CENTRAL BANK OF BARBADOS

PRICES, CREDIT AND THE BALANCE OF PAYMENTS

by

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Prices, Credit and the Balance of Payments

This paper is a preliminary examination of the relationship between prices, credit and the balance of payments in an attempt to suggest a combination of measures appropriate for short-run adjustment. The first part of the paper surveys the theory of balance of payments adjustment and the second section looks at the data for Barbados. The summary and conclusions are presented in the final section.

II

Survey of balance of payments theory

The focus of attention in this survey will be the elasticities, absorption and monetary approaches discussed by Johnson [1,2] and the fiscal approach to the balance of payments associated with the New Cambridge School [3]. Johnson [1] also discussed two other approaches to balance of payments adjustments: the classical theory which derived from the work of Hume and the pre-1930 theory of international trade, and the economic policy approach pioneered by Tinbergen and Meade. In some ways differences between the approaches to the balance of payments result from the chronologically increasing sophistication of economic theory.

The elasticities approach to the balance of payments is derived from partial equilibrium analysis and emphasises the importance of relative prices - exchange rate changes - in the adjustment process. The effectiveness of a

devaluation is linked to the price elasticities of goods entering foreign trade. If devaluation were to have a favourable impact on the balance of trade, the sum of the elasticities of demand for imports in the devaluing country and for its exports in foreign markets would at least have to be greater than unity. On the supply side the assumption that a small developing country faces an infinitely elastic supply curve for imports might be realistic but it is doubtful if a similar assumption about the supply of exports is tenable.

In this approach to the analysis of balance of payments adjustment the response of importers and exporters to exchange rate changes is defined as if income and prices of other commodities (domestic goods) remained constant. But unless the monetary and fiscal authorities take steps to neutralise the effects of other income and price changes, or to prevent such changes, it is indefensible to explore the effects of devaluation as if income and other prices remained constant. Murphy and Das [4] have found that the absence of money illusion reduces the change in a country's balance of payments attributable to a devaluation of a given size and that the effect is probably greater under flexible than under fixed exchange-rate arrangements.

As the income effects, including those induced by terms-of-trade movements, were incorporated into the analysis of devaluation, the beneficial consequences of relative price movements for the payments balance were counteracted. Devaluation seemed therefore to be a less attractive balance of payments policy than had been imagined. However, it has not been repudiated as a tool for use in a payments deficit and forms an integral part of adjustment programmes recommended by the International Monetary Fund.

For one thing analysts recognised the success of the U.K. devaluation in 1949 and, for another, most recent cases of devaluation have been accompanied by measures designed to prevent off-setting income changes. The elasticities approach to adjustment was, however, still in need of theoretical refinement when the debate became bogged down in conflicting views on the accuracy of the calculation of the elasticities.

Alexander [5,6] attempted to shift the emphasis away from this debate by his work in the absorption approach to payments adjustment. The focus of attention now became the difference between aggregate domestic production and aggregate domestic expenditures. These total domestic expenditures are defined by Alexander as absorption. The elasticities approach led to the presumption that problems with the balance of payments were due to decisions in the foreign trade sector while the absorption thesis suggested that the imbalance was due to decisions made throughout the economy. The key to the effectiveness of any balance of payments adjustments strategy therefore became the direction and the extent to which it induced changes in domestic output relative to domestic absorption [7].

The adjustment strategy, usually a devaluation, had (or failed to have) the desired response by acting through a number of channels: allocation of resources, the terms of trade, the cash balance effect, income redistribution, the money illusion and 'miscellaneous direct affects' (Alexander [5] and Machlup [8]).

The original rendition of the absorption approach was criticized by Machlup [8], among others, for suppressing the elasticities which were implicit in the model. These criticisms led to a synthesis of the elasticities and absorption approach to international payments adjustment by Alexander [6]. But an even more fundamental problem is the concept of the propensity to absorb. It includes target variables as well as the instrument variables which may be used to frustrate or achieve the targets; it includes government expenditure which is not a function of income but an independent variable that can be administered in a direction opposite to that of changes in income. The propensity to absorb may be influenced by monetary and fiscal policy, the former sometimes being assumed exogenous to the model and at other times being treated as if it were endogenous. Finally, Machlup [8] points out that the propensity to absorb may be altered by the devaluation which is based on it.

