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Koskela Erkki and Virén Matti

NATIONAL DEBT NEUTRALITY: SOME INTERNATIONAL EVIDENCE

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NATIONAL DEBT NEUTRALITY: SOME INTERNATIONAL EVIDENCE*

by

Erkki Koskela** and Matti Virén***

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** Professor of Economics, University of Helsinki.

*** Dr. Econ., Bank of Finland.

Abstract:

This paper contains - in the context of consumption behavior - some empirical tests for the debt neutrality hypothesis. According to this hypothesis, the tax/debt financing mix of government spending does not matter. The large international cross section-time series data from OECD countries lends no support to the coefficient restrictions implied by the debt neutrality hypothesis. This result turns out to be robust with respect to various ways of measuring the public sector deficit variable, to weighting patterns, to additional variables, to various data samples and to estimation methods.

CONTENTS

1. INTRODUCTION

Given the volume and composition of government expenditures, does it matter whether they are financed by taxes or debt issues? Do government deficits absorb private saving that would otherwise finance private capital formation? The traditional Keynesian analysis answers positively these questions. Recently, however, this analytical framework has come increasingly under attack. In this paper we are concerned with an evaluation of one line of criticism which says that effects of government expenditures are not dependent on their financing. According to this debt neutrality hypothesis the substitution of government debt for taxation with given government expenditures absorbs no saving and is therefore neither expansionary nor inflationary.

The argument behind the debt neutrality hypothesis is simply that when a government, with given government expenditures, switches from tax to debt financing, expectations of additional future taxes of equal present value offset the current tax reduction so that the timing of tax liabilities does not matter. Consumers have thus effectively an infinite planning horizon via their linking to future generations through a chain of bequests (and gifts) (see Barro (1974) for an exposition). Obviously one can doubt the degree of foresight and rationality required by this process, i.e. the way consumers link current fiscal changes to their future tax liabilities. Even accepting it, one can argue against the neutrality proposition in terms of corner solutions to intergenerational bequests (and gifts), distortions introduced by the tax system, liquidity constraints, distribution effects, in-kind transfers and so on (see, Carmichael (1982a), Feldstein (1982)). The net effect of these potential non-neutralities

cannot be solved by theoretical reasoning. The real issue of debt neutrality must now be considered to be an empirical one.

Despite its fundamental importance very little empirical research has been directly addressed to the debt neutrality issue. Excluding the study by Carmichael and Hawtrey (1981), in which Australian quarterly time series data are used, all tests thus far conducted have utilized U.S. annual time series data (see e.g. Kochin (1974), Yawitz and Meyer (1976), Buiter and Tobin (1979), Holcombe and Jackson and Zardkoohi (1982), Seater (1982) and Feldstein (1982)). The existing time series evidence is quite mixed. Differences in data bases, specification of consumption functions, and definitions of income variables can be mentioned as possible reasons for these mixed findings. Moreover, with the exception of Buiter and Tobin (1979) and Carmichael and Hawtrey (1981), tests of the debt neutrality hypothesis have been quite weak in the sense of using a t-test for the government debt variable[1)]. But, since debt neutrality is defined in the context of a change in the tax/debt finance mix for a given level of government spending, any valid test must combine parameter restrictions on both the tax and debt variables.

This paper provides further empirical evidence on the debt neutrality hypothesis in the following respects: First, we use a large international data sample from 9 OECD countries over the period 1964-1979. Secondly, the debt neutrality hypothesis is tested, not only by using a t-test for the government debt variable, but also by using parameter restrictions on both the tax and debt variables. Thirdly, the robustness of results is extensively checked in terms of the inflation adjustment with respect to the total government debt, in terms of additional explanatory variables

which are often used in the specification of consumption and saving behavior and in terms of the distinction between 'permanent' and 'transitory' components of income.

In what follows, theoretical considerations are discussed in section 2, while section 3 is devoted to empirical results.

