

"Finance, Growth and the Balance of Trade in the OECS," by Arnold McIntyre
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INTRODUCTION

The model-building approach to economic analysis is still relatively underdeveloped in the Caribbean and in the case of the O.E.C.S.¹ economies no previous attempt at modelling these economies was found.² However, there have been models of short-run economic behaviour developed for the larger English-speaking Caribbean islands of Jamaica, Guyana, Barbados and Trinidad which proved to be useful. In particular, the work of Bourne (1974); Bourne (1975); St. Cyr (1979); Worrell (1984) and Worrell and Holder (1984) helped to inform the analysis. In addition, the theoretical constructs of the model were also informed by models of short-run economic behaviour in developing countries; notably, Aghevli and Khan (1978); Coats and Khatkhate (1978) and Aghevli and Khan (1980).

The main purpose of this analysis is to formulate a relatively simply macroeconomic model that is relevant to the O.E.C.S. countries. Specifically, the model attempts to analyse the inter-relationships between merchandise trade, the monetary sector and the real sector. The specific emphasis on merchandise

trade rather than the balance of payments is due to two factors: First, the balance on merchandise trade is probably the most important component of the balance of payments and given the trade dependent nature of these economies it is directly related to the real sector. Second, there exists no consistent series of data on the balance of payments for the period 1972-82. In addition, it was not possible to look at the total balance of trade given the absence of data on invisible trade.

The model attempts to specify at a high level of aggregation the structure of O.E.C.S. economies. It is hoped by analysing the structure of these economies that the inter-relationship between merchandise trade, the monetary sector and the real sector can be illustrated. In addition, a casual investigation of these economies may lead one to believe 'a priori' that an aggregative income - determined Keynesian model is most appropriate in describing short-run macroeconomic behaviour. The model does not make this assumption but instead tests its validity. In addition the model seeks to examine the impact of monetary variables on price, expenditure and foreign trade.

First, we will outline the structure and characteristics of the O.E.C.S. economies. Second, we will review the recent

trends in the economic performance of these countries. Third, a relatively simple aggregative model of finance, growth and the balance-of-trade will be formulated. In addition, the behavioral equations will be estimated by the ordinary least squares (ols) technique and the results will be presented. Finally, a discussion of the policy implications of the model will be undertaken and some policy prescriptions will be suggested.

2. STRUCTURE AND CHARACTERISTICS OF THE O.C.E.S. ECONOMIES

The seven (7) small islands of the Organization of Eastern Caribbean States (OECS) variously described as "micro-states" or "mini-states" are said to be highly vulnerable to external events. Their very small geographic and demographic size further exacerbates their vulnerability. The land area of the islands ranges from 102.3 square kilometres in Montserrat to 787.4 square kilometres in Dominica, while the size of the population varies from 12,000 in Montserrat to 134,400 in St. Vincent in 1984. Population growth in all of these islands has been hindered by migration to the U.S.A., Canada and to a lesser extent the U.K. In addition, there has also been substantial migration to the larger English-speaking Caribbean islands for example, the migration of Grenadians and Vincentians to Trinidad. In addition

to affecting the growth of the population migration has also affected the development potential of the O.E.C.S. states. Many highly skilled individuals upon completion of their training in tertiary institutions migrate to metropolitan or larger Caribbean territories in search of job opportunities. This has seriously constrained the growth of high level manpower and reinforces the need for foreign expertise.

As former colonies of various metropolitan countries, the O.E.C.S. economies were developed to produce a particular export staple most notably sugar or bananas. Their economies evolved as appendages of the metropolitan countries. Patterns of specialization in production were imposed upon them which were in accordance with metropolitan interests rather than their own. This has led to the highly skewed nature of production and the development of 'staple' economies. It is for this reason that these islands produce one or two primary products essentially for export for example bananas, sugar, cocoa and nutmeg.

The nature of external economic relations has not changed substantially in the independence era. The O.E.C.S. countries continue to depend heavily on the metropolitan countries to maintain and increase their internal levels of output, employment and income. The character of their dependence on the metropolitan

economies is perhaps most clearly manifested in the area of foreign trade. On the one hand, they are dependent on the export of one of two primary products some of which are accorded preferential treatment in metropolitan markets for example, sugar. This is accompanied by their heavy dependence on imports. For not only capital and intermediate goods but also for the most basic consumer goods including food. As a result these islands are highly 'open' economies with trade bring the engine of growth. The data in Table 1 is indicative of the highly open nature of these economies. In the period 1970-82 exports were 35 per cent of Gross Domestic Product (GDP). The highly open nature of these economies generates a substantial demand for imports to satisfy domestic demand for goods and services. It is interesting to note that in the 1980s imports were consistently over 100 per cent of GDP.² This dependence on imports implies that these countries must export to finance their vital imports of 'wage' and 'investment' goods. In addition, it appears that the balance of trade or the current account of the balance of payments is a reasonable indicator of the economic performance of these economies.

In the O.E.C.S. countries the small domestic market of 56,000 to 100,000 consumers makes a lot of economic activity

unprofitable and as such not viable. This reinforces the need to export. In addition, the smaller physical size of these islands intensifies their vulnerability to natural disasters such as hurricanes and volcanoes. Furthermore, the limited range of natural resources and more importantly the small size of skilled manpower implies that their development options are narrowly circumscribed. It almost forces one to believe that the smaller a country's size the narrower are its development options. These factors continue to be a feature of these economies and are impediments to the process of growth and transformation.

Finally, an important economic characteristic to be identified is the heavy dependence of the O.E.C.S. economies on external financial support. Public sector investment is financed almost entirely from foreign resources. The World Bank's estimated that in 1978 over 80 per cent of public sector investment in the O.E.C.S. was financed from official foreign sources in the form of grants or highly concessionary loan.³ Lestrade (1981) commenting on this heavy dependence on external financial resources argues that:

This is a result of very low public and private sector savings stemming from a generally low capability for efficient public sector economic management, and a lack of dynamism in the private sector.

3. RECENT TRENDS IN ECONOMIC PERFORMANCE

It is difficult to paint a picture of increasing prosperity for the O.E.C.S. countries in the period 1970-82. The salient features of the economic performance of these countries have essentially been characterised by decline. Generally, their growth performance was not strong. Economic growth measured by the annual rate of growth of GDP (constant prices) was volatile among the O.E.C.S. countries with some economies experiencing high rates of negative growth and followed immediately by high rates of negative growth. In Table 1, we attempt to measure the variability in economic growth. The coefficient of variation measure provides results which strongly indicate that economic growth was extremely volatile in the period. Hence, the volatile nature of the process of economic growth was a feature of the economic performance of these countries between 1970-82.

The structure of production in the O.E.C.S. economies has traditionally been almost exclusively dominated by the agricultural sector particularly the production of one or two

primary products for exports, for example bananas, sugar and nutmegs. However, during recent times there has been some change in the structure of production with the emergence of simple manufacturing and tourism. Both of the new sectors have a high import content with non-labour inputs not being produced domestically.

