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Middle Eastern Department

Private Sector Consumption Behavior and Non-Keynesian Effects of Fiscal Policy

Prepared by Rina Bhattacharya[1]

Authorized for distribution by Sena Eken

August 1999

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Abstract

This paper explores the hypothesis that the propensity to consume out of income is not constant but varies, perhaps in a nonlinear fashion, with fiscal variables. It examines whether there is any empirical evidence to support the hypothesis that households move from non-Ricardian to Ricardian behavior as government debt reaches high levels and as uncertainty about future taxes increases. The paper also examines the possibility of a relationship (along the lines of the Bertola-Drazen model) between the propensity to consume out of income and the government consumption-to-GDP ratio.

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I. INTRODUCTION

Recently the possibility that fiscal policy may have non-Keynesian effects, and in particular the idea that fiscal consolidation can be expansionary even in the short run, has stimulated considerable interest among academic economists and policy-makers.

Standard Keynesian theory suggests that fiscal consolidation reduces private sector demand through negative income multipliers. However, Giavazzi and Pagano (1990, 1996) present empirical evidence to suggest that these negative income multiplier effects may, under certain circumstances, be outweighed by wealth effects (operating through changes in the market value of wealth), or by changes in households' perception of their permanent income. Fiscal consolidation may increase the market value of wealth by reducing the real interest rate—either through crowding in or, if the level of debt is high, reducing the (default) risk premia on government debt. It may also cause households to revise upwards their perception of their after-tax permanent income, if reductions in government expenditure act as a signal of a reduction in the future tax burden. Related to this Blanchard (1990) argues that cuts in current taxes which necessitate even larger increases in future taxes (to pay debt interest charges) can reduce permanent income if the deadweight cost of taxes is increasing in taxes: thus changes in the intertemporal allocation of taxes can affect permanent income.

The empirical evidence for these anti-Keynesian effects comes in part from the experience of two episodes of fiscal consolidation in Ireland (1987–89) and Denmark (1982–84), when fiscal consolidation was accompanied by strong growth in private consumption and investment, despite a significant cut in government spending. Conversely, in Sweden in the early 1990s major tax cuts coincided with sharp falls in private sector demand.

Giavazzi and Pagano (1996) suggest that the overall impact of fiscal consolidation is likely to depend on two broad sets of factors:
(i)   the characteristics of the fiscal consolidation plan - its size/persistence and credibility, and whether the fiscal consolidation comes from public consumption cuts, from tax increases or from reductions of public transfers.
(ii)   initial conditions and the circumstances in which a consolidation plan is implemented - it is plausible that these non-Keynesian effects are more likely to occur in countries where the debt/GDP ratio is very high or has been rising steeply in the recent past.

Most of the empirical work in this area has focused on the issue of the characteristics of the fiscal consolidation plan (e.g. Alesina and Perotti (1996), Giavazzi and Pagano (1996), McDermott and Wescott (1996)), but there has been relatively little empirical work looking directly at the second issue (the importance of initial conditions).

In their 1996 paper Giavazzi and Pagano attempt to test whether the fall in consumption in Sweden in the early 1990s (which coincided with significant tax cuts) is explained by a decline in the market value of wealth, or whether revisions to permanent income may also have played a role. More specifically, they model private sector consumption in Sweden as a function of non-human wealth and household disposable income, but not of (estimated)

permanent income. Ex-post forecasts from this model overpredict Swedish consumption in the early 1990s, which they interpret as evidence that fiscal expansion caused a downward revision of households' (expectations of their) permanent income. The presence of a large negative error is confirmed by other researchers in this area. These results led them to conclude that the key channel through which fiscal policy affected private sector consumption in Sweden in the early 1990s was through changes in (expected) permanent income, rather than through changes in real interest rates.

In this paper I empirically explore the hypothesis that the propensity to consume out of income is not constant but varies, perhaps in a non-linear fashion, with fiscal variables. More specifically, the idea is that expected permanent income is a time-varying multiple λ_t of current gross household income, where λ_t is a non-linear function of fiscal variables, such as the government debt-to-GDP ratio or the government consumption-to-GDP ratio. I derive time-varying estimates of the propensity to consume out of current gross household income for twelve OECD countries - Austria, Belgium, Canada, France, Greece, Italy, the Netherlands, Japan, Spain, Sweden, the United Kingdom and the United States, and see whether the empirical results provide any support for this hypothesis.

The hypothesis is consistent with the theoretical model of consumers with finite horizons presented in Sutherland (1997). The idea is that at low levels of government debt fiscal policy has the usual "Keynesian effects", with the positive income effects of a higher fiscal deficit outweighing any possible negative effects through downward revisions to expected permanent income. This is because consumers benefit from the higher flow of current income resulting from the fiscal deficit and expect future generations to pay the implied taxes. The opposite occurs when the level of government debt is high: under these circumstances a higher debt-financed fiscal deficit can be contractionary because it signals that a debt stabilization programme or a government default may be imminent, which could have serious negative real effects on the economy. For households this implies that their expected tax bills increase by more than their current incomes rise as a result of the higher fiscal deficit, and so they reduce their current consumption. Thus we find that, in terms of Sutherland's model, a fiscal transfer that takes place when the level of per capita government debt is low has a less than one-for-one effect on expected future taxes, while a fiscal transfer that takes place when the level of per capita government debt is high has more than a one-for-one effect. The implication is that, at relatively low ratios of debt-to-GDP, the multiple λ is high and rising or perhaps flat, but as the debt-to-GDP ratio reaches high levels (which may be regarded as unsustainable) the value of λ starts to fall sharply (see Figure 1). In short, households move from non-Ricardian to Ricardian behavior as government debt reaches high levels and as uncertainty about future taxes increases.

Sutherland's intergenerational model looks at the relationship between government debt and expected permanent income, while abstracting away from the dynamics of government spending. By contrast Bertola and Drazen (1993) propose an alternative model which looks at the relationship between government spending and expected permanent income, while abstracting away from the dynamics of government debt. In normal times—that is, in the absence of fiscal crises, a rise in government spending crowds out private sector consumption

because of expectations of higher future taxes (expected permanent income falls). If, however, households believe that current high levels of government spending are unsustainable and will soon be cut, and that taxes in the future will be significantly lower, the effect of any further increases in government spending will be an increase in expected permanent income. Bertola and Drazen assume that consumers are uncertain about the precise level of spending at which a stabilization takes place. This gives rise to a variety of consumer responses to the evolution of government spending. The general idea of the Bertola and Drazen model, however, is that increases in government spending have smaller and smaller crowding out effects as a crisis point approaches because it induces sufficiently strong expectations of future policy changes in the opposite direction. If expectations follow this model then one possibility is a non-linear relationship between λ and the government consumption-to-GDP ratio, as shown in Figure 2.

Section 2 presents more details of the standard consumption function that is estimated. Section 3 presents the empirical results and uses panel data estimation techniques to test for an empirical relationship between the propensity to consume out of current gross household income and the government debt-to-GDP ratio and/or the government consumption-to-GDP ratio. Finally Section 4 presents the main conclusions.

II. THE THEORETICAL BASIS FOR THE ESTIMATED CONSUMPTION FUNCTION

Each representative consumer in the economy is assumed to maximize expected lifetime utility as of period t:

$$\text{Max } E_t \sum_{t=0}^{T} (1+\rho)^{-t} U(C^*_t) \tag{1}$$

where C^*_t denotes total effective real consumption at time t;

ρ is a constant (positive) rate of subjective time preference; and

T is the expected time of death.

It is assumed that total effective real consumption C^*_t in period t is a linear combination of private consumption C^P_t and a fraction θ of government consumption spending G_t:

$$C^*_t = C^P_t + \theta G_t \tag{2}$$

A negative value for θ implies that an increase in government consumption raises the marginal utility of private consumption (i.e. the two are complements), whereas a positive θ would suggest that an increase in government consumption diminishes the marginal utility of private consumption (i.e. the two are substitutes).