2. THEORETICAL CONSIDERATIONS

A major part of the subsequent tests is based on the following consumption function specification

$$(1) \qquad c_t = b_1 \Delta \log p_t + b_2 \Delta U_t + b_3 c_{t-1} + b_4 y_t + b_5 DEF_t + b_6 TAX_t + \sum_{j=1}^{9} d_j D_j + u_t$$

where c_t refers to real per capita private consumption expenditure, y_t to real per capita national income, TAX_t to real per capita taxes (net of transfers), DEF_t to the real per capita public sector deficit, p_t to the implicit deflator of private consumption expenditure and U_t to the unemployment rate (see Appendix 1 for details of the data and data sources). D_j's denote individual country intercepts, while u_t is the error term and Δ the backwards first difference operator.

Leaving aside the additional variables, $\Delta \log p_t$ and ΔU_t, for a while, the consumption function specification (1) is fairly conventional in the sense that consumption is determined by the income variable and the

lagged dependent term. According to the debt neutrality hypothesis the household sector subsumes the public sector under its own behavior and it is reasonable to expect it to do the same for the corporate sector. In what follows corporate retained earnings has been included as a source of income in the real (per capita) national income y_t. There is, in fact, some empirical evidence in favour of the hypothesis of subsuming the corporate sector under the household sector (see Koskela and Virén (1983)) in the sense that corporate retained earnings should be included into the relevant income concept for households. If the debt neutrality hypothesis is true, then from the point of view of households public sector deficits are equivalent to current taxes so that testing for the debt neutrality hypothesis boils down to testing for the coefficient restriction $b_4 = -b_5 = -b_6$ in the consumption function (1), i.e. to testing whether $y_t - DEF_t - TAX_t$ is the appropriate income concept or not. Besides this coefficient restriction test we also apply a weaker test by looking at the question of whether the coefficient estimate of government debt variable will differ from zero (to the negative direction). One should notice that this simple test procedure combines neutrality with the subsidiary hypothesis that increases in government spending and decreases in taxes have the same effect on private consumption expenditure (cf. Feldstein (1982) and also Carmichael (1982b)).

The additional variables, $\Delta \log p_t$ and ΔU_t, can be justified by referring to Deaton's (1977) analysis on the role of unanticipated inflation vis á vis saving on the one hand[2)] and to the "uncertainty hypothesis" on the other hand (see Juster and Shapiro (1979), Juster and Wachtel (1972)). In terms of the latter hypothesis, ΔU_t can be interpreted as a proxy for real income uncertainty, which has a negative effect on household consumption.

The presence of the lagged dependent term in the consumption function (1) can be justified in various ways (for a brief summary, see Deaton and Muellbauer (1980), p. 373-377). Usually, however, reference is made to the permanent income hypothesis and the Koyck transformation. In the present context, this interpretation of the lagged dependent term necessitates the same weights for the lag structures of the income components y_t, DEF_t and TAX_t in the permanent income. Given the fact that time series behaviour of these income components displays great differences as for their relative variability (see figures in Appendix 2), one might expect - using e.g. the analysis of Turnovsky (1969) as a frame of reference - that the adjustment coefficients (of the underlying adaptive expectations model) vary depending inversely on the variability of the respective income components. From this point of view testing for the debt neutrality hypothesis boils down to testing for the coefficient restriction $b_4 = -b_5 = -b_6$ from the 'permanent' components of y_t, DEF_t and TAX_t. Since the rejection of the coefficient restriction may result, not from the invalidity of the debt neutrality hypothesis but, from differences in the time series behavior of various income components we also estimated "directly" the following permanent income consumption function

$$(2) \qquad c_t = a_1 \Delta \log p_t + a_2 \Delta U_t + a_3 y_{pt} + a_4 DEF_{pt} + a_5 TAX_{pt} + \sum_{j=1}^{9} g_j D_j + e_t$$

where the subscript p refers to the "permanent" proxy of the respective variables (the way of forming these proxies is discussed later on) and e_t is the error term. The debt neutrality hypothesis in (2) in its strong form implies the restriction $a_3 = -a_4 = -a_5$, while a weaker test concerns whether a_4 is nonzero and negative.

Before turning to the estimation results we should discuss the definition of the variable DEF. The national income accounting definition for DEF is simply G - TAX where G denotes real (per capita) purchases of goods and services by the public sector. An alternative way of measuring DEF would be to include the loss in the real value of previously outstanding public sector debt to the deficit, that is to write $DEF^a = G - TAX - v$, where $v_t = (D_{t-1})(\Delta \log p_t)$, D_{t-1} being the outstanding real stock of public sector debt (cf. Arak (1982) and Miller (1982))[3]. In what follows we use both the adjusted deficit concept DEF^a and the unadjusted (national income accounting) deficit DEF as the public sector deficit variable (see Appendix 1 for details of contructing DEF^a and DEF).

