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The Criteria for Choosing a Politico-Economic Model, Forecast Results for British Expenditures 1976–79: A Reply to Frey and Schneider

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An important insight emphasized by proponents of 'politico-economic' models is that economic policy is made by politicians in the context of political institutions. As a result, economic policy reflects the interaction between economic structures and decisions taken in this political context. Attempts to model this interaction formally should be encouraged, as we believe that purely 'economic' or 'political' accounts of economic policy give at best a partial view. We do not accept, however, that the only possible way of modelling economic policy in its political context is that offered by Frey and Schneider (1982). Our approach is also 'politico-economic', since it is based upon an explicit view of institutional behaviour.

The Frey and Schneider model is weak as a description of institutional policy-making. Moreover, their empirical work does not stand up to careful examination. The field is not improved by the promulgation of misleading claims about the properties of various models. In particular, we shall show that

(1) statistical evidence does not support the central claim of the Frey–Schneider model, that government expenditures in times of 'popularity deficit' are determined by the opinion poll standing of political leaders, and
(2) the alleged forecasting superiority of their model rests, at best, on comparisons between their *full* model and a *subset* of our model in which they deliberately omit factors which we describe (Alt and Chrystal, 1981) as extremely important.

It is impossible to understand the technical or statistical issues clearly without a brief treatment of the origins and structure of the two models. An extended discussion is available in Alt and Chrystal (1983).

1. COMPARISON OF MODELS

1.1 Permanent Income Model

Our model is based upon a view of government spending as extremely 'sticky', that is, exhibiting a high level of inertia in response to short-term changes in the political or economic environment. This view is sustained by the formal way in which expenditures are planned in the countries in which Frey and Schneider model expenditures. In at least two modern economies, the institutional procedures adopted for expenditure planning deliberately target expenditure growth on the expected growth of national income. Price (1978, 77–8), for example, argues in the case of Britain that:

> Public expenditure enjoyed an unchallenged pre-eminence in the original blueprints for postwar stabilization policy, but in practice it surrendered this position to taxation and the manipulation of consumer demand. . . . By the end of the 1950s the avowed strategy had become to ensure that public spending was neutral *vis-à-vis* internal stability, with the public sector expanding at a rate consistent with the long-run growth of the economy, so that at least one sector would be free from cyclical disturbances. . . . [However] public expenditure has never wholly shed its short-term role.

Following the 1961 Plowden Report, expenditure planning in Britain was institutionalized in the Public Expenditure Survey Committee system known as PESC. The intention of this system was to plan public expenditure over a five-year horizon 'in relation to prospective resources'; that is, real public expenditure was projected as a stable share of the anticipated future level of real national income. Mistakes have been made in forecasting national income and in keeping expenditure to the planned share, but this does not alter the underlying intention, which is the context within which expenditure decision were made. Knott (1981) offers a similar description of budgetary policy in West Germany. A major concern for the Federal government in drawing up the Finance Plan is the size of the public sector as a share of GNP, with the purpose being to keep the public sector 'at a constant or slightly increasing proportion' of GNP. In negotiation with the Länder, explicit reference is made to the growth rate of nominal GNP. Indeed unions, employers and the Länder all produce independent estimates of nominal GNP growth to use in negotiations over the forthcoming budget.

Since expenditure is planned in relation to levels of income experienced over some time, expenditure plans are too sticky to change in the light of short-term fluctuations in income. Only when those responsible for expenditure decisions are convinced that a change in income will be sustained does the change in income come to be reflected in expenditures. The institutional rigidities of any national political and administrative system make it impossible for policy-makers to hire and fire civil servants, cancel and instigate projects, and raise and lower pensions and taxes in response to their transient fortunes in the opinion polls, at least on a scale large enough to appear in aggregate expenditure figures.

Our hypothesis is that expenditures respond mainly to the trend or permanent level of national income. Empirically, one can represent this with expenditures as a function of an infinitely long weighted series of past values of income. It is convenient to employ the Koyck transformation as a simple operational alternative. As a result, current expenditure can be shown to depend upon just current national income and

lagged expenditure. This relationship is identical to the Permanent Income Hypothesis, formulated by Friedman (1957) for personal consumption expenditure.