The performance of the agricultural sector was not strong in most of the countries but there was some improvement in the period. In fact, nominal agricultural GDP grew from EC\$60.0 million in 1970 to EC\$167.3 million in 1979 and then to EC\$200.5 million in 1982.⁴

The policy efforts to encourage manufacturing were rewarded by the substantial growth in nominal manufacturing GDP throughout the period. Manufacturing GDP increased from EC\$14.7 million in 1970 to EC\$45.1 million in 1977 and then to EC\$114.9 million in 1982.⁵

The growth in the tourist industry was another positive feature of these countries economic performance. Data is not available on tourist expenditures. However, the growth of this sector can be illustrated with the use of statistics on the number of visitor arrivals. In the period Antigua, Saint Lucia

and Grenada accounted for a large proportion of the visitors to the O.E.C.S. sub-region. The number of visitor arrivals in Antigua and Saint Lucia increased from 72,328 and 42,399 in 1972 to 209,112 and 70,674 respectively in 1981. In Grenada, the number of visitor arrivals decreased from 132,993 in 1972 to 25,072 in 1981.⁶

The period 1970-82 did not register favourable improvements in the area of trade for the O.E.C.S. states. The most outstanding feature of the period was the continuous widening in the visible trade deficit. The O.E.C.S. merchandise deficit increased from EC\$-190.2 million in 1970 to EC\$-856.6 million in 1982.⁷ All of the O.E.C.S. states experienced a deficit in merchandise trade for the entire period. Antigua and Saint Lucia were the two countries with the highest levels of foreign trade. The deficit in Antigua rose from EC\$-85.2 million in 1975 to EC\$-277.5 million in 1982. In Saint Lucia the deficit increased from EC\$-45.9 million in 1970 to EC\$-66.0 million in 1975 to EC\$-206.4 million in 1982.⁸

In the post-independence period most O.E.C.S. governments decided that the public sector should attempt to improve the welfare of their populations and provide the impetus for growth and development.⁹ This gave rise to a substantial increase in

public expenditure both in terms of current and capital spending. This increased expenditure was not accompanied by increases in government revenue resulting in the creation of fiscal deficits. All of the O.E.C.S. countries with the possible exception of Montserrat experienced fiscal deficits in the period 1970-80. In Antigua, in the sub-period 1970-75 there was a surplus of EC\$1.8 million and that dramatically changed to a fiscal deficit of EC\$65.8 million in the sub-period 1976-80. Dominica experienced fiscal deficits in both sub-periods but it declined by 36.5 per cent between 1970-75 and 1976-80.¹⁰

Finally, the O.E.C.S. states, like the rest of the world, experienced very high levels of inflation in the 1970's with phenomenally high rates of inflation occurring after the 'oil crisis' of 1973-74. The rate of inflation increased in all of the countries in the period. In Antigua inflation grew from 8.3 per cent in 1971 to 12.3 per cent in 1975 and then declined marginally to 11.5 per cent in 1981. In Saint Lucia, inflation increased from 8.4 per cent in 1971 to 17.7 per cent in 1974 declining slightly to 17.1 per cent in 1981.¹¹ Hence, inflation continues to be a problem facing these economies.

4. MODEL OF FINANCE, GROWTH AND THE BALANCE OF TRADE

Before attempting to formulate a simple aggregate macro-economic model of the O.E.C.S. economies. It is useful to analyse the money supply process in the O.E.C.S. area.

4.1 Money supply process in the O.E.C.S. area

In the framework of an open economy, the money supply is dependent not only on the net foreign assets of the banking system but also on the domestic credit expansion of the banking system. Thus:

$$1. \quad M \equiv NFA + DC$$

where:

NFA = Net foreign assets

DC = Domestic credit of the banking system

M = Money supply

However,

$$2. \quad B = \Delta R$$

where:

B = Balance of payments surplus or deficit

R = Foreign reserves (net)

Hence,

$$\begin{aligned} 3. \quad \Delta M &= \Delta R + \Delta DC \\ &= B + \Delta DC \end{aligned}$$

Equation (3) suggests that money supply expansion depends not only on the balance of payments but also on domestic credit expansion which is an important feature of the adjustment process in the E.C.C.B. area.

The relationship between the balance of payments and domestic monetary developments is also evident in examining the balance sheet of the E.C.C.B.

$$4. \quad MB = NFA + DCCB$$

where:

MB = Monetary base

NFA = Net foreign assets of the Central Bank

DCCB = Net domestic credit of the Central Bank

Alternatively

$$DCCB = CCB + CCG$$

Hence,

$$5. \quad MB = NFA + CCB + CCG$$

Where:

CCB = Net claims on Commercial Bank

CCG = Net claims on Government.

Equation (5) is really the "sources" of the monetary base and movements in this can be precipitated by any of the three asset components.

In Table 2 we present the summary accounts of the ECCA/ECCB which we observe the "sources" of the monetary base.

Now, the money-multiplier framework relates the monetary base to the money supply; thus:

$$6. \quad M = mMB$$

where:

m = money - multiplier.

Hence, any change in the "sources" of the monetary base will shift the base and this will induce changes in the money supply.

In many developing countries with large fiscal deficits, public sector indebtedness to Central Bank's dominates movements in the monetary base and consequently in the money supply. Given the peculiar nature of monetary arrangements in the Eastern Caribbean Central Bank (ECCB) area¹² it is important to state explicitly the mechanisms for the financing of budgetary deficits. In the ECCB area the fiscal deficits of member states are financed only in a small way by Central Bank credit to the government. Bilateral and multilateral aid flows are the principal sources of deficit finance. Next in order of quantitative importance are loans from the commercial banks. For example, in Saint Lucia in 1975, the financing of public sector

deficits was as follows: EC\$10.3 million from capital grants; EC\$2.7 million from foreign borrowing and EC\$1.5 million from net ECCA borrowing. In 1980 the deficit was financed by EC\$29.1 million from banks and foreign borrowing and EC\$1.8 million from net ECCA borrowing.¹³

Consequently, in the O.E.C.S. countries movements in the monetary base are not likely to be primarily due to changes in Central Bank credit to the governments, thus, changes in the net foreign assets of the Central Bank are largely responsible for shifts in the monetary base.

In recent times the commercial banks have been playing an increasingly important role in providing credit to the governments. In fact, commercial bank credit to the public sector increased from EC\$3.7 million in 1975 to EC\$280.0 million in 1982.¹⁴ Hence, there has been a substantial growth in public sector use of commercial bank credit. However, in the context of the money-multiplier framework the principal "source" of monetary base movements has been the net foreign assets of the ECCB. The data in Table 2 is indicative of this when we look at the "sources" of the monetary base.

Having looked at the money supply process in the O.E.C.S. area through the lenses of the money-multiplier framework we can now formulate our simple macroeconomic model in which the money supply has an important role.

4.2 The Model

Our simple model is designed to capture the short-run relationship between the excess demand (or supply) of money and key economic variables. Specifically the model attempts to analyse the relationship between the monetary variables and the domestic demand for goods which induces changes in the foreign trade sector. In addition, it examines the relationship between the monetary variables and the domestic price level and the effects of relative price changes on foreign trade.

In the estimation of the behavioral equations in the model, two sets of results are presented: First, the results obtained from aggregation, the individual country data, that is, treating the O.E.C.S. as the unit of analysis. Second, the results from pooling the annual data for each country that is, pooled time-series, and cross-section data. (See Appendix I).