It was recognised [5] that monetary policy could also be used to effect an improvement in the foreign balance. Given the practical problems of defining a suitable framework for using either the elasticities or absorption approaches to payments adjustments, the monetary approach appeared to be simpler and more manageable for applied research and for policy formulation [9]. The balance of payments was viewed as an essentially monetary phenomenon and the relationships were built on the imputation of strong functional connections between money or credit creation and income, and between income and imports. The monetary analysis of the balance of payments also recognised the basic accounting identities linking the domestic monetary base with the balance of payments. These identies are: that between a change

in external reserves and the sum of net current account and capital account flows and that between the monetary base and the domestic and foreign assets of the monetary authorities.

This second identity can be summarized by the following equation which represents the balance sheet of the monetary authorities:

$$NFA + NCr_g + Cr_b + OAL = C + D_b = B \text{ where}$$

NFA is net foreign assets;
NCr_g is net credit to government;
Cr_b is credit to commercial banks;
OAL is net other assets and liabilities;
C is currency in circulation
D_b is deposits by commercial banks; and
B is the monetary base.

The monetary base is influenced by such factors as credit to government, the net credit or debit position of the monetary authorities with commercial banks and net foreign assets. It follows, therefore, that the net foreign assets will change in the opposite direction from that of an expansion in domestic credit.

In addition to the proposition that the balance of payments is a monetary phenomenon requiring analysis with the tools of monetary theory rather than with trade theory, Johnson [1,2] also identified two other essential characteristics of this approach. Firstly money is a stock so that an adequate balance of payments theory must integrate stocks and flows; secondly the money stock can be charged in two alternative ways, through domestic credit creation or destruction, or through reserve flows. From this he concluded that since balance of payments disequilibrium was a stock adjustment and not a flow phenomenon it was inconsistent to conduct the analysis in terms of behavioural relationships such as elasticities of demand.

The advantage of the monetary approach to the balance of payments is that it takes account of the overall balance while the other approaches focus attention on the current balance . It also avoids the debate on the accuracy and size of the elasticities or of the absorptive capacity. Such considerations as whether or not the economy is in a mass unemployment or inflationary situation; whether the economy is a price taker or not; and whether the adjustment is through the capital or current account do not compromise the efficacy of the monetary approach to the balance of payments. However, the basis for the monetary approach - the imputation of strong functional relationships between money and credit creation and income does not seem to be so firmly established to support such strong conclusions.

A fourth approach to the balance of payments - the fiscal approach - has been developed by the New Cambridge School as a result of disatisfaction with the efficacy of monetary policy in the U.K. [3]. This approach to the analysis of the balance of payments postulates that the deficit on current account is primarily the result of the fiscal deficit. The chain of causation is based on certain restrictive assumptions about savings and investments namely: that domestic output is inelastic in the short-run, that investment is dependent only on the rate of profit, that an unexpected higher rate of profit does not stimulate investment and that the marginal propensity to consume out of labour income is unity. These assumptions imply a stable private sector surplus - there being no multiplier effect of public sector expenditure on domestic production. Thus an autonomous increase in government expenditure is leaked completely into imports causing a deterioration in the trade deficit.

This model was advanced for the United Kingdom, where most of the debate on its validity has taken place. However, the preliminary findings of Milne [10] based on data for 17 countries, support the fiscal approach to the balance of payments. But the existence of an empirical relationship between the government deficit and the trade balance does not necessarily imply causality. The assumptions of the New School are too restrictive to have general applicability and adjustment in the fiscal approach works through credit to government, which is only one of the variables in the monetary approach to the balance of payments... The fiscal approach therefore lacks the explanatory power of the monetary approach.

II

Examination of the Barbadian balance of payments

This section examines the performance of the Barbadian balance of payments in the light of the theories outlined above. The results obtained should be treated with caution in view of the shortness of the data series (which makes it impossible to use the Durbin-Watson statistic in most cases) and because of the quality of much of the data. In most cases we have used both regression and chart analysis since the regression results proved highly unstable as a result of the small number of observations. In addition, specification of the equations was constrained by data availability: no quarterly series exists for most of the data, the most notable case being the balance of payments variables for which only eight quarterly estimates are available. Hence, yearly data has been used.

The overall balance on the external account is given by:

$BF = D + \bar{T} + \bar{K}$ where

BF is the balance for official financing;

D is the balance on goods and services and which is which is equal to X - M;

$\bar{T}$ is net transfers; and

$\bar{K}$ is net autonomous capital flows;

Since transfers and capital flows are treated as exogenous variables most of the analysis is concentrated on the balance on goods and services. It is only on considering the monetary and fiscal approaches that the overall balance is taken as the dependent variable.