Government Debt/GDP

λ_t

Figure 1

Government Consumption/GDP

λ_t
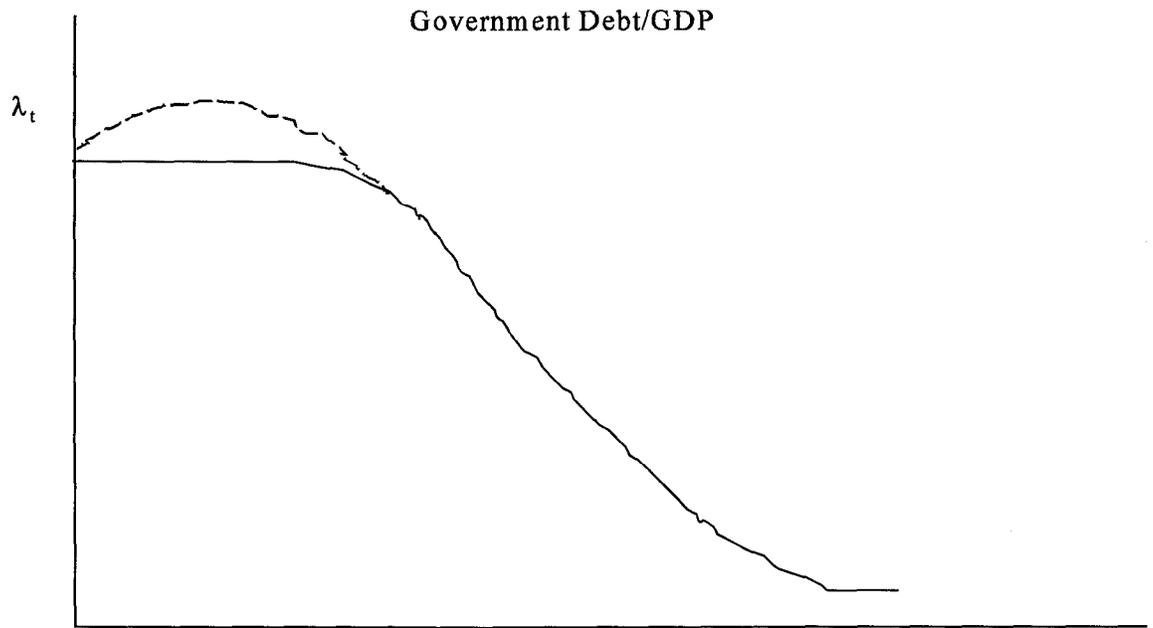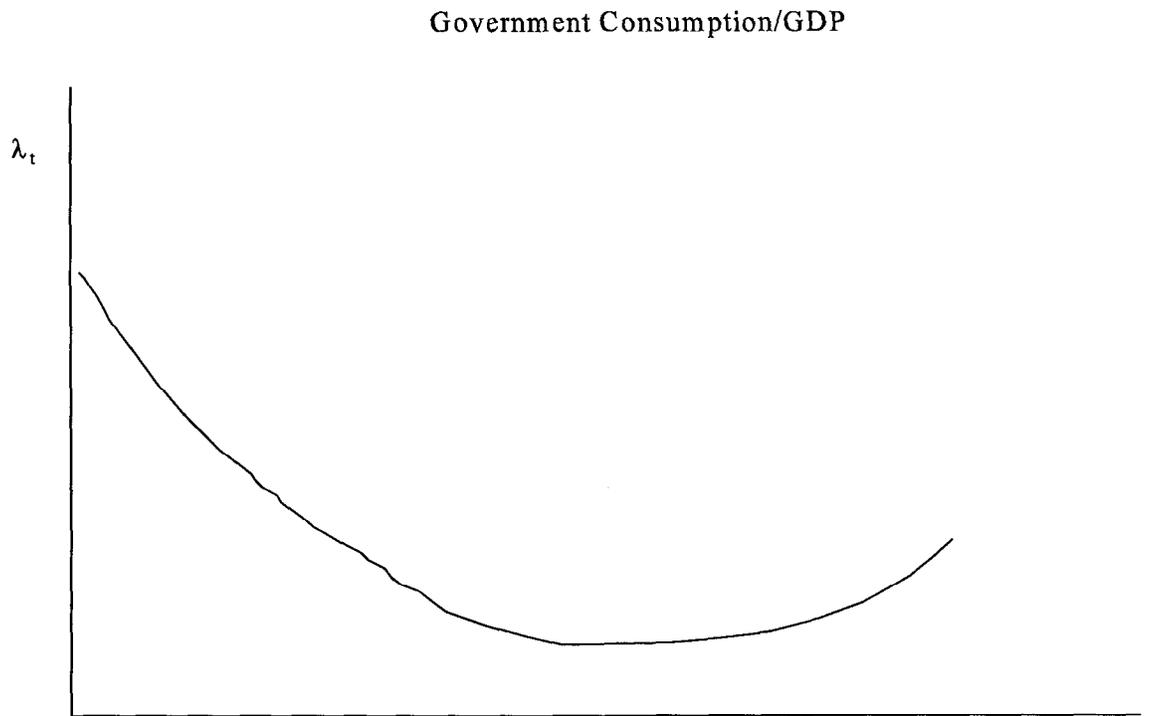
Figure 2

The standard household budget constraint is given by

$$A_{t+1} \quad = \quad (1+r)A_t + Y^L_t - C^P_t - \tau_t \tag{3}$$

where A_t is the financial assets (nonhuman wealth) of the consumer in period t;

Y^L_t is the gross labor income of the consumer in period t;

τ_t is the taxes paid by the consumer in period t;

and r is the real interest rate, assumed to be constant.

If the utility function is quadratic, if preferences are intertemporally separable, and the (constant) real interest rate r is equal to the (constant) rate of time preference ρ, we have

$$E_t(C^P_{t+1} + \theta G_{t+1}) \quad = \quad C^P_t + \theta G_t \tag{4}$$

Assuming that the consumer has no bequest motive to accumulate assets to pass on to his heirs after his death, the planned consumption path from period t to T will satisfy

$$E_t \sum_{s=t}^{T} (1+r)^{-(s-t)} C^P_s \quad = \quad A_t + E_t \sum_{s=t}^{T} (1+r)^{-(s-t)} (Y^L_s - \tau_s) \tag{5}$$

Taking expectations of (5) conditional on information available at time t, and using the result in (4) that expected effective real consumption is constant, we get

$$C^P_t + \theta G_t \quad = \quad \beta \left[A_t + E_t \sum_{s=t}^{T} (1+r)^{-(s-t)} (Y^L_s - \tau_s) \right] + \theta E_t G_{t+1}$$

$$= \quad \beta E_t W_t + \theta E_t G_{t+1} \tag{6}$$

where $\beta \quad = \quad r / [(1+r) - (1+r)^{-T}]$

This is a modified version of the permanent income hypothesis, with government consumption entering into the utility function. β is the propensity to consume out of (expected) lifetime wealth, and is assumed to be the same for both human and nonhuman wealth. To make this type of model tractable, most empirical studies to date have assumed that the present discounted value of current and future real disposable household incomes is a distributed lag of current and past real disposable household incomes. Often these types of consumption functions have been estimated in first differences. When combined with the assumption of rational expectations, the change in $E_t W_t$ is taken to be a white noise process which can be incorporated in the standard error term ϵ_t.

Where I propose to depart from the existing literature is instead to hypothesize that expected permanent income is a non-linear function of current gross household income such that

$$E_t W_t = A_t + E_t \sum_{s=t}^{T} (1+r)^{-(s-t)} (Y_s - \tau_s)$$

$$= \gamma_1 + \lambda_t Y^T_t \tag{7}$$

where Y^T_t is the total (labor and non-labor) gross income of the consumer in period t; and λ_t is a non-linear function of government net debt per capita, or of government consumption spending per capita, both as a proportion of per capita GDP.

Following Sutherland (1997) the idea here is that, at low or moderate levels of government debt per capita, fiscal policy has the usual Keynesian effects, and consumers behave in a non-Ricardian manner. Current generations of consumers discount future taxes because they may not be alive when taxes are raised (or there will be a larger population available to pay taxes). But when government debt per capita reaches very high (perhaps unsustainable) levels, current generations of consumers know that there is a high probability that the burden of extra taxes to finance even higher levels of government debt will fall on them. Consequently their behavior becomes more Ricardian.

If one further assumes that real per capita government consumption spending is expected to grow in line with real per capita GDP we get that

$$E_t G_{t+1} = (1+n) G_t \tag{8}$$

where n is the steady-state growth rate of real per capita GDP.

Substituting (7) and (8) into (6) we get the following consumption function:

$$C^P_t = \alpha + \beta \lambda_t Y^T_t + \theta n \, G_t$$
$$= \alpha + \delta_t Y^T_t + \theta n \, G_t \tag{9}$$

where
$$\alpha = \beta \gamma_1$$
$$\delta_t = \beta \lambda_t$$

and δ_t is the (time-varying) propensity to come out of current gross income. λ_t is thus the variable which relates current gross income to expected lifetime wealth. The main hypothesis of this paper is that λ_t depends on current and expected future fiscal policy, and is a non-linear function of current fiscal variables such as the government debt-to-GDP ratio.

III. THE EMPIRICAL RESULTS

As argued earlier in this paper, there is reason to believe that the propensity to consume out of income is not necessarily constant, but may vary over time in line with developments in fiscal variables such as government net debt or government consumption as a percentage of GDP. This is because movements in these variables may affect expectations about the future level of taxes. If this is the case then standard regression techniques might not be appropriate. One widely-used technique for deriving time-varying parameter values is the Kalman Filter. This is the approach that is used in this paper. Its key elements, applied to Equation (9) above, are as follows:

Measurement Equation

$$\text{Log } C^p_t = Z_t \alpha_t + \xi_t \tag{10}$$
$$\xi_t \sim N(0, \sigma^2)$$

where

Log C^p_t is the dependent variable and is defined as before, and

Z_t consists of three independent variables - the constant term, the log of per capita gross household income in period t, and the log of per capita government consumption in period t. All variables are defined in real terms.

