SPECIFICATION AND ANALYSIS

OF

SAVINGS FUNCTIONS

FOR

THE ORGANISATION OF EASTERN CARIBBEAN STATES

by

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ABSTRACT

This paper attempts to specify a savings function for the Organisation of Eastern Caribbean States (O.E.C.S.) countries and, among other things, to test the well known McKinnon-Shaw hypothesis on financial liberalisation. for these countries. Panel data are used and appropriate estimation procedures applied. The McKinnon-Shaw hypothesis is rejected and the major determinants of domestic savings are established as income and foreign savings. Policy conclusions are drawn.

1. Introduction

The Organisation of Eastern Caribbean States (O.E.C.S.) represents an economic grouping of 7 English speaking micro states of the Caribbean. They are Antigua & Barbuda, Dominica, Grenada, Montserrat, St. Kitts & Nevis, St. Lucia and St. Vincent & the Grenadines. With the exception of Montserrat (which is still a British colony) they are all fully independent states. All countries use the same currency unit - the Eastern Caribbean (EC) dollar - which is pegged to the US dollar, and are all served by the same monetary authority - the Eastern Caribbean Central Bank.

Table 1 gives a brief profile of the various countries that make up his grouping:

Table 1

General Data on O.E.C.S. Countries

Country	Area (km^2)	Population in 1987 (000's)	1987 GDP* EC$ m, 1984 Prices	Population Density 1987	Per Capita GDP, 1987
Antigua & Barbuda	440	77.1	512.4	175.2	6645.9
Dominica	750	78.3	234.9	104.4	3000.0
Grenada	340	94.1	223.4	276.8	2374.1
Montserrat	100	11.9	114.8	119	9647.1
St. Kitts & Nevis	270	46.5	187.3	172.2	4028.0
St. Lucia	620	142.3	404.4	229.5	2841.9
St. Vincent & the Gren.	340	111.8	274.0	328.8	2450.1
Total	2860	562.0			

* At Factor Cost, except Montserrat which is at market prices

Source: Derived from data supplied by the O.E.C.S Secretariat, the Caribbean Development Bank and ECLAC

In 1987, the total population of all seven countries just exceeded half a million. The smallest country (Montserrat) had a population of less than 12 000 living on a land area of 100 km^2 and the population of the largest (St. Lucia) did not exceed 150 000 for a total land area of 620 km^2.

There are some small-to-medium sized cities in developed countries which are larger than all these countries put together, and it is therefore not difficult to appreciate that the resource base of all these counties is extremely narrow which, apart from the tourism sector, consists largely of agricultural products like spices and bananas. Traditionally, domestic savings have been extremely low and even frequently negative as Table 2 attests:

Table 2

Domestic Savings Ratios* in O.E.C.S. Countries 1977-1988
(percentages)

Year	Ant	Dom	Gre	Mon	St. Kitts	St. Lucia	S. V.G.
1977	17.1	2.1	n.a.	(28.1)	21.7	1.8	(1.0)
1978	18.3	0.39	n.a.	(27.7)	15.9	4.7	3.7
1979	6.5	(28.7)	n.a.	(32.4)	10.6	7.5	(11.0)
1980	7.2	(20.6)	(5.6)	(27.5)	7.9	33.8	(12.0)
1981	9.8	(12.2)	(3.8)	(23.6)	11.3	9.4	0.73
1982	8.8	(0.10)	(1.2)	(22.0)	3.4	8.3	(0.18)
1983	15.4	7.5	5.2	(17.7)	(12.4)	9.1	7.2
1984	11.7	11.2	0.87	(17.0)	(2.0)	11.2	13.9
1985	10.3	11.8	0.96	(17.0)	8.2	17.9	22.0
1986	11.4	13.6	2.3	(10.5)	6.4	28.9	18.1
1987	13.5	10.8	8.3	(8.2)	(1.8)	24.2	7.1
1988	n.a.	13.5	n.a.	(1.0)	n.a.	n.a.	13.4

* Ratio of Domestic Savings to GDP

n.a. not available
() indicate negative values

Ant = Antigua & Barbuda
Dom = Dominica
Gre = Grenada
Mon= Montserrat
S. V.G. = St. Vincent & the Grenadines

Source: Derived from data supplied by the O.E.C.S Secretariat, the Caribbean Development Bank and ECLAC

Economic growth and development have therefore been largely dependent on a steady inflow of foreign savings as well as foreign aid. It is not expected, however, that such flows will continue in the future for a host of reasons - see Aghevli & al [1] and Bourne [2]. Like many other countries of the so-called third world, therefore, the O.E.C.S. countries will have to make attempts to shore up their domestic savings effort. This, in our view, can only be done if the process of domestic savings in these countries is properly understood.

