

DOCUMENT OF INTERNATIONAL MONETARY FUND AND NOT FOR PUBLIC USE

Any views expressed in the Departmental Memoranda (DM) Series represent the opinions of the authors and, unless otherwise indicated, should not be interpreted as official Fund views.

DM/86/6

INTERNATIONAL MONETARY FUND

Fiscal Affairs Department

Effects of the Budget Deficit on the Current Account Balance: The Case of the Philippines*

Prepared by Ahsan H. Mansur

Approved by Mario I. Blejer

January 29, 1986

| | <u>Contents</u> | <u>Page</u> |
|------|--|-------------|
| I. | Introduction | 1 |
| II. | Relationship Between Current Account Balance and Budget Deficit: Some Preliminary Observations | 3 |
| III. | Specification of the Model | 5 |
| | 1. Price equation | 6 |
| | 2. Government sector | 7 |
| | 3. Demand for imports | 8 |
| | 4. Real income | 9 |
| | 5. Absorption function | 10 |
| | 6. Fiscal policy, domestic credit, and money supply | 10 |
| | 7. The complete model and workings | 11 |
| IV. | Estimates of the Structural Model | 14 |
| V. | Simulation Exercises | 16 |
| | 1. Increase in government expenditure | 18 |
| | 2. The effects of holding the budget deficit as a percent of GNP at the level of 1978 | 18 |
| | 3. Relationship between simulated real budget deficit and the trade balance | 21 |
| VI. | Conclusions | 23 |

*I would like to thank Mario Blejer, David Burton, Peter Heller, Oystein Pettersen, and Ranji Salgado for helpful comments. Ziba Farhadian helped with some empirical estimations.

| <u>Contents</u> | <u>Page</u> |
|--|-------------|
| <u>APPENDIX I</u> | |
| Review of Recent Economic Developments, 1970-82 | 26 |
| <u>APPENDIX II</u> | |
| Derivation of Cyclically Neutral Fiscal Stance | 31 |
| <u>APPENDIX III</u> | |
| Causality Tests for the Relationship Between the Budget Deficit and the Current Account Deficit of the Balance of Payments | 33 |
| <u>Text Tables</u> | |
| 1. Fiscal Developments Measured in Terms of Fiscal Stance and Impulses, 1970-82 | 4 |
| 2. Specification of the Complete Model | 12 |
| 3. Estimates of Behavioral Equations | 15 |
| 4. Summary Statistics for Selected Endogenous Variables, Based on the Baseline Simulation | 17 |
| 5. Qualitative Effects of an Increase in Central Government Expenditure | 19 |
| 6. Impact of a Permanent 10 Percent Increase in Government Expenditure Under Different Forms of Financing, 1970-82 | 20 |
| 7. Effects on Trade Balance and Price Level Under Alternative Scenarios, 1978-82 | 22 |
| 8. Comparison of Simulated Trade Deficit and Budget Deficit Under Alternative Scenarios, 1970-82 | 24 |
| <u>Charts</u> | |
| 1. Balance of Payments and Fiscal Developments, 1970-82 | 4a |
| 2. Actual and Predicted Values of Selected Variables in the Basic Simulation, 1970-82 | 16a |
| 3. Impact of a Permanent 10 Percent Increase in Government Expenditure Under Different Forms of Financing, 1970-82 | 18a |
| 4. Effects on Trade Balance and Price Level Under Alternative Scenarios, 1970-82 | 22a |

Contents

Page

Appendix Tables

| | | |
|-----|--|----|
| 9. | National Government Budget; Revenues and Expenditures, 1970-82 | 27 |
| 10. | Monetary Survey, 1970-82 | 29 |
| 11. | Balance of Payments, 1970-82 | 30 |
| 12. | Cross-Correlation Coefficient Between Budget Deficit and Current Account Balance | 34 |

| | |
|------------|----|
| References | 36 |
|------------|----|

I. Introduction

The purpose of this paper is to provide an empirical study of the Philippines' economy during the period 1970-82, with emphasis on the economy's external developments. Since the early 1970s, the Philippines has experienced external imbalances with very low holdings of external reserves, caused both by adverse external developments and expansionary domestic demand. The expansionary role of the Government in recent years is believed to have contributed to the increase in domestic demand, and like many other countries, a reduction in the external deficit was sought through policies to reduce fiscal imbalances. Notwithstanding frequent attempts to restrain government expenditure and increase tax revenue, the national government's overall budgetary position appears to have remained expansionary, and the shift in the composition of government expenditure in favor of development expenditure with higher import content has tended to exert more pressure on the balance of payments. In the light of these considerations, this paper examines the effects of the overall budget deficit and the composition of its financing on the Philippines' current account balance of its balance of payments. 1/

The relationship between fiscal deficit and the current account balance has been examined in the literature in various ways, for example, Milne (1976), Tahari (1978), and Kelly (1982) tested the relationship between the fiscal balance and current account balance using ad hoc single equation specifications. 2/ These studies test the relationship in an ad hoc fashion which does not necessarily imply causality; such tests rely on the assumption that changes in the budget deficit are autonomous, when in reality they are generally endogenous.

Different ways of financing the budget deficit are also expected to affect the trade balance in different ways; the same degree of fiscal imbalance generally has different effects on the trade balance depending on the financing of the deficit from external sources, or the domestic banking and nonbanking system, or from a combination of sources. Simple testings, short of a complete specification of the structural model, cannot capture these interactions between budget balance, price level, domestic aggregate demand, and the current (or trade) account balance.

1/ Throughout this paper, current account balance (deficit) refers to the current account balance (deficit) of the balance of payments, unless explicitly stated otherwise.

2/ Milne used time-series data to estimate the equation $TB_t = \alpha + \beta (G_t - T_t)$, where the trade balance (TB) is regressed on the budget deficit; Kelly regressed the changes in the current account on the change in the overall budget deficit using cross-sectional data for a number of Fund program countries. Using a modified version of this type of testing, Tahari found a statistically significant relationship for some countries, including the Philippines, while for many other countries the result was negative.

However, before attempting to establish a quantitative relationship through a structural model, we should determine if recent developments indicate an apparent case where the budget deficit and its financing can account for a large part of the current account imbalance. In the case of the Philippines we examine recent fiscal, monetary, and balance of payments developments and determine if fiscal policy was indeed expansionary and whether any causal relationship between the overall budget deficit and the current account balance (the causality running from the budget deficit to the current account balance) can be established; based on positive indications from the preliminary observations we specify a small macroeconomic model to simulate the impacts of alternative fiscal policies on the current account balance and derive their quantitative effects.

The structural model evaluates the effects of fiscal policy changes on the current account balance through changes in aggregate demand and the rate of domestic credit expansion originating from fiscal operations. While specifying the transmission mechanism from expansionary fiscal policy to the external trade account developments, we focus on the structure of the real economy, that is, private sector absorption, income, or output determination. Fiscal expansion contributes to the increase in real output through increases in the components of aggregate demand, which affects domestic private sector absorption and consequently the demand for imports. The model used in this paper considers the real and monetary sectors simultaneously and determines the price level endogenously.

In analyzing the effects of the budget deficit on the current or trade account, we consider two major scenarios based on differences in the sources of financing of the budget deficit. In the first, the deficit is financed by external borrowing or by banking system credit, with credit to the private sector restrained so that total credit from the banking system remains unchanged. In the second, the deficit is financed by an equivalent net increase in credit from the banking system. We also analyze the effects of alternative financing methods on the domestic price level, output, and revenue. Special attention is paid to macroeconomic developments in recent years (especially during 1980-82) by using counterfactual simulations where the budget deficit as a percent of gross national product (GNP) is held fixed at a desirable level.

The plan of the paper is as follows. Section II considers some preliminary observations on the nature of the fiscal policy pursued during the period of analysis and on the causal relationship between the overall government budget deficit and the current account balance. Section III outlines the structure of the model. The estimated model along with some of its empirical characteristics are discussed in Section IV. Section V reports on a variety of simulation exercises based on the model, and concluding remarks are presented in Section VI.

II. Relationship Between Current Account Balance and Budget Deficit: Some Preliminary Observations

Before specifying the macroeconomic model, we examine the movements in the overall government budget deficit and the current account balance, and the simultaneous movements between the current account balance and the capital account balance, and changes in the net claims of the banking system on the Government (Chart 1). 1/ A casual comparison of the movements of the various variables seems to support the contention that the Philippines' current account balance is significantly influenced by the movements in the overall budget deficit, particularly during 1980-82. The observed relationship between budget deficits and the current account balance may be examined more closely by subjecting them to more formal tests of causality and by determining the nature (expansionary or contractionary) of budgetary policy.

Comparison of the actual and cyclically adjusted (or neutral) fiscal balance indicates that in 7 out of 12 observations, the actual deficit was greater than the corresponding cyclically neutral balance, indicating an expansionary fiscal stance (Table 1 and Appendix II). When seen from a stabilization point of view, the fiscal policy is found to be out of tune with the cyclical developments in the economy. Using the trend GNP as the estimate for potential GNP for the Philippines, in the absence of independent estimates of potential GNP, we find that in 7 out of 12 observations, fiscal policy was not countercyclical. 2/ In five instances when actual output was higher than the trend, the fiscal stance was expansionary or neutral after allowing for cyclical adjustments; in two instances fiscal policy was contractionary when actual GNP was lower than the trend level. 3/

1/ For an overview of recent fiscal, monetary, and balance of payments developments, see Appendix I.

2/ Estimates of trends in GNP have been used as proxies for potential GNP, since official estimates of potential gross domestic product (GDP) are not available for the Philippines. An alternative measure of potential GNP based on the "Linked Peak" method was used by Riha (1975). Conceptually, trend GNP represents output levels which are attainable, and from a fiscal point of view, government expenditure should be tied to the level of economic activity which is attainable, rather than to some hypothetical full employment or potential level of output, which may not be attainable in the medium term.