Transition Equation

$$\alpha_t = \alpha_{t-1} + \eta_t \tag{11}$$
$$\eta_t \sim N(0, \sigma^2 Q)$$

Initial Conditions

$$\alpha_0 \sim N(a_0, \sigma^2 P_0) \tag{12}$$

The above state-space model was estimated using a Kalman Filter for twelve OECD countries - Austria, Belgium, Canada, France, Greece, Italy, the Netherlands, Japan, Spain, Sweden, the United Kingdom and the United States. All the data for the estimation came from the OECD Analytical Database. These particular countries were chosen because they were the only ones to have a sufficiently long time-series data[2]. Gross household income here is defined as household disposable income plus direct taxes paid by households plus total

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[2] Finland also has a relatively long time-series data on these variables, but the government there has been in a net creditor position at least since the early 1960s.

transfers paid by households less total transfers received by households. The figures for government net debt (the net financial liabilities of government) includes all financial liabilities less all financial assets, as defined by the system of National Accounts (where data availability permits), and covers the general government sector which is a consolidation of central government, state and local government, and the social security sector.

An estimate of Q was obtained by first setting $\eta_t = 0$ in the transition equation, estimating the model using recursive least squares, and dividing the variance-covariance matrix of the estimated coefficients by the variance of the error terms in the measurement equation. Estimates of the vector of prior coefficients a_0, σ^2 and P_0 were obtained from a regression of the initial observations of the sample. The results presented in Table 1 are the coefficients and t-statistics from the last period observation for each country that were obtained after "smoothing" (see Harvey (1981)). Use of the Kalman Filter enabled estimation of time-varying coefficients for δ_t, but with the existing data and methodology it was not possible to get estimates separately for β and λ_t.

Table 1. Summary of Kalman Filter Coefficient Estimates

	Constant term	Coefficient on government consumption	Coefficient on total gross income of households
Austria, 1966–1994 (t-statistic)	-0.21 (-0.71)	0.48 (2.96)**	0.58 (4.78)**
Belgium, 1976–1995 (t-statistic)	-1.07 (-2.03)*	0.30 (2.09)*	0.80 (7.68)**
Canada, 1967–1996 (t-statistic)	0.81 (4.91)**	0.50 (3.27)**	0.45 (3.38)**
France, 1969–1996 (t-statistic)	0.33 (2.68)**	0.47 (6.31)**	0.54 (7.10)**
Greece, 1966–1996 (t-statistic)	1.21 (4.72)**	0.37 (3.66)**	0.58 (5.75)**
Italy, 1976–1995 (t-statistic)	-5.73 (-16.06)**	0.60 (2.18)*	0.79 (3.05)**
Japan, 1966–1995 (t-statistic)	-1.46 (-3.48)**	0.48 (3.38)**	0.68 (7.13)**
Netherlands, 1976–1996 (t-statistic)	-3.32 (-4.93)**	0.67 (11.08)**	0.76 (6.58)**
Spain, 1970–1995 (t-statistic)	1.67 (8.40)**	0.10 (4.63)**	0.77 (23.58)**
Sweden, 1966–1996 (t-statistic)	3.33 (6.64)**	0.28 (5.44)**	0.44 (5.09)**
United Kingdom, 1966–1996 (t-statistic)	0.06 (0.12)	0.01 (0.04)	0.96 (5.64)**
United States, 1966–1996 (t-statistic)	0.05 (0.14)	-0.22 (-3.16)**	1.16 (38.08)**

*   Significant at the 5% level
**   Significant at the 1% level

The first striking observation is that the coefficient estimates vary widely across countries. Looking first at government consumption, the coefficient is statistically significant for all countries except for the United Kingdom. For almost all of the other countries the estimated coefficients are positive and statistically significant, varying from 0.10 in Spain to 0.67 in the Netherlands. The one exception is the United States, where the coefficient is statistically significant and negative at -0.22. In terms of the theoretical model presented above, the implication is that government consumption and private consumption act as complements in the United States (an increase in government consumption serves to increase the marginal utility of private consumption). The opposite would be the case in all of the other countries.

The estimated coefficients on total gross income of households also varies widely across countries but is always positive and statistically significant at the 1 percent level. It is greater than one for the United States, with an estimate of 1.16. For the other countries the estimates vary from a low of 0.44 in the case of Sweden, to a high of 0.96 in the case of the United Kingdom.

The twelve countries in this study can be classified into three broad groups. Group 1 - consisting of Japan, the Netherlands, the United Kingdom and the United States - can be characterized as having relatively low, and fairly stable, government debt-to-GDP ratios. The second group of countries - Group 2, consisting of Austria, France, Spain and Sweden - are those which have had relatively low, but slowly and steadily rising, government debt-to-GDP ratios over the period under study. In the last group of countries - Group 3, consisting of Belgium, Canada, Greece and Italy - the government debt-to-GDP ratio has been rising quite rapidly to very high levels over the past two decades or so.

Figures 3a, 3b and 3c plot government net debt as a percentage of GDP (top panel) and the estimated coefficients on gross household income (lower panel) - that is, the estimated $\beta\lambda_t$ s - over time for the three groups of countries mentioned above. Figures 4a, 4b and 4c plot the coefficients, not over time but against government net debt as a percentage of GDP, for all the countries in each of the three groups. Finally Figures 5a, 5b and 5c plot the estimated coefficients against government consumption as a percentage of GDP for all the countries in each of the three groups.

We start by looking at the relationship between the propensity to consume out of current gross household income and the level of government indebtedness. For the Group 1 countries the time-series evidence is decidedly mixed. In the case of Japan there appears to be no clear relationship between the estimated propensity to consume and government net debt as a percentage of GDP. In this context it is relevant to note that, over the period under study, government net debt was always below 30 percent of GDP. The evidence from the United Kingdom suggests that, at relatively low levels of government indebtedness, there is no discernible relationship between the two variables, but once the government debt-to-GDP ratio exceeds 30 percent there is a clear tendency for the propensity to consume to decline as government indebtedness increases. Turning now to the Netherlands the evidence points to an inverse-U relationship between the coefficient on current gross household income and

government net debt as a percentage of GDP, with a threshold level of government net debt at around 35 percent of GDP.

The United States is once again an outlier, being the only country in this study to show a steadily rising propensity to consume out of current gross household income while government net debt rose steadily since the early 1980s to almost 50 percent of GDP. This may have something to do with the belief that the United States government would be able to finance its debt through external borrowing more easily, and at lower cost, than most other countries. Such optimism may be based on the dollar's prominence as an international currency, the relative size of the United States economy, and the fact that United States had been in a strong net external creditor position for most of this century until the mid-1980s.

In none of the Group 2 countries is there a clear relationship between the propensity to consume out of current gross household income and government indebtedness. It is important here to note that France, Spain and Sweden had a government debt-to-GDP ratio under 35 percent over most of the estimation period - indeed, in the case of Sweden, the entire estimation period. And in the case of Austria Figure 4b indicates a clear negative relationship between the propensity to consume out of current gross household income and government net debt once the government debt-to-GDP ratio exceeds 35 percent.

We turn now to the Group 3 countries which have had high and rapidly rising government indebtedness over the past two decades or so. Canada and Greece show a clear negative relationship between government indebtedness and the propensity to consume out of current gross household income. The evidence from Italy also indicates a negative relationship for most of the period, although there are a couple of outliers in 1994 and 1995 which suggest that there might have been a structural break around that time. This may have been related to the signing of the Maastrict treaty and expectations that the government would have to permanently cut its spending in order to meet the criteria for being a member of EMU.

The results for Belgium are somewhat more difficult to interpret. They indicate a negative relationship between the two variables of interest, but with a structural break in the mid-1980s. This may have had something to do with Sint-Anna program for stabilizing government debt, which was approved in May 1986 and marked a significant departure from past efforts at fiscal adjustment. The policy package was innovative both in terms of the magnitude of adjustment that was required and for the fact that it relied almost exclusively on expenditure-cutting measures rather than on tax increases as had been the case in the past. It is noteworthy that the government debt-to-GDP ratio started to stabilize around this time, after having risen sharply over the previous decade.

In short, the time-series evidence presented above provides some empirical support for the hypothesis that households move from non-Ricardian to Ricardian behavior as government indebtedness reaches high levels and as uncertainty about future taxes increases. In particular there appears to be a critical threshold level of around 30–35 percent of GDP, after which the propensity to consume out of gross household income tends to fall steadily as government net debt rises. The major exception to this general result is the United States.