While the permanent income relationship determines the trend in expenditures, other factors cause cycles about the trend. These include deliberate policy changes associated with, say, the aims of Keynesian-style stabilization policy. Other factors are more or less automatic. These include the growth of transfer payments which arises from an increase in unemployment. We have never suggested that an explanation of government expenditures should ignore these factors. The concern for stabilization policy and what Frey and Schneider call the economic constraint requires that we add to the basic permanent income formulation the targets of economic policy. Unemployment, inflation, and the balance of payments are generally agreed to represent the targets of economic policy in Britain (though note that Frey and Schneider's choice is different). We have accordingly included them in our basic model.

1.2 The Frey-Schneider Model

This model is certainly the most ambitious empirical politico-economic model in the literature. It attempts to introduce the electoral ambitions of politicians directly into a systematic model of expenditure determination. We shall show, however, that their model involves a relatively small departure from our approach to the public sector. While it appears to lead to very different results, we shall see that these results depend critically on one arbitrary (and we believe theoretically mistaken) restriction in their model. We show that this restriction is unjustified on statistical grounds.

The key variable in the Frey–Schneider approach is what they call the 'popularity deficit' (DEF). At any time, the Government is assumed to have some critical standing in the opinion polls such that if it leads the Opposition by at least this amount, it is confident of winning the next election. This critical popularity level is defined arbitrarily as 8% behind the Opposition immediately after an election, rising irregularly to eight percentage points ahead just before an election. The popularity deficit, DEF, is then equal to the difference between the actual lead in recent opinion polls and this critical standing.

The values of the expenditures which the government chooses to adopt depend on whether DEF is positive or negative. If it is negative (the government's lead is less than its critical standing), the government engages in re-election effort by spending more and taxing less, the intensity of this effort depending on the size of DEF. If DEF is positive, 'ideological' targets are pursued. In effect, this means that the party in power sets the expenditures by reference to DEF multiplied by GDP, with different target shares of GDP in expenditure assumed for Labour and Conservative incumbencies. Finally, there are, for all periods, variables reflecting 'economic constraints', the balance of payments (BOP) and the real wage rate (W) in all cases and, additionally, unemployment in the case of transfers. Their model is thus of the following form, for any expenditure category E_t:

$$E_t = \text{constant} + a_1 D_1 DEF + a_{2i}(1 - D_1)DEF \times GDP + a_3 D_1 E_{t-1} + a_4(1 - D_1)E_{t-1} + a_5 BOP_{t-1} + a_6 W_{t-1} \quad (1)$$

where D_1 is one in periods of popularity deficit and zero otherwise, and the coefficient a_{2i} of GDP varies over parties of different ideologies.

Frey and Schneider claim that for the USA, the United Kingdom and Germany, their model can be estimated successfully. Expenditures are affected by re-election strategies and ideology, as well as the economic constraint. In our terms, their model raises three separate questions. First, does the planning we have been describing stop in critical periods? That is, is there any evidence that the relationship we have been describing between expenditures and expected trend growth of GDP disappears at times because politicians adopt other strategies? Second, how much does party control matter? What differences in expenditures can be attributed to differing ideological commitments? Finally, what is the role in expenditure determination of the economic constraint, or in our terms, how big is the role of stabilization policy?

Let us take the question of planning. According to Frey and Schneider, equation (1) does not contain GDP when popularity is in deficit (that is, below the critical standard). In this case, its coefficient is *restricted* to zero. That is, when popularity is in deficit, $D_1 = 1$, so that $1 - D_1 = 0$, and the GDP term drops out of the equation. Thus (abbreviating the constraint terms) their model really has different equations for periods of popularity deficit and periods of popularity surplus:

$$\text{Deficit:} \quad E_t = a_1 DEF + a_3 E_{t-1} + \ldots (+ \text{constraints})$$

$$\text{Surplus:} \quad E_t = a_{2i} DEF \times GDP + a_4 E_{t-1} + \ldots (+ \text{constraints})$$

Their surplus period equation is much like our permanent income formulation, but with the extra complication that GDP is multiplied by DEF. In a period of popularity deficit, there is no target share of GDP in the equation, but it is replaced by the popularity deficit. Thus, the model assumes that governments in popularity deficit periods consider only their position in the polls and spend *without* consideration of national income. We shall show that it is exactly in these deficit periods that the model performs poorly.