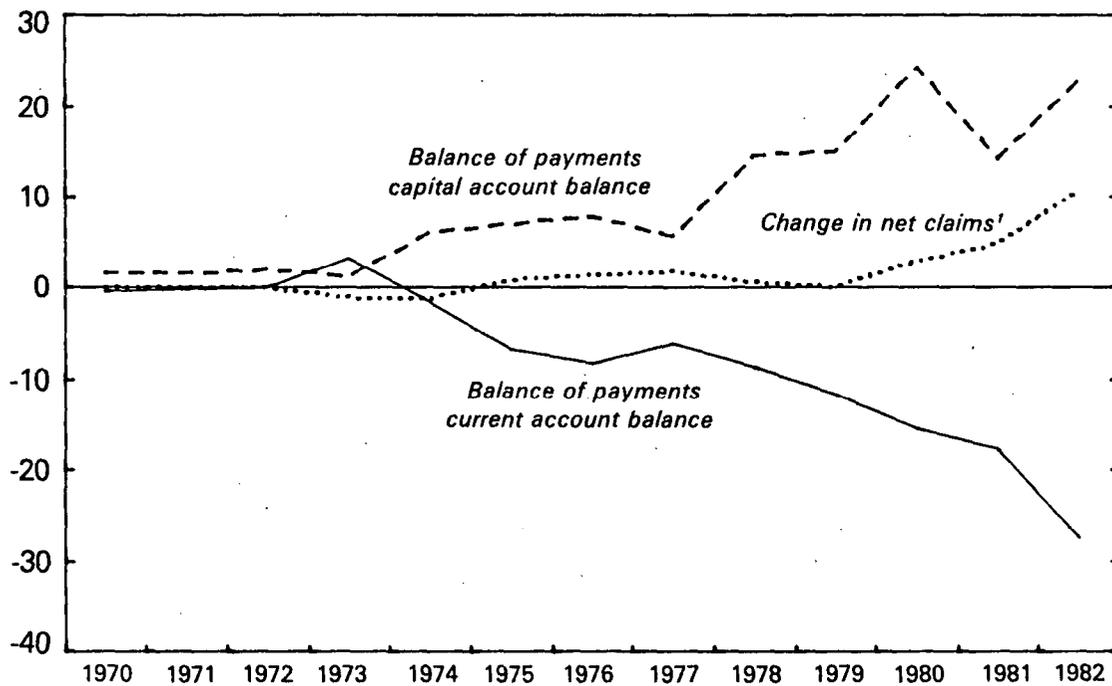
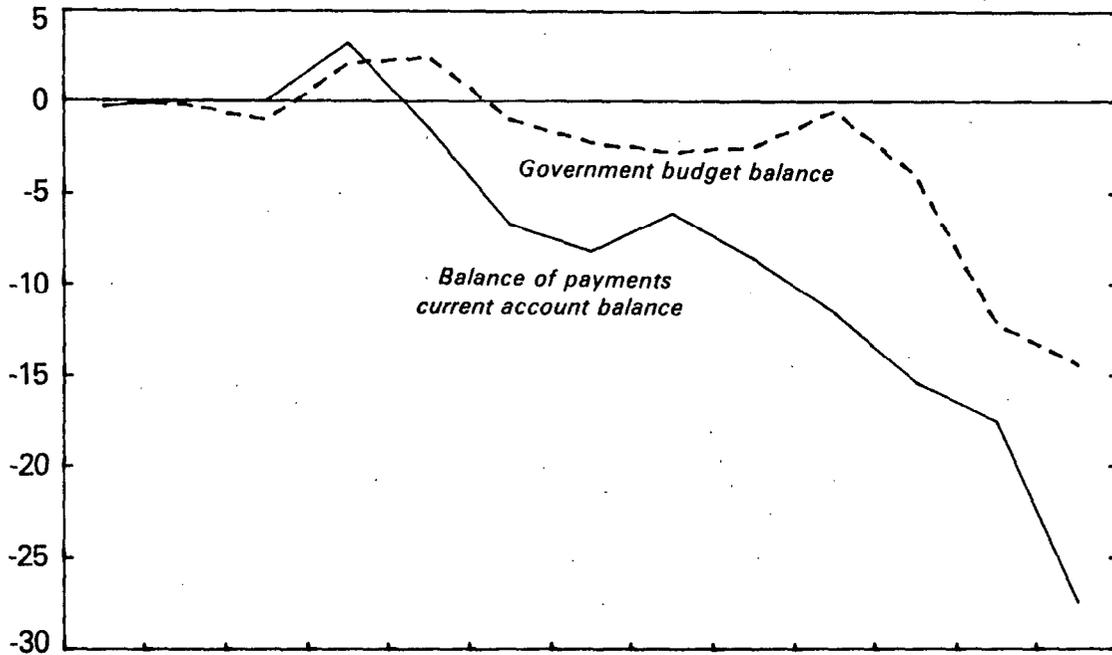
3/ Using an alternative approach based on Hansen (1969) and Snyder (1970), Riha (1975) noted that in many instances during 1947-73 the estimated budget impact was destabilizing for the Philippines. Riha concluded that in periods when budget changes favorably influenced stabilization, much of the stabilization could be ascribed to fortuitous events rather than to cognizant policy.

Table 1. Philippines: Fiscal Developments Measured in Terms of Fiscal Stance and Impulses, 1971-82

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|-----------------------------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| (In billions of pesos) | | | | | | | | | | | | |
| Actual GNP | 49.6 | 55.5 | 71.6 | 99.9 | 114.3 | 132.7 | 152.8 | 177.7 | 221.0 | 265.1 | 330.6 | 336.2 |
| Potential GNP ^{1/} | 49.3 | 56.4 | 70.7 | 100.2 | 115.3 | 133.8 | 152.5 | 177.1 | 216.3 | 263.2 | 304.1 | 341.4 |
| Revenue | 4.9 | 7.0 | 9.4 | 11.9 | 16.7 | 17.9 | 19.8 | 23.8 | 29.5 | 34.2 | 35.9 | 38.2 |
| Expenditure | 4.5 | 8.1 | 10.4 | 11.7 | 18.2 | 20.6 | 22.7 | 26.2 | 29.7 | 37.8 | 48.1 | 52.6 |
| Recurrent | (3.8) | (6.5) | (8.5) | (8.8) | (14.7) | (15.8) | (17.7) | (19.2) | (20.7) | (24.2) | (26.4) | (31.7) |
| Capital | (0.7) | (1.6) | (1.9) | (2.9) | (3.5) | (4.8) | (5.0) | (7.0) | (9.0) | (13.6) | (21.7) | (20.9) |
| Balance | 0.5 | -1.1 | -1.0 | 0.2 | -1.5 | -2.7 | -2.9 | -2.4 | -0.2 | -3.6 | -12.2 | -14.4 |
| Neutral revenue | 6.6 | 7.4 | 9.6 | 13.4 | 15.3 | 17.8 | 20.5 | 23.8 | 29.6 | 35.5 | 40.7 | 45.0 |
| Neutral expenditure | 7.3 | 8.3 | 10.5 | 14.9 | 17.1 | 19.8 | 22.5 | 26.2 | 31.9 | 38.9 | 45.0 | 50.5 |
| Recurrent | (5.3) | (6.1) | (7.7) | (10.9) | (12.5) | (14.5) | (16.5) | (19.2) | (23.4) | (28.5) | (33.0) | (37.0) |
| Capital | (2.0) | (2.2) | (2.8) | (4.0) | (4.6) | (5.3) | (6.0) | (7.0) | (8.5) | (10.4) | (12.0) | (13.5) |
| Neutral balance | -0.7 | -0.9 | -0.9 | -1.4 | -1.7 | -2.0 | -2.1 | -2.4 | -2.4 | -3.4 | -4.3 | -5.5 |
| Fiscal stance | -1.1 | 0.2 | 0.1 | -1.6 | -0.2 | 0.7 | 0.8 | — | -2.2 | 0.2 | 7.9 | 9.9 |
| (As percent of GNP) | | | | | | | | | | | | |
| Fiscal stance | -2.1 | 0.3 | 0.2 | -1.6 | -0.2 | 0.5 | 0.5 | — | -1.0 | 0.1 | 2.6 | 2.7 |
| Fiscal impulse | ... | 2.5 | -0.1 | -1.8 | 1.4 | 0.7 | — | -0.5 | -1.0 | 1.1 | 2.5 | 0.1 |
| Revenue impulse | ... | -2.7 | -0.5 | 1.2 | -2.7 | 1.1 | 0.5 | -0.4 | — | 0.4 | 1.1 | 0.5 |
| Expenditure impulse | ... | 4.2 | 0.4 | -3.0 | 4.1 | -0.4 | -0.5 | -0.1 | -1.0 | 0.6 | 1.5 | -0.4 |
| Recurrent | (...) | (3.8) | (0.5) | (-3.2) | (4.0) | (-1.0) | (-0.2) | (-0.8) | (-1.2) | (-0.4) | (-0.5) | (0.6) |
| Capital | (...) | (1.4) | (-0.1) | (0.2) | (0.1) | (0.6) | (-0.3) | (0.7) | (0.2) | (1.0) | (2.0) | (-1.0) |

^{1/} Based on the simple regression of actual GNP on time.

CHART 1
PHILIPPINES
BALANCE OF PAYMENTS AND
FISCAL DEVELOPMENTS, 1970-82
(In billions of Philippine pesos)



Source: International Monetary Fund, *International Financial Statistics*.
¹Changes in net claims on the central government due to borrowing from the domestic banking system to finance a part of the overall budget deficit.