Elasticities/multiplier Approach

This approach to balance of payments adjustment implies that adjustment largely depends on the own-currency elasticities of demand for imports and exports and on the original marginal propensity to import out of income Barbados is a price-taker and the short-run supply elasticity of our exports is very low, little can be done in the short-term about the export side of our balance of payments position. We have therefore chosen to focus on the import side. Since there are no estimates of disposable real income, deflated GDP has in this, and in all the other equations, been used as a proxy. The following results were obtained:

$$M = -74.4105 + 1.2049Y - 0.0882PM$$
$$(-6.1460)\ (15.5809)\ (-2.3410)$$

$DW = 1.7001 \qquad R^2 = 0.9597$

where M is imports in real terms from 1960 to 1977

Y is estimated GDP deflated by the retail price index for 1960 to 1977

PM is index of import prices

Income is highly significant and import prices are significant at the 5% level. The signs are those expected, implying that imports are positively related to income and negatively related to import prices.

The logarithmic form of this equation was also tested:

$$\ell nM = -3.1676 + 1.6278\ \ell n\ Y - 0.0889\ \ell n\ PM$$
$$(-6.6780)(13.3251) \qquad (-1.6483)$$

$$D.W. = 1.6106 \qquad R^2 = 0.9580$$

The real income coefficient remained highly significant but the import price coefficient was not significant even at the 10% level. Nor did the log linear form of the import demand equation improve the fit though a large proportion of the variation in M is still "explained".

The relationship suggested by the regressions is clearly issustrated in Figure 1. However, after 1967 the positive relationship between income and imports is far more evident. In 1973, for example, increasing income appears to have offset rising import prices. This is in contrast to the period ten years before when imports rose very slightly with higher import prices, despite the sharp increase in income. This may indicate an element of rising expectations and, as a result, an increasing propensity to import.

Absorption Approach

The absorption approach suggests that income, the distribution of income, real money balances and the existence of money illusion will all affect the balance of payments. We think the assumption of money illusion for the period covered (1966 to 1977) highly unlikely and have therefore not tested this aspect. Since the theory focuses on the explanation of the trade balance the following equations take the balance on goods and services as the dependent variable. Unfortunately, only sporadic profit data is available so we were unable to include a profit variable.

$$D = 137.965 - 1.0792\, w/y - 1.2403\, Y + 1.4297\, MBP \qquad R^2 = 0.7878$$
$$(-1.2532) \quad (-5.0278) \quad (2.4287)$$

where D is balance on goods and services

w/y is ratio of real wage to real GDP;

Y is real GDP

MBP is measure of real money balances, i.e., currency in circulation and savings deflated by retail prices.

These two variables were chosen to represent real money balances since the Barbadian public tends to use savings deposits both for precautionary and transaction reasons. It is therefore postulated that they are the most likely measures, in the Barbadian context, of a desired money stock.

The signs on all the variables are as expected: the deficits on goods and services is an increasing function of real income and of the increase in wages relative to total income, and a decreasing function of real money balances. However, though Y is significant at the one percent level, MBP is just significant at the five percent level and W/Y is not significant. Interpretation of this equation is very suspect since some degree of muti-collinearity between Y and MBP is expected so that the estimates of coefficients are likely to be imprecise.

As indicated by the regression results the trend in the balance on goods and services closely follows that in Y (this can be seen in Figure 2). However, the relationship between W/Y and the deficit if less clear: between 1968 and 1974 a decreasing ratio of wages to real income is associated with an irregularly deterioting balance. The 1976 pay agreements are reflected in an upturn in W/Y and there is also a sharp deterioration in the balance.

However, not even a tentative conclusion can be drawn from this: not only was 1976 a year of falling sugar prices but a further note of caution has to be sounded. The figure indicates a fall in real income in 1976 which appears to result from the dubious use of the retail price index as a GDP deflator. (Marshall 10 indicated an increase in real income for 1976 and this may account for the deterioration in the external balance).