In this paper we propose to respond to this problem. We will formulate some relatively straightforward functions which we will use in particular to test the well known McKinnon-Shaw hypothesis on the responsiveness of savings to the (real) interest rate using well known econometric methods. The O.E.C.S. countries are a natural laboratory for employing panel data, and an important aspect of our exercise is to use techniques associated with the use of such data, in particular the "fixed effects" and the "random effects" models.

In the following section, we present in some detail the models and the modelling methodology which will be the main focus of this paper. In section 3, we examine and analyse the results in some detail and in section 5 we conclude the paper.

2. The Models, Modelling Methodology and Data

The general form of the savings function to be fitted in this paper is the following:

$$S_d = f(Y, S_f, \mathbf{i})$$

where S_d is some indicator of domestic savings, Y an activity variable (usually national income), S_f an indicator of foreign savings inflows and **i** a vector of interest rates.

Income is generally assumed to be a major determinant of savings, especially since the work of Keynes [11]. Work on developing economies has tended to give even greater emphasis to the role played by foreign savings. It is argued for instance in Grinols and Bhagwati [10] that such foreign inflows tend to discourage the domestic savings effort, moreso as it has a direct impact on the government budget deficit which, in small countries like those under consideration, is likely to be a very large component of overall domestic savings. Watson [18] and Watson and Ramlogan [19] verify this strong negative relationship between domestic and foreign savings in the case of another Caribbean country (Trinidad & Tobago).

The greatest controversy surrounds the use of the interest rate variable. We can point to at least two reasons for this: in the first place, although classical economists assumed that it was the most important variable to consider, Keynesian theory (which quickly became the new orthodoxy) greatly de-emphasized its importance. Secondly, development economists are quick to point (not without cause) to the absence of organised financial markets in countries like the O.E.C.S and to conclude that interest rates simply cannot play a major role in the mobilisation of savings or any other kind of financial resources for that matter. See for instance Sundararajan [17].

Feldstein [5] was among the first to challenge the empirical validity of the econometric results tending to favour the Keynesian hypothesis even in developed countries. In his view, the use of nominal as opposed to real interest rates tended to bias all such results in favour of the Keynesian arguments. It was however the seminal works of McKinnon [12] and Shaw [15] which generated a flurry of theoretical and empirical studies with special emphasis on developing countries. These authors claimed that artificially low real interest rates discourages both savings and investment and even results in inefficient use of investible funds. They conclude that the financial system should be liberalised to allow for higher nominal rates.

The fact is that in many Caribbean countries, including the O.E.C.S., real rates are generally low an frequently negative, tending to indicate the presence of "financial repression". Watson [18] confirms the financial liberalisation hypothesis for the case of Trinidad & Tobago and also shows that artificially low rates may even result in lower rates of economic growth. Fry [6], [7], [8] is also associated with a series of works which tend to confirm this hypothesis for other countries. There is , however, no unanimity on the matter: Giovannini [9], for instance, is very critical of Fry's work and uses the same data to arrive at the opposite conclusion.

In this paper we will consider this controversy in the light of the O.E.C.S. data. We will employ three (3) distinct specifications of the general savings model. The first, which we will refer to as Model 1, is

$$S_d = \alpha_0 + \alpha_1 Y + \alpha_2 S_f + \alpha_3 (d - \pi)$$

where S_d is the level of real domestic savings, measured as the difference between real GDP at market prices (Y) and real total consumer expenditure. S_f is real foreign savings, d the weighted deposit rate of interest and π the rate of inflation (as measured by

the change in the consumer price index). The entity $(d-\pi)$ is therefore a measure of the real interest rate.