In many years, the net impulse from changes in revenue was expansionary, indicating a slower growth in revenue relative to actual GNP. In 1972 and 1975, however, when major revenue measures were undertaken as part of stabilization measures to contain the widening budget deficit, the revenue impulse was contractionary. In the years following the large increases, revenue increased at a slower rate relative to GNP, imparting expansionary impulses to the economy.

Total expenditure was more restrained in the second half of the period of analysis (1976-82); impulses owing to capital expenditure tended to be highly expansionary but were partly offset by contractionary impulses exerted through restraint in recurrent expenditure. Based on the summary measures discussed above, the stance of fiscal policy at the national government level was broadly neutral during 1970-80 and became sharply expansionary during 1980-82; this deterioration occurred notwithstanding efforts to increase revenue and contain expenditure. The shift in the composition of expenditure impulse in favor of capital expenditure, which is believed to be more import intensive, also had adverse implications for the current account balance.

Causality tests indicate that for both yearly and biannual data, the current account deficit of the balance of payments is correlated with the past value of the budget deficit (Appendix III). The line of causality runs from the fiscal to the balance of payments deficit, and the possibility of a reverse causality is ruled out for the Philippines on empirical grounds.

III. Specification of the Model

Given the preliminary observations on the nature of the relationship, we proceed to design a model which can explicitly establish a causal relationship between the government budget deficit and the current account balance in quantitative terms. The macroeconomic model used as the basis for the simulation analysis consists of a number of behavioral equations explaining prices, output, and fiscal, monetary, and balance of payments developments. The "basic model" contains macroeconomic and monetary aggregates and addresses the central issues of determining the quantitative effects of the budget deficit and its alternative forms of financing on the current account balance of the balance of payments and on the price level. Individual behavioral relationships are estimated in order to solve the whole system, and the effects of the policy changes are simulated from the solution of this system. In the fiscal accounts we consider the developments in the broad components of government revenue and expenditure; the effects of budgetary adjustments on the current account balance are specified to be felt through their contribution to aggregate demand and their effects on the supply and demand for money.

1. Price equation

We consider two alternative specifications for the price equation. The first is based on the widely used approach to derive the price equation from the appropriately specified functional form for the demand for real money balances. 1/ Demand for real money balances (broadly defined) is generally formulated as a function of the level of real income, real balance in the previous period, and the opportunity cost of holding money. For developing economies like the Philippines, where a broad range of financial assets do not exist and the rate of interest is institutionally influenced to remain low--effectively implying a negative real rate of return--the relevant opportunity cost is the expected rate of inflation. 2/ Using the actual inflation rate as a proxy for the expected rate of inflation, the demand for real balances is, therefore, specified in log-linear form as:

$$\log (M/P)_t = a_1 + b_1 \cdot \log Y_t + c_1 \pi_t + d_1 \cdot \log (M/P)_{t-1}; \quad b_1 > 0, d_1 > 0; c_1 < 0 \quad (1)$$

where M = the stock of nominal money balances,

P = the price level,

Y = the level of real income,

π = the rate of inflation.

The price equation may be obtained by solving equation (1):

$$\log P_t = -a_1 - b_1 \log Y_t - c_1 \pi_t + \log M_t - d_1 \cdot \log (M/P)_{t-1} \quad (1')$$

This specification, although ad hoc, can also be derived from an adaptive expectation scheme; the desired demand for real balance (M^*/P) in logarithmic form may be expressed as:

$$\log (M^*/P)_t = \alpha_1 + \beta_1 \cdot \log Y_t + \gamma_1 \cdot \pi_t$$

Assuming that actual demand for real balance is a convex combination of previous periods' real balance and the desired real balance of the current period, that is:

$$\log (M/P)_t = \theta \log (M^*/P)_t + (1-\theta) \cdot \log (M/P)_{t-1}.$$

1/ This functional form is widely used in empirical work, for example, in Aghevli and Khan (1978), Khan and Knight (1981), Otani and Park (1976).

2/ This assumption is valid for most of the sample period (1970-82); a process of interest rate deregulation was initiated in 1980 and was completed in 1983. Since then interest rates have been fully market-determined.

After substitution, this system reduces to:

$$\log (M/P)_t = \theta\alpha_1 + \theta \beta_1 \log Y_t + \theta\gamma_1 \pi_t + (1-\theta) (M/P)_{t-1}$$

which is equivalent to equation (1).

We also examined other partial adjustment schemes for the demand for money function and adaptive expectation schemes for the expected rate of inflation and found that none of the other variations, either independently or jointly, were statistically significant in explaining the demand for real balances for the Philippines.

The alternative specification for the price equation is based on the notion that changes in the price level are due to three sources of shocks: the domestic real sector, the foreign price movements relative to domestic prices, and domestic monetary developments.

$$\Delta P = P_t - P_{t-1} = a_1' + b_1' (ADD_t - Y_t^P) + c_1' (P_t^f - P_{t-1}^f) + d_1' (M_t - M_{t-1}), \quad (1'')$$

where ADD = aggregate domestic demand,

Y^P = potential output,

P^f = foreign price level.

This alternate form was tested with Philippine data; except for c_1' , all other coefficients were found to be statistically insignificant and the overall fit not satisfactory. ^{1/}

2. Government sector

Government budgetary developments are modeled explicitly to analyze the effects of fiscal policy under alternative formulations. We distinguish between three separate sources of fiscal revenues for simulation purposes. On the revenue side, revenue from import duties is assumed to be a function of nominal imports; total domestic tax is specified to be a function of nominal GDP; and nontax revenue and export duties are assumed to be exogeneously determined.

^{1/} The estimated price equation in this form is:

$$\Delta P = 0.04 + 0.054 (ADD_t - Y_t^P) + 0.27 (P_t^f - P_{t-1}^f) + 0.003 (M_t - M_{t-1})$$

(3.5) (1.6) (2.1) (1.6)

where the t-ratios are shown in the parentheses.

$$\log TM_t = a_2 + b_2 (\log IMP_t + \log PRM_t)$$

$$\log TD_t = a_3 + b_3 (\log Y_t + \log P_t),$$

where TM = tax on international trade excluding export duties,

IMP = volume of total imports,

PRM = unit value of imports,

TD = total domestic based taxes.

This separate estimation of the major components of total taxes implicitly takes care of any potential aggregation problem that may exist when a single aggregate tax function is used. Export duties have been treated exogenously because frequent changes in the tax rates and exemptions prevent a stable relationship between export receipts and export duties in the Philippines. Revenue from export duties has been mainly derived from export of coconut products; however, as the prices of coconut products fluctuated in the export markets, duties were inversely adjusted to stabilize the domestic producer prices. Revenue from domestic taxes (TD) is the sum of all domestic based taxes and is collected mainly in the form of personal and company income taxes, and excise and sales taxes on goods and services. These categories of taxes are independent functions of GNP, thus their sum may also be defined as an aggregate function of GNP without any problem of aggregation bias. ^{1/}

3. Demand for imports

The demand for imports is specified as a function of aggregate demand, domestic prices relative to foreign prices, and a dummy variable to capture the shift in import demand that has taken place beginning in 1978. The aggregate demand variable (AD_t) used in the import demand function is defined to be the sum of domestic private sector absorption, real government expenditure, and exports. In the conventional specifications, imports are generally specified to be functions of income or output but are not sufficiently explicit to distinguish between private and public sector contributions to absorption and import demand. The indirect effects of real income or output through private sector absorption will, however, be important and are captured in the proposed specification. Income or output determines the private sector absorption and so plays the same role as it plays in the conventional specification of the import demand function. Moreover, the fiscal deficit generated through excessive public expenditure (financed by external borrowing or

^{1/} The sum of the aggregate parameter vectors is equal to the estimate of the parameter vector of the aggregate equation, and the expected values from the disaggregated equations also sum to those given by the aggregate equation if each kind of tax is explained by the same set of variables. For more on the problem of aggregation bias, see Theil (1954).

domestic credit creation), which is not directly related to GNP but part of aggregate demand, also affects demand for imports.

$$\log \text{IMP}_t = a_5 + b_5 \log \text{AD}_t + c_5 \log (\text{PRM}_t / P_t) + d_5 \cdot D_{1,t}; \quad b_5 > 0; \quad c_5 < 0$$

$$\text{AD}_t = \text{ABS}_t^P + \text{EXPT}_t + G_t/P_t$$

where IMP = real imports,

PRM = unit value of imports,

ABS^P = private sector absorption,

EXPT = exports,

G = government expenditure,

D_1 = dummy variable.

The aggregate demand variable (AD_t) has a positive effect and the price term has a negative effect on import demand. An increase in the government budget deficit through increased nominal expenditure leads to higher import demand through its effect on aggregate demand, while the financing of the deficit through domestic credit creation increases the domestic price level to partly offset the initial expansionary thrust and its effects on the demand for imports indirectly.

In an effort to establish a link between import-intensive development expenditure and import demand, we regressed real imports on real output or aggregate demand excluding government development expenditure, relative price, real development expenditure, and a dummy variable. The statistical fit of real development expenditure was highly significant, but contrary to its expected sign. One possible explanation of this perverse relationship may be that the Philippines was under successive adjustment programs during most of the period covered in this study. During periods of high imports relative to exports, the Government, to reduce domestic and external imbalances, constrained current and development expenditure within certain targets, leading to a conceptually perverse, but statistically significant relationship.

4. Real income

Reflecting the short-term nature of the model, real income is determined by the movements in aggregate demand for domestically produced goods in combination with capacity constraints. The previous peak level of output is assumed to be a proxy for the capacity output, without explicitly considering such factors as capital accumulation, growth of labor force, and technical progress, which are more important in the long run; for the Philippines, however, this measure of capacity output coincides with output in the previous period. To take into account the

effects of aggregate demand on output, we consider two specifications. In one form, aggregate demand for domestically produced goods (ADD) affects real output directly, so that:

$$\log Y_t = a_6 + b_6 \cdot \log (ADD_t) + C_6 \cdot \log (Y_{t-1})$$

where $ADD_t = ABS_t^P + EXPT_t - IMP_t + G_t/P_t$.