Monetary Approach

The monetary approach to the balance of payments indicates that reserve accumulation is negatively related to the rate of expansion of domestic credit, positively correlated with the rate of growth of real income (which generates an increase in the demand for real money balances), and positively related to the increase in the domestic price level. The use of import prices does not affect the analysis because of the relationship which exists between domestic prices and import prices. (See Francis, G.; "Price trends in Barbados 1958-1973", Central Bank of Barbados Quarterly Report Vol. 2 No. 4 December 1975.) As indicated, the monetary approach stresses changes in reserve levels, however, since these were heavily influenced by official financing transactions in one year, it appears unlikely that these changes would accurately reflect the decision variables explicit in the theory. The balance for official financing is therefore taken as the dependent variable in the following estimates for 1966 to 1977 (this is equal to the changes in international reserves except in 1977):

$$BF = 22.5454 - 0.3755\,\Delta Y - 0.3740\,\Delta PM - 0.5661\,\Delta CC \qquad R^2 = 0.3970$$
$$(1.6843)\ (-0.7338)\quad (-1.0415)\quad (-1.2532)$$

BF is balance for official financing.
ΔY is the change in real income
ΔPM is the change in import prices
ΔCC is the change in commercial bank credit

It was necessary to use commercial bank credit rather than total domestic credit (which is more relevant to the monetary approach) since there is insufficient annual data for domestic credit and, as mentioned earlier, little or no quarterly data are available for the balance of payments and income. Not only is R^2 of this equation extremely low but all the explanatory variables are insignificant

Figure 3 plots the variables estimated in the above equation. During most of the period increases in credit do appear to have had a roughly adverse effect on the external balance although some exceptions should be noted. Although credit in 1975 expanded faster than in the previous year, the external balance improved as this was the year of record sugar earnings from higher world prices. In 1970 although credit expansion was slower compared to the previous year, the deficit continued to widen but by 1971 there was some improvement. The 1977 increase in credit expansion together with the improvement in the balance is accounted for by the restrictions on imports and credit to the distribution and personal sectors. The relationship between changes in income and the balance on goods and services is also as expected except for 1976 (explained above) and 1977, the year restrictions were introduced.

Fiscal Approach

Since the fiscal approach largely attributes deteriorations in the balance of payments to the fiscal deficits (FD), this is the sole explanatory variable used in this equation. We have used the deficits for the fiscal years 1964/65 to 1977/78 to correspond with balances from 1964 to 1977.

$$BF = 2.5795 + 0.2117\ FD \qquad R^2 = 0.1609$$
$$(0.4823)\ (1.5167)$$

Using the overall balance FD is insignificant and R^2 indicates an extremely poor fit. However, use of the balance on goods and services produces more significant results.

$$D = -56.7864 + 1.0167\ FD \qquad R^2 = 0.6394$$
$$(-6.7247)\ (4.6127)$$

Although FD is now significant at the one percent level, R^2 continues to indicate a poor fit of the regression line. This could imply that although the fiscal deficit affects the trade balance it is insufficient on its own to account for variations in balance of payments performance. Deficits in the Government account appear positively correlated with deficits on the external account (goods and services) for most years after 1958, the last year of surplus in the Government budget (See Figure 4).

Much of the balance of payments debate in Barbados has centred around the relative roles of prices, wages and credit in balance of payments adjustment. Participants variously argue that increased wages (assuming that the marginal propensity to consume out of wage income is higher than out of profit income).

and credit can be expected to generate a deterioration in the balance on goods and services.

The following equations examine this discussion:

$$D = 66.9668 - 0.3531\,PM + 0.0663\,PX - 0.1796\,CC - 0.7331\,W \qquad R^2 = 0.8560$$
$$(1.2794)\ (-4.0894)\ (0.5090)\ (-0.3058)\ (-1.5670)$$

where PX is export prices;

W is real wages.

The only significant variable is import prices (at the one percent level). The effect of changes in the explanatory variables were also tested:

$$D = -65.3121 + 0.1947\Delta PX - 1.4038\Delta PM - 0.539\Delta CC + 0.2742\Delta W \qquad R^2 = 0.7835$$
$$(-5.6660)\ (1.8631)\ (-3.4823)\ (-1.2124)\ (0.4967)$$

Again, the only significant variable is the price of imports, at the five percent level in this case. These equations provide little indication of the relative importance to be attached to alternative theories, the significance of import price indicating only the extent to which our balance of payments performance is dominated by external forces. However, it should be recognised that the relevant indicator for the impact of credit should be total domestic credit, rather than commercial bank credit, and that the wage index is based on severely limited information.

