilibrium analysis, it is shown that as money supply increases, it exerts upward pressure on prices. And as this happens, the real rate on deposit decreases, thereby discouraging savings (equation 14). Thus, IS shifts back toward the original condition (IS_1 to IS_2). And because inflation is feared to bring havoc to economic growth, the government adopts policy to control the rise in prices. And in so doing, the LM curve shifts backward (LM_1 to LM_2).
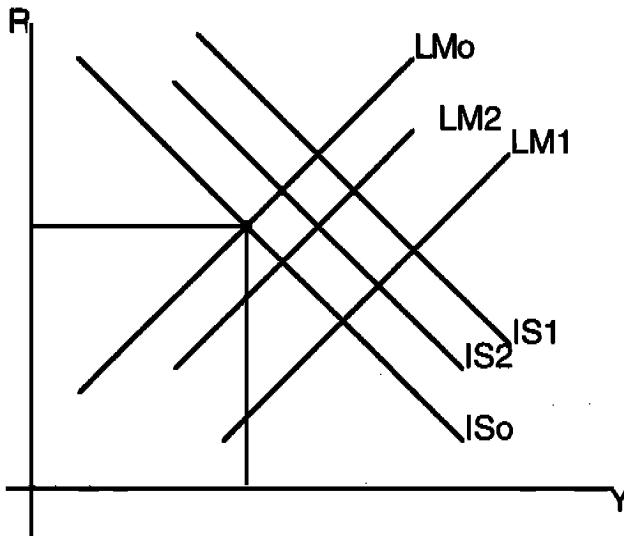

FIGURE 5
Impact of ODA Explained Using IS-LM Relationship

Using the outcome of the model simulation, the presence of Ricardian Equivalence during the 1980s may exert further pressure for IS to shift backward. Ricardian Equivalence means that people presume ODA as a future tax burden, thereby making them opt to ease up on their consumption rather than save.

From the IS-LM framework, the analysis may be extended to the aggregates.

The aggregate demand function derived from IS and LM is given in its general form:

$$Y = f (M/P, ODAP, ... x) \qquad [21]$$

The curve slopes downward (quantity-price relationship) as shown by the inverse relationship with P (equation 17). Shifts in the IS-LM curves will correspondingly result in shifts in aggregate demand curve (and movement along the IS or LM curve results in movement along the aggregate demand curve). For example, a rightward shift in LM as a result of increase in money supply will shift aggregate demand to the right.

The aggregate supply, on the other hand, is given by:

$$Y = f (N, K) \qquad [22]$$
$$\text{where} \quad N = f (W/P) \qquad [23]$$
and
$$K = (I_t - \varphi K_{t-1}) + K_{t-1} \qquad [24]$$

$$\text{where} \quad I = S + ODA \qquad [25]$$

The estimated aggregate supply function is

$$Y = 8.959 + 0.29N + .184K^* \qquad [26]$$
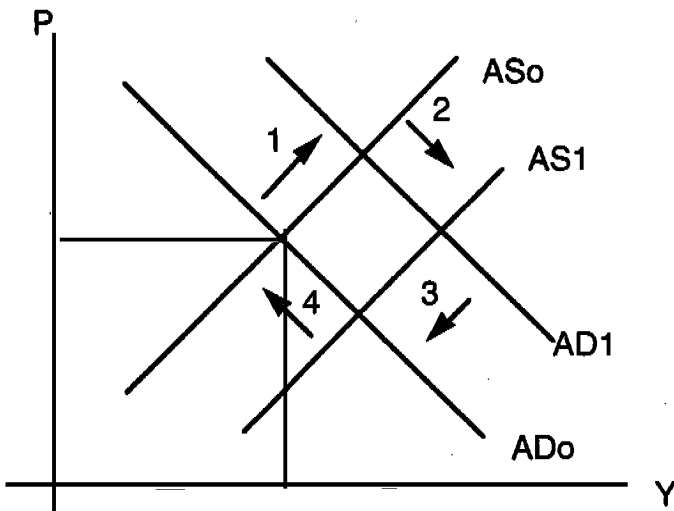$$\quad (9.45) \quad (.25) \quad (5.53)$$
$$\text{Adj. } R^2 = 0.97 \quad D.W. = 2.0$$

where $N = 8.42 + .479 \text{ W/P}^{*}$ [27]
            (16.88)   (2.65)
      Adj. $R^2 = 0.97$ D.W. $= 0.236$

Following the IS-LM framework of analysis presented above, aggregate demand initially shifts to the right as investment is increased by the inflow of ODA. Correspondingly, aggregate supply makes a rightward shift manifesting an increase in output (or income). But as the inflow impacts other variables working in the economic system (such as prices), contraction of the aggregate demand and aggregate supply from the initial shift takes place.