3. EMPIRICAL RESULTS

The OLS estimation results with the consumption function specification (1) are reported in Table 1. The data consist of 9 OECD countries over the period 1964-1979 the number of observations being 120 (see Appendix 1 for other details). The consumption function was estimated in several forms, using weighted (by population) and unweighted observations as well as observations measured both in local currencies and in US dollars. To test for first-order autocorrelation in residuals, Durbin's m-statistic was computed to account for the break, in sequence in going from one country to the next; in the weighted cases, weights were used in computing the m-statistic.

The estimation results can be summarized briefly as follows: First, as expected, (given the level form of (1)) all equations fit the data very

Table 1. OLS Estimates of the Consumption Function: period 1964-79

	(1) Unweighted Local currency	(2) Weighted Local currency	(3) Unweighted U.S. dollars	(4) Weighted U.S. dollars
$\Delta \log p_t$	-1.998 (3.66)	-1.067 (2.90)	-.915 (4.30)	-.068 (0.28)
ΔU_t	-.032 (1.49)	-.010 (0.96)	-.001 (0.11)	-.012 (1.64)
c_{t-1}	.652 (13.22)	.672 (14.17)	.302 (8.60)	.382 (10.08)
y_t	.275 (8.51)	.322 (8.37)	.593 (20.96)	.631 (14.89)
DEF_t	-.012 (0.28)	-.018 (0.30)	-.050 (0.74)	-.115 (1.11)
TAX_t	-.154 (2.81)	-.295 (4.34)	-.405 (5.02)	-.672 (5.04)
Individual intercepts:				
Canada	.185 (2.79)	.016 (0.26)	-.038 (1.03)	-.168 (4.10)
Finland	.382 (2.04)	-.040 (0.20)	.023 (0.51)	-.135 (2.04)
France	.309 (1.33)	-.325 (1.50)	-.024 (0.52)	-.228 (4.11)
Germany	-.002 (0.01)	-.284 (2.49)	-.124 (3.96)	-.217 (6.36)
Netherlands	.086 (0.60)	-.284 (1.97)	-.109 (2.87)	-.246 (5.05)
Norway	.323 (1.51)	.031 (0.12)	.055 (1.39)	-.001 (0.01)
Sweden	-.227 (0.82)	-.727 (2.50)	-.232 (5.10)	-.302 (4.61)
United Kingdom	.270 (4.32)	.138 (3.46)	.066 (1.82)	.086 (2.57)
United States	.180 (2.68)	.004 (0.07)	.027 (0.59)	-.160 (3.54)
R^2	.999780	.999788	.999589	.999633
Durbin's m	.157 (1.46)	.123 (1.40)	.481 (5.13)	.571 (5.48)
$F_{2,105}$	34.449	10.649	32.190	21.869
$F_{2,88}$	24.805	19.729	9.751	10.560

All variables are expressed in per capita form, number of observations is 120 (with the adjusted deficit variable 103). Numbers inside parentheses are t-ratios. $F_{2,105}$ and $F_{2,88}$ stand for test statistics for the coefficient restriction: $b_4 = -b_5 = -b_6$ in the case of unadjusted and adjusted deficit variable, respectively.
Critical values of the F-statistics are: $F_{.05,88} = 3.13$, $F_{.05,105} = 3.05$, $F_{.01,88} = 4.92$, $F_{.01,105} = 4.74$.

well; the relavant parameter estimates are rather precise and stable. Moreover, country intercepts are significant. F-statistics in cases (1) and (3) of Table 1 are 5.778 and 16.691 respectively, while the critical value at the 1 percent significance level is 2.82. Second, the coefficient estimates of the additional variables are of the expected sign and rather precisely estimated, suggesting that inflation and real income "uncertainty" decrease consumption and increase saving. Third, and most important, the coefficient restriction $b_4 = -b_5 = -b_6$ implied by the debt neutrality hypothesis can in all cases be rejected at the 1 per cent significance level according to F-statistics[4]. This result is not surprising given the low t-ratios of the coefficient estimates of the DEF-variable; with two exceptions they are below one, thus suggesting that the null hypothesis according to which the coefficient of the DEF-variable is zero cannot be rejected[5].