Summary and Conclusions

Successive approaches to the balance of payments by extending the scope of the analysis from partial equilibrium concepts represent the increasing sophistication of economic theory. The classical theory was superceded by the elasticities approach to external payments analysis; this in turn gave way to the absorption theory which later incorporated the salient features of the 'sophisticated elasticities' approach. The monetary approach to the balance of payments dispensed with the behavioural assumptions of the elasticities and absorption approaches. Balance of payments adjustment was seen as a stock rather than a flow problem which brought the analysis back to the classical theory. The most recent development, the fiscal approach, departs from the monetary approach by identifying credit to government rather than total domestic credit as the factor influencing the balance of payments.

This paper was a preliminary attempt to investigate the balance of payments adjustment; further empirical research is indicated. This should incorporate improved data estimates as well as an attempt to formulate proxies for presently unavailable date, and behavioural hypotheses based on sectoral and economy-wide studies.

The statistical tests of factors affecting the balance of payments of Barbados do not give firm support to any of the theories discussed, nor do they indicate which variables, apart from import prices, are appropriate instruments of balance of payments adjustments. This may be due in part to the small number of observations and in part to the quality of some of the data.

At best, the results may be taken to suggest that the policymaker cannot rely entirely on any single theory to inform the choice of balance of payments adjustment instruments. Rather, an eclectic approach based on sound judgement and knowledge of the peculiarities of the economy is needed.