The second specification, which we shall refer to as Model 2, is

$$s_d = \beta_0 + \beta_1 y + \beta_2 s_f + \beta_3 (d- \pi)$$

where s_d and s_f are, respectively, the ratios of domestic and foreign savings to GDP and y is the natural logarithm of per capita GDP.

In models 1 and 2, α_1 and β_1 are expected to be positive, and α_2 and β_2 to be negative. The McKinnon-Shaw hyothesis is verified in model 1 if α_3 is positive and significant and for model 2 if β_3 is positive and significant.

Model 3 is a slight variation of model 2:

$$s_d = \gamma_0 + \gamma_1 \frac{1}{y\,2} + \gamma_2 \frac{1}{y\,4} + \gamma_3 s_f + \gamma_4 (d- \pi)$$

Such a specification was first used by Singh [16], and has the property of allowing both the average and marginal propensities to save to rise, first at an increasing then at a decreasing rate, reaching an upper asymptote where both the average and marginal propensities converge.

The estimation of these models will be based on pooled annual time series data. Three separate but related methods will be used:

i. The Ordinary Least Squares Dummy Variable (OLSDV) method which assumes that the slope coefficients are the same across countries but intercepts differ. Testing this assumption will require that the model be fitted by Ordinary Least Squares for each country.

ii. The Fixed Effects model which is identical to the OLSDV except that data series of equal length must be used.

iii. The Random Effects model (individual effects only)

For a fuller discussion on the fixed and random effects model, see Mundlak [13].

The various measures of savings, income[1] and inflation used in models 1, 2 and 3 were derived from the publications of the O.E.C.S. [14] and the Caribbean Development Bank [3] while data on the interest rates were obtained from the Eastern Caribbean Central Bank [4]. A coherent set of data for Dominica, Montserrat and St. Vincent & the Grenadines was available for the period 1977-88, while for Antigua & Barbuda, St. Kitts & Nevis and St. Lucia similar data were available for the period 1977-87. In the case of Grenada, however, such data were available only for the period 1980-87.

[1]The savings and income data used are measured in constant 1984 EC dollars.

3. Results

A summary of the results obtained from the OLSDV exercise for models 1, 2 and 3 is presented in Tables 3, 4 and 5 respectively. The equation of greatest interest to us in each of these tables is the one labelled "O.E.C.S. (Pooled data, country dummies)" - it is in fact the OLSDV fit. It is obtained by applying OLS to a particular model using a standard dummy variable for each country which has a value of 1 if the observation pertains to that country and zero otherwise. It therefore assumes that the slope coefficients are identical for every country and the only difference is in the intercepts.

Strictly speaking, we should test this assumption, and this requires the fitting of two subsidiary sets of regressions: one involving OLS fits for each individual country, and the other the OLS fit obtained when the data are pooled but no dummies are used. These results have an interest in their own right and are also reported in these tables.

The test statistic for the equality of the intercepts is $F_{1,2}$ (it has an F distribution under the null hypothesis) and is reported in each table with its corresponding degrees of freedom. Similarly, $F_{2,3}$ is the appropriate statistic for testing the equality of the slope coefficients. Other statistics reported are R^2 (the coefficient of determination corrected for degrees of freedom), the Durbin-Watson[1] (DW) statistic, the F statistics for the individual regressions and the individual t-statistics (in parentheses).

[1]The DW statistic is not reported for regression fits involving pooled data as it does not have a proper meaning in this context

Table 3

Model 1

$$S_d = \alpha_0 + \alpha_1 Y + \alpha_2 S_f + \alpha_3 (d - \pi)$$

Results for all countries Using All Available Data (OLSDV)