Panel data estimation results provide further evidence in support of a negative relationship between the propensity to consume out of current gross household income and government net debt as a percentage of GDP. Equation (13) presents the fixed effects ("Within") results obtained from regressing the estimated propensity to consume against government net debt and government net debt squared, both as a percentage of GDP. Equation (14) presents the corresponding random effects estimates. Both sets of results suggest a significant negative relationship, and the estimated coefficients are very similar. However, the Hausman specification test rejects at the 5 percent level the null hypothesis that the individual country intercept terms are uncorrelated with the independent explanatory variables, implying that the random effects estimates are biased and inconsistent. Moreover, both sets of results indicate that the relationship between the propensity to consume and government net debt is linear rather than quadratic.

Fixed Effects Estimates

$$PTC_t = \text{constant} - 0.002306 \ GNDGDP_t + 0.000004 \ (GNDGDP_t)^2 \qquad (13)$$
$$(-5.355) \qquad\qquad (1.145)$$

R-squared = 0.8546   Adjusted R-squared = 0.8479

F-test that the intercept terms are the same across countries
= F(11,281) = 130.36, p-value = 0.0000

Random Effects Estimates

$$PTC_t = 0.7938 - 0.002190 \ GNDGDP_t + 0.000004 \ (GNDGDP_t)^2 \qquad (14)$$
$$(17.487) \ (-5.112) \qquad\qquad (1.013)$$

R-squared = 0.0233   Adjusted R-squared = -0.0219

where
PTC is the estimated propensity to consume out of current gross household income, and GNDGDP is government net debt as a percentage of GDP.

(Figures in brackets are t-statistics).

Hausman Test of H_0: Random Effects vs. H_0: Fixed Effects

Chi-squared (2) = 7.3593, p-value = 0.0252

Turning now to the propensity to consume out of current gross household income and government consumption as a percentage of GDP, Figures 5a, 5b and 5c indicate that if there

is a relationship between these two variables it is indeed very weak: only in the case of Japan is any sort of relationship clearly discernible.

Panel data estimation provide somewhat more positive results than the individual country time-series evidence, although even here the results are far from conclusive. Equation (15) presents the fixed effects results obtained from regressing the estimated propensity to consume against government consumption and government consumption squared, both as a percentage of GDP. Equation (16) presents the corresponding random effects estimates. Both sets of results suggest a negative relationship, which is borderline significant at the 5 percent level in the fixed effects case and at the 7 percent level in the random effects case, and the estimated coefficients are once again quite similar. This time, however, the Hausman specification test does not reject at the 5 percent level the null hypothesis that the individual country intercept terms are uncorrelated with the independent explanatory variables, implying that the random effects estimates are consistent. As in the case with government net debt, the coefficients on the squared term are statistically insignificant even at the 10 percent level, indicating that if there is a relationship between the propensity to consume and government consumption as a percentage of GDP it is linear rather than quadratic.

Fixed Effects Estimates

$$PTC_t = \text{constant} - 0.016081\ GCONGDP_t + 0.000170\ (GCONGDP_t)^2 \qquad (15)$$
$$\phantom{PTC_t = \text{constant} - }(-1.985) (0.786)$$

R-squared = 0.8224   Adjusted R-squared = 0.8151

F-test that the intercept terms are the same across countries:
$F(11,314) = 113.35$, p-value = 0.0000

Random Effects Estimates

$$PTC_t = 0.9329 - 0.014479\ GCONGDP_t + 0.000130\ (GCONGDP_t)^2 \qquad (16)$$
$$(10.909)\ (-1.807) (0.607)$$

R-squared = 0.0334   Adjusted R-squared = -0.0066

where PTC is the estimated propensity to consume out of current gross household income, and
GCONGDP is government consumption as a percentage of GDP.

(Figures in brackets are t-statistics).

Hausman Test of H_0: Random Effects vs. H_0: Fixed Effects

Chi-squared (2) = 1.9612, p-value = 0.3751

Figure 3a - Group 1:

Government Net Debt and Propensity to Consume, 1960–96
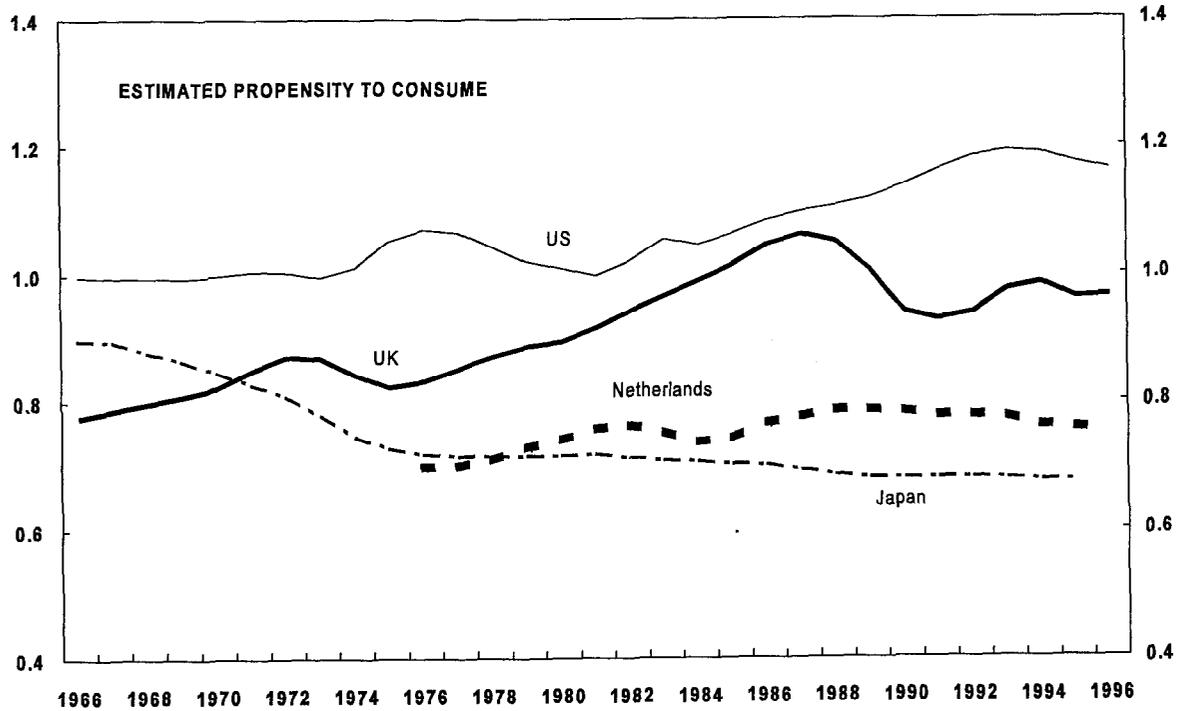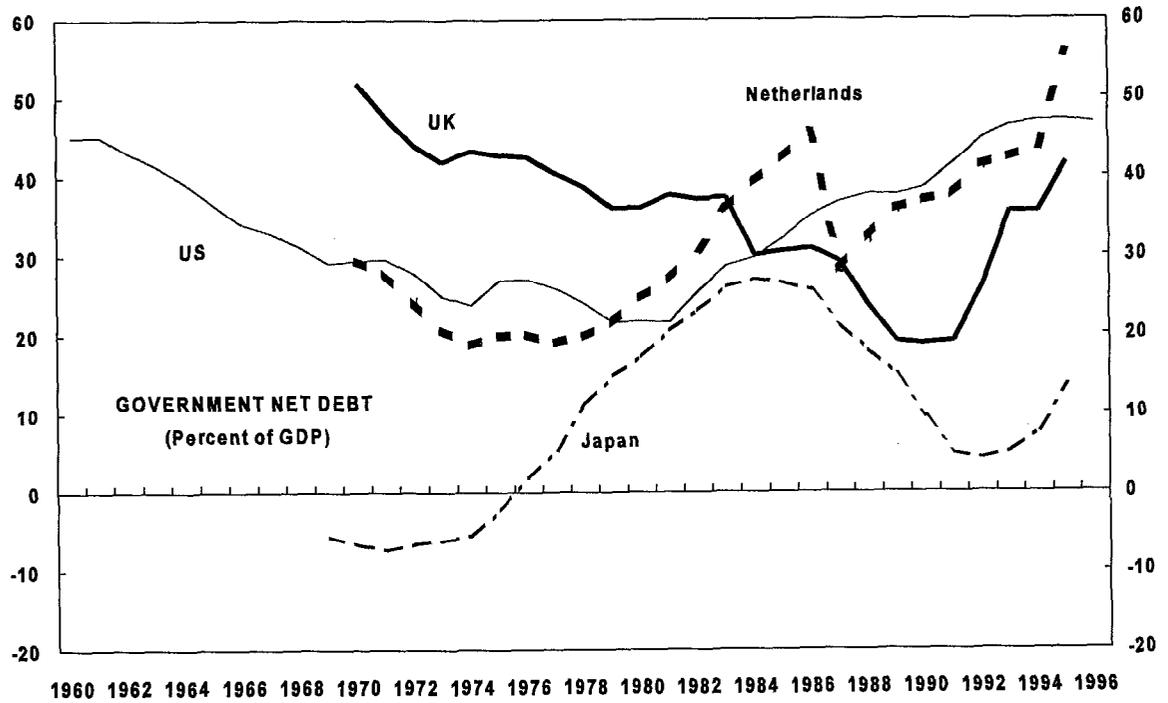
Figure 3b - Group 2:

## Government Net Debt and Propensity to Consume, 1960–96
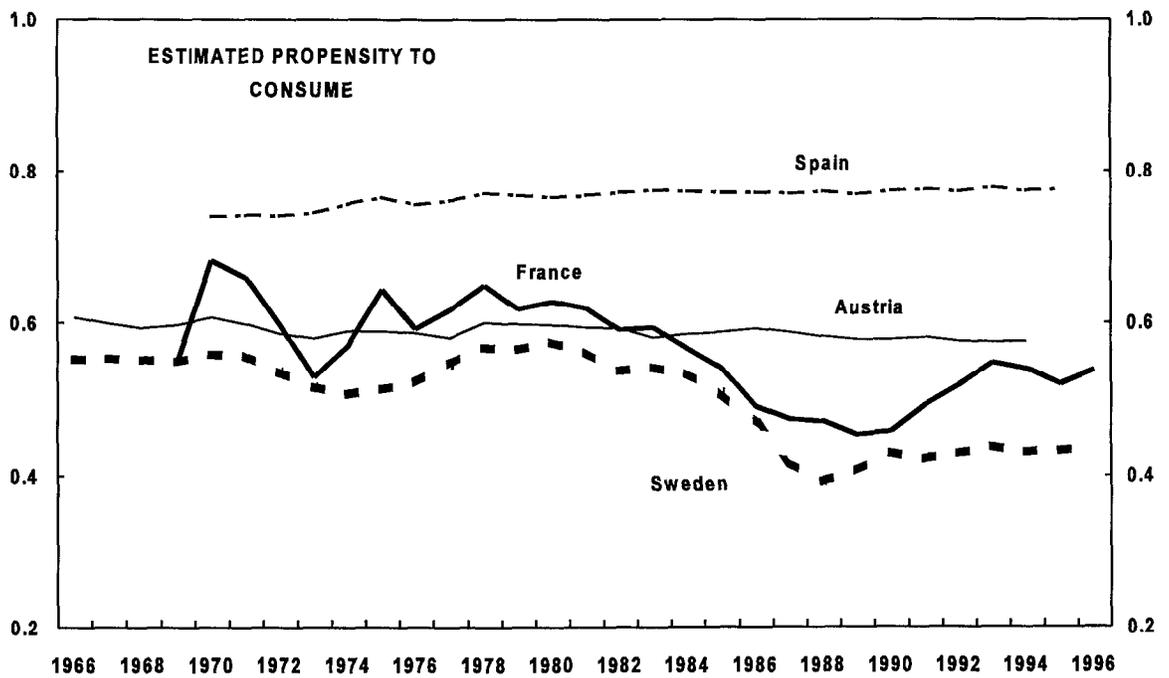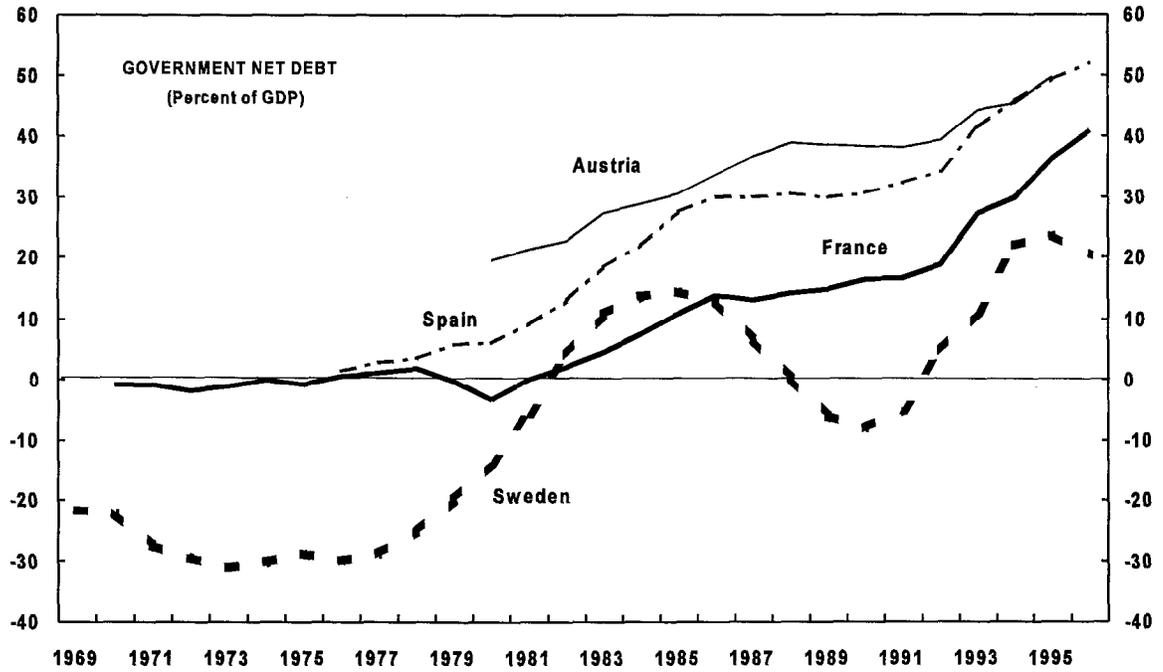
Figure 3c - Group 3:

Government Net Debt and Propensity to Consume, 1960–96
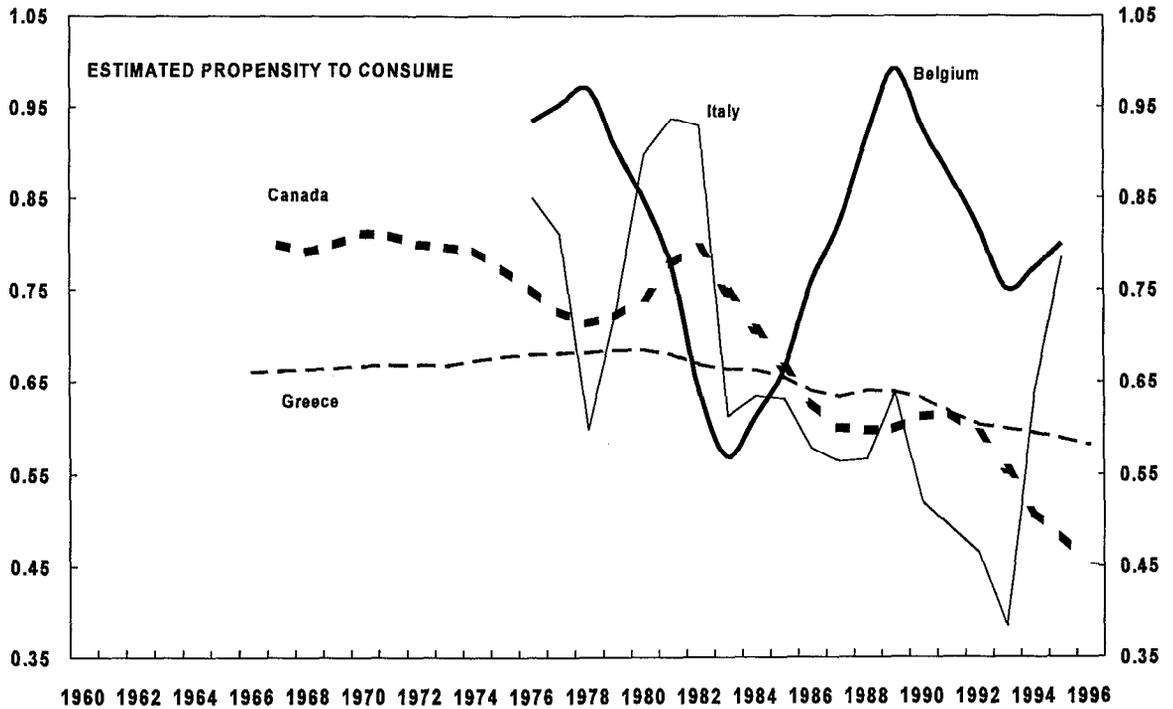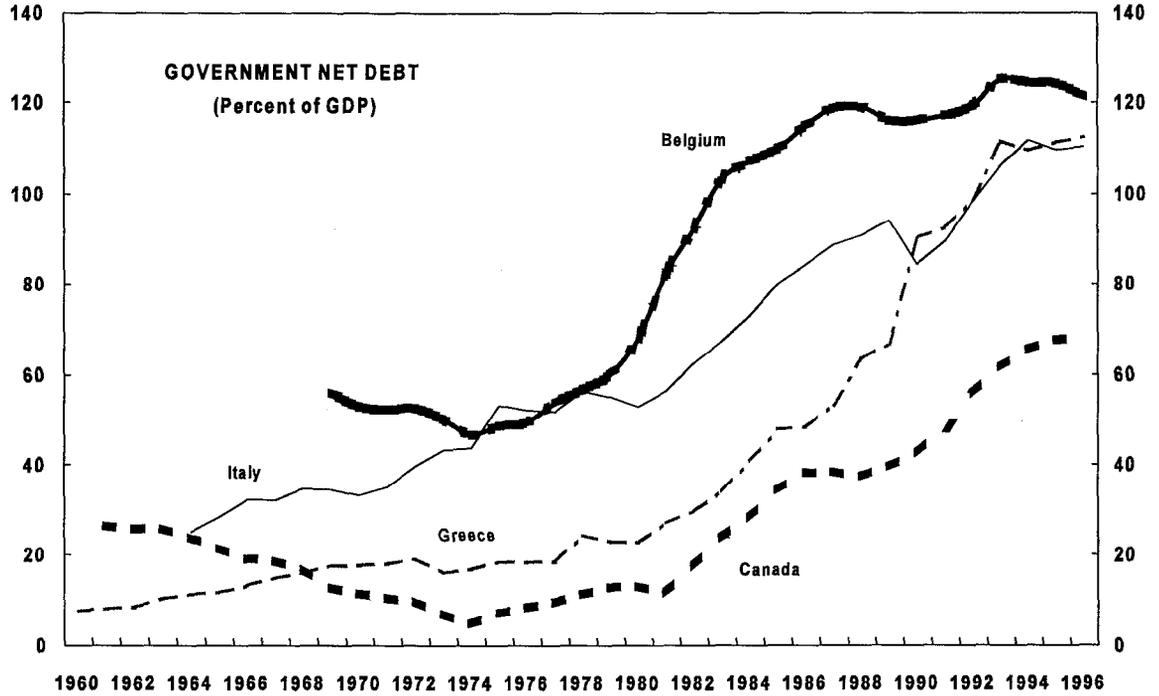
Figure 4a - Group 1:
Coefficient on Gross Household Income against Government Net Debt