This specification allows for variations in real output through demand management policies, although the coefficient of $\log (ADD_t)$ is expected to be smaller than the coefficient of $\log (Y_{t-1})$.

In the second specification, real output depends on the output of the previous period and the excess of aggregate demand over the trend level of real output (Y^*), where the trend for real output level is derived by regressing output on time.

$$\log Y_t = a_6' + b_6' \cdot (\log ADD_t - \log Y_t^*) + c_6' \cdot \log (Y_{t-1})$$

and

$$Y_t^* = a_7 + b_7 \cdot t.$$

This specification states that aggregate domestic demand in excess of normal output will temporarily increase real income, and any slackness in the aggregate domestic demand arising from reductions in private and government demand will reduce output. The degree of responsiveness of real output to aggregate demand depends on the parameter b_6 and the size of domestic aggregate demand relative to the trend for real output.

5. Absorption function

Private sector aggregate consumption and investment behavior is represented in terms of a single absorption function:

$$\log ABS_t^P = a_8 + b_8 \log DY_t$$

where ABS_t^P = private sector real absorption,

$DY_t = Y_t - R_t/P_t$ is the real disposable income.

6. Fiscal policy, domestic credit, and money supply

Government fiscal operations and the money supply are linked through the financing of the budgetary deficits. In the absence of adequate nonbank sources of domestic financing, most of the domestic financing of the budget deficit tends to be in the form of borrowings from the domestic banking system. Changes in domestic credit (ΔDC_t) can take place through changes in the banking system's claims on the private sector (ΔCP_t) and on the government sector, then:

$$\Delta DC_t = (G_t - R_t - NFF_t - DNB_t) + \Delta CP_t$$

or, alternatively:

$$DC_t = (G_t - R_t - NFF_t - DNB_t) + (CP_t - CP_{t-1}) + DC_{t-1}.$$

where DC = total domestic credit,

NFF = net foreign financing of the budget,

DNB = nonbank domestic financing,

CP = credit to the private sector.

In this formulation, an expansion of the fiscal deficit not financed from external and nonbank domestic sources results in an equivalent increase in domestic credit. In economies where the financial markets are not developed, the option of nonbank domestic financing may be fairly limited.

Broadly defined supply of money including currency, demand deposits, and time deposits, is identically equal to the sum of the level of net domestic credit extended by the banking system and the net stock of international reserves (NR_t), that is:

$$M_t = NR_t + DC_t - OTM_t$$

where OTM is the other monetary instruments not included in the definition of money in the present analysis. ^{1/} Net international reserves should optimally be treated as endogenous to make it perfectly consistent with the rest of the model. However, given the high volatility of the Philippines' net external reserves (arising from various economic and noneconomic factors), it would be inappropriate to use a simple specification. Since a detailed modeling for the determination of international reserves is beyond the scope of this paper, we treat it as exogenous.

7. The complete model and workings

The complete model has been modified slightly to capture some specific factors; dummies have been introduced in the tax functions to capture the shifts in the revenue collection caused by substantive revenue measures introduced since 1975. The full structural model along with a glossary of the variables is shown in Table 2.

^{1/} Based on the classification shown in International Financial Statistics for the Philippines, the sum of net foreign assets and domestic credit equals the sum of money, quasi-money, bonds, and other items (net); the term OTM which is used in this equation is the sum of bonds and other items (net).

Table 2. Philippines: Specification of the Complete Model

1. Price equation

$$(i) \log P_t = \log M_t + a_1 - b_1 \log Y_t - c_1 \pi_t - d_1 \cdot (\log M_{t-1} - \log P_{t-1})$$

2. Government sector

Tax functions:

$$(i) \log TM_t = a_2 + b_2 (\log IMP_t + \log PRM_t)$$

$$(ii) \log TD_t = A_3 + b_3 (\log Y_t + \log P_t)$$

3. Demand for imports

$$(i) \log (IMP_t) = a_5 + b_5 \log AD_t + c_5 \log (PRM_t/P_t) + C_6 \cdot D_{1t}$$

$$(ii) AD_t^P = ABS_t + EXPT + G_t/P_t$$

4. Real income

$$(i) \log Y_t = a_6 + b_6 \cdot \log ADD_t + c_6 \cdot \log Y_{t-1}$$

or (ii) $\log Y_t = a'_6 (\log ADD_t - \log Y_t^*) + C'_6 \cdot \log Y_{t-1}$, where

where

$$Y_t^* = a_7 + b_7 \cdot t$$

$$ADD_t = AD_t - IMP_t$$

5. Private sector absorption

$$(i) \log ABS_t^P = a_8 + b_8 \cdot \log (Y_t - R_t/P_t)$$

6. Identities

$$(i) ADD_t = ABS_t^P + EXPT_t - IMP_t + G_t/P_t$$

$$(ii) R_t = EXP (\log TM_t) + EXP (\log TD_t) + NONT_t + TEX_t$$

$$(iii) DC_t = (G_t - R_t - NFF_t - DNB_t) + DC_{t-1} + (CP_t - CP_{t-1})$$

$$(iv) M_t = NR_t + DC_t - OTM_t$$

$$(v) TB_t = EXPT_t - IMP_t$$

Table 2 (concluded). Philippines: Specification of the Complete Model

Definition of Variables

Endogenous

- P = price level
TM = nominal import duty
TD = nominal domestic taxes
IMP = real private sector import
Y = real income
Y* = normal or potential income
ABS^P = real private sector absorption
ADD = aggregate real demand for domestically produced goods
R = total revenue in nominal terms
DC = domestic credit
M = broadly defined supply of money
TB = trade balance

Exogenous

- G = nominal government expenditure
PRM = import price index
t = time period
EXPT = real exports
NONT = nontax revenue (nominal)
TEX = export duty (nominal)
NFF = net foreign financing (nominal)
DNB = domestic nonbank financing (nominal)
CP = credit to the private sector (nominal)
OTM = sum of bonds and other items (net)
-

To elucidate the workings of the model we consider the effects of an increase in government budget deficit, resulting from increased government expenditure and partly financed by increased supply of central bank credit to the Government. This increase will have two direct effects: aggregate real domestic demand will increase as will the nominal supply of money. These direct effects will tend to increase the price level, real income, and real level of imports through different channels and feedback effects of other endogenous variables. Imports will be affected indirectly through three channels: aggregate demand will increase due to an increase in real government expenditure and increased private sector absorption resulting from higher income effect, and as the import prices fall relative to the general price level. The process will gradually reverse as increased import duties and domestic based taxes and a decreased stock of real balances reduce the budget deficit and private sector absorption; if the system is mathematically stable, imports and the current account balance will stabilize.

IV. Estimates of the Structural Model

Since the basic model given by equations (1.i) - (6.v) in Table 2 is simultaneous, we estimate the individual equations by the two-stage least-squares method. The estimated equations are shown in Table 3, and the ratio of the coefficients to their respective standard errors are noted in the parentheses below the coefficients.

The price equation derived from the original demand for money function is statistically significant and has all the coefficients with the expected signs. The estimated coefficients indicate that an increase in real output and in previous periods' stock of real money balances reduces the price level, while increases in the rate of inflation reduce demand for real balances and raise the price level.

The equation determining taxes on international trade is statistically significant and indicates that the elasticity of import duty with respect to the value of imports is less than unity; this explains the slow growth of import duty in the Philippines as the value of imports increased over time. The statistical significance of the dummy variable (D1) represents a shift in the import duty since 1975 when a number of new measures were adopted to increase the collection of import duty. The estimated buoyancy of domestic based taxes also appears to be less than unity, indicating a slackness in tax collection relative to the growth of income. These estimates also support the previous finding that expansionary fiscal impulses were being exerted on the economy through slower growth in revenue (Section II).

The specification of real output as a function of the demand for domestically produced goods and of real output in the previous period yields a better statistical fit for the Philippine data set, compared with the alternative specification containing excess of domestic demand over the capacity output as an explanatory variable. Equation (4.i) in

Table 3. Philippines: Estimates of Behavioral Equations 1/

$$(1) \log P_t = \log M_t - 0.527 - 0.231 \cdot \log Y_t + 1.025 \pi_t - 0.863 \cdot \log (M/P)_{t-1}$$

(2.08) (2.42) (7.13) (10.31)

$$\bar{R}^2 = 0.99 \quad D-W = 2.65 \quad F(3, 8) = 426.6 \quad H\text{-statistic} = -1.18$$

$$(2) \log (TM_t) = -1.83 + 0.87 (\log IMP_t + \log PM_t)$$

(-4.82) (7.09)

$$+ 0.37 D1_t$$

(2.18)

$$\bar{R}^2 = 0.99 \quad D-W = 1.61 \quad F(2, 9) = 66.2$$

$$(3) \log (TD_t) = -2.329 + 0.947 \cdot (\log Y_t + \log P_t)$$

(-4.51) (6.5)

$$\bar{R}^2 = 0.96 \quad D-W = 1.85 \quad F(1, 10) = 267.9$$

$$(4) \log (ABS_t) = -0.25 + 0.72 \cdot \log (Y_t - R_t) + 0.31 \cdot \log ABS_{t-1}$$

(0.73) (2.32) (1.10)

$$\bar{R}^2 = 0.97 \quad D-W = 1.74 \quad F(2, 9) = 188.7 \quad H\text{-statistic} = 1.72$$

$$(5) \log Y_t = 0.34 + 0.29 \cdot \log ADD_t + 0.65 \cdot \log Y_{t-1}$$

(4.44) (3.45) (7.25)

$$\bar{R}^2 = 0.998 \quad D-W = 1.88 \quad F(2, 9) = 582.0 \quad H\text{-statistic} = 0.19$$

$$(6) \log IMP_t = -0.44 + 0.80 \cdot \log AD_t - 0.03 \cdot (PRM_t/P_t) + 0.15 D2_t$$

(-1.00) (9.69) (0.21) (1.90)

$$\bar{R}^2 = 0.976 \quad D-W = 1.91 \quad F(3, 8) = 88.41$$

1/ Figures in parentheses are the ratios of estimated coefficients to their respective standard errors; Durbin-Watson statistics should not be taken at face value for the equations containing lagged endogenous variables.

