Built-in Flexibility of Taxation and Stability when Tax Liabilities Respond with a Time Lag

Part II: *A Reply*

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In my earlier paper (Smyth, 1975b) I combined a distributed lag or permanent income consumption function with a lagged tax function. Bradley (1976) disputes my finding that short, two-period, oscillations may result and that consequently the presence of built-in flexibility of taxation may be destabilising rather than stabilising. Bradley reaches his conclusion by limiting consideration to parameter values that he regards as plausible. I shall demonstrate that there is empirical evidence that conflicts with that advanced by Bradley, evidence that gives parameter values consistent with oscillations and destabilisation.[1]

The crucial point at issue is the sign and the size of the root (1) above. This root is obtained using the following expression for permanent income, *Yp* in time period *t*

$$Yp_{,t} = \sum_{n=0}^{\infty}(1-\lambda)\lambda^n(Y_{t-n}-T_{t-n}) \qquad (3)$$

where Y is measured income and T tax revenues. In this formulation $0 \leqslant \lambda < 1$, c is the marginal propensity to consume and t is the marginal tax rate.

Two-period oscillations will occur if the root in (1) is negative and these oscillations will be explosive if the root is less than -1. Bradley argues that a negative root requires implausibly low values of λ. He cites Friedman (1957). Friedman obtains $\lambda = 0{\cdot}67$ and $c = 0{\cdot}88$; then a marginal tax rate greater than

1. Bradley also modifies my first model to introduce a lag in the consumption function which was unlagged in my model. Bradley demonstrates that this model will be stable. It is well known that built-in flexibility of taxation may be stabilising—indeed it is often thought (incorrectly) that it is necessarily stabilising—so it is of little interest to construct another stable model. The question of interest is whether or not it is possible to construct models in which built-in flexibility is destabilising; this is the question I addressed in my 1975 paper. Of course, the other question raised by Bradley, that of empirical relevance, is also of interest and so I devote the present reply to it.

unity is required for two-period oscillations and *a fortiori*, a still higher rate for divergent oscillations.[2]

However, the estimates of λ are highly sensitive to changes in the treatment of the data and to estimation methods. Friedman's procedure was to choose the value of λ maximising R^2 in the regression of consumption on permanent income. Wright (1969) repeated Friedman's analysis using slightly different data—specifically, revised data for 1950 and 1951 and alternative treatment of the war years—and found the value of R^2 to peak at much lower values of λ, 0·25 or 0·20 instead of 0·67. Regressing consumption on current income and lagged consumption for the period 1929–41 and 1946–59, Christ (1966) also obtained a lower value of λ, 0·275. However, Smyth (1975a) obtains a value of 0·860 for λ the period 1909 to 1949 with the war years excluded.[3]

The results so far considered are based on annual data for the United States. We may aggregate over time from quarterly estimates to annual estimates using the formula $\lambda_A = \lambda_Q^{0 \cdot 25}$ where λ_A and λ_Q are the values of λ on annual and quarterly bases respectively. Estimates of quarterly consumption function include Griliches *et al.* (1962), Zellner and Geisel (1970) who make four alternative assumptions about the error terms, Lovell (1975) and Smyth and McMahon (1972) for Australia. Estimated values of λ as low as 0·04 on an annual basis are obtained.

Table I presents estimates of λ from annual and quarterly studies with all values of λ put onto an annual basis together with the corresponding estimates of the marginal propensity to consume. It is apparent that the conditions for oscillations and for explosive oscillations imply lower values of t than is suggested by the Friedman study except that implied by Smyth (1975a). Certainly the majority of the results do not suggest that t would have to be implausibly large for oscillations to occur—seven of the required values of the marginal tax rate are less than 0·3.

If one takes the variance of Y as a measure of the magnitude of fluctuations in Y, as I did in my original paper, then the presence of built-in flexibility is de-stabilising if the absolute value of the root is increased. Bradley's conclusion, that the introduction of the tax function into my second model will necessarily be stabilising, is based on his empirical assertion that the introduction of built-in flexibility of taxation does not cause the root to switch from positive to negative. Once the

2. Bradley incorrectly gives $c(1-\lambda) = 0 \cdot 33$ with $c = 0 \cdot 88$. Reference to Friedman (1957, p. 147, note c to Table 15) makes it clear that it is $(1-\lambda)$ that equals 0·33, not $c(1-\lambda)$. Bradley's incorrect figure is based on Evans (1969, p. 23) which he cites. Evans' error arises through his failure to normalise the Koyck distributed lag in his derivation of Friedman's consumption function so that the derived marginal propensity to consume is made to differ from the marginal propensity to consume from permanent income. The corrected figure strengthens, rather than weakens, Bradley's argument as the estimated value of λ is raised.

3. This estimate was based on a regression of consumption on current income, income of the previous period and lagged consumption in Smyth and Jackson (1974) using the Goldsmith data which were also the basis for Friedman's study. Smyth (1975*a*) shows that this approach permits testing of the hypothesis that the marginal propensity to consume out of transitory income is zero (it was found to be significantly different from zero).

Table 1: *Alternative consumption function estimates and implied critical values for the marginal tax rate*

Study	λ *(annual basis)*	c	*Value of t in excess of which system is*	
			oscillatory	*oscillatory and explosive*
Annual Data				
Friedman (1957)	·67	·88	2·27	4·67
Christ (1966)	·275	·912	·42	·94
Wright (1969)	·2	·88	·28	·70
Wright (1969)	·25	·88	·38	·91
Smyth (1975*a*)	·860	·586	10·48	21·37
Quarterly Data				
Griliches *et al.* (1962)	·2015	·91	·28	·66
Zellner and Geisel (1970)	·1863	·89	·26	·64
Zellner and Geisel (1970)	·0410	·94	·05	·16
Zellner and Geisel (1970)	·1897	·94	·25	·56
Zellner and Geisel (1970)	·3552	·96	·58	1·20
Lovell (1975)	·208	·9119	·29	·67
Smyth and McMahon (1972) for Australia	·0540	·756	·08	·48

possibility that λ is low is allowed for, his argument no longer holds. A low value of λ appears to be a real possibility. If we take a value of λ of 0·1, for instance, and a value of c of 0·9 then built-in flexibility of taxation will be de-stabilising for marginal tax rates less than 0·28. None of these values are implausible. Thus the empirical evidence does not cause us to reject the conclusion that in a model with taxes a lagged function of income and a permanent income consumption function the presence of built-in flexibility may be de-stabilising rather than stabilising.

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