4.2 (a) Import demand

In most models of developing countries that involve trade the demand functions for imports is of the following general functional form:

$$M_{if} = F^{it} \left\{ Y_t, P_{if}, \text{-----}, Z_{it}, U_{it} \right\}$$

Where: M_{it} : is import demand for the
 i^{th} commodity in year 't'

F^{it} : is the function whose mathematical form is to
be specified

Y_t : is a measure of real gross national income
or some other activity variable

P_{it} : is the relative price of the i^{th} commodity

Z_{it} : indicates other explanatory variables

U_{it} : is a disturbance term.

Joefield-Napier (1982) estimated this general functional form
in a study of the demand for imports in Barbados 1954-70.

The data on import spending indicates that in all of the
O.E.C.S. countries 70 per cent or more of domestic expenditure
is on imports. Hence, we can postulate that the demand for
imports is positively related to the level of domestic
expenditure.¹⁵ In addition, import demand can be argued to be
negatively related to relative prices (i.p. import price/domestic
price level): Hence:

$$(4.21) \quad IM^d = f(Z, P1)$$

$$F'Z > 0; F'P1 < 0.$$

Where:

IM = Value of imports

Z = Nominal expenditure

P1 = Import price/domestic price level.

4.2 (b) Export supply

A lot of the research that has been done by Caribbean economists on exports has been related to the notion of export-led growth. Best and Levitt (1968); Demas (1972) and Farrell (1982) have all attempted to examine the role of exports in the process of growth and to highlight its vital importance in economic transformation. Some macroeconomic models of developing countries, for example, Aghevli and Khan (1980) have included exports and specifically export supply. Most models developed in the Caribbean, Worrell (1981) and Worrel (1984) have tended to incorporate the tradable/non-tradable dichotomy. We have attempted to estimate the supply of exports rather than looking at tradables and non-tradables.¹⁶

The dollar price of exports can be said to be determined exogenously in the world market. This follows from the fact that the O.E.C.S. countries are very small producers and are not in a position to influence price. Thus, the flow of exports is determined by supply conditions in the export sector. This

assumption of exogenous export prices is generally valid for most developing countries.

It can be argued that the supply of exports¹⁷ will be a positive function of the level of output in the economy, i.e. GDP. However, the composition of domestic exports in the O.E.C.S. are largely primary agricultural commodities. Hence, it is more appropriate to use nominal agricultural output as our activity variable. In addition, we can argue that export supply will be positively related to relative prices; i.e. price of exports/domestic price level. Hence:

$$(4.22) \quad ES = F(Q_A, P_2)$$

$$F'_{Q_A} > 0, \quad F'_{P_2} > 0$$

Where:

ES = Export supply

Q_A = Nominal agricultural output

P_2 = Price of exports/domestic price level.

4.2 (c) Money demand

Coats and Khatkhate (1980) argue that the demand-for-money functions that have been estimated in the developing countries are basically the same as those employed in the developed countries with adjustment for peculiar institutional features or

or data limitations in a specific country. This is consistent with the research that has been done in the Caribbean to date. The early work done on money demand was cast in terms of analysing the relative applicability of the Keynesian and Quantity Theory formulations of the demand for money function.

One can isolate three attempts by Caribbean scholars to fill this void in monetary research - Bourne (1974); Maclean (1982) and St.Cyr (1979). A common feature of these studies is that they cast money in terms of financial assets and liabilities. St.Cyr also defines money as currency plus demand deposits (narrow money) and estimates a similar function.

We propose a functional form similar to those in wide use in the developed countries but make adjustments for institutional factors and data limitations.

A problem arises in choosing between output or real income as the basic scale variable. Now, real gross domestic product is the best measure of real income but not necessarily the best proxy for expenditure if expenditure is our scale variable. Maclean (1982) argues that in a small, open economy for example Barbados, income should not be used as a proxy for transactions due to the high proportion of import expenditure

in total expenditure. Hence, an alternative proxy is the sum of income and imports which he calls the 'augmented transactions proxy'.

It is difficult to accept Maclean's 'augmented transaction proxy' since a larger proportion of imports are intermediate and capital goods which are used in domestic production so that we can suspect collinearity between GDP and imports. In addition, we can argue that in Caribbean economies a large proportion of GDP is composed of exports and hence a lot of import spending on intermediate and capital goods is really for the production of exports. So that both exports and imports should have been included and as such it is more appropriate to use Gross National Product (GNP) as our basic scale variable. However, the data limitations of the O.E.C.S. countries necessitated the use of GDP as our proxy of income.¹⁸

The role of the interest rate in the demand for money functions depends on our definition of money. If we define money as currency in circulation and demand deposits (M1) the rate of interest is a measure of the opportunity cost of holding money. However, if we use the definition of broad money (M2) which includes time and savings deposits, then we have to use the rate of interest on other financial assets as the rate of

interest on commercial bank deposits is now our 'own rate of return' on money. We could use the rate of interest on government securities as a measure of the opportunity cost of holding money but individuals and firms in the O.E.C.S. do not tend to hold other financial assets. Another alternative we could use is the rate of return on corporate equity but the data is just not available in the O.E.C.S. area.

Laidler(1983) argues that most studies of the demand for money in the long run is a demand for real money balances. The studies accept the notion that the demand for nominal money is proportional to the general price level. Maclean (1982) challenges the linear homogeneity postulate in the context of a small, open economy and formulates a demand function for nominal money balances. We estimate a demand for nominal money function for both narrow and broad money. We then estimate the demand for real money balances since we find that the price elasticity of the demand for money is biased towards 1.

If we use the broad definition of money (M2) then we can use the rate of inflation as a measure of the opportunity cost of holding money. Given the limited range of financial assets in the O.E.C.S. we can argue that durable goods, inventories and consumer goods are the most important alternatives to holding money in the O.E.C.S. countries.

In using the price index there are some difficulties in converting it into an appropriate measure of expected inflation. Individuals willingness to hold fixed assets i.e., the prices they are willing to pay for them will reflect the change in their real value (the rate of inflation) expected over the period of their maturity. This cannot be argued in the case of money which is a sight asset i.e., it has no holding period (with the possible exception of some time and savings deposits). This implies that the rate of inflation that is appropriate for the demand for money is that which individuals believe to be under way currently.

We have to construct a proxy for expectations. Coats and Khatkhate(1980) argue that the "most common approach has been that expectations are formed adaptively". In addition, one can use the actual rate of inflation in the previous period assuming that expectations are static, or the current rate of inflation assuming that it is an unbiased reflection of rationally formed expectations. In our formulation we use the actual rate of inflation since our evidence indicates that expectations are static.

Money demand function (1972-82)

$$(4.23) M^d = -563.3966 + 6.9845P + 0.4878 Y/P + 31.3452 WRTSD$$

(-4.278) (19.63) (4.19) (2.16)

$$R^{-2} = 0.98 \quad P.W. = 2.97 \quad n = 11$$

$$S.E. = 35.48463 \quad \bar{M} = 582.5 \quad F = 164.815$$

Where:

M = Nominal money balances (M2)

P = Domestic price level

Y/P = Real GDP proxy for real income

WRTSD = Weighted average rate of interest on time, savings and demand deposits.