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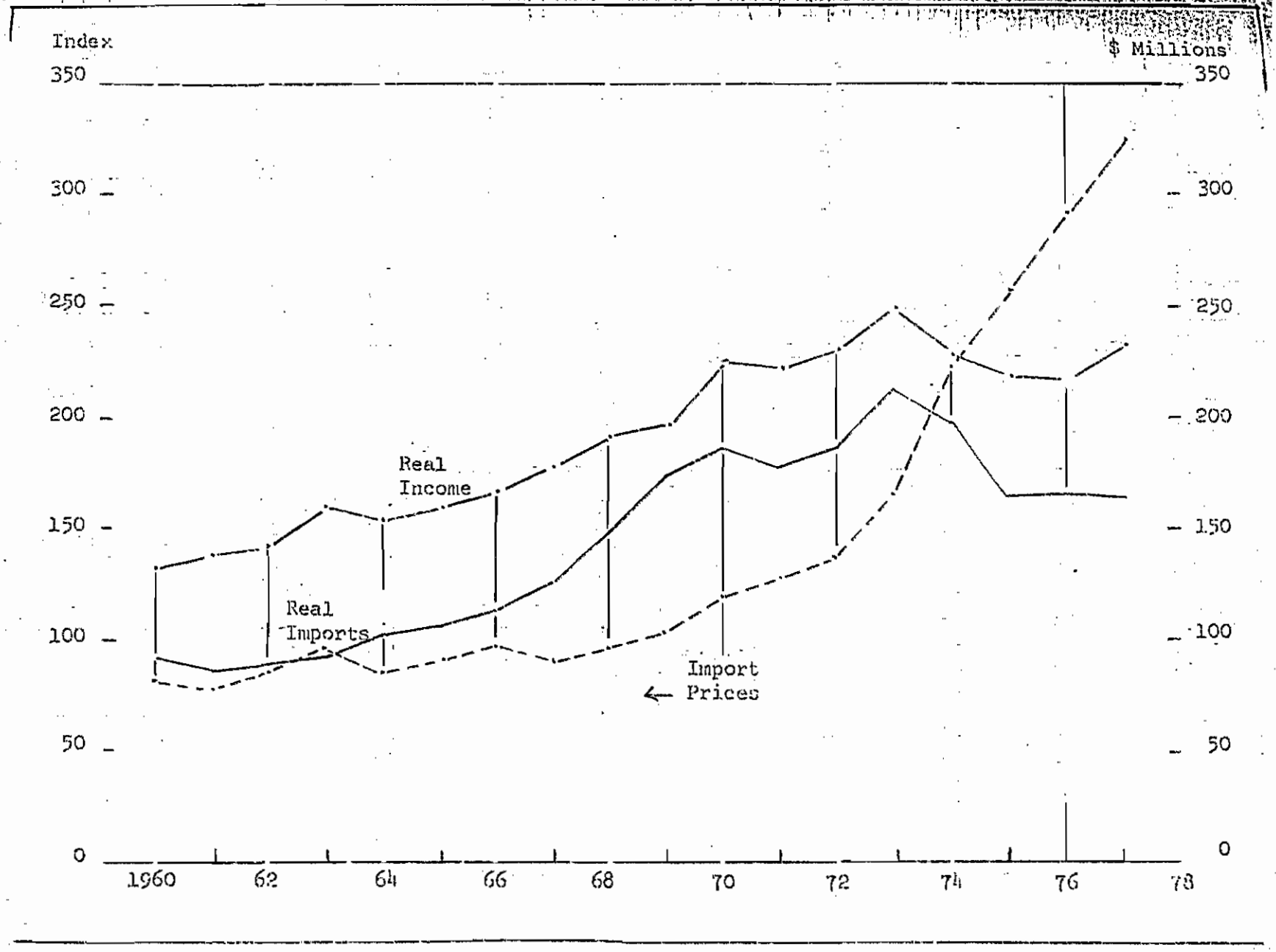