Country	α_0	α_1	α_2	α_3	R^2	DW	F
Antigua & Barbuda (1977-87)	-13.93	0.201 (3.79)	-0.250 (2.64)	- 16.1 (0.249)	0.63	1.47	6.76
Dominica (1977-88)	-50.5	0.387 (4.13)	-0.480 (4.05)	34.8 (0.749)	0.93	1.63	46.3
Grenada (1980-87)	-71.5	0.285 (3.19)	-0.028 (0.129)	26.1 (1.47)	0.66	1.68	5.5
Montserrat (1977-88)	-34.97	0.329 (3.71)	-0.234 (1.52)	16.13 (0.861)	0.75	0.896	11.9
St. Kitts & Nevis (1977-87)	-9.04	0.318 (4.10)	-0.830 (9.42)	-82.8 (3.26)	0.93	2.83	48.4
St. Lucia (1977-87)	-180.7	0.697 (6.25)	-0.350 (2.18)	-193.7 (3.13)	0.92	1.60	38.3
St. Vincent & the Grenadines (1977-88)	-17.4	0.318 (11.6)	-0.745 (12.7)	-27.9 (0.817)	0.99	1.82	298.4
O.E.C.S. (Pooled data, no country dummies)	-25.87	0.311 (17.0)	-0.513 (8.57)	-10.9 (0.483)	0.81	-	108.6
O.E.C.S. (Pooled data, country dummies)	-24.03	0.363 (11.7)	-0.558 (10.7)	-27.1 (1.44)	0.87	-	59.9

(All country dummies were significant)

$F_{1,2}$ (6, 67) = 7.31

$F_{2,3}$ (18, 49) = 6.59

Table 4

Model 2

$$s_d = \beta_0 + \beta_1 y + \beta_2 s_f + \beta_3 (d - \pi)$$

Results for all countries Using All Available Data (OLSDV)

Country	β_0	β_1	β_2	β_3	R^2	DW	F
Antigua & Barbuda (1977-87)	0.041	0.015 (3.79)	-0.277 (2.64)	0.002 (0.249)	0.58	1.53	5.68
Dominica (1977-88)	-1.32	0.185 (1.82)	-0.454 (3.91)	0.276 (1.03)	0.93	1.91	48.1
Grenada (1980-87)	-1.21	0.161 (2.08)	-0.194 (1.38)	0.088 (1.40)	0.66	1.81	5.58
Montserrat (1977-88)	-3.11	0.343 (5.60)	-0.283 (2.66)	0.186 (1.27)	0.91	1.17	37.8
St. Kitts & Nevis (1977-87)	-0.327	0.072 (0.829)	-0.824 (9.61)	-0.546 (3.73)	0.95	2.84	59.3
St. Lucia (1977-87)	-7.05	0.901 (4.04)	-0.188 (1.18)	-0.043 (0.247)	0.89	1.54	28.8
St. Vincent & the Grenadines (1977-88)	-0.453	0.089 (2.37)	-0.707 (11.9)	-0.058 (0.415)	0.98	1.97	228.5
O.E.C.S. (Pooled data, no country dummies)	0.358	-0.012 (0.676)	-0.739 (15.2)	0.029 (0.316)	0.80	-	104.9
O.E.C.S. (Pooled data, country dummies)	-0.933	0.155 (4.17)	-0.601 (13.0)	-0.082 (1.20)	0.90	-	78.2

(All country dummies were significant)

$F_{1,2}$ (6, 67) = 13.02

$F_{2,3}$ (18, 49) = 6.73

Table 5

Model 3

$$s_d = \gamma_0 + \gamma_1 \frac{1}{y^2} + \gamma_2 \frac{1}{y^4} + \gamma_3 s_f + \gamma_4 (d - \pi)$$

Results for all countries Using All Available Data (OLSDV)

Country	γ_0	γ_1	γ_2	γ_3	γ_4	R^2	DW	F
Antigua & Barbuda (1977-87)	-8.80	449.5 (2.55)	0.0005 (2.58)	-0.168 (0.233)	0.205 (1.54)	0.77	2.23	9.33
Dominica (1977-88)	-1.61	60.4 (0.104)	0.0002 (0.188)	-0.437 (2.52)	0.363 (5.42)	0.92	1.84	31.7
Grenada (1980-87)	0.655	-37.6 (0.119)	0.000004 (0.007)	-0.200 (1.06)	0.089 (1.21)	0.55	1.82	3.14
Montserrat (1977-88)	-11.45	571.4 (4.17)	0.0007 (5.07)	-0.293 (5.18)	0.137 (1.75)	0.97	3.08	105.9
St. Kitts & Nevis (1977-87)	-0.347	21.1 (0.049)	0.00006 (0.096)	-0.820 (7.33)	-0.545 (3.42)	0.94	2.84	38.2
St. Lucia (1977-87)	-70.4	2932.5 (2.54)	0.006 (2.74)	0.115 (0.704)	0.407 (1.91)	0.94	2.68	41.8
St. Vincent & the Grenadines (1977-88)	-2.50	102.95 (0.794)	0.0003 (0.954)	-0.749 (9.66)	-0.159 (0.869)	0.98	2.05	166.4
O.E.C.S. (Pooled data, no country dummies)	1.43	-52.9 (1.69)	0.00008 (1.79)	-0.700 (13.2)	-0.024 (0.272)	0.81	-	81.6
O.E.C.S. (Pooled data, country dummies)	0.603	-26.3 (0.883)	0.00003 (0.609)	-0.599 (12.5)	-0.083 (1.21)	0.90	-	69.6