We then estimated the log-linear function:

$$(4.24) \text{LOG } M^d = 2.0055 + 1.0985 \text{ LOG } P + 0.6333 \text{ LOG } Y/P + 0.1799 \text{ LOG } WRTSD$$

(3.131) (30.83) (6.84) (2.86)

Since our parameter estimates are in fact elasticities we find that our price elasticity of the demand for money is biased toward 1. Hence, we can accept the linear homogeneity postulate and estimate the demand for real money balances.

$$(4.25) \text{ LOG } (M/P)^d = 2.7495 + 0.5393 \text{ LOG } Y/P + 0.1379 \text{ LOG } \text{WRTSD}$$

(3.379) (5.66) (2.02)

$$\text{Rho } (1) = 0.01837$$

$$\text{Rho } (2) = 0.76652$$

$$R^{-2} = 0.73 \quad \text{D.W.} = 2.96 \quad n = 8$$

$$\text{S.E.} = 0.049709 \quad \frac{\bar{M}}{\bar{P}} = 6.3839 \quad F = 6.44$$

Finally, we estimated the demand for real money balances including the rate of inflation variable as a measure of the opportunity cost of holding money.

$$(4.26) \left(\frac{M}{P}\right)^d = 336.7480 + 0.3237 Y/P + 13.9711 \text{ WRTSD}$$

(2.40) (2.24) (1.331)

$$- 167.1891 \dot{P}_t$$

(-1.59)

$$\bar{R}^2 = 0.704 \quad \text{P.W.} = 1.303 \quad n = 11$$

$$\text{S.E.} = 30.11526 \quad \left(\frac{\bar{M}}{\bar{P}}\right) = 599.76 \quad F = 8.1148$$

Our estimated equations of the demand for money provide us with good empirical results. We get good overall fits as measured by our \bar{R}^2 and standard error (S.E.) of the regression. Our empirical results for the demand for real money balances is not as well established. We observe that the inclusion of the rate of inflation as a measure of the opportunity cost of holding money does not improve the explanatory power or fit of the regression and it is not significant at 5 per cent.¹⁹

4.2 (d) Expenditure

A typical model of monetary relationships in developing countries features a demand for money which is a function of income and/or a wealth variable, interest and/or prices. In a fixed exchange rate regime, the money supply is determined by the balance of payments and net advances by the Central Bank to commercial banks, the government and the public. When there is an imbalance between demand and supply this precipitates reactions which alter expenditures and relative prices which have an impact on output and the balance of payments. For a series of articles consistent with this framework see Coats and Khatkhate (1980).

Consistent with this approach, we argue that the interaction between the supply of and the demand for money is the key link in the chain of causation from money to expenditures and prices. In this vein we postulate that total domestic expenditure is positively related to nominal income and the excess supply of nominal money (M^2); hence:

$$Z = f[Y, (M^S - M^d)]$$

or,

$$(4.27) Z = f(Y, EM)$$

$$f'_Y > 0; f'_{EM} > 0$$

where:

$$EM = (M^S - M^d)$$

We can decompose total domestic expenditure into two parts; private expenditure and government expenditure. We can examine the influence of income and excess money on private expenditure and treat government expenditure as an exogenous variable; hence:

$$(4.28) \quad PE = f(Y, EM)$$

$$f' Y > 0; f' EM > 0$$

Now in estimating our functions for total expenditure and private expenditure we used nominal GDP as a proxy for nominal income due to the absence of national income statistics. In addition, in estimating the influence of excess money we calculated it as the difference between the historical values of the money supply (M2) and the fitted values of the demand for nominal money balances.²⁰

4.2 (e) Domestic price level

In the Caribbean economies it has been argued that changes in import prices provide the inflationary stimuli; for a sample of studies in this vein see Bourne (1972). It is argued that these economies import large quantities of consumer, intermediate and capital goods including food at an inflated price and they comprise a large proportion of the domestic supply of goods;

hence, imported inflation is a feature of Caribbean economies. Specifically, with respect to the O.E.C.S. countries Allen (1977) looked at the inflationary trend in these islands between 1970-75 and found little evidence to support the argument that monetary expansion has had significant influence on the inflationary process. Allen (1976) concludes that the evidence suggests that imported inflation was the important factor explaining domestic inflation. Finally St.Cyr (1979) examines the effect of money and import prices on the rate of inflation in Trinidad and Tobago (1964-76) and found them to be both significant explanatory variables.

In our model we argue that the price level is determined by two sets of factors—excess demand and cost-push factors; the latter being the level of import prices. We represent excess demand as the difference between the supply of money (M^s) and the demand for money balances; hence:

$$P = f(ED, CP)$$

Where:

P = Domestic price level

ED = Excess demand

CP = Cost-push factor

Now,

$$ED = M^s - M^d$$

By Substitution for M^d

$$(4.29) P = a_1 ED + a_2 PM$$

$$= b_1 M^S - b_2 Y/P - b_3 WRTSD + b_4 PM$$

Where:

PM = Level of import prices

WRSTD = Weighted average rate of interest on time,
savings and demand deposits.

4.2 (f) Empirical results

$$(4.21) IM = 1706.7251 + 0.4895 Z - 433.3644 P1$$

$$(0.515) \quad (3.205) \quad (-1.955)$$

$$R^{-2} = 0.9412 \quad \bar{IM} = 783.1$$

$$S.E. = 92.03078 \quad N = 9$$

$$D.W. = 2.16 \quad F = 33.034$$

$$\text{Rho (1)} = 1.2461 (0.50708)$$

$$\text{Rho (2)} = 0.3006 (0.55423)$$

$$(4.22) XS = 18.22834 + 1.6921 Q'_A + 11.6966 P2$$

$$(-0.212) \quad (6.772) \quad (0.211)$$

$$R^{-2} = 0.87 \quad \bar{XS} =$$

$$S.E. = 27.8652 \quad N = 9$$

$$D.W. = 2.16$$

$$\text{Rho (1)} = 0.8411 (0.36159)$$

$$\text{Rho (2)} = 0.82616 (0.41828)$$

$$(4.27) Z = 972.8196 + 0.2676Y + 1.9604EM$$

$$Z = (3.276) \quad (0.652) \quad (1.55)$$

$$R^{-2} = 0.5084$$

$$\bar{Z} = 1233.322$$

$$S.E. = 225.6857$$

$$N = 9$$

$$D.W. = 2.94$$

$$F = 3.068$$

$$\text{Rho (1)} = 1.05143 \quad (0.3831)$$

$$\text{Rho (2)} = 8-0.9091 \quad (0.4539)$$

$$(4.28) \quad PE = 979.7471 - 0.0913Y + 1.9362 EM$$

$$(3.008) \quad (-0.209) \quad (1.405)$$

$$R^{-2} = 0.217$$

$$\bar{PE} =$$

$$S.E. = 228.7897$$

$$N = 9$$

$$D.W. = 2.84$$

$$\text{Rho (1)} = 0.9633 \quad (0.4160)$$

$$\text{Rho (2)} = 0.7560 \quad (0.4965)$$

$$(4.29) P_t = 82.1999 + 0.1376M^S - 0.0689Y/P - 4.7386 \text{ WRTSD}$$

$$(2.965) \quad (2.75) \quad (-2.65) \quad (-1.98)$$

$$+ 0.0170 PM$$

$$(0.06)$$

$$\bar{R}^2 = 0.9696$$

$$\bar{P} = 96.318$$

$$S.E. = 5.43669$$

$$N = 11$$

$$D.W. = 3.04$$

$$F = 121.566$$

N.B: The Standard Errors of the Rho Coefficients are in Brackets.