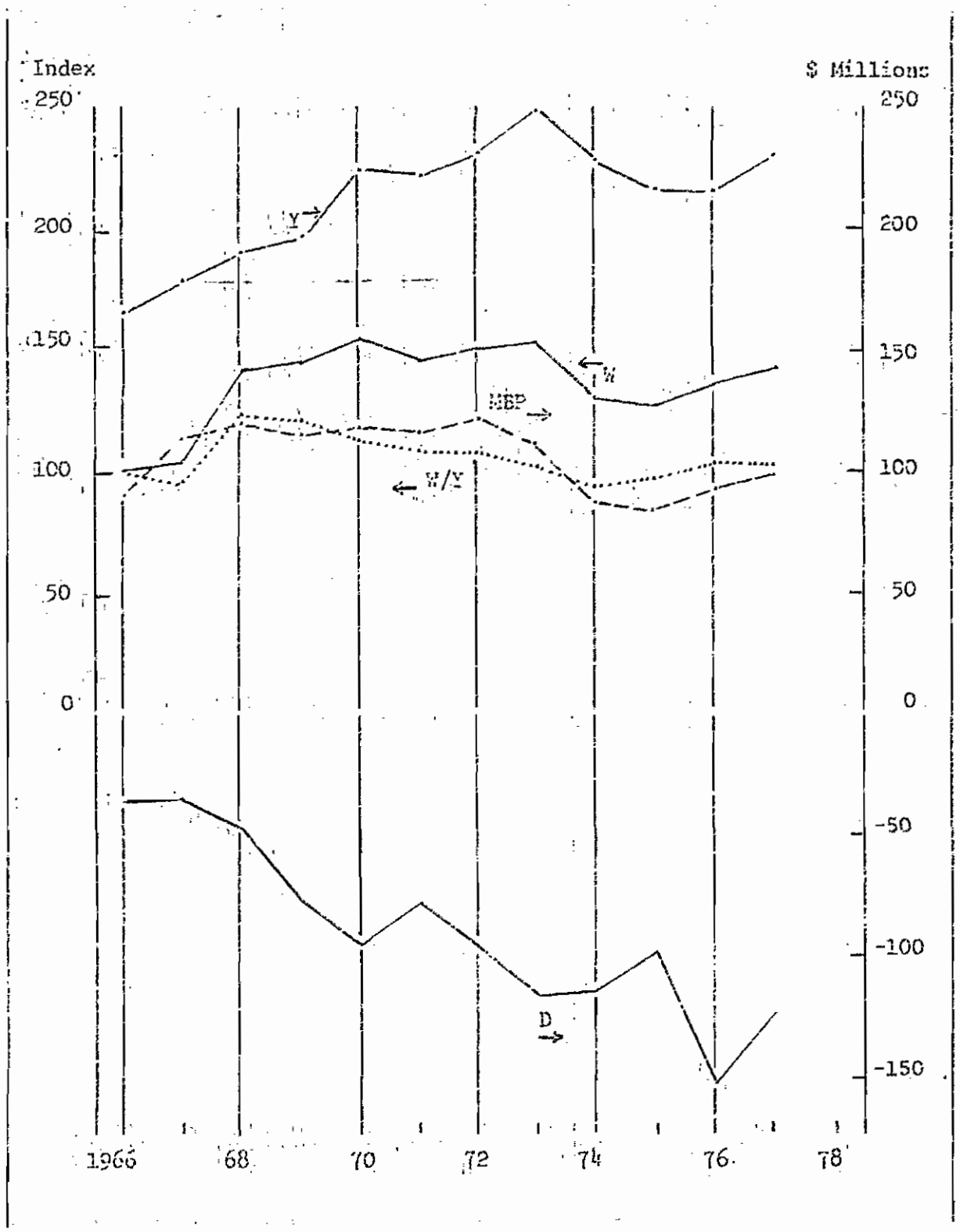
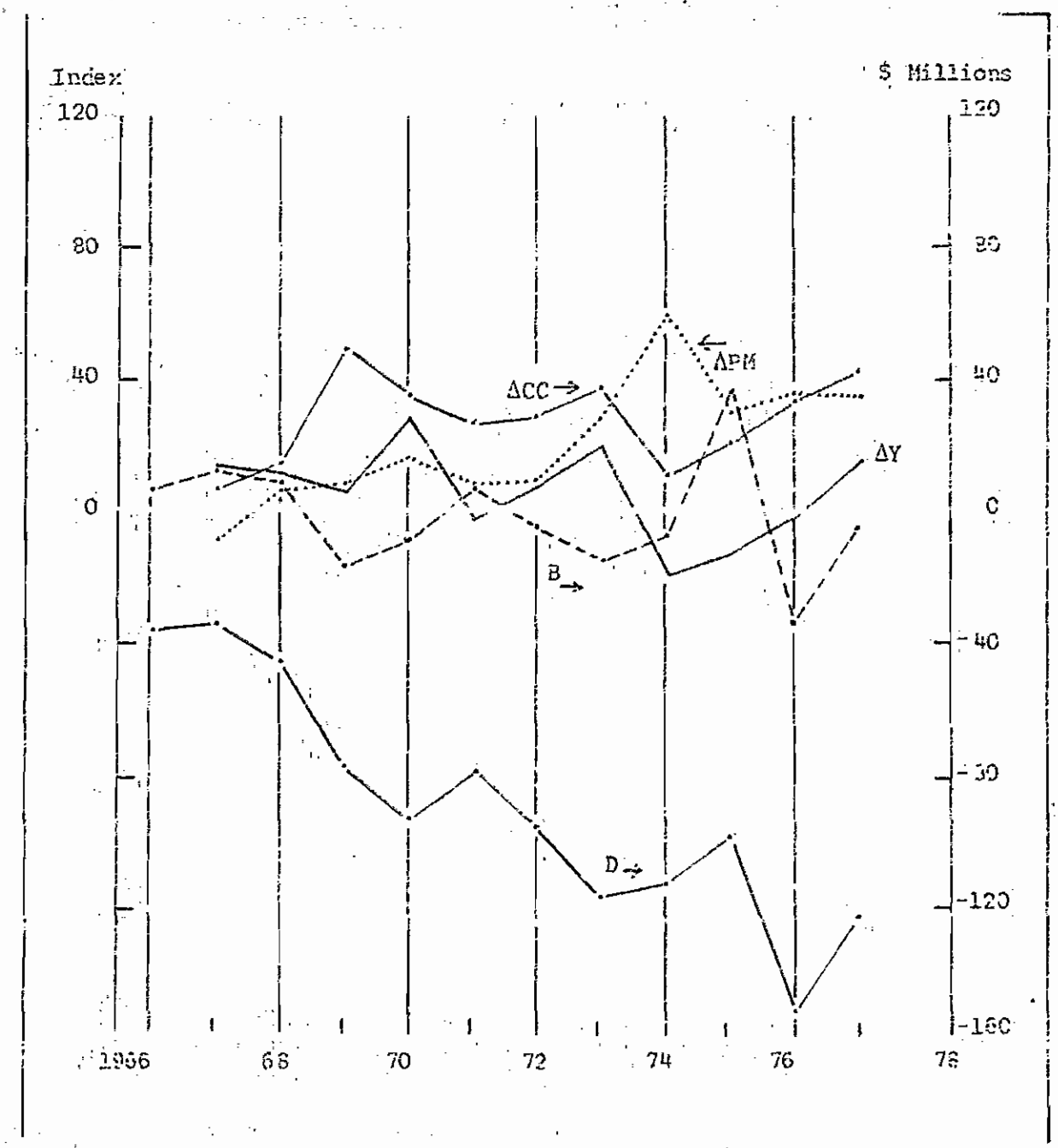