Table 2 provides a better fit as a single equation specification and also as an equation of the complete model, since the predicted values in the baseline simulations with equation (4.i) are much closer to the actual values compared with the alternative specification. Thus, in the subsequent analysis, we consider equation (4.i) as the specification for real output. By allowing aggregate domestic demand to influence real output, this model allows for government real expenditure to directly influence real output, and thus appears to be Keynesian in nature. However, the elasticity of output with respect to capacity output (or the output in the previous period) is more than twice the elasticity of real output with respect to the aggregate demand for domestically produced goods and services, and thus, in the long run real output is determined mostly by the rate of growth of potential output.

The import demand function has statistically significant estimators for the coefficients of log AD and the dummy variable; the coefficient of the relative price term is not significantly different from zero, although the coefficient has the correct sign. The equation is statistically significant and the overall statistical fit is good. The estimated elasticity of imports with respect to AD is less than unity, and real government expenditure, which is a component of AD, affects the demand for imports directly.

V. Simulation Exercises

This section describes how the model simulates the impact of a change in government expenditure on the trade balance, prices, and output; the simulations consist of changing government expenditure in nominal or real terms by a certain percentage with appropriate specifications for its financing and tracing the impact of these changes on the rest of the model. Before drawing conclusions regarding the quantitative significance of fiscal adjustments, however, we must determine how equations (1.i)-(6.v) in Table 2 perform as a system, compared with the observed historical data. Statistical information about the simulated values of endogenous variables indicates that all the equations perform well both as individual behavioral relations and as a part of the complete model (Table 4). For all the equations, the mean of the actuals and predicted values of the endogenous variables are very close to each other, and the standard deviations of the predicted values of endogenous variables are generally not higher than the standard deviations of the corresponding actual values. The goodness of fit of the baseline simulations, which is evident from the statistics reported in Table 4, is also reflected in Chart 2.

Starting from the baseline simulations discussed above, we perform two general types of simulations: (a) the case of a hypothetical increase in nominal government expenditure by 10 percent financed by borrowing from the domestic banking system or from external sources; (b) we simulate what would have happened to trade balance, prices, and

CHART 2
PHILIPPINES
ACTUAL AND PREDICTED VALUES OF SELECTED
VARIABLES IN THE BASIC SIMULATION, 1970-82

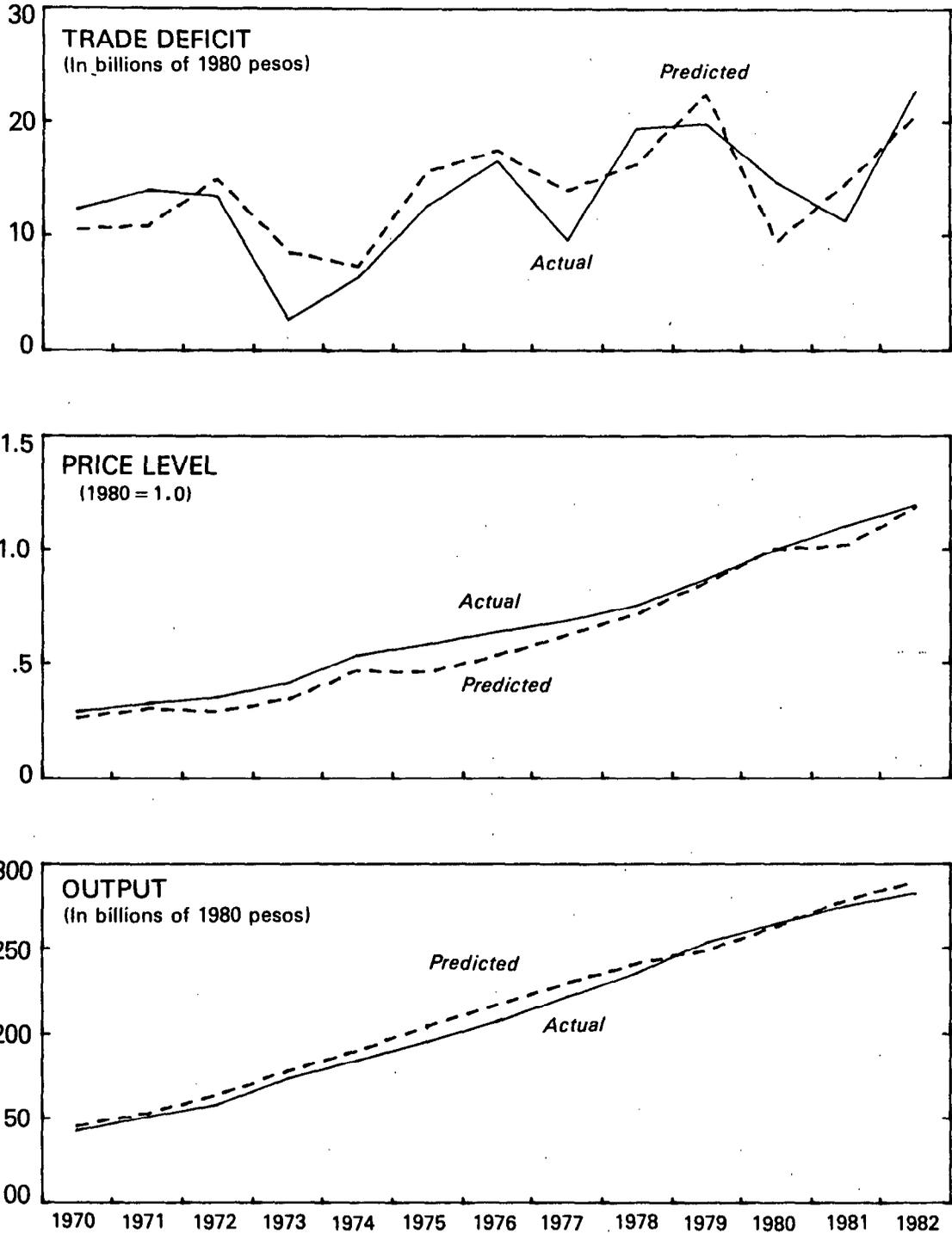


Table 4. Philippines: Summary Statistics for Selected Endogenous Variables, Based on the Baseline Simulation, 1970-82

| Endogenous Variable | Mean Absolute Error | Post Mean Square Error | Mean of 1/ | | Standard Deviation 1/ | |
|---------------------|---------------------|------------------------|------------|-----------|-----------------------|-----------|
| | | | Actuals | Predicted | Actuals | Predicted |
| log P | 0.06 | 0.08 | ... | ... | ... | ... |
| log IMP | 0.06 | 0.06 | 0.01 | 0.01 | 0.017 | 0.015 |
| log TM | 0.19 | 0.23 | ... | ... | ... | ... |
| log TD | 0.14 | 0.17 | 0.01 | 0.09 | 0.097 | 0.058 |
| log R | 0.08 | 0.11 | 0.09 | 0.07 | 0.070 | 0.050 |
| log GNP | 0.03 | 0.03 | 0.01 | 0.01 | 0.003 | 0.003 |
| log ABS | 0.03 | 0.03 | 0.01 | 0.01 | 0.010 | 0.003 |
| log M | 0.05 | 0.06 | 0.06 | 0.06 | 0.015 | 0.025 |

1/ Theil statistics, based on log-relative changes.

output in recent years (during 1978-82), if the overall budget deficit were at the level of 1978 as percent of GNP. We also consider the differences arising from alternative sources of financing.