Our empirical results are fairly well established. Our adjusted \bar{R}^2 and standard error's of the regression are good. Serial correlation is corrected for using the Cochrane-Orcutt procedure. Most of our variables are significant at 5 per cent or better and have their correct 'a priori' signs. Now, there are features of the results we want to discuss: First, in equation (4.21) our relative price variable (P1) is not significant at 5 per cent and we are reluctant to accept this result. We argue that the short length of time series interfered with this result. Second, in equation (4.23) our relative price variable is not significant at 5 per cent. We are also reluctant to accept this result. We suggest that: First a change in the export price index will not result in an immediate response in export supply as there are lags in adjustment which our short series might not have captured. Second, a change in the export price index does not always mean a change in the 'farm gate price' which is the price that farmers respond to. In some instances government policy is responsible for this. Hence, we argue that the 'farm gate price' would be more appropriate as the relative price variable than the export price index. Third, we could argue that an alternative specification might improve the result.

Finally, the poor results we get for equation (4.27) our total expenditure function might be due to the poor quality of the data in the O.E.C.S. area. In addition, the equation for (4.28) our private expenditure function we get a negative sign for our income proxy which is a counter-intuitive result. For we argued 'a priori' that an increase in income will result in an increase in private expenditure. So our results give us an incorrect 'a priori' sign that cannot be reasoned theoretically.

5. SIMPLE ANALYTICS OF THE MODEL

Having estimated the model, we will carry out some simple manipulations of the model. (See Appendix III for outline of Model) Specifically, we will solve the model for key endogenous variables - nominal income (Y), the price level (P) and imports (I) and we will look at the impact on these endogenous variables as a result of a change in the exogenous variables - money supply (M^S) government expenditure (G_0) and relative prices (P_1) i.e. price of imports/ domestic price level. We assume an initial value for Y say Y_0 and solve for dI and dP and then determine the second period effect on Y of changes in the exogenous variables by substituting the solution values of dP and dI . Having solved

for Y and by total differentiation we obtain the following impact multipliers:

$$(5.1) \quad \frac{\partial y}{\partial M^s} = \frac{[1 - m_1(a_1 - a_2 d_3 \theta_1)]}{[1 + \theta(1 - M_1)]} > 0$$

$$(5.2) \quad \frac{\partial y}{\partial G_0} = \frac{(1 - M_1)}{[1 + \theta(1 - M_1)]} > 0$$

$$(5.3) \quad \frac{\partial y}{\partial P_1} = \frac{M_2}{[1 + \theta(1 - M_1)]} < 0$$

Where: $\theta = (a_1 d_1 - a_2)$.

Our impact multiplier in (5.1), (5.2) and (5.3) tell us that: First, an expansion in the money supply will via its effects on expenditure lead to an increase in income. Monetary expansion will increase private expenditure which will lead to an increase in income. In addition, it will generate excess demand which will increase expenditure and in turn increase income. However, some proportion of the increase in expenditure will lead to an increase in imports which will constrain the growth in income. Furthermore money supply expansion will increase the domestic price level which will shift relative prices (P_1) and induce an increase in imports which will further constrain the growth in income.

Second, the government expenditure multiplier also has a positive effect on income but some proportion of the increase in income as a result of increased government expenditure also induces an increase in imports which ultimately has a negative effect on income. Hence, the traditional Keynesian counter-cyclical policies of increasing expenditure through monetary and fiscal policy would have adverse consequences in these economies as a result of their high level of 'openness'. Unless there are compensating increases in the exports of goods and services and/or international capital movements 'reflating' the domestic economy by increasing expenditure will fuel imports and have a negative effect ultimately on the balance of payments. In addition, the net effect on income will depend on whether the effect on income of an increase in government expenditure offsets the negative effect on income of an increase in imports due to an increase in government expenditure.

Third, a change in relative prices (price of imports/domestic price level) will have a negative effect on income. A change in relative prices will induce an increase in imports which will in turn have a negative effect on income. To compensate for the negative effect of relative prices on income there will have to be an increase in export supply either through an increase in nominal agricultural output or a favourable shift in relative prices (i.e., price of exports/domestic price

level). Totally differentiating P and I and we obtain the following partial derivatives:

$$(5.4) \quad \frac{\partial P}{\partial M^S} = \sigma_1 > 0$$

$$(5.5) \quad \frac{\partial I}{\partial M^S} = m_1 (a_1 - a_2 d_2) > 0$$

$$(5.6) \quad \frac{\partial I}{\partial a_0} = m_1 > 0$$

The above partial derivatives tell us that money supply and government expenditure both have a positive impact on imports. A change in money supply affects private expenditure which induces a change in total domestic expenditure which leads to a change in imports and ceteris paribus results in balance of trade disequilibrium. In addition, a money supply change affects the domestic price level which alters the demand for nominal money balances. If there is still monetary disequilibrium as a result of excess money supply then there will be a change in expenditure and consequently imports.

An increase in government expenditure will lead to an increase in total domestic expenditure which would result in an increase in imports and ceteris paribus balance of trade disequilibrium. Hence, government expenditure has a high import content and as we argued earlier this imposes limitations on the use of government expenditure as a tool of counter-cyclical policy in these economies.

Finally, a change in money supply has a positive effect on the domestic price level. As we have argued earlier, this will affect relative prices and induce changes in foreign trade and this has important implications for the balance of trade and ultimately the balance of payments.

6.

IMPLICATIONS OF THE MODEL AND POLICY OPTIONS

Possibly the most important conclusion that can be drawn from the model is that monetary imbalances (i.e., when money demand does not equal supply) sets up reactions which alter expenditures and the domestic price level consequently inducing changes in income and foreign trade and ultimately the balance of payments. Principally this is due to increases in imports as a result of increased expenditure due to money supply expansion. In addition, the change in the domestic price level affects relative prices which increases imports and adversely affects export supply. The principal policy implications of these conclusions are the following: First, the authorities must attempt to maintain some control of the money market to avoid the effects of monetary disequilibrium. An important mechanism in this respect is the authorities must determine whether the demand for money is a stable function and hence can be predicted with reasonable accuracy. In addition,

the authorities must be able to control money supply expansion to match the demand for money. Second, expenditure (both private and public) must be maintained at levels that do not encourage substantial increases in imports of goods and services to ensure the equilibrium of the balance of trade. Third, given the serious limitations of expanding income via changes in aggregate expenditure and the fact that changes in key macro variables tend to impact positively on imports, it is almost inescapable that for income growth and balance of trade equilibrium the short-run economic policies pursued by these countries must encourage an expansion in export supply as far as possible.

In a real sense the first two policy implications of the model are closely related since tight monetary control which alters expenditure would consequently stabilize changes in imports. Hence, we will focus on the stability and predictability of money demand.

In the O.E.C.S. countries our linear demand for nominal money (M2) function provided us with good empirical results. However, our data was only for the short period 1972-82. Hence, we can conclude that for this specific period the demand-for-money is stable and well estimated but one would need a longer

times series to arrive at a more general statement about the stability of money demand.