(All country dummies were significant)

$F_{1,2}$ (6, 66) = 11.96

$F_{2,3}$ (24, 42) = 6.97

The tests of intercepts and slopes indicate that we must reject the null hypothesis of equality in both cases and for all three specifications. In the particular case under consideration, however, the tests for the equality of the slopes is not reliable if only because it is based on the results obtained from the fits of the individual countries and in the best case, there are only 12 data points; in the worst case (Grenada) there are only eight.

The OLSDV fit for all three specifications is quite good. Looking first at Table 3, the results indicate that both the income and foreign savings coefficients, in addition to being correctly signed, are highly significant.. It is interesting to note that for every dollar inflow of foreign savings the domestic savings effort falls by about 56 cents which is not much different from the values reported for Trinidad & Tobago in Watson [18]. The McKinnon-Shaw hypothesis, however, is rejected: the interest rate coefficient is incorrectly signed and, in addition, is not significant.

Similar conclusions can be drawn from examination of Table 4: once again the McKinnon-Shaw hypothesis is rejected while income and foreign savings are performing as predicted by theory. In Model 3, however, these conclusions must be modified somewhat. Here, the income variables do not perform at all as expected although the overall fit of the Model is quite good. This is symptomatic of the presence of multicollinearity, particularly between $\frac{1}{y^2}$ and $\frac{1}{y^4}$.

We now turn to consider the fixed effects (FE) and the random effects (RE) models. These models require the use of data of equal length and since the only common set of data for all countries covered the period 1980-87, this was used. The summary results for models 1, 2 and 3 are presented in Tables 6, 7 and 8.

Table 6

Model 1

$$S_d = \alpha_0 + \alpha_1 Y + \alpha_2 S_f + \alpha_3 (d - \pi)$$

Results for all countries Using Data 1980-87 (FE and RE Models)

Country	α_0	α_1	α_2	α_3	R^2	DW	F
Antigua & Barbuda	-28.9	0.201 (3.91)	-0.123 (1.12)	11.6 (0.173)	0.70	1.93	6.36
Dominica	-16.6	0.363 (1.73)	-0.888 (2.01)	-148.6 (0.844)	0.88	1.67	18.9
Montserrat	-45.6	0.428 (4.16)	-0.250 (2.65)	8.01 (0.740)	0.88	2.86	18.4
St. Kitts & Nevis	16.93	0.228 (2.10)	-0.996 (6.24)	-54.97 (1.47)	0.90	3.27	21.4
St. Lucia	-98.4	0.523 (2.97)	-0.387 (1.98)	-282.0 (4.02)	0.93	1.97	31.7
St. Vincent & the Grenadines	-46.7	0.455 (12.7)	-0.879 (21.3)	-167.47 (5.05)	0.997	2.68	709.4
O.E.C.S. (Pooled Data, No dummies)	-27.8	0.321 (14.6)	-0.524 (6.54)	-20.6 (0.741)	0.80	-	75.9
O.E.C.S. (FE)	-23.2	0.359 (8.03)	-0.498 (7.12)	-29.3 (1.31)	0.88 (0.73)	-	44.2
O.E.C.S. (RE)	-14.05	0.334 (11.2)	-0.513 (7.59)	-27.3 (1.22)	0.75	-	54.9