FIGURE 6

Impact of ODA on Aggregate Demand-Aggregate Supply

LONG-RUN GROWTH IMPLICATIONS

Going back to the macro model, the relationship of ODA to the country's long-run expansion path may be presented as follows.

From the model, demand for ODA (or ODA disbursements) is set equal to government expenditures net of taxes, ODA grants and government borrowings plus the cost of borrowed funds (both domestic and external). In equation form:

$$ODAD = G-T-GFTR-B+R_b*B+R_a*STOCKODA \qquad [28]$$

From equation 28, the growth of ODA is equal to the induced rise in bond rate as a consequence of a rise in ODA-loan and the induced tax increase as a result of the rise in income brought about by the rise in ODA-loan. This relationship is expressed by equation 29 as follows:

$$\frac{\partial\,ODAD}{\partial stockoda} = \left[\frac{\partial R_b}{\partial stockoda}*B + R_a\right] - \left[\frac{\partial T}{\partial Y}\frac{\partial Y}{\partial stockoda}\right] \qquad [29]$$

where:

ODAD	=	growth in ODA
stockoda	=	cumulative ODA inflows
R_b	=	bond rate
B	=	government bond
R_a	=	ODA loans rate of interest
T	=	taxes
Y	=	national income

The equation means that in order to see a decline in growth of ODA, domestic absorption, which is measured in the form of increased tax revenues (presented as the second bracketed term on the righthand side of the equation), should permit the development of a surplus and repayment of the direct and indirect (or induced) cost of the ODA inflow (presented in

the first bracketed term on the right hand side of the equation). If this does not happen despite the positive effect of ODA loan on aggregate income, the rise in taxation still falls short of the associated cost in the use of ODA funds, thereby resulting in a chain of increasing rate of ODA inflow. Therefore, in summary, unless this component of the equation increases more than the direct and induced debt service obligations (domestic and foreign), a declining flow of ODA loans can not be expected. In short, dependency on foreign loans becomes perpetual.

Referring to the macro model, a simulation of the values of the variables (see Annex A) showed that ODA can keep short-run consumption and investment level at a relatively higher level but not without the long-run cost implications. The use of ODA loans was accompanied by a corresponding rise in the bond rate which in turn created a pattern of cyclical fluctuation in income. If tax revenues fall short of the amount needed to service both domestic borrowing (bond) and foreign (ODA) loans, short-run adjustment is triggered by a further demand for ODA finance. As this cycle of growth and borrowing takes place, the structure of the country's expansion path is shaped into one that is dependent on foreign aid.

Empirically, the Philippine case is described as a perpetual dependence on foreign loans (or ODA if this is the only type of foreign capital that may be availed). Not only does the country's tax collection foretell this condition, but official actions as well such as those taken during the period 1986-1990 when the Aquino administration adopted a policy to maximize external borrowings to bring down domestic interest rates in the short run.
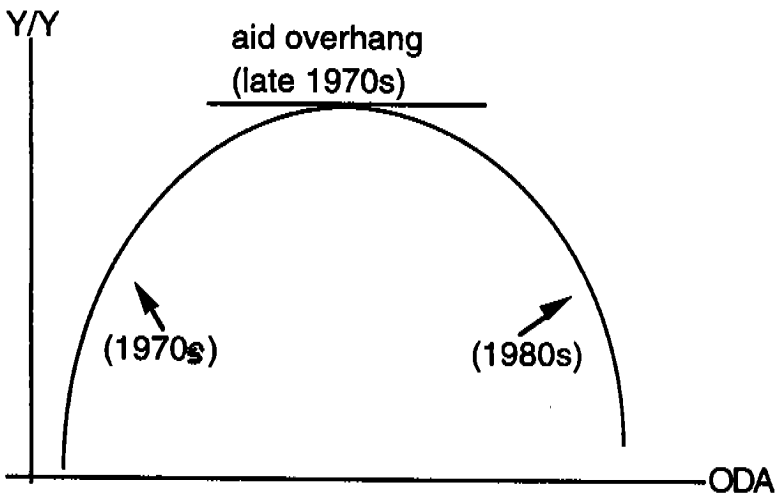
CONCLUSIONS

In the short run, ODA does have a cushioning impact on the cyclical fluctuation in income. It provides temporary shelter for internal stability since it may be used to temporarily dampen any short-run increases in interest rates.