If we assume that in the O.E.C.S. countries the demand for money can be predicted with reasonable accuracy, then the monetary authority will be in a better position to analyze the price, expenditure and balance of trade (and ultimately the balance of payments) effects of a particular stock of money or growth in domestic credit. The challenge facing the authorities will be to control money supply expansion within finite limits consistent with the demand for money so as to mitigate the price, expenditure and foreign trade effects resulting from monetary disequilibrium. We will now examine the appropriateness or effectiveness of using the conventional tools of monetary and fiscal policy to achieve monetary equilibrium.

6.1 Monetary policy

Essentially the ability of the monetary authority to control the money supply in the O.E.C.S. economies depends upon the controllability and predictability of the asset components (sources) of the monetary base and the money multiplier. By using the traditional instruments of monetary policy (reserve requirements, interest rates, ceilings on bank credit etc) the authorities must attempt to manipulate those "sources" of the

monetary base and the money multiplier over which they have control in order to offset fluctuations in the autonomous components. In attempting to do this the O.E.C.S. policymakers face serious problems.

First, our empirical results suggest that the money multiplier model does not adequately explain money supply movements in the O.E.C.S. (See Appendix 2) However, this could be due to the poor quality of data for the monetary base which we acknowledge as a problem. In addition, the results presented in Appendix 2 indicate that the money multiplier was volatile for the period 1974-82. Sharpley (1983) argues that short-term variations in the money multiplier are relatively large in Less Developed Countries. Despite the length of the period this is not an encouraging trend since the monetary base and the money multiplier is an important ingredient of money supply control.

As we have argued earlier, in most developing countries the largest component of the monetary base is the Central Bank's claim's on government due to Central Bank financing of large fiscal deficits. This is not the case in the O.E.C.S. countries and the E.C.C.B. is only permitted to finance a limited proportion of these countries fiscal deficits. The largest component of the base is the net foreign assets of the Central

Bank, movements in which the Central Bank has no control over and are due to the balance of payments outcome. Since these countries have a fixed exchange rate regime the burden for neutralising changes in foreign assets remain with the monetary authority. Sharpley (1983) argues that the Central Bank in a developing country "is liable to find this an impractical task and will thus be/able to pursue independent monetary targets.^{less}

Despite the relatively smaller size of Central Bank credit to governments as a component of the monetary base in O.E.C.S. countries, it is still an important target for monetary control. In Table 3 we observed that this component had increased throughout the period 1974-82 despite the fact that government only had limited access to Central Bank credit. In general, Third World countries rely on credit creation by the Central Bank to finance their deficits. The size of their borrowings, is only constrained by self-discipline or International Monetary Fund (IMF) lending conditions. Since the latter is not really a desirable alternative. O.E.C.S. countries must employ self-discipline to ensure that Central Bank financing of budgetary deficits does not become too large.²¹

Finally, the conventional amoury of monetary policy instruments are of restricted use in the O.E.C.S. countries.

The underdeveloped nature of the organized capital market seriously limits the use of open market operations. Second, interest rates are pegged and are not used as an instrument of monetary control. Third, for restraining the growth in monetary base raising the reserve requirements of commercial banks is perhaps the most powerful and effective instrument available to the authorities in the O.E.C.S. area. However, there is only limited flexibility in changing reserve requirements since commercial banks need time to adjust their assets to new liquidity ratios. Finally, the relative size of Central Bank credit to the commercial banks is so small that it is of no real policy significance.

6.2 Fiscal policy

In the O.E.C.S. countries the major objectives of fiscal policy are three-fold: First, to improve the availability (by lowering costs) and the quality of social services and expand their supply particularly Health and Education. Second, to develop the infrastructure to improve the productive capacity of the economy. Third, to improve the standards of living via wage increases and to mitigate unemployment via the public sector. In an attempt to achieve these three objectives government expenditure has continued to grow. The strain on the public purse is manifested by the emergence of fiscal deficits.

In addition, the expansion of social services, the development of infrastructure and increasing wages all tend to induce increases in imports which must be financed. Given the high import content of expanding government expenditure to meet these objectives fiscal policy must actively encourage expenditure that is growth - inducing particularly if it has a favourable impact on export supply.

In the context of the above objectives, the most direct impact on economic growth and export supply will come from expenditure on the development of infrastructure. Hence, priority must be accorded to infrastructural development which has the greatest potential for improving growth and export supply. In periods where expenditure must be curbed to overcome budgetary imbalances these areas must as far as possible be spared from expenditure reductions.

The expansion of social services for example, Health and Education also play a vital role in promoting growth. Once again a disaggregated approach must be taken in attempting to reduce expenditure particularly in the area of education.

Finally, not all areas of capital expenditure are growth promoting and not all areas of current expenditure have no favourable impact on growth. It is important that a

disaggregated approach be adopted in attempting to control expenditure to maintain budgetary balance while at the same time trying to improve the growth and export prospects of the economy as far as possible. In addition, it might be found that redistributive objectives must be sacrificed in an attempt to improve the growth prospects of these economies.

6.3 The integrated approach

In the post-independence period the central problem confronting the O.E.C.S. economies has been the diversification of the structure of production to improve the possibilities for growth and the expansion of exports. In this context short-run policies should be aimed at reorienting the productive system and at the policy level this would necessitate integrating macroeconomic policy to facilitate long-run goals of economic transformation. In our discussions of the model we recognized that increasing the supply of exports was the most appropriate means of dealing with the problem of import leakage and increasing income. The centrepiece of this approach is that emphasis should be placed on supply-side measures rather than the control of aggregate demand. Such an approach is consistent with the 'real economy' approach advocated by Killick, Bird, Sharpley and Sutton (1983). In addition, it essentially conflicts with

IMF stabilization programmes which have as their centre-piece demand-management policies supported by supply-oriented measures. We are not arguing that such an approach be adopted solely during a period of adjustment precipitated by balance of payments disequilibria. It is being suggested that this should guide the formulation of policy irrespective of the state of the balance of payments. Finally, this approach to short-run policy formulation requires that there is a long-run strategy for the transformation of the economy which includes among a host of other things the identification of new exports and measures to improve the efficiency of production of existing exports.²² So short-run policies must be as far as possible consistent with the policy directions of the long-run programme of structural transformation. Implicitly, this requires that O.E.C.S. countries develop a sophisticated process of planning rather than the adoption of 'ad hoc' measures. In summary, we are arguing for a strategy of short-run economic management which is growth-promoting and export oriented and minimises the conflicts with government objectives for economic transformation.²³ Furthermore, the programme will specifically aim at stimulating output and productivity, ameliorating key bottlenecks within the productive system and increasing the focus of policy beyond broad macro aggregates to include specific microeconomic

policies. In the O.E.C.S. countries microeconomic policies would have to focus on improving agricultural output, developing tourism and possibly other service type activity and expanding the manufacturing sector.