$F_{1,2}$ (6, 46) = 6.08

$F_{2,3}$ (18, 28) = 5.54

Table 7

Model 2

$$s_d = \beta_0 + \beta_1 y + \beta_2 s_f + \beta_3 (d - \pi)$$

Results for all countries Using Data 1980-87 (FE and RE Models)

Country	β_0	β_1	β_2	β_3	R^2	DW	F
Antigua & Barbuda	-0.268	0.047 (0.983)	-0.129 (1.25)	0.067 (0.456)	0.21	2.05	1.64
Dominica	-0.285	0.074 (0.309)	-0.927 (2.38)	-0.879 (1.02)	0.89	1.71	19.3
Montserrat	-4.19	0.461 (4.60)	-0.276 (3.29)	0.105 (0.987)	0.93	2.91	32.1
St. Kitts & Nevis	1.16	-0.100 (0.593)	-1.02 (5.56)	-0.338 (1.67)	0.89	3.25	20.5
St. Lucia	-6.55	0.838 (1.59)	-0.109 (0.377)	-0.243 (0.711)	0.91	2.18	23.4
St. Vincent & the Grenadines (1977-88)	-1.59	0.240 (3.48)	-0.882 (12.5)	-0.765 (3.20)	0.99	2.21	286.5
O.E.C.S. (Pooled data, no country dummies)	0.528	-0.031 (1.55)	-0.747 (12.0)	-0.016 (0.156)	0.78	-	66.1
O.E.C.S. (FE)	-1.03	0.166 (3.00)	-0.515 (8.64)	-0.055 (0.798)	0.90 (0.77)	-	56.7
O.E.C.S. (RE)	0.109	-0.002 (0.050)	-0.646 (11.36)	-0.029 (0.364)	0.72	-	49.3

$F_{1,2}$ (6, 46) = 11.59

$F_{2,3}$ (18, 28) = 4.66

Table 8

Model 3

$$s_d = \gamma_0 + \gamma_1 \frac{1}{y_2} + \gamma_2 \frac{1}{y_4} + \gamma_3 s_f + \gamma_4 (d - \pi)$$

Results for all countries Using Data 1980-87 (FE and RE Models)

Country	γ_0	γ_1	γ_2	γ_3	γ_4	R^2	DW	F
Antigua & Barbuda	-16.6	851.3 (1.65)	0.001 (1.68)	-0.179 (1.97)	0.227 (1.46)	0.46	3.03	2.47
Dominica	-4.99	221.5 (0.135)	0.0004 (0.147)	-0.892 (1.74)	-0.652 (0.345)	0.85	1.62	10.9
Montserrat	-23.27	1217.6 (0.695)	0.001 (0.793)	0.257 (2.78)	0.161 (1.19)	0.92	3.01	21.5
St. Kitts & Nevis	-18.98	905.69 (0.397)	0.001 (0.384)	-1.07 (4.23)	-0.303 (1.24)	0.86	3.10	12.2
St. Lucia	-59.15	2469.1 (0.587)	0.005 (0.639)	0.011 (0.030)	0.197 (0.244)	0.88	2.42	14.9
St. Vincent & the Grenadines	-26.4	1089.8 (0.847)	0.002 (0.893)	-0.899 (12.0)	0.032 (0.034)	0.99	2.23	201.6
O.E.C.S. (Pooled data, no country dummies)	1.89	-72.7 (1.61)	-0.0001 (1.81)	-0.699 (10.4)	-0.029 (0.295)	0.79	-	52.1
O.E.C.S. (FE)	1.63	-75.1 (1.59)	0.00004 (0.580)	-0.492 (7.80)	-0.060 (0.865)	0.90 (0.77)	-	51.5
O.E.C.S. (RE)	0.771	-70.3 (1.45)	-0.0001 (1.46)	-0.610 (9.88)	-0.036 (0.459)	0.73	-	38.4

$F_{1,2}$ (6, 45) = 10.83

$F_{2,3}$ (24, 21) = 2.87

This time, the principal results are contained under the headings "O.E.C.S. (FE)" and "O.E.C.S. (RE)". Since the FE Model is identical to the OLSDV model for an equal number of observations across the individual countries, we carry out the same tests for equality of intercepts and slopes[1]. For some reason which we could not determine, the value of R^2 differed for the FE model when we used RATS 5.0 rather than TSP 4.1 (all other results were identical) and since for programming convenience we only used RATS for the RE model, for purposes of comparison we report in parentheses the value of this statistic obtained using the RATS package for the FE model.