But with the equations which correspond to data measured in U.S. dollars the residuals are, however, autocorrelated. Moreover, OLS estimations also indicate heteroscedasticity of residuals[6]. For both of these reasons the t- and F-tests should be considered with due care. Therefore we made a correction both for autocorrelation and for heteroscedasticity (see Kmenta (1971), p. 509-514). The available computer program made it necessary to concentrate on the period 1972-1979 over which countries has equal number of observations about relevant variables. The estimation results are presented in Table 2, where equations (1) and (2) present OLS estimates with DEF- and DEF^a-variables respectively.

Again the coefficient restriction $b_4 = -b_5 = -b_6$ implied by the debt neutrality hypothesis can in all cases be rejected at the 1 percent

Table 2. OLS and GLS estimates of the consumption function: period 1972-79

	(1)	(2)	(3)	(4)
$d\log p_t$	-1.107 (3.92)	-.989 (2.72)	-1.028 (4.71)	-.965 (3.23)
dU_t	.005 (0.44)	.005 (0.42)	.006 (0.89)	.006 (0.98)
c_{t-1}	.214 (5.12)	.215 (5.20)	.181 (5.79)	.188 (6.10)
y_t	.573 (17.74)	.573 (17.62)	.580 (21.59)	.582 (21.86)
DEF[a]	-.053 (0.59)		-.075 (0.94)	
$ADEF_t$		-.055 (0.63)		-.046 (0.61)
TAX_t	-.112 (1.12)	-.106 (1.03)	-.110 (1.17)	-.126 (1.32)
Individual intercepts				
Canada	-.123 (2.82)	-.117 (2.83)	-.118 (2.79)	-.108 (2.74)
Finland	-.073 (1.54)	-.075 (1.63)	-.056 (1.45)	-.060 (1.58)
France	.009 (1.32)	.008 (1.29)	.014 (2.39)	.012 (2.27)
Germany	-.254 (5.55)	-.252 (5.54)	-.245 (6.56)	-.240 (6.59)
Netherlands	-.192 (4.30)	-.182 (3.83)	-.170 (3.94)	-.162 (3.77)
Norway	-.100 (1.53)	-.094 (1.44)	-.097 (1.65)	-.087 (1.55)
Sweden	-.491 (5.90)	-.487 (5.97)	-.456 (6.13)	-.442 (6.24)
United Kingdom	.025 (0.58)	.036 (0.92)	.024 (0.57)	.041 (1.19)
United States	.081 (2.27)	.086 (2.44)	.104 (2.34)	.108 (2.47)
R^2	.995	.995	.996	.996
$F_{2,57}$	52.054	55.933	..	..
estimation method	OLS	OLS	GLS	GLS

All variables are expressed in per capita form and in U.S. dollars, number of observations is 72. Numbers inside parentheses are t-ratios. $F_{2,52}$ stands for test statistics for the coefficient restriction: $b_4 = -b_5 = -b_6$. GLS refers to estimates after autocorrelation and heteroscedasticity corrections.
Critical values of F-statistics are: $F_{.05} = 3.16$ and $F_{.01} = 4.99$.

significance level according to F-statistics. Moreover, debt variable is not significantly different from zero which contradicts with the debt neutrality. Making both autocorrelation and heteroscedasticity corrections have practically no effect on results as it can be seen from equations (3) and (4) of Table 2. The coefficient estimates of y_t, DEF_t, DEF_t^a and TAX_t and their t-values are almost identical with those given by OLS estimates[7].

The debt neutrality is, if anything, a long-run proposition so that the rejection of the coefficient restriction $b_4 = -b_5 = -b_6$ may not result from the rejection of the debt neutrality hypothesis. The coefficient estimates of y_t, DEF_t and TAX_t may differ because of their different time series behavior, even though the coefficient estimates of the permanent income components of y_t, DEF_t and TAX_t would behave in line with the coefficient restrictions. To test this possibility we constructed empirical proxies for these permanent income components. This was done by fitting for each country, and each time series, an AR(1) process with a constant term and using the fitted values as the permanent income proxies for y_t, DEF_t and TAX_t in the consumption function specification (2). The corresponding OLS estimates are reported in Table 2[8].