Japan

Netherlands

United States

United Kingdo
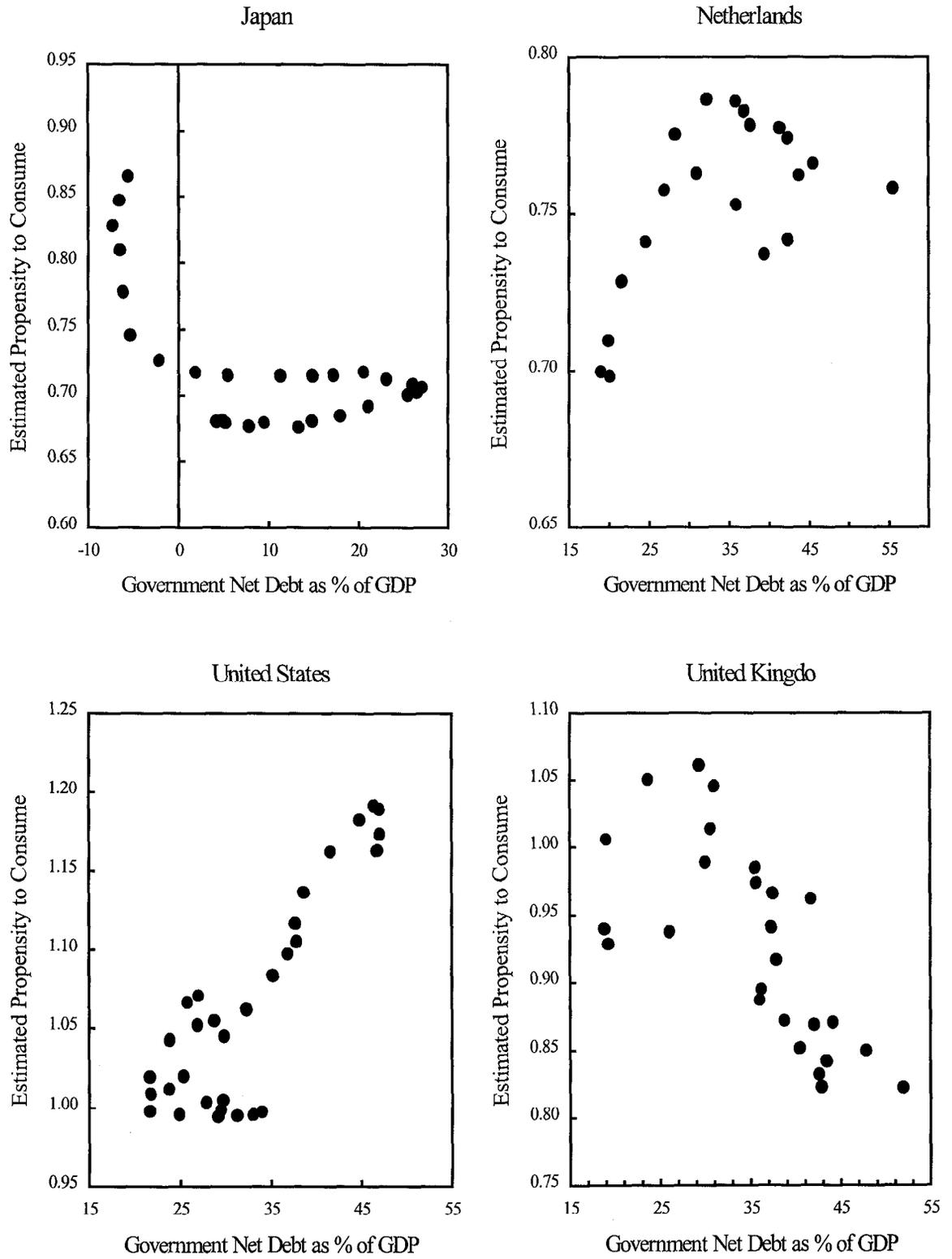
Figure 4b - Group 2:
Coefficient on Gross Household Income against Government Net Debt
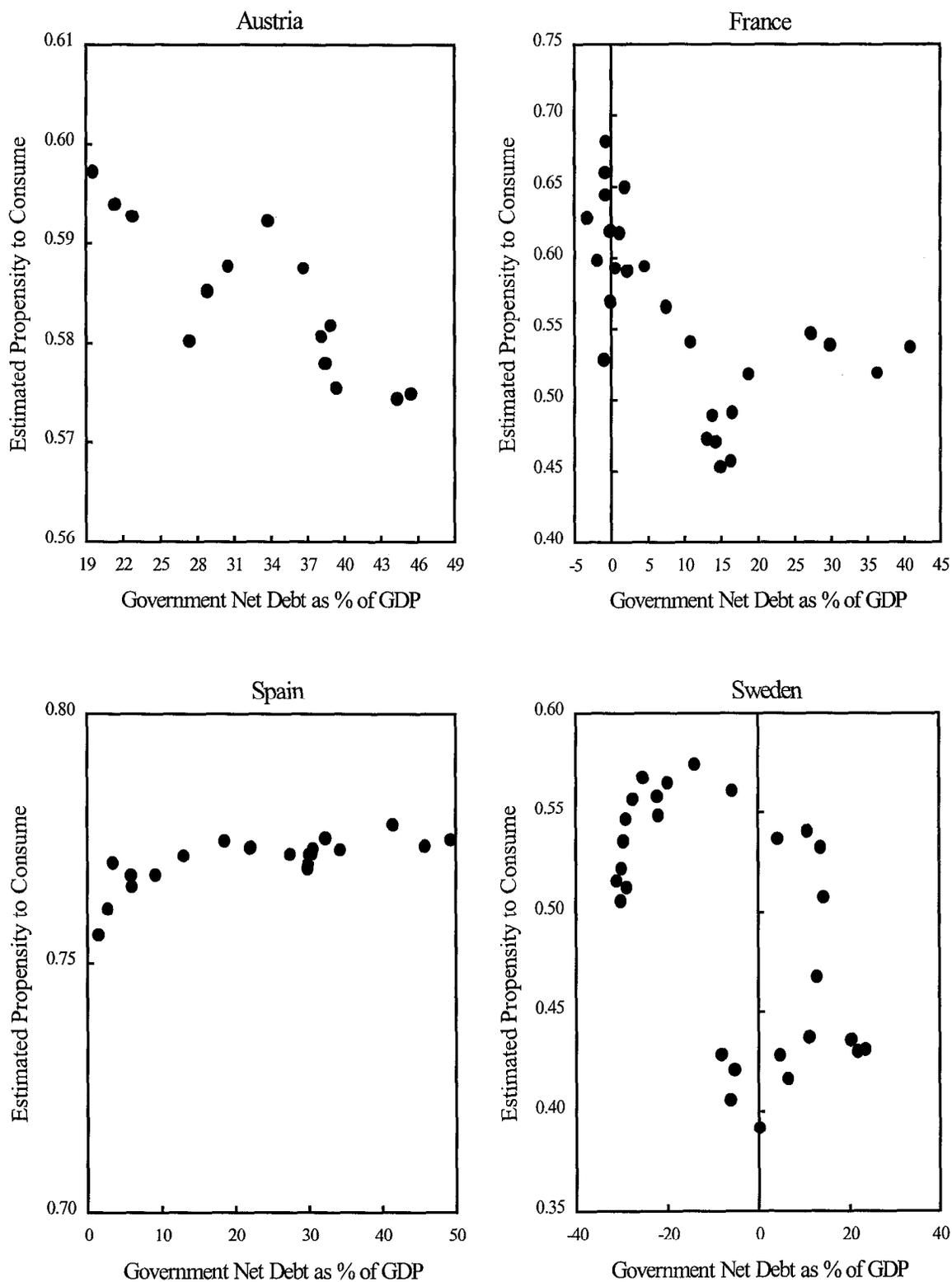
Figure 4c - Group 3:

Coefficient on Gross Household Income against Government Net Debt
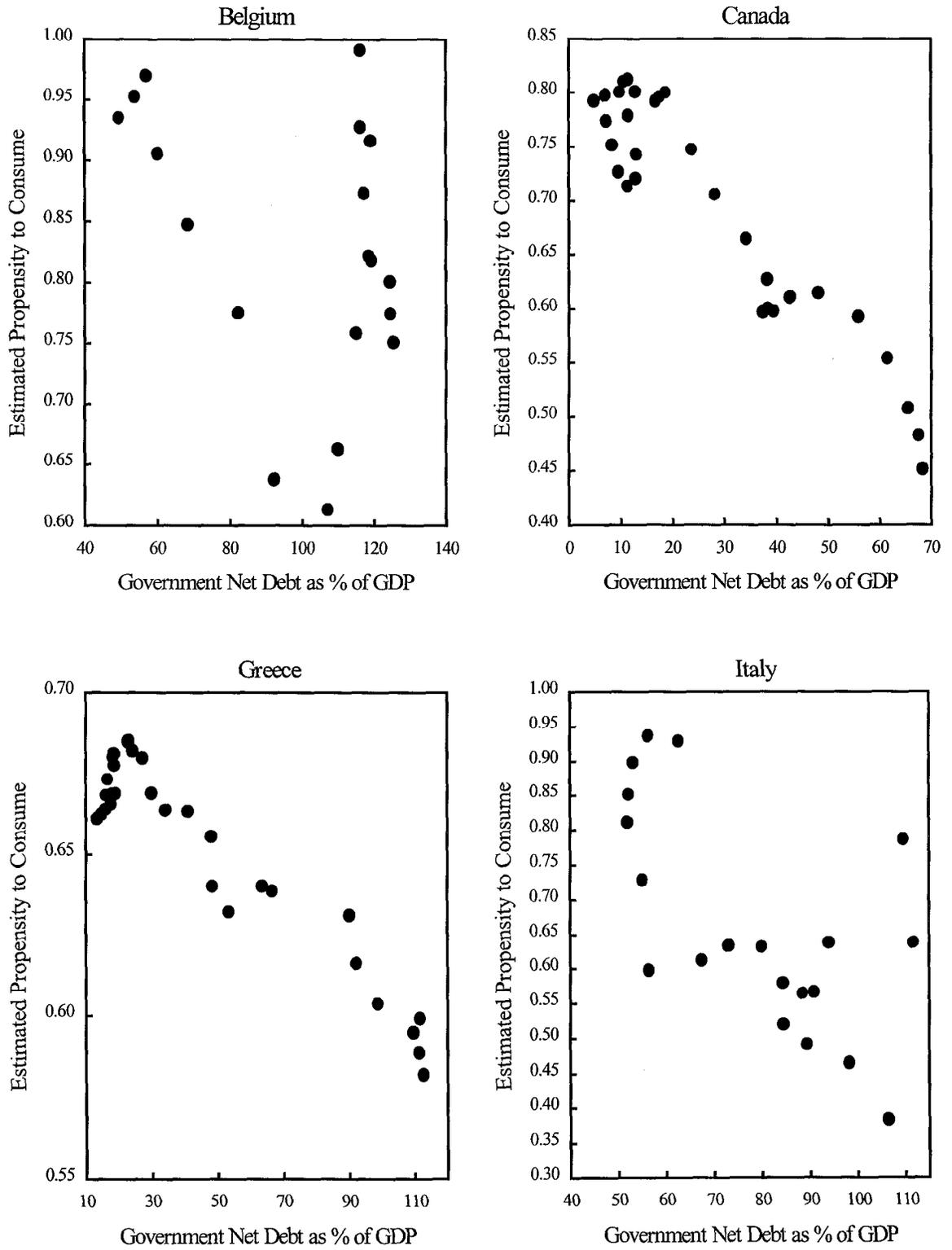
Figure 5a - Group 1:
### Coefficient on Gross Household Income against Government Consumption

Japan

Netherlands

United States

United Kingdo
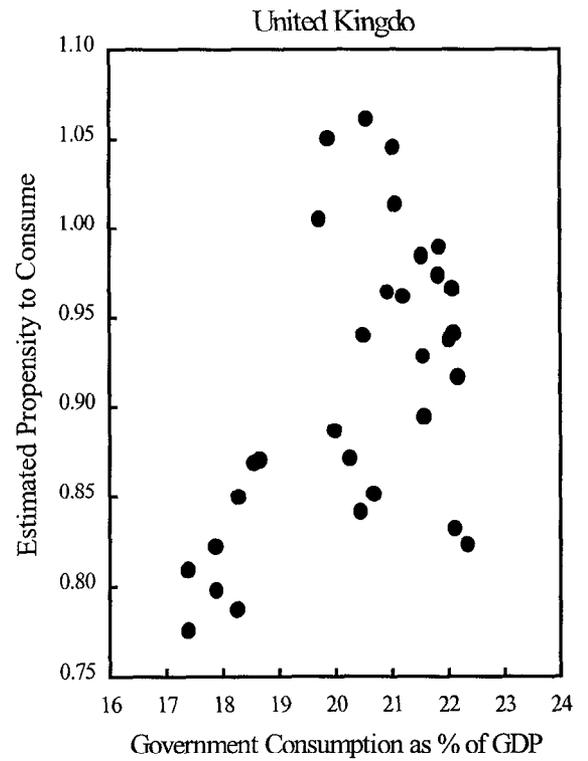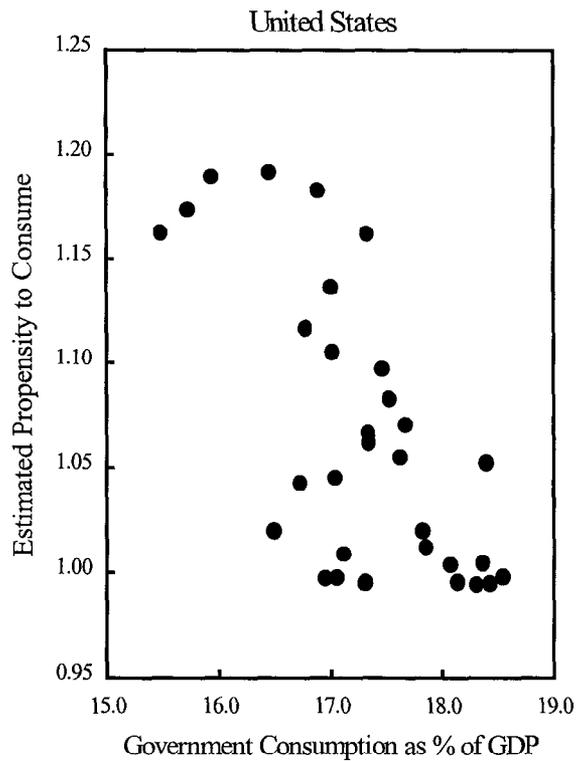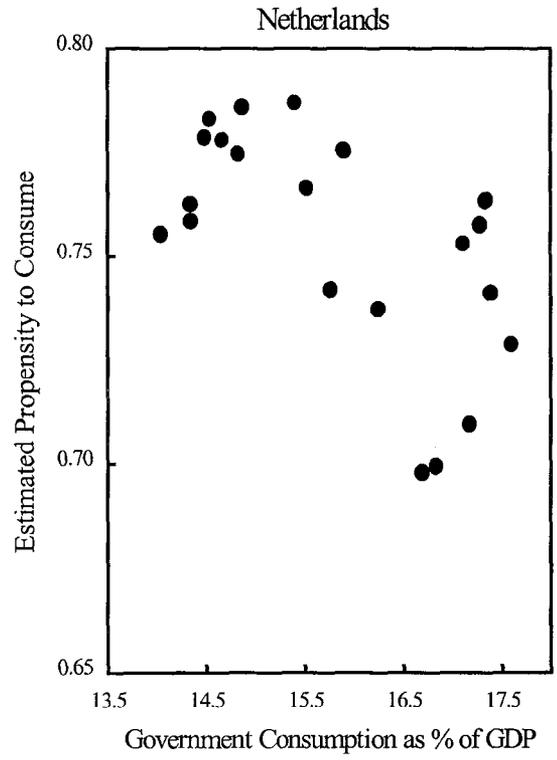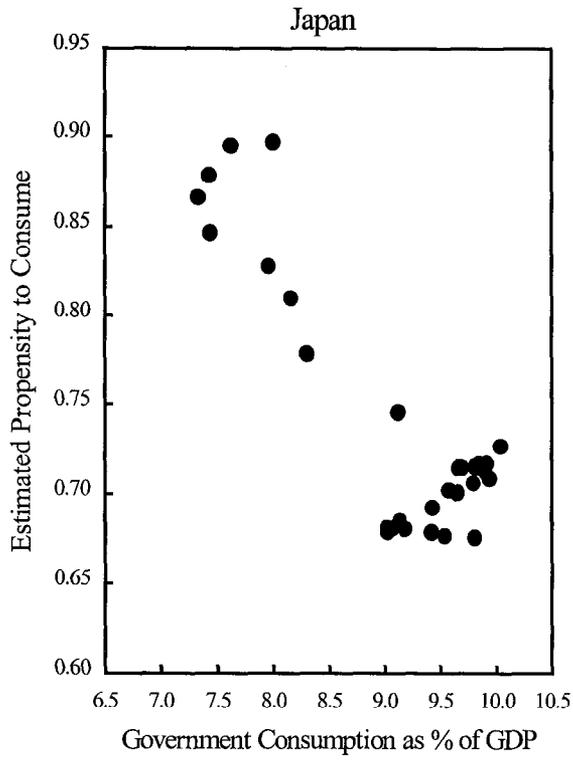
Figure 5b - Group 2:

Coefficient on Gross Household Income against Government Consumption

Austria

France

Spain

Sweden

Figure 5c - Group 3:
Coefficient on Gross Household Income against Government Consumption

Belgium

Canada

Greece

Italy
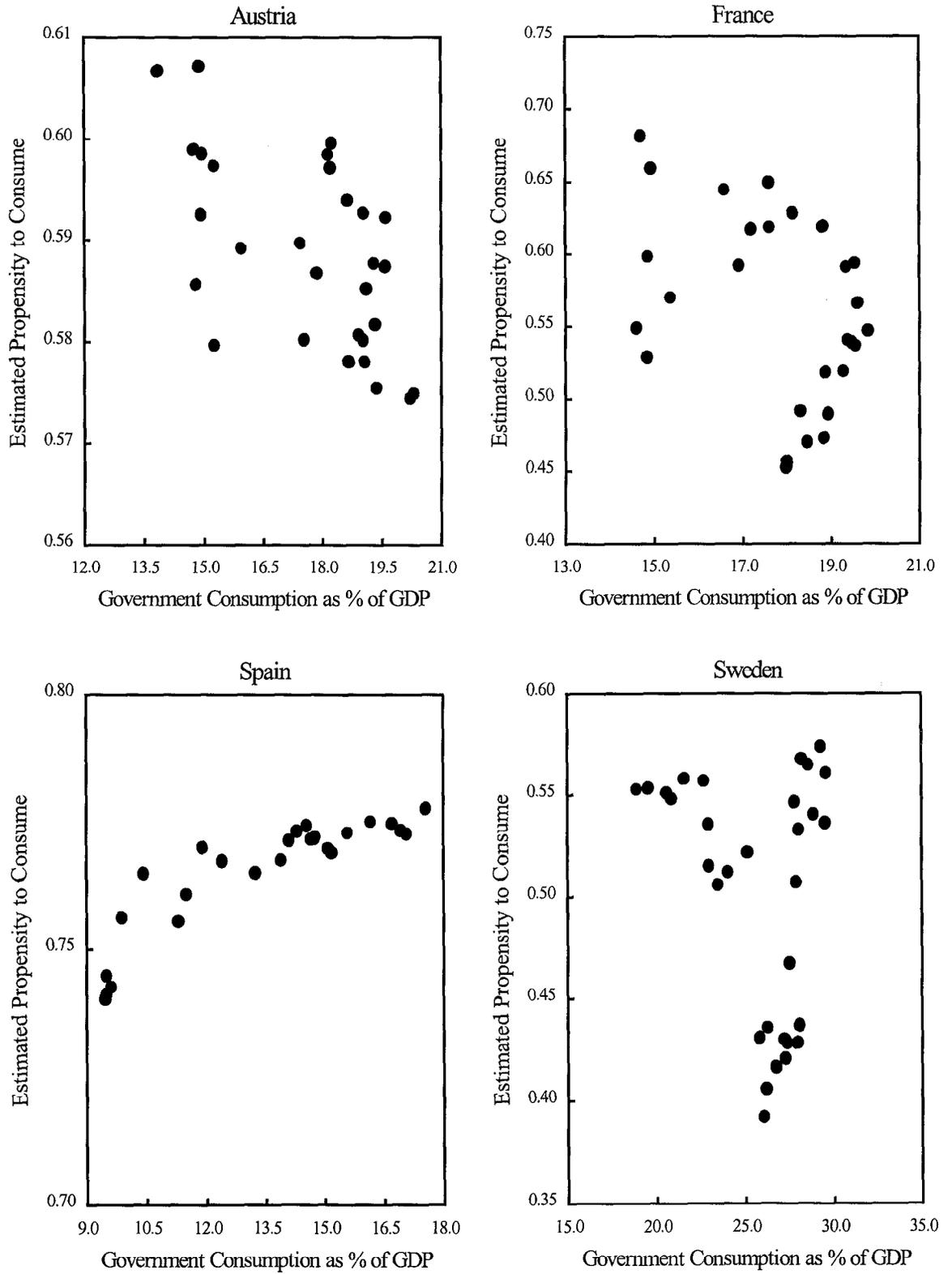
IV. CONCLUSION

The individual country time-series evidence presented in this paper provides some empirical support for the hypothesis that households move from non-Ricardian to Ricardian behavior as government indebtedness reaches high levels and as uncertainty about future taxes increases. In those countries where government net debt has been relatively low as a proportion of GDP the estimated propensity to consume out of current gross household income shows little relationship with government net debt. This seems to be the case in Austria, France, Japan, Spain, Sweden, and the United Kingdom. However, in countries which have experienced a high level of government indebtedness, there is evidence of a clear negative relationship once government net debt as a percentage of GDP exceeds a certain critical level. This critical threshold level seems to be around 30–35 percent, after which the propensity to consume tends to fall steadily as government net debt rises. Panel data estimation results provide further evidence of a negative relationship between these two variables.

The major exception to this general result is the United States, which is the only country in this study to show a steadily rising propensity to consume out of current gross household income while government net debt rose steadily since the early 1980s to almost 50 percent of GDP. This may have something to do with the belief that the United States government would be able to finance its debt through external borrowing more easily, and at lower cost, than most other countries due to the dollar's prominence as an international currency, the relative size of the United States economy, and the fact that United States had been in a strong net external creditor position for most of this century until the mid-1980s.

It needs to be noted here that the results for Belgium and Italy are somewhat difficult to interpret and indicate that the relationship between the propensity to consume and government net debt may not be stable. The results for Belgium suggest a negative relationship between the two variables of interest, but with a structural break in the mid-1980s. This may have had something to do with Sint-Anna program for stabilizing government debt, which was approved in May 1986 and marked a significant departure from past efforts at fiscal adjustment both in terms of the magnitude of adjustment that was required and because it relied almost exclusively on expenditure-cutting measures rather than on tax increases as had been the case in the past. The evidence from Italy also indicates a negative relationship for most of the period, although there are a couple of outliers in 1994 and 1995 which suggest that there might have been a structural break around that time. This may have been related to the signing of the Maastrict treaty and expectations that the government would have to permanently cut its spending in order to meet the criteria for being a member of EMU.

Our results therefore provide some empirical support for Sutherland's (1997) theoretical model, which showed how the power of fiscal policy to affect consumption can vary depending on the level of public debt. In particular, when government debt reaches high levels, expectations about future taxes could result in higher fiscal deficits having a contractionary effect on overall aggregate demand (and, conversely, fiscal surpluses having an expansionary effect on the economy).

The individual country time-series results also indicate that, even if there is an empirical relationship between the propensity to consume and government consumption as a percentage of GDP, it is indeed very weak; only in the case of Japan is there some evidence of crowding out once the government consumption-to-GDP ratio exceeds 8 percent. Panel data estimation provide somewhat more positive results, although even here the results are far from conclusive. Furthermore, our empirical results do not show any support for the Bertola-Drazen story of a positive relationship between government consumption and private consumption once the level of government spending reaches a "crisis" point.

Finally, in terms of the theoretical model presented above, our results suggest that government consumption and private consumption act as complements in the United States (an increase in government consumption serves to increase the marginal utility of private consumption). The opposite would be the case in all of the other countries.