For all three specifications, the McKinnon-Shaw hypothesis is rejected. Once again, too, the $F_{1,2}$ and $F_{2,3}$ statistics lead to the rejection of the null hypothesis of equality of the intercepts and slopes, but we must stress even more than we did for the OLSDV model the caveat concerning the slope test since, this time, the individual countries are being fitted with only 8 data points.

Despite using the shorter series, the results for the FE and OLSDV models are very similar for models 1 and 2. Once again, the income and foreign savings coefficients have fairly similar values, are correctly signed and significant. The results obtained for model 3 are similar only to the extent that the foreign savings variable dominates as in the case of the OLSDV model: it is correctly signed and highly significant. The income variables once again seem to be suffering the consequences of collinear data. This seems to suggest that models 1 and 2 are quite stable and therefore more reliable than model 3.

The results of the RE indicate that, for all three specifications, the McKinnon-Shaw hypothesis must once more be rejected. The results for Model 1 are not much different from those obtained for the FE specification, suggesting that there are no special "individual effects",

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[1]The results for Grenada are identical to those in Tables 3, 4 and 5 and are therefore not reported here.

at least in the case of this model. In the case of Model 2, there is a definite deterioration in performance compared to that of the FE model: the income variable coefficient is incorrectly signed and is not significant. The same problem occurs in the case of model 3.

If Grenada is removed from the sample, we would have a consistent set of data covering the period 1977-87 (11 data points each) and this would probably result in improved performance. There is another plausible reason for excluding Grenada: the period under study was very eventful for this small country. In 1979, there was an insurrection which resulted in the seizure of power by a group whose declared objective was to lead the country along the path of "non capitalist development". This led to strained relationships with its O.E.C.S. partners who supported a U.S. led invasion of the country in 1983. In Tables 9, 10 and 11, we present the results for the FE and RE for all the countries of the O.E.C.S. excluding Grenada.

Table 9

Model 1

$$S_d = \alpha_0 + \alpha_1 Y + \alpha_2 S_f + \alpha_3 (d - \pi)$$

Results for all countries (excluding Grenada) Using Data 1977-87 (FE and RE Models)

Country	α_0	α_1	α_2	α_3	R^2	DW	F
Dominica	-61.13	0.439	-0.495	21.1	0.92	1.83	37.7
		(3.63)	(3.99)	(0.407)			
Montserrat	-22.6	0.214	-0.279	17.2	0.79	1.19	13.7
		(3.05)	(2.64)	(1.35)			
St. Vincent & the Grenadines	-17.3	0.318	-0.746	-28.0	0.99	1.82	234.4
			(9.91)	(11.6)	(0.764)		
O.E.C.S. (Pooled Data, No dummies)	-27.5	0.323	-0.535	-42.3	0.82	-	100.0
		(16.1)	(8.11)	(1.42)			
O.E.C.S. (Fixed Effects)	-31.1	0.395	-0.609	-72.4	0.89	-	68.5
			(11.9)	(11.5)	(3.02)	(0.80)	
O.E.C.S. (Random Eff.)	-12.9	0.365	-0.601	-64.6	0.80	-	87.2
		(13.7)	(11.1)	(2.68)			

$F_{1,2}$ (5, 57) = 9.33

$F_{2,3}$ (15, 42) = 5.82

Table 10

Model 2

$$s_d = \beta_0 + \beta_1 y + \beta_2 s_f + \beta_3 (d - \pi)$$

Results for all countries (excluding Grenada) Using Data 1977-87 (FE and RE Models)