The coefficient restriction $a_3 = -a_4 = -a_5$ in the consumption function specification (2) is rejected by the data and the coefficient estimate of DEF_{pt} is of wrong sign from the point of view of the debt neutrality hypothesis (with the caveat, however, that the error term is autocorrelated). These suggest that differences in the coefficient estimates of income components cannot be explained in terms of their different time series behavior[9].

Table 3. OLS Estimates of the Consumption Function with Permanent Income Proxies

Variable		Individual intercepts	
$\Delta \log p_t$	-2.897 (3.23)	Canada	.297 (2.96)
ΔU_t	-.093 (2.96)	Finland	1.092 (3.72)
y_{pt}	.679 (16.62)	France	.961 (2.59)
DEF_{pt}	.270 (2.93)	Germany	-.004 (0.02)
TAX_{pt}	-.159 (1.43)	Netherlands	.180 (0.76)
		Norway	.893 (2.47)
		Sweden	-.678 (1.45)
		United Kingdom	.406 (4.03)
		United States	.428 (4.48)

$R^2 = .999595$, D-W = .864, $F_{2,105} = 90.575$

Observations are unweighted, expressed in per capita form and measured in local currencies.
Critical values of the F-statistics are: $F_{.05} = 3.05$, $F_{.01} = 4.74$

4. CONCLUSIONS

In this paper we have tested the debt neutrality hypothesis, using a large international annual cross country data set from 9 OECD countries over the period 1964-1979. Our results are clearly at the variance with the predictions implied by the debt neutrality hypothesis thus lending no support to the 'Modigliani-Miller proposition in public finance' according to which the tax/debt financing mix of government spending does not matter. Estimates are robust with respect to various ways of measuring the public sector deficit variable, with respect to weighting patterns, to additional explanatory variables, to various data samples and to various estimation

methods. Moreover, rejection of the coefficient restriction implied by the debt neutrality hypothesis does not appear to be explained in terms of the distinction between 'permanent' and 'transitory' components of gross income, taxes and the public deficit.

FOOTNOTES:

1) Recently Carmichael (1982a) has shown that as a matter of fact debt neutrality hinges on the question of whether government bonds and intergenerational transfers are perfect substitutes or not in the individuals' budget. This means that the debt neutrality hypothesis can be formulated independently of the individuals' perception of government debt as net wealth. Consequently, studies using measures of net wealth with and without government debt, like Feldstein (1982), Yawitz and Meyer (1976) and Tanner (1979), do not provide a valid basis for testing debt neutrality (see also Carmichael 1982b).

2) There are also some other ways of justifying the inflation rate variable as a factor affecting consumption (and saving) behavior of households (see e.g. Hendry and von Ungern-Stenberg (1981) and the discussion in Deaton (1977)).

3) Obviously the inflation adjustment should be made to all monetary assets and liabilities by evaluating the corresponding losses and gains from holding them. Due to data problems we do not try to carry out a more systematic adjustment for inflation effects.

4) Almost identical results in terms of F-statistics for the coefficient restriction were obtained without individual country intercepts. Also a similar result was obtained when an equation (1) was estimated separately for each country. In this case the following F-statistics for the coefficient restriction and t-ratios for the government deficit variable in the case of unadjusted deficit variable were obtained:

Country	F-statistic for $b_4 = -b_5 = -b_6$:		t-ratios for $b_4 = 0$:	
	(1)	(2)	(3)	(4)
Canada	23.102	6.279	-3.29	-.33
Finland	11.494	7.100	-2.68	-.98
France	4.266	3.200	-1.95	-1.12
Germany	3.292	5.684	-1.22	-3.12
Netherlands	3.348	1.580	-.67	-1.92
Norway	3.169	4.528	-2.14	-2.15
Sweden	2.871	1.937	-.76	-.04
U.K.	29.511	7.065	-.32	1.00
U.S.A.	4.370	.339	.10	-.77

Columns (1) and (3) correspond to the case without ΔU and $\Delta \log p$. Results with the adjusted deficit variable were almost identical. In most cases, partially due to the very small sample sizes, the DEF_t- and TAX_t-variables are so unprecisely estimated that the test results are not very informative. Anyway they leave some minor reservations for the rejection of the debt neutrality hypothesis.