There are 'a priori' reasons to expect that such an approach to short-run economic management would be appropriate for O.E.C.S. economies if it can be successfully implemented. First, it will directly address the primary long-run problem rather than treating it as a separate objective requiring a different set of policies and instruments. Second, it would allow policy-makers to have a more precise understanding of the impact of short-run policy measures on the process of economic transformation. This is in contrast to other approaches which focus on demand-management policies without sufficiently considering the supply effects that such policies induce and the extent to which this constrains the possibilities for growth and transformation. Third, in periods of 'adjustment' the emphasis will simply not be on restoring equilibrium but achieving equilibrium at a higher level of economic activity. Implicitly, we are arguing that these are not irreconcilable objectives. Fourth, achieving growth with adjustment should lessen the welfare costs of adjustment. A frequent critique of IMF type policies is the large welfare costs that are incurred

to restore equilibrium. Finally, the high level of economic planning that is necessitated by such an approach to short-run management would encourage discipline on the part of the authorities. O.E.C.S. governments would require discipline to restrain expenditure during periods of 'boom' to a level consistent with anticipated medium term trends and objectives. They must refrain from embarking upon additional social programmes and sophisticated infrastructural projects. For example, highrise office buildings, when government resources increase temporarily. A failure to do so would interfere with the attainment of medium-term objectives as they will encourage patterns of expenditure that are not sustainable in the absence of relatively large surpluses which will fuel imports and create balance of trade and ultimately balance of payments disequilibrium.

A necessary pre-requisite for the efficient implementation of such a strategy in the O.E.C.S. countries is long term financing. The small size of these economies gives them their own advantage in that relatively smaller amounts of concessional finance would be required and as such their financing needs would not be as large as most Third World countries. Supporting finance is crucial since these countries ability to meet their import needs is vital to expanding and diversifying

production and exports. Another frequent criticism of IMF programme's of stabilization that compress imports, is that they severely constrain production of vital exports by starving those industries of important imports of intermediate and capital goods. Hence, the country's ability to overcome the structural problem is reduced since an expansion of these sectors is vital to overcoming the problem. This does not mean that demand-management and in particular import compression is not required by such an approach during periods of 'adjustment'. It simply means that adjustment requires a reduction in absorption but with income increasing the extent to which absorption would be required to fall would be reduced. In addition, a disaggregated approach must be adopted in reducing absorption rather than just simply reducing absorption per se to satisfy broad macro targets. Therefore, demand-management policies would be pursued as far as possible to support supply-oriented measures.

In conclusion, the successful implementation of such an approach which we argue is most appropriate to the O.E.C.S. economies requires a high level of political commitment on the part of the governments. A survey of the Third World countries economic experience in the 1970s points out that political considerations have tended to influence policy prescriptions to an unnecessary degree and have essentially served to exacerbate

the balance of payments disequilibria most of the economies have experienced. Therefore, a sophisticated level of planning and a high level of political commitment is necessary for the success of such an approach to short-run management given the broad parameters of the approach that we have outlined.

FOOTNOTES

1. The Organization of Eastern Caribbean States is composed of the following Caribbean islands: Antigua, Montserrat, St. Kitts-Nevis, Grenada, St. Vincent, Saint Lucia and Dominica.
2. See IMF "A Comparative Study of Balance of Payments Development and Financial Policies in the Caribbean Countries" (See IMF Institute Seminar, Barbados August 1983)
3. See Lestrade, S.
4. O.E.C.S. Economic Affairs Secretariat, St. John's, Antigua. Direct Enquiry.
5. Ditto.
6. The turning point in the growth of visitor arrivals to Grenada seems to have occurred in 1979. It can be suggested that the political instability that was prevalent at that time particularly the March 13th 1979 coup d'etat led by the left-wing New Jewel Movement was largely responsible for the substantial decline in visitor arrivals.
7. Compiled from ECCM - Digest of Trade Statistics 1975; O.E.C.S./EAS - Digest of Statistics, 1982.
8. Ditto
9. This is also true of most Commonwealth Caribbean Governments in the post-independence period and is not peculiar to the O.E.C.S. countries.
10. O.E.C.S./EAS, St. John's Antigua. Direct Enquiry.

11. Caribbean Development Bank estimates. Direct Enquiry.
12. The ECCB area is composed of the same group of countries that make up the OECS since the ECCB is the Central Bank of the OECS countries.
13. See IMF "A Comparative Study of Balance of Payments Developments and Financial Policies in the Caribbean Countries" (IMF Institute Seminar, Barbados, August 8th 1983).
14. See ECCA Annual Statement of Account 1976 and Economic and Financial Review, December, 1982.
15. The lack of data on the volume of imports and the absence of an appropriate deflator prompted the use of the value of imports and as a result nominal domestic expenditure rather than real expenditure was used as an independent variable.
16. We argue that in the OECS economy output is essentially from the tradeable goods sector and non-tradeable goods output is extremely small.
17. The absence of data on the volume of domestic exports and the absence of an appropriate deflator promoted the use of the value of domestic exports and as a result nominal rather than real agricultural output was included as an independent variable.
18. Although we had data on foreign trade (i.e. exports and imports) there is no data on net factor payments abroad so that we could not calculate GNP.
19. The short length of our data series reduces the usefulness of our econometric results. Hence in our analyses we cannot make a lot of use of our parameter estimates. But the results do allow us to have some understanding of some of the macroeconomic relationships and the importance of some of the macro variables.
19. We suspect that the short length of the data series may have affected the performance of the rate of inflation variable. Since 'a priori' there are strong reasons to hypothesize that the rate of inflation is a significant variable in the demand for real money balance.

21. The following are values for the excess supply of money in the period 1972-82:

<u>OBSERVATIONS</u>	<u>EXCESS MONEY (EM)</u>
1972	5.2360
1973	-24.9560
1974	-3.9690
1975	29.7670
1976	-24.1370
1977	28.6490
1978	-11.5440
1979	-15.8340
1980	18.4670
1981	-51.4910
1982	49.8230

22. We must remember that the ECCB is a multi-state Central Bank and this raises problems for increasing Central Bank financing of fiscal deficits of member states which must be resolved before increased access to Central Banks credit can be obtained by individual states.
23. I am indebted to Compton Bourne for a clearer exposition of this point since he pointed out that recent strategies of export-led growth tended to place emphasis on the identification and production of new exports. However, these are activities with very long lags and as such the effects of which will be transmitted in the medium-term. Hence, the prospects for growth in the short-run could be improved by measures aimed at increasing the efficiency of production of existing exports with the intention being to lower the cost per unit of output which may give producers a 'competitive edge' in the international market. In addition, we observed

by casual empiricism that Caribbean countries were repeatedly failing to meet their quotas under existing commodity agreements, e.g. Lome Agreement and that this could partly be due to inefficient production.

24. Balassa (1984) argues that developing countries that used output-increasing policies of export promotion and import substitution to offset the balance of payments effects of external shocks in the 1970s experienced higher rates of growth than inward-oriented economies output-increasing policies of adjustment. The latter group of countries financed the balance of payments deficits caused by external shocks by foreign borrowing in the 1974-76 period and as a result had to adopt deflationary measures in 1979-81 as their high level of indebtedness reduced the possibilities for further borrowing. To some extent the experience of developing countries in the 1970s is testimony to the wisdom of emphasizing supply-oriented policies which encourages the growth of exports.

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A P P E N D I C E S

(i)

APPENDIX 1

The Pooled Results

There are several techniques by which the data might be pooled. The first technique is to combine all cross-section and time-series data and perform ordinary least-squares regression on the entire data set.