1. Increase in government expenditure

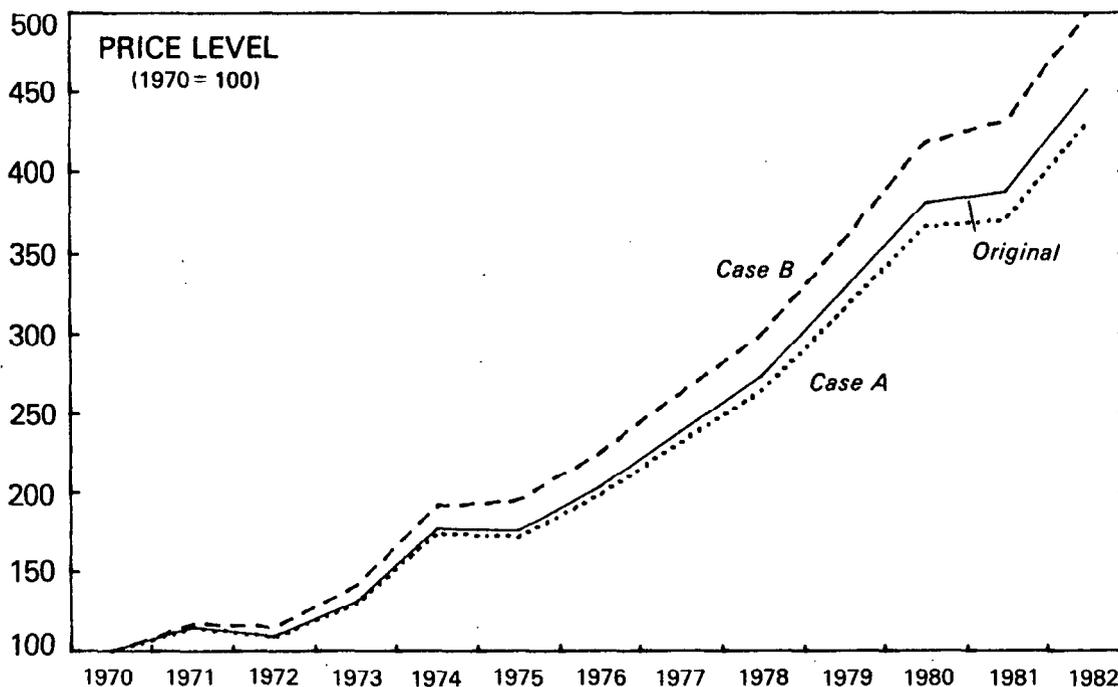
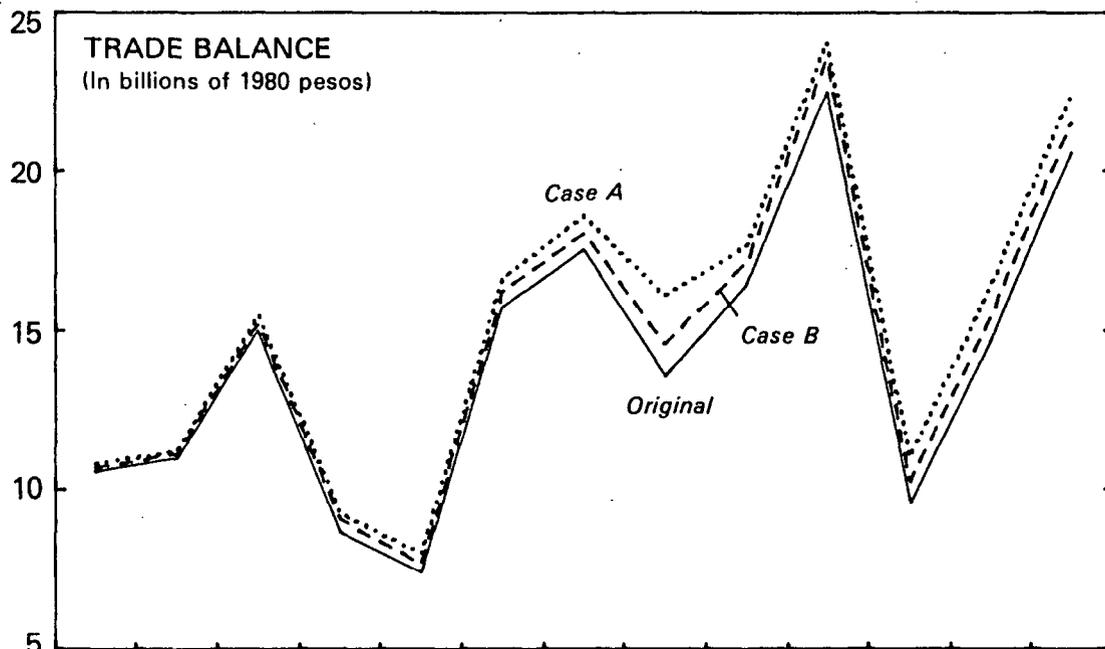
The first type of simulation examines the sensitivity of the trade balance, output, and price level in the Philippines to arbitrary changes in the budget deficit through changes in expenditure. Consider two scenarios: government expenditure is increased by 10 percent in real and in nominal terms. In the case of a real increase in government expenditure the price level is assumed constant; in the case of a nominal increase in government expenditure, domestic credit will change depending on the financing of the budget deficit. When nominal expenditure is increased, the ultimate effect depends on the final real increase in government expenditure based on the endogenously determined price level. The effect of an expansionary fiscal policy on the price level depends on the financing of the increased deficit; it is most inflationary if the deficit is financed by borrowing from the domestic banking system, as the consequent increase in money supply increases the price level. The partially offsetting effect coming from the output response is also minimal in the money-financed case because the final real increase in government expenditure is less than the initial increase. If the increased government expenditure is fully financed by external borrowing, domestic credit and the money supply will not change, and increases in output, ceteris paribus, will depress the domestic price level somewhat. The effects of an externally financed government budget deficit is qualitatively and quantitatively similar to the simulations where the price level is held fixed and real government expenditure is increased by 10 percent. In general, any increase in the budget deficit owing to increased expenditure adversely affects the trade balance, irrespective of the financing of the deficit; a certain nominal increase in government expenditure is likely to deteriorate the trade balance in real terms when the deficit is externally financed or the price level is held constant (Tables 5 and 6 and Chart 3).

2. The effects of holding the budget deficit as a percent of GNP at the level of 1978

The budget deficit in the Philippines has historically been about 1.0 percent of GNP during 1970-80 but in 1981 and 1982 it increased sharply to 4.0 percent and 4.3 percent, respectively. In light of the fact that the simulations reported in Section V.1 point to a deterioration in the trade balance when government expenditure increases relative to revenue, it may be argued that an improvement or smaller deterioration in the trade balance could have been attained if the overall budget deficit had been held at the 1978 level as a percent of GNP. To examine the quantitative effects of any such adjustment in the budget deficit, we adjust government expenditure during 1979-82 so that the measured deficit as a percent of GNP remains at the level of 1978 (in terms of

CHART 3
PHILIPPINES

IMPACT OF A PERMANENT 10 PERCENT INCREASE
IN GOVERNMENT EXPENDITURE UNDER DIFFERENT
FORMS OF FINANCING, 1970-82¹



¹Original simulation refers to the basic run; Case A represents a 10 percent increase in government expenditure financed by external borrowing; the scenario where the deficit is financed by a net increase in the borrowing from the banking system is shown as Case B.

Table 5. Philippines: Qualitative Effects of an Increase in Central Government Expenditure

| Major Endogenous Variables | Case A <u>1/</u> | Case B <u>2/</u> | Case C <u>3/</u> |
|----------------------------|------------------|------------------|------------------|
| Price level | -- | - | + |
| Trade deficit | + | + | + |
| Output | + | + | + |
| Revenue | + | + | + |
| Money supply | ? | -- | + |

1/ Increased budget deficit owing to 10 percent increase in government expenditure in real terms, holding the price level constant.

2/ Increased budget deficit owing to 10 percent increase in government expenditure in nominal terms, the deficit being financed by external borrowing.

3/ Increased budget deficit resulting from 10 percent increase in government expenditure in nominal terms, the deficit being financed by borrowing from the domestic banking system.

Table 6. Philippines: Impact of a Permanent 10 Percent Increase in Government Expenditure Under Different Forms of Financing, 1970-82 ^{1/}

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| (In billions of constant pesos) | | | | | | | | | | | | | |
| <u>Trade deficit</u> | | | | | | | | | | | | | |
| Original simulation | 10.6 | 11.0 | 15.0 | 8.6 | 7.4 | 15.7 | 17.5 | 14.0 | 16.4 | 22.5 | 9.5 | 14.6 | 20.5 |
| Scenario I | 10.7 | 11.1 | 15.2 | 9.0 | 7.7 | 16.2 | 18.0 | 14.6 | 17.1 | 23.5 | 10.2 | 15.4 | 21.5 |
| Scenario II | 10.8 | 11.2 | 15.5 | 9.2 | 8.0 | 16.6 | 18.6 | 15.1 | 17.6 | 24.1 | 11.0 | 16.4 | 22.4 |
| <u>Output</u> | | | | | | | | | | | | | |
| Original simulation | 146.0 | 153.0 | 164.5 | 178.5 | 190.5 | 204.6 | 217.2 | 230.0 | 241.4 | 249.3 | 263.4 | 278.4 | 289.3 |
| Scenario I | 146.1 | 153.6 | 164.9 | 179.4 | 191.5 | 205.9 | 219.0 | 232.1 | 242.2 | 252.1 | 266.4 | 281.9 | 293.0 |
| Scenario II | 146.3 | 133.9 | 165.5 | 180.1 | 192.5 | 207.4 | 220.8 | 234.2 | 246.3 | 254.7 | 269.4 | 285.3 | 297.0 |
| (Indices: 1970 = 100) | | | | | | | | | | | | | |
| <u>Price index</u> | | | | | | | | | | | | | |
| Original simulation | 100.0 | 115.3 | 109.5 | 131.3 | 177.5 | 176.0 | 203.8 | 238.9 | 274.0 | 326.7 | 381.7 | 388.2 | 451.1 |
| Scenario I | 100.0 | 117.2 | 115.5 | 141.0 | 191.6 | 195.0 | 225.1 | 262.3 | 299.2 | 356.9 | 418.4 | 432.2 | 499.2 |
| Scenario II | 100.0 | 114.7 | 108.8 | 129.7 | 174.7 | 172.2 | 198.2 | 231.5 | 264.5 | 314.3 | 366.3 | 370.7 | 430.4 |

Source: Staff estimates.

^{1/} Original simulation refers to the basic run; Scenario I represents a 10 percent increase in government expenditure in nominal terms, financed by borrowing from the banking system; the case where the deficit resulting from the same increase in government expenditure is financed by a net increase in the external borrowing is shown under Scenario II.

actual data). ^{1/} Qualitatively the simulated impact of such a reduction in government expenditure is opposite to what has been discussed earlier in this section in the context of a hypothetical increase in government expenditure. The hypothetical reduction in government expenditure would have led to a consequent reduction in the trade account deficit by about 10 percent during 1981-82, if prices remained unchanged or the financial surplus of the government were used to reduce external financing without any net effect on domestic credit; in this situation, the trade deficit in 1982 would have been limited to a level 13.8 percent higher than that of 1978, compared with 25.4 percent without the adjustment (Table 7 and Chart 4). In a simulation where the reduced budget deficit in nominal terms implies a corresponding reduction in the total domestic credit, the deflationary effect on the price level would have caused a smaller real reduction in government expenditure, and the consequent reduction in trade deficit would also have been smaller. The proposed hypothetical reduction in government expenditure would have improved the trade balance and exerted a significant deflationary effect on the price level, depending on the composition of the financing of the adjusted deficit. In any case, it may be stated that the simulations indicate a significant quantitative relationship between a change in real government expenditure and the balance of trade in the Philippines.