5) The coefficient estimates obtained with the adjusted deficit variable were .019 (0.37), .026 (0.46), -.092 (1.27), -.173 (1.71) corresponding to the four equations in Table 1. Only the last t-ratio exceeds just the 5 percent significance level (in one-tailed but not in two-tailed t-test). Recalling also the presence of autocorrelation in this case, the result cannot be regarded as an important support for the debt neutrality hypothesis.

6) Heteroscedasticity of residuals was tested by using Glejser's test procedure (cf. e.g. Maddala (1977), p. 262-263). The absolute values of OLS residuals were then regressed on C_t with the null hypothesis of homoscedasticity that the respective coefficient estimate is equal to zero. The resulting t-statistics were 4.53 for equation (1) and 3.37 for equation (3) which clearly exceed the 1 % significance level.

7) Again, the individual country intercepts could not be restricted to be equal according to F-statistics. But excluding the individual country intercepts left the debt neutrality test results practically unchanged. A complete set of results is available from the authors upon request.

8) A more direct way of testing for neutrality as a long run proposition would be to estimate permanent components jointly with the consumption function. Unfortunately, the number of annual observations does not make it a feasible procedure.

9) As a final check of robustness of our results we estimated a savings function specification proposed by Deaton (1977) according to which saving depends on the real income change rate and inflation rate "innovations". The corresponding specification was estimated both with constant and static expectations and by using the (DEF/y^h) as an additional variable. The estimation results with constant expectations (cf. Koskela and Virén (1982a) for the details of the estimation procedure) were as follows:

Variable		Individual intercepts	
$\Delta \log y_t^h$	.282 (7.07)	Canada	.015 (2.02
$\Delta \log p_t$	.151 (4.39)	Finland	-.004 (0.69)
$(s/y^h)_{t-1}$	.602 (8.36)	France	.021 (2.99)
$(DEF/y^h)_t$	.031 (0.70)	Germany	.045 (3.90)
		Netherlands	.036 (3.27)
		Sweden	-.002 (0.43)
		United Kingdom	.008 (1.35)
		United States	.010 (1.73)

R^2 = .966740, Durbins' m = .055 (0.59), number of observations = 110.

where (s/y^h) is the dependent variable y^h being households' real disposable income (see Appendix 1 for other details). As far as the performance of the additional variable (DEF/y^h) is concerned, its coefficient estimate is of the right sign from the viewpoint of the debt neutrality hypothesis, but the t-ratio is so low that the null hypothesis according to which the corresponding coefficient is equal to zero cannot be rejected.

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APPENDIX 1:

Variables and Data Sources

C_t : Private final consumption expenditure from National Accounts of OECD Countries, (OECD, June 1980) (C_t indicates current prices and c_t constant prices).

Y^h_t : Households' disposable income from National Accounts of OECD Countries, (OECD, June 1980).

p_t : The implicit price deflator for private final consumption expenditure.

Y_t : National income from National Accounts of OECD Countries, (OECD, June 1980).

y_t : Real per capita national income, obtained by deflating Y_t by p_t and dividing by the estimate of mid-year population, POP_t.

DEF_t : Real per capita general government deficit from Financial Statistics of OECD Countries, various issues, (deflated by p_t and divided by POP_t).

DEF^a_t : Real per capita general government deficit adjusted for inflation ($DEF^a_t = DEF - (D_{t-1})(\Delta \log p_t)$, where p_t is the implicit deflator of private final consumption expenditure and D_t the real per capita stock of outstanding public sector debt).

D_t : Real per capita total outstanding debt of general government from OECD Financial Accounts, various issues, and Monatsberichte der Deutschen Bundesbank, various issues, and Statistisk Årsbok, Sveriges Riksbank, various issues, and Canada Year Book, various issues, Bulletin trimestriel, Banque de France, various issues (deflated by p_t and divided by POP_t).

y_t^h: Households' real per capita disposable income from National Accounts of OECD Countries (OECD June 1980).