Index
$ Millions
350
300
250
200
150
100
50
0
Real
Income
Real
Imports
Import
Prices
1960
62
64
66
68
70
72
74
76
78

FIGURE 2



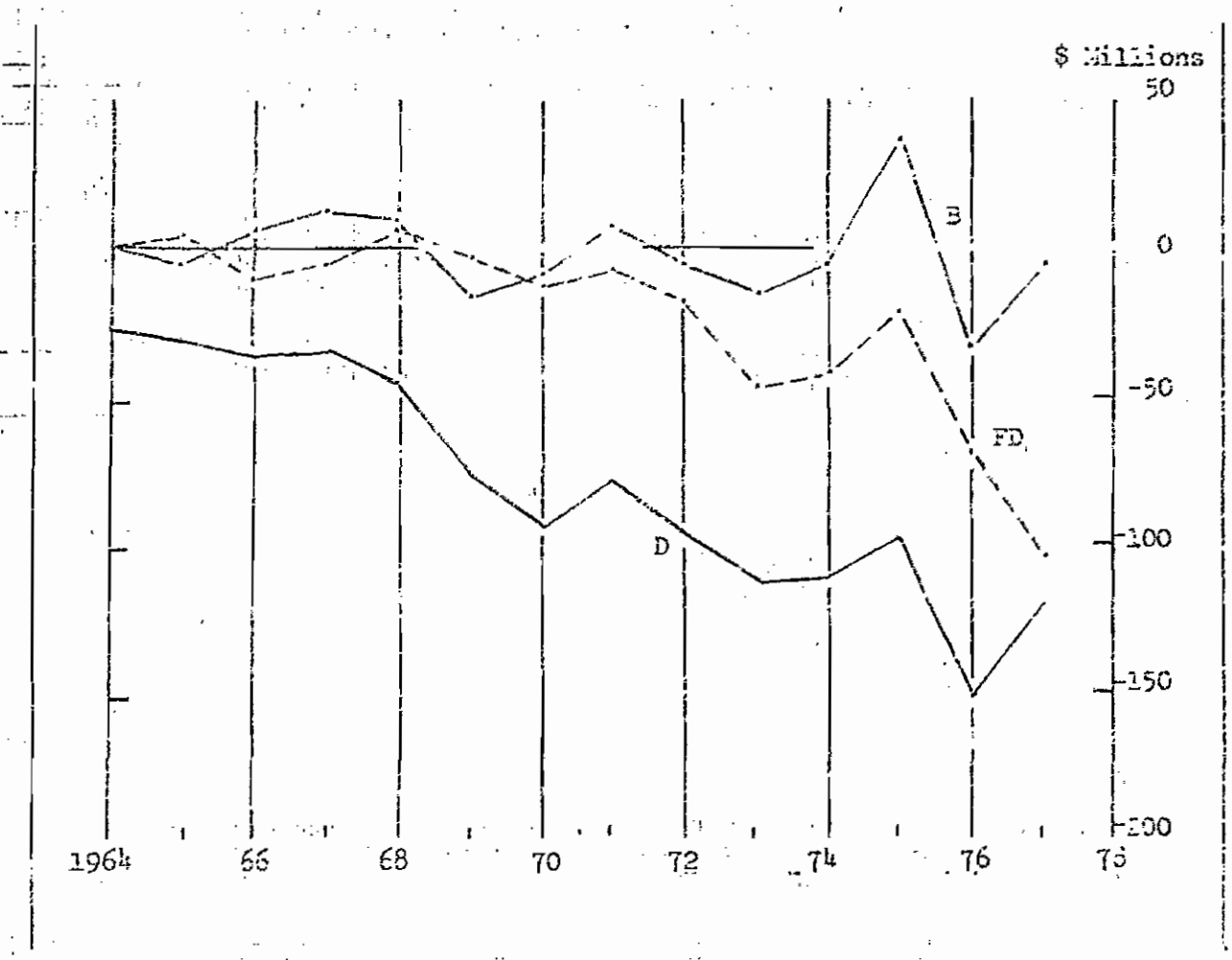
D = Balance on goods and services
Y = Real Income
W = Real Wage
MBP = Real Money Balances
W/Y = Index of wage/income

FIGURE 3



BF = Balance for official financing
ΔPM = Change in Index of Import Prices
ΔY = Change in Real Income
ΔCC = Change in Commercial Bank Credit
D = Balance on Goods and Services

FIGURE 4



D = Balance on goods and services
BF = Balance for official financing
FD = Fiscal Deficit