It may be noted that the sharp deterioration in the trade balance of the Philippines during 1980-82 was mainly attributable to the reduced value of exports caused by external developments. Merchandise exports remained stagnant in 1981 and declined by 12.3 percent in 1982 in U.S. dollar terms, with most of the decline attributed to lower export prices. In this paper, we have not analyzed recent developments in exports in any detail; they have been treated as being exogenously determined to avoid possible distortions arising from simplistic or inadequate examination of the complex issues related to the determination of exports from the Philippines. The deterioration in the trade balance may be attributable to a number of external and domestic factors not covered in this study, but it can be argued that apart from the adverse developments in exports, expansionary fiscal policy also contributed significantly to the deterioration in the trade and current accounts of the Philippines.

3. Relationship between simulated real budget deficit and the trade balance

In the simulations considered above, we have adjusted expenditure to certain levels and examined its impact on the trade balance, output, and prices. The way the basic model has been specified, tax revenue is endogenous to the system, depending on the nominal value of output and imports, so the overall budget balance is also endogenously determined.

^{1/} The simulated budget deficit, however, will not necessarily remain constant as a percent of simulated GNP, as both revenue and GNP will be different from their corresponding historical data.

Table 8. Philippines: Comparison of Simulated Trade Deficit
and Budget Deficit Under Alternative Scenarios, 1970-82

(In billions of constant 1980 pesos)

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <u>Basic simulation</u> | | | | | | | | | | | | | |
| Budget deficit | -2.2 | -4.3 | 5.9 | 6.9 | -1.2 | 5.3 | 6.2 | 4.1 | 5.5 | 3.0 | 6.1 | 12.3 | 11.6 |
| Trade deficit | 10.6 | 11.0 | 15.0 | 8.6 | 7.4 | 15.7 | 17.5 | 14.0 | 16.4 | 22.5 | 9.5 | 14.6 | 20.6 |
| <u>Scenario I 1/</u> | | | | | | | | | | | | | |
| Budget deficit | 0.2 | -2.5 | 9.2 | 10.2 | 1.2 | 8.3 | 9.2 | 7.4 | 8.7 | 5.7 | 9.1 | 15.7 | 15.0 |
| Trade deficit | 10.8 | 11.3 | 15.5 | 9.2 | 8.0 | 16.6 | 18.6 | 15.1 | 17.6 | 24.0 | 11.0 | 16.3 | 22.4 |
| <u>Scenario II 2/</u> | | | | | | | | | | | | | |
| Budget deficit | -1.0 | -3.2 | 7.8 | 9.3 | 0.9 | 8.4 | 9.3 | 7.0 | 8.5 | 5.8 | 9.3 | 16.5 | 15.6 |
| Trade deficit | 10.7 | 11.1 | 15.2 | 9.0 | 7.7 | 16.2 | 18.0 | 14.6 | 17.1 | 23.5 | 10.2 | 15.4 | 21.5 |
| <u>Scenario III 3/</u> | | | | | | | | | | | | | |
| Budget deficit | -2.2 | -4.3 | 5.9 | 6.9 | -1.2 | 5.3 | 6.2 | 4.1 | 5.5 | 5.2 | 5.9 | 6.9 | 7.4 |
| Trade deficit | 10.6 | 11.0 | 15.0 | 8.6 | 7.4 | 15.7 | 17.5 | 14.0 | 16.4 | 23.2 | 9.8 | 14.1 | 20.2 |
| <u>Scenario IV 4/</u> | | | | | | | | | | | | | |
| Budget deficit | -2.2 | -4.3 | 5.9 | 6.9 | -1.2 | 5.3 | 6.2 | 4.1 | 5.5 | 5.5 | 6.0 | 4.6 | 3.6 |
| Trade deficit | 10.6 | 11.0 | 15.0 | 8.6 | 7.4 | 15.7 | 17.5 | 14.0 | 16.4 | 23.1 | 9.6 | 13.2 | 18.7 |

1/ Ten percent increase in government expenditure in nominal terms, financed by borrowing from the domestic banking system.

2/ Ten percent increase in government expenditure in nominal terms, financed by external borrowing or equivalent reduction in the credit to the private sector.

3/ Government expenditure is so adjusted that the measured deficit during 1979-82 is constant as a percent of GNP at the level of 1978; the reduction in deficit is balanced through equivalent reduction in domestic credit to the Government.

4/ Same as Scenario III, except that there is no net change in the total domestic credit.

reducing government expenditure. If the financial savings were used to reduce net external borrowing, the trade deficit could be significantly reduced; if the savings were used to reduce the borrowing from the domestic banking system, the inflation rate could be significantly lower and some modest improvement in the trade balance could also be achieved. Notwithstanding the strong relationship between the fiscal deficit and the trade balance, it should, however, be emphasized that the deterioration in the Philippines' trade and current account balances during 1981-82 was mainly attributable to adverse external developments which reduced export receipts. The expansionary fiscal stance during 1981-82 further worsened the deteriorating balance of payments position. Fiscal adjustments in the form of a reduced overall deficit alone were probably not sufficient to reverse the developments in the current account deficit during 1981-82, but in any event, fiscal restraint was necessary to achieve a sustainable balance of payments position in the medium term.

import duties declined as a result of a sharp fall in the growth of imports. Expenditure policies were partly influenced by the sluggish economy; while strict economy measures were imposed on current expenditure, equity contributions to the financially depressed public enterprises and accelerated implementation of the infrastructure program increased capital expenditure sharply.

Reflecting developments in the overall budget balance, bank credit to the Government increased rapidly. Claims on Government (net), which was only 6.4 percent of total domestic credit at the end of 1980, increased to 14.6 percent by the end of 1982 (Appendix Table 10). During 1982, more than 36 percent of the domestic credit expansion went to the Government; the corresponding share in 1980 was less than 8 percent.

2. Balance of payments and monetary developments

Developments in the Philippine balance of payments have been characterized by steadily increasing trade and current account deficits. Deterioration in the trade balance during most of the period (except in 1973) was attributable to the rapid increase in imports (averaging 19.4 percent a year) relative to the growth of exports (averaging 13.8 percent a year) during 1970-82 (Appendix Table 11). Notwithstanding increasing receipts from remittances, the deficit in the services account rose sharply during 1976-82 owing to increasing payments on freight and insurance, and net investment income. Reflecting these developments in the trade and services accounts, the current account balance had a deficit equivalent to 6.1 percent and 8.6 percent of GNP in 1981 and 1982, respectively. A steadily rising net inflow of capital tended to offset the developments in the current account balance, and the overall balance remained in surplus during most of the period.

Monetary policy was expansionary during most of the period. Total domestic credit increased at an annual average rate of about 23 percent during 1970-80; most of this rise was attributable to the nongovernment sector, as the claims on the Government increased at a slower rate (12.2 percent). Government borrowing from the banking system increased sharply during 1980-82 from ₱ 6.3 billion at the end of 1980 to ₱ 22.0 billion by the end of 1982 (at an average annual rate of 87 percent); claims on the nongovernment sector increased at a rate of 17.9 percent, to ₱ 129 billion during the same period. Money and quasi-money was growing at an average rate of 20 percent during 1970-80 and continued to grow at about the same rate during the following two years.

Simultaneous examination of the fiscal, monetary, and balance of payments developments indicates that during most of the 1970s, the budget deficit remained low as did the current account deficit. During 1980-82, financial stabilization programs were discontinued, the fiscal deficit and the associated domestic and external financial imbalances increased sharply, and the current account balance plunged to record deficit levels.

Table 10. Philippines: Monetary Survey, 1970-82

(In billions of pesos)

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---------------------------------|-------|-------|-------|--------|--------|-------|-------|-------|-------|-------|-------|--------|--------|
| Net foreign assets | -0.6 | -0.8 | 0.1 | 4.8 | 6.6 | 2.8 | 0.2 | -- | 6.7 | -14.1 | -20.8 | -26.3 | -44.7 |
| Total domestic credit | 12.8 | 14.3 | 16.5 | 18.6 | 26.1 | 34.3 | 43.5 | 52.3 | 65.0 | 81.4 | 99.1 | 122.1 | 151.0 |
| Claims on Government (net) | (2.0) | (2.1) | (2.1) | (1.1) | (--) | (0.9) | (2.3) | (4.1) | (4.7) | (4.9) | (6.3) | (11.6) | (22.0) |
| Change in total domestic credit | 1.4 | 1.5 | 2.2 | 2.1 | 7.5 | 8.2 | 9.2 | 8.7 | 12.7 | 16.4 | 17.7 | 23.1 | 28.8 |
| Claims on Government (net) | (--) | (0.1) | (--) | (-1.0) | (-1.1) | (0.9) | (1.4) | (1.8) | (0.6) | (0.2) | (1.4) | (5.3) | (10.4) |

Source: International Monetary Fund, International Financial Statistics.