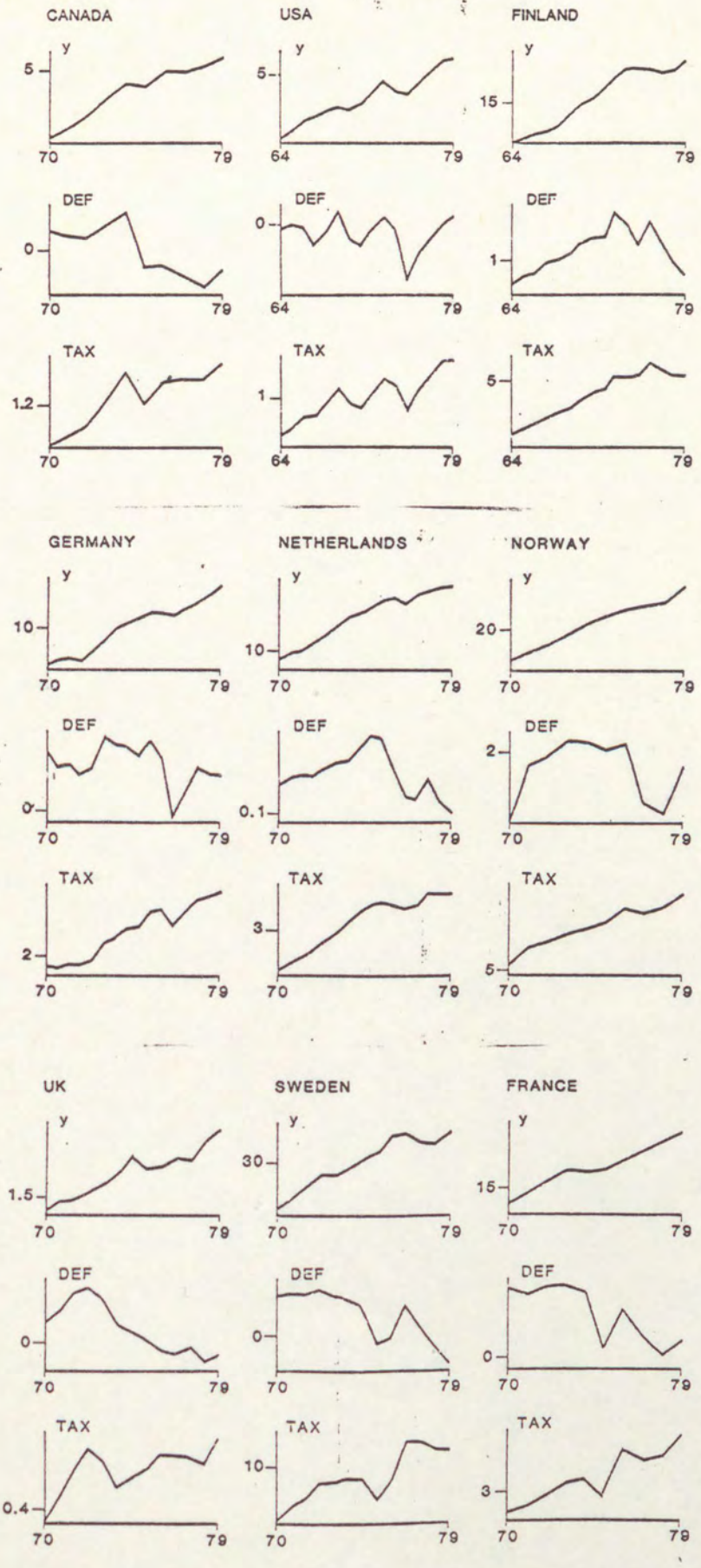
TAX_t: Real per capita taxes net of transfers from National Accounts of OECD Countries, (OECD, June 1980), (deflated by p_t and divided by POP_t).

POP_t: Estimate of mid-year population from OECD Labor Force Statistics, various issues.

The data covers the period 1964-1979 for Finland, Germany, Netherlands and United States, 1967-1979 for Sweden and United Kingdom and 1970-1979 for Canada, France and Norway. Current SNA is used for all countries.

Due to deficient data on the total outstanding debt of general government the number of observations available for the adjusted deficit variable was 103.

APPENDIX 2: Graphs of y_t, $-DEF_t$ and TAX_t



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