However, as Leff and Sato (1980) proposed, a pattern of spiralling of prices (interest rates) follows the inflow of external funds which, in the long
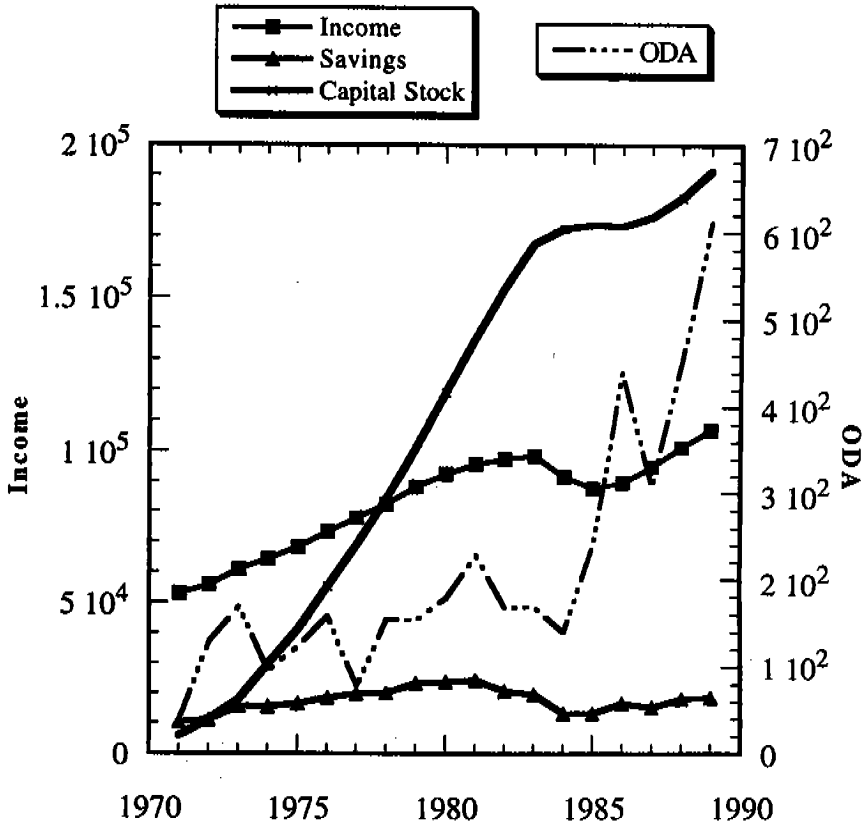
run, creates a chain of dependency. This pattern of growth and borrowing is observed in the case of the Philippines particularly during the period 1986-1990 when it was made a policy to maximize external borrowings to bring down domestic interest rates in the short run. Hoping that this would be accompanied by a subsequent mobilization of domestic resources, the situation was aggravated by the shortfall in tax revenues as well as the corresponding decline in domestic savings. The Philippine experience in ODA may be graphically presented thus:

FIGURE 7
Diminishing Marginal Efficiency of ODA Inflow

The situation in the 1970s (high savings and investment ratios with high ODA inflows and high economic growth) is represented by the upward sloping portion of the curve. At this time, the ODA inflow was seen as a supplement for domestic resources until about 1975 when the country experienced a so-called "aid overhang." This period was characterized by a shortage in productive investments — capital accumulation was not accompanied by a corresponding rise in output.

FIGURE 8
Movement of Real Income, Savings and Capital Stock
vis-a-vis ODA Inflows, 1971-1989

In more concrete terms, the disbursement of funds has been forestalled by the government's absorptive capacity. This was traced to the inability of the government to provide the necessary local counterpart funds as well as its failure to satisfy requirements for project start-up or continuance. What happened was that income growth declined despite reported increases in ODA (diminishing portion of the curve). While this happened in the 1980s

when the Ricardian Equivalence was found to hold true, then, this phenome-
non may be explained partly by the saving behavior of the people (that is,
people behave correspondingly by treating further ODA inflows as future
tax burden) as being affected by their perception of an increasing ODA
flows.

In other words, the inability of the country to improve its saving rate was
a reflection of the inability of the government to improve its tax collection
effort and a loss of public confidence (that is, people preferred to smoothen
out consumption rather than save during times of uncertainty. Furthermore,
the improvement in savings rate observed in the 1970s was not sustained
because of the implicit decision of the government to use ODA as a
substitute rather than as a supplement to local investment while keeping its
desired level of consumption.