The second approach recognises that omitted variables may lead to changing cross-section and time-series intercepts. Co-variance analysis involves the addition of dummy variables to the model to allow for these changing intercepts. For our model, we employed the co-variance analysis and dropped the intercept but introduced dummy variables for each of the individual islands.

We then estimated the behavioral equations for the foreign trade variables i.e., imports and exports supply. It was not possible to estimate the other behavioral equations as they all used money supply and we could not find data for money supply in the individual islands; we obtained the following results:

$$IM = 0.880Z + 10.6012 P1$$

(6.57) (0.11)

$$\bar{R}^2 = 0.8677 \quad D.W. = 2.08 \quad N = 24$$
$$S.E. = 29.4053 \quad \bar{IM} = 115.337$$

where: IM = Imports
Z = Domestic expenditure
P1 = Relative prices i.e. price of imports/
domestic price level

$$X5 = 2.3311 Q_A + 2.8521 P2$$

(5.58) (0.48)

$$R^{-2} = 0.8434 \quad D.W. = 1.43 \quad n = 32$$
$$S.E. = 10.7798 \quad \bar{Xs} = 25.819 \quad F = 27.937$$

where: Xs = Export supply
Q_A = Nominal agricultural GDP
P₂ = Relative prices i.e. export prices.
domestic price level.

(ii)

The results from our export supply and import demand functions indicate a "good fit" with a high R^2 and a low S.E. In addition, only Z and Q_A are significant at 5 per cent or better. Once again our A results indicate that relative prices are not significant explanatory variables. However, we are reluctant to accept this result for the reasons we discussed earlier. Finally, data limitations presented us from estimating the rest of our behavioral equations. Specifically it was not possible to obtain data on the money supply in the individual islands. All of the islands belong to the ECCB and the money supply data is presented for the ECCB area as a whole rather than for the individual islands.

(iii)

APPENDIX 2

THE MONEY MULTIPLIER IN THE O.E.C.S.

Using the money-multiplier framework the equation defining the money supply as some multiple of the monetary base was treated as a behavioral relationship and estimated for the O.E.C.S. countries for the period 1974-82.

$$M = m MB$$

$$M = 4.97823 MB$$

$$\bar{R}^2 = 0.302$$

$$D.W. = 0.664$$

$$S.E.E. = 191.5009$$

$$n = 9$$

The explanatory power of the money-multiplier framework as measured by the adjusted coefficient of determination is extremely low and not encouraging. Serial correlation measured by the Durbin-Watson statistics (D.W.) is present. Finally, the regression reveals that the money-multiplier is 4.97823, however, the overall fit of the regression is not good.

In addition, we attempted to calculate the money multiplier using the public currency/deposit ratio and the commercial bank reserve/deposit ratio and we employed the following equation:

$$M = \frac{(1 + c)}{(c + r)}$$

WHERE:

M = Money supply

C = Public currency/deposit ratio

r = Reserve/deposit ratio

(iv)

<u>YEAR</u>	<u>C</u>	<u>r</u>	<u>m</u>
1974	0.107	0.052	6.962
1975	0.010	0.196	4.903
1975	0.090	0.258	3.132
1977	0.094	0.144	4.597
1978	0.109	0.153	4.233
1979	0.190	0.092	4.914
1980	0.126	0.083	5.387
1981	0.115	0.068	6.093
1982	0.102	0.054	7.064

It is evident that there is variability in the two ratios c and r and the money multiplier m . The money multiplier begins to decrease in 1974-76 then stabilises and increases in 1980-82.

TABLE 1 - MAIN FEATURES OF O.E.C.S. ECONOMIES

COUNTRY	GEOGRAPHIC SIZE	POPULATION ('0000)			PER CAPITA GDP EC\$			MEASURES OF OPENNESS					
								X/Y			M/Y		
	Sq Km	1970	1975	1982	1970	1975	1982	1970	1975	1982	1970	1975	1982
O.E.C.S.								0.24	0.49 ¹	0.37	0.85	1.09	1.11
ANTIGUA	441.6	64.79	70.52	77.23	776	1,710	3,829						
DOMINICA	787.4	69.55	79.92	80.20	545	738	1,968						
GRENADA	344.5	92.78	105.41	110.00	661	777	N.A.						
MONTERRAT	102.3	11.46	11.74	11.68	951	1,968	6,070						
ST. KITTS	352.2	44.88	48.30	45.10	680	1,323	3,055						
ST. LUCIA	616.4	99.81	111.80	124.00	669	1,125	2,537						
ST. VINCENT	384.0	86.31	103.03	127.00	429	689	1,431						

X/Y = Exports/GDP
M/Y = Imports/GDP
¹GDP Includes Grenada

SOURCE: O.E.C.S./EAS ESTIMATES

TABLE 2 - SUMMARY ACCOUNTS OF ECCA/ECCB

SOURCES OF MONETARY BASE							USES OF MONETARY BASE						
	1973	1974	1975	1976	1977	1978		1973	1974	1975	1976	1977	1978
Net Foreign Assets	75.9	54.1	61.3	151.6	165.8	147.5	Reserve Money		52.4	115.3	165.1	128.7	144.9
Net Claims on Government's	7.8	13.1	17.6	24.4	39.8	28.7	i. Currency outside Commercial Bank	34.26	36.9	41.8	48.5	56.9	65.7
Claims on Commercial Banks	5.6	6.1	68.7	120.2	81.8	97.4	ii. Currency in Bank Vaults	11.55	12.4	12.4	19.2	19.2	25.5
i Other items (Net)		-20.9	-32.3	-131.1	-128.7	-128.7	iii. Commercial Bank Deposits with ECCA/ECCB	-	3.6	61.1	10.14	52.6	53.7

Other items (net) = (NFA & claims on Government's Claims on Commercial Banks)
 -(Reserve Money)

Note that the reporting form sent to Commercial Banks by ECCA changed after 1978 and so prior to 1978 the data for this item is really on approximation rather than the precise statistics.

SOURCES: CALCULATED FROM ECCA - ECONOMIC AND FINANCIAL REVIEW
 (Vol.10, No.1; Vol.8, No.1; Vol.9, No.1; Vol.8, No.2)

ADDITIONS AND CORRECTIONS TO
 "Finance, Growth and the Balance of Trade in the O.E.C.S. Countries"
 by Arnold McIntyre

APPENDIX 3

OUTLINE OF MODEL

For simplicity and mathematical convenience we manipulated the model treating our equations as a system of linear equations. We now outline our system of equations and now we treat the money supply as an exogenous variable.

$$IM = m_0 + m_1 Z + m_2 P$$

$$XS = x_0 + x_1 Q_A + x_2 P$$

$$M^d = d_0 + d_1 Y + d_2 P + d_3 r$$

$$Z = a_0 + a_1 Y + a_2 EM$$

$$P = b_1 M^s - b_2 Y - b_3 r + b_4 PM$$

I D E N T I T I E S:

$$Z = PE + G$$

$$Y = Z + XS - IM + OIT \quad (\text{Income - expenditure identity})$$

D E F I N I T I O N S

$$EM = M^s - M^d$$

N.B.: We have changed our symbol on the weighted average rate of interest on savings and time deposits. In addition, the absence of data on invisible trade require that we include a balancing item (OIT) in our income-expenditure identity.