Table 11. Philippines: Balance of Payments, 1970-82

(In millions of U.S. dollars)

| | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Trade balance | -26 | -49 | -125 | 275 | -450 | -1,196 | -1,116 | -838 | -1,310 | -1,539 | -1,938 | -2,223 | -2,646 |
| Exports | 1,064 | 1,136 | 1,136 | 1,872 | 2,694 | 2,263 | 2,517 | 3,078 | 3,423 | 4,602 | 5,788 | 5,722 | 5,021 |
| Imports | -1,090 | -1,186 | -1,261 | -1,596 | -3,144 | -3,459 | -3,633 | -3,916 | -4,733 | -6,141 | -7,726 | -7,945 | -7,667 |
| Net services | 141 | 187 | 158 | -32 | -34 | -46 | -257 | -244 | -166 | -379 | -542 | -576 | -1,196 |
| Net transfers | 119 | 134 | 188 | 230 | 277 | 318 | 268 | 262 | 314 | 356 | 434 | 472 | 474 |
| Current account | -48 | -2 | 5 | 473 | -208 | -923 | -1,104 | -820 | -1,162 | -1,562 | -2,046 | -2,327 | -3,368 |
| Capital account | 241 | 244 | 281 | 258 | 853 | 1,094 | 1,197 | 988 | 2,138 | 2,116 | 3,269 | 2,359 | 4,243 |
| Errors and omissions and others | -99 | 140 | 103 | 28 | 69 | -182 | -178 | -214 | -113 | -143 | -117 | 118 | -672 |
| SDRs | 18 | 17 | 18 | -- | -- | -- | -- | -- | -- | 28 | 29 | 27 | -- |
| Overall balance | 112 | 119 | 201 | 703 | 576 | -11 | -85 | -46 | 863 | 439 | 1,135 | 177 | 203 |

Source: International Monetary Fund, International Financial Statistics.

Derivation of Cyclically Neutral Fiscal Stance

Before we attribute the deteriorating balance of payments position to budgetary developments, it is desirable to establish that the fiscal policy was expansionary during the period under consideration; even if the overall fiscal deficit is not expansionary, a shift in the composition of government expenditure toward higher import intensity may also cause a higher current account deficit. If none of these is true, deterioration in the current account balance may be attributable to private sector demand or to other factors.

The approach considered to determine the stance of fiscal policy involves adjusting the actual fiscal balance for cyclical effects in an effort to obtain a cyclically neutral measure of the budget balance. The summary measure used in this section was originally proposed by the German Council of Experts and employed in the World Economic Outlook report of the Fund. ^{1/} The actual budget balance (B_t) may be decomposed into a cyclically neutral component (B_t^n) and the expansionary or contractionary fiscal stance (FIS_t).

$$\begin{aligned}
 B_t &= B_t^n - FIS_t \\
 &= \underbrace{(t_o \cdot Y_t^P - g_o \cdot Y_t^P)}_{\text{normal balance}} - \underbrace{[t_o \cdot (Y_t^P - Y_t)]}_{\text{cyclical component}} - FIS_t
 \end{aligned}
 \tag{II-1}$$

$$= (t_o \cdot Y_t - g_o \cdot Y_t^P) - FIS_t$$

where $t_o = T_o/Y_o$, base year tax (T_o) to GNP (Y_o) ratio,

$g_o = G_o/Y_o$, base year expenditure (G_o) to GNP ratio,

Y = actual output in nominal prices,

Y^P = potential output in nominal prices,

T = government revenue,

G = government expenditure,

FIS = fiscal stance measure.

^{1/} For more on this and other summary measures, see Dernburg (1975); Chand (1977); Heller, Haas, and Mansur (1985).

The first two terms in equation (II-1), normal balance and cyclical components, can be merged to define the cyclically neutral balance; actual deficit in excess of the cyclically neutral deficit is deemed as expansionary, relative to the base year fiscal stance. To determine if the thrust of the fiscal policy has been more expansionary relative to the previous year, the fiscal impulses (FI) may be examined by taking the first differences of the fiscal stance measure:

$$FI_t = FIS_t - FIS_{t-1}$$

We also examine the expansionary or contractionary nature of total budgetary expenditure and its components. Government expenditure is termed cyclically neutral if it increases proportionately with increases in nominal potential output; a more than proportionate increase is considered as expansionary and vice-versa.

Causality Tests for the Relationship Between the Budget Deficit
and the Current Account Deficit of the Balance of Payments

The causality test used in this paper is based on the method developed by Pierce (1977) and Pierce and Haugh (1977). In the context of our present analysis, the budget deficit is viewed as causing the current account deficit if the budget deficit leads the current account deficit over time; leads and lags between the two series, when both are transformed to their stationary forms, determine the direction of causality. Possible transformations include ordinary or seasonal differencing, lags, or, more generally, the power transformation of Box and Cox (1964), and certain types of detrending. The transformations remove the effect on a series of its own past values and convert it into a form where consecutive values of the series are uncorrelated. ^{1/} The cross-correlation coefficients between the current account deficit and the budget deficit in the previous and current periods after the transformation of this data are shown in Appendix Table 12. The coefficients indicate that for both yearly and biannual data, obtained from the Fund's International Financial Statistics, the current account deficit of the balance of payments is correlated with the past value of the budget deficit; for annual data, the contemporaneous relationship is also statistically significant.

These significantly positive correlation coefficients indicate that, in a plausible behavioral model for the Philippines, a widening fiscal deficit caused by weak revenue performance or excessive government spending has led to a deterioration in the current account deficit; the line of causality runs from the fiscal to the balance of payments deficit. As an argument for reversed causality, it is sometimes argued that a reduction in exports may lead to a fall in imports, which may harm government revenue and lead to a wider fiscal deficit. Examination of the data on the Philippines indicates that exports were steadily increasing in all years, except 1975 when recession in the industrial countries caused exports to decline (Appendix Table 11). The level of imports, however, continued to increase, as did the international trade

^{1/} One might suggest that causal relationships between the budget deficit (BD) and the current account deficit (CAD) can be determined through their sample cross-correlations, or by regressing CAD on past and present values of BD and performing an F-test on the appropriate set of regression coefficients. Both these procedures (correlation and regression), however, can be misleading if autocorrelation is not appropriately taken into account; the types of autocorrelations normally found in the time series, if unattended, overestimate the significance of the tests and indicate relationships that do not exist. Consequently, it is desirable to make appropriate transformations of the time series to remove any existing autocorrelation prior to a cross-correlation analysis.

Table 12. Philippines: Cross-Correlation Coefficient Between the Budget Deficit and the Current Account Balance

| | Budget Deficit | |
|---|--------------------------|-----------------------|
| | Previous Period (t-1) | Current Period (t) |
| <u>Detrending (ordinary differencing)</u> | | |
| Yearly data | 0.349 <u>1/</u> | 0.460 <u>1/</u> |
| Biannual data | 0.449 <u>1/</u> | 0.188 |
| <u>Detrend (moving average)</u> | 0.347 <u>1/</u> | 0.091 |

1/ The estimated coefficient is at least twice the value of its standard error.

based tax revenue. In fact, revenue increased sharply in 1975 owing to new revenue measures adopted as a part of the stabilization program. Thus, the reverse causality running from lower exports and the consequent current account balance to the overall fiscal deficit is not relevant for the Philippines.

References

- Aghevli, B., and M. Khan, "Government Deficits and the Inflationary Process in Developing Countries," Staff Papers, International Monetary Fund, Vol. 25 (September 1978), pp. 383-416.
- Box, G., and D. Cox, "An Analysis of Transformations," Journal of the Royal Statistical Society (B) 26 (1964), pp. 211-52.
- Chand, S., "Summary Measures of Fiscal Influence," Staff Papers, International Monetary Fund, Vol. 29 (July 1977), pp. 405-49.
- Dernburg, T., "Fiscal Analysis in the Federal Republic of Germany: The Cyclically Neutral Budget," Staff Papers, International Monetary Fund, Vol. 22 (November 1975), pp. 825-57.
- Hansen, B., Fiscal Policy in Seven Countries, 1955-1967, assisted by W. Snyder (Paris: OECD, March 1969).
- Heller, P., R. Haas, and A. Mansur, "A Review of the Fiscal Impulse Measure, with Estimates of the Structural Budget Balance," International Monetary Fund, DM/85/18 (March 21, 1985).
- Kelly, M., "Fiscal Adjustment and Fund-Supported Programs, 1971-80," International Monetary Fund, DM/82/65 (September 28, 1982).
- Khan, M., and M. Knight, "Stabilization Programs in Developing Countries: A Formal Framework," Staff Papers, International Monetary Fund, Vol. 28 (March 1981), pp. 1-53.
- Milne, E., "The Fiscal Approach to the Balance of Payments," International Monetary Fund, DM/76/113 (December 14, 1976).
- Otani, I., and Yung Park, "A Monetary Model of the Korean Economy," Staff Papers, International Monetary Fund, Vol. 20 (March 1976), pp. 164-99.
- Pierce, D.A., "Relationships--and the Lack Thereof--Between Economic Time Series, with Special Reference to Money and Interest Rates," Journal of the American Statistical Association, Vol. 72 (March 1977).
- _____, and L.D. Haugh, "Causality in Temporal Systems: Characterizations and a Survey," Journal of Econometrics, Vol. 5 (May 1977), pp. 265-93.
- Riha, T., "An Evaluation of Fiscal Performance in the Philippines: 1947-73," Discussion Paper No. 75-7, Institute of Economic Development and Research, School of Economics, University of the Philippines (June 1975).

Snyder, W., "Measuring Economic Stabilization: 1955-65," The American Economic Review, Vol. 60 (December 1970), pp. 924-33.

Tahari, A., "Budget Deficits, Credit Creation, and the Balance of Payments: Empirical Evidence for Brazil, Philippines, Sri Lanka, Thailand, and Venezuela," International Monetary Fund, DM/78/92 (October 24, 1978).

Theil, H., Linear Aggregation of Economic Relations (Amsterdam: North-Holland Publishing Company, 1954).