Figure 7 may be expounded by Figure 8 which shows the trend in the
movement of domestic savings, capital stock, and real income vis- a-vis the
rise in ODA flows from 1970-1989. In the 1970s, the increasing levels of
ODA is accompanied by a rise in domestic savings and rapid increase in
capital stock and real income. From 1981, ODA flows (although showing
some declines in certain years are still higher in terms of nominal value than
those received in the 1970s) are accompanied by lower rates of domestic
savings, decreasing rate of increase in capital stock, and slower real income
growth.

A very important policy implication of the analysis is that the level of
ODA per se does not foretell any future improvement in the rate of economic
growth of the recipient country. What matters most is the appropriate use
of ODA because this will trigger the key to higher domestic resource
mobilization which, in turn, is the foundation for a self-sufficient economic
growth. Equally important is that ODA should remain as a supplement
resource and not a substitute resource. This was evident in ODA's positive
growth impact in the 1970s when high inflows of ODA were accompanied
by high investment and income growth. But as more and more ODA was
availed, the expected improvement in domestic capacity necessary for a
self-sufficient, self-sustaining economic growth was never realized so that

in the long-run, the Philippines was left with an overwhelming foreign and domestic debt obligations.

The government's failure to put the funds in productive use on a timely manner coupled by investments that did not generate a stimulus for further growth together had a combined effect of compromising whatever gains may have been realized from ODA receipts.

This study strongly recommends cautious financial planning of the Philippine government by reconsidering its present attitude toward foreign capital financing. Rather, it should give serious attention to the enhancement of domestic resources (such as strengthening its tax base and tax collection capacity) as well as the domestic private sector initiative through greater involvement in foreign aid-financed activities. An initial step has been adopted through the build-operate-transfer (BOT) scheme used in the implementation of energy projects. Similar schemes of this nature should be actively adopted for they provide greater domestic absorptive capacity.

Another important venue to spread the development effort is to reach the grassroots level through a more committed support to microenterprise development such as the scheme provided by the financial intermediary loan program currently implemented by Japan's Overseas Economic Co-operation Fund. With the use of ODA funds, this program extends long-term credit to small and medium entrepreneurs who were often marginalized by government policies and traditional lenders. Such programs allow the participation of greater members of society in the development process, thus, bringing the material gains of economic growth to the grassroots level. In addition, they simultaneously address the problems of poverty and dependency.

The much-needed spur in economic activities should come from a broader segment of society which will form the backbone of the desired domestic-led sustainable economic growth which is expected to be realized from the series of positive effects it will generate, namely, increased tax revenues, higher domestic savings, and healthier domestic investment environment. As this happens, the perennial problem of poverty is addressed and a self-reliant citizenry is developed.

As a final note, the government should be worried about the Philippines' strong potential to develop a perpetual dependence on ODA and other types of foreign capital if domestic capacity (or self-help efforts) is not enhanced. Hence, a regulated flow of foreign aid and other foreign capital is deemed to be beneficial. Making a guarded and conscious effort to efficiently utilize every borrowed penny is more certainly important than an attitude favoring a consistent rise in foreign capital inflow that means nothing more than bloating further the country's debt.

Annex A

Base Values vs. Simulated Values of Selected Variables
Assuming a 10% Increase in Government Spending
Financed by ODA-loans and ODA grants

Note: Simulated Values are those preceded by letter 'S'.

Y	=	National income
RI	=	Interest rate
Rb	=	Bond rate
Pc	=	Personal consumption
I	=	Domestic Investment

YRS	Y	SY	R1	SR1	Rb	Srb
1980	92171	102703	14.0121	13.8685	12.3358	11.1955
1981	95443	103662	14.8664	14.7343	12.5286	13.6686
1982	98105	101942	18.2852	18.1215	14.7375	14.0210
1983	98487	97703	19.4452	19.2700	14.7492	13.6678
1984	91386	93850	26.6632	26.4392	17.8170	17.8921
1985	88015	94305	27.7569	27.5444	17.6793	17.9539
1986	90253	106519	18.2839	18.1346	13.0805	11.3700
1987	94717	110183	14.1041	13.9548	13.9824	15.3149
1988	100676	110438	14.6443	14.5208	13.7235	12.5017
1989	106901	105569	20.6580	20.5345	21.0840	21.2855

Yrs	Pc	SPc	I	SI
1980	59270	62147	26609	30192
1981	61617	63967	27220	29118
1982	63535	65194	26267	25709
1983	65348	65200	24923	18407
1984	66032	66866	14215	10588
1985	65977	67051	11124	9152
1986	66597	72263	10111	15153
1987	70409	73811	13574	20837
1988	74646	76582	15926	21451
1989	78929	78565	18283	20989

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