Country	β_0	β_1	β_2	β_3	R^2	DW	F
Dominica	-1.56	0.216	-0.465	0.225	0.92	2.07	39.8
		(1.71)	(3.73)	(0.742)			
Montserrat	-2.32	0.257	-0.308	0.179	0.92	1.57	39.7
		(4.43)	(3.74)	(1.59)			
St. Vincent & the Grenadines	-0.473	0.092	-0.704	-0.055	0.98	1.98	187.9
			(2.04)	(10.6)	(0.364)		
O.E.C.S. (Pooled data, no country dummies)	0.378	-0.013	-0.780	-0.080	0.82	-	98.7
		(0.679)	(14.2)	(0.657)			
O.E.C.S. (FE)	-0.990	0.164	-0.656	-0.246	0.92	-	97.9
		(4.11)	(14.0)	(2.84)	(0.83)		
O.E.C.S. (RE)	0.064	0.052	-0.709	-0.165	0.79	-	82.9
		(1.70)	(14.2)	(1.74)			

$F_{1,2}$ (5, 57) = 17.68

$F_{2,3}$ (15, 42) = 6.00

Table 11

Model 3

$$s_d = \gamma_0 + \gamma_1 \frac{1}{y_2} + \gamma_2 \frac{1}{y_4} + \gamma_3 s_f + \gamma_4 (d - \pi)$$

Results for all countries (excluding Grenada) Using Data 1977-87 (FE and RE Models)

Country	γ_0	γ_1	γ_2	γ_3	γ_4	R^2	DW	F
Dominica	-8.27	341.8	0.0007	-0.397	0.571	0.91	1.96	26.7
		(0.459)	(0.533)	(2.08)	(0.741)			
Montserrat	-11.8	591.1	0.0007	-0.292	0.136	0.96	3.12	55.4
		(2.39)	(2.75)	(4.72)	(1.59)			
St. Vincent & the Grenadines	-0.436	176.1	0.0005	-0.760	0.205	0.98	2.19	147.5
			(1.08)	(1.21)	(9.39)	(1.04)		
O.E.C.S. (Pooled data, no country dummies)	2.07	-81.5	0.0001	-0.718	-0.076	0.83	-	80.9
		(2.31)	(2.41)	(12.2)	(0.643)			
O.E.C.S. (FE)	1.47	-66.5	-0.00003	-0.637	-0.253	0.92	-	88.5
		(2.00)	(0.582)	(13.2)	(2.94)	(0.83)		
O.E.C.S. (RE)	0.544	-57.2	-0.00007	-0.690	-0.164	0.79	-	50.7
		(1.61)	(1.26)	(13.1)	(1.72)			

$F_{1,2}$ (5, 56) = 15.83

$F_{2,3}$ (20, 36) = 5.88

In the case of the FE models, there is some improvement to the extent that interest rate variable has now become significant. The negative sign, however, means that the McKinnon-Shaw hypothesis must still be rejected, and may even be indicating that, as far as interest rates are a "price" (as classical economists believed) then the there is a negative "income" effect which is dominating the "substitution" effect. Again, models 1 and 2 validate the strong influences of the income and foreign savings variables, while the income variables in model 3 still do not perform as expected.

The RE model, as before, displays some deterioration compared to the FE model as it did in the situation when Grenada was included in the set. The interest rate variable is significant (but negatively signed) only in the case of model 1 and in the case of models 2 and 3 even the income variables do not perform well. There seems to be less evidence for random as opposed to fixed effects in the models considered.

4. Conclusion

The results clearly indicate that model 1 is the preferred specification among those considered while model 2 is a reasonable alternative. Model 3 suffers from some weaknesses and, in particular, from the effects of multicollinearity.

There seems to be no evidence of the existence of random effects but it must be borne in mind that we limited our investigation to the determination of "individual" as opposed to "temporal" effects.

The McKinnon-Shaw hypothesis is not at all verified in any of the cases considered and this would suggest that any policy aimed at mobilising domestic savings cannot rely on an active interest rate policy. It is possible that this result is due to the almost total absence of a financial/capital market in the O.E.C.S. countries so precluding the possible beneficial role of policy measures involving the use of interest rates. But the problem may also be due to the data used. Indeed, strictly speaking, the definition of the real rate of interest involves the expected rate of inflation for which there is no precise and readily available measure. In our study, was approximated by the actual rate as measured by year on year changes in the consumer price index although we did try other measures similar to those used in Watson [18] and Watson and Ramlogan [19] without any noticeable improvement in the results.

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