To test this restriction in their model, the obvious thing to do is to take their deficit period equation and add GDP to it. If the result of doing this is that a_1 is then found to be zero and that $a_3 = a_4$, then the apparent empirical success of their model rests on the erroneous omission of national income targets in periods of popularity deficit. We have done considerable statistical estimation which showed no differences even remotely approaching statistical significance between popularity deficit and non-deficit periods in the relationship between national income and expenditure. For example, the equation reported in Chrystal and Alt (1981) for Britain from 1962–74 provided estimates statistically consistent with $a_3 = a_4 = .54$, $a_1 = 0$, and $b_2 = .04$ regardless of which party was in power and whether or not popularity was in deficit or surplus. In no case have we been able to find a significant effect of popularity deficit on expenditure *if GDP is included in the equation as well.*

We conclude that the apparent impact of popularity on expenditures which Frey and Schneider report rests on the unwarranted exclusion of GDP from their model in periods of popularity deficit. The point is that if GDP really predicts expenditures in deficit periods, then its omission will cause whatever replaces it to pick up the GDP effect. There is a strong presumption that this is what happens in the case of the Frey-Schneider model, especially since, according to their popularity function, it is

probable that the popularity deficit is itself partly a function of GDP through the effect of income on popularity.

With respect to the other questions, party differences and stabilization policy, Frey and Schneider choose to represent our model with a version of Equation 3 in Chrystal and Alt (1981). This represents expenditures as a function of only lagged expenditures and contemporaneous GDP, in spite of the fact that practically the next sentence says that we believe stabilization policy considerations are important. Moreover, Frey and Schneider ignore our previously published estimates in which both party differences and the targets of policy (unemployment, inflation and the balance of payments) are included (Alt and Chrystal, 1981). These estimates show that inflation appears sporadically in the consumption function. Neither inflation nor the balance of payments appear in the transfers function, but there is a large and significant coefficient attaching to the unemployment rate in both the consumption and transfers functions. The effect of unemployment is larger in the case of transfers than consumption (not only is the coefficient larger, but aggregate transfer payments are less than consumption). This effect includes the automatic response of unemployment benefit, a major component of transfers, to changes in the unemployment rate. The inclusion of unemployment accounts for the upward shift in transfer payment in the Labour incumbency after 1974. It appears that this 'ideological' difference between parties with respect to transfers appears only in the 1964–70 Labour government.

2. COMPARISON OF FORECASTS

In their present paper, as well as their reply to Chrystal and Alt (1981), Frey and Schneider claim further support for their model through its superior forecasting ability. What they actually demonstrate is that their model *including* the economic constraint outperforms a version of ours from which the targets or constraints have been *excluded*. Their reply demonstrates neither the importance of re-election strategy in determining expenditure nor the superior forecasting performance of their model over ours. All the points we have just made apply equally to these forecasting tests. We shall first show that their forecasting results rest on a biased comparison of models, and then fairly compare the results obtained with the full models.

2.1 Biased Test on a Subset of Our Model

Let us take as an example the case of transfer payments which, as we shall see, is the expenditure category which the Frey–Schneider model does best in comparison with ours. They defend their policy function by considering fit and forecast properties of two models. Model (1) is a simple 'permanent income' formulation estimated by regressing expenditure on its own lagged values and national income (GDP). In fact, it is a subset of the model we published in Alt and Chrystal (1981), with unemployment, the effect of Labour incumbency, and a 'Christmas bonus' adjustment omitted. This they compare to Model (2), a model in which (a) the variable 'popularity deficit' (DEF) – the difference between the government's current lead in the opinion polls and a critical electoral 'safety' standard – replaces GDP whenever $DEF < 0$, (b) the effects of GDP when $DEF > 0$ are split between incumbencies,

and (c) three extra variables, the unemployment rate, real wage rates and the balance of payments, are added to the equation. Model (2) thus contains five extra parameters, of which two, real wage rates and the balance of payments, are unrelated to any politico-economic argument about transfers.

Frey and Schneider provide empirical and theoretical claims for the superiority of Model (2). As they note, the fit of the two models was identical in terms of R^2, in spite of the extra parameters of Model (2), so the empirical claim rests on their comparison of forecasting power, in which statistical inference plays no part. As a first and simple step, we show that the apparent superiority of Model (2) does not rest on a superior politico-economic theory, but rather on the exclusion of important parameters from our model. We replicate their forecasts in three steps, with separate regression estimates generating the forecasts in each case. The results are:

Model		Sum of squared forecast *errors 1976.4–1978.3*
(i)	Model (2)	5.64
(ii)	Model (2), omitting real wage rates and the balance of payments	14.48
(iii)	as (ii), but substituting income for the popularity deficit when LEAD < CRITDEF	14.47

The sum of squared forecasting errors rises by 165%, from 5.64 to 14.48, when the extraneous factors, real wage rates and the balance of payments, are omitted from the equation for transfers.[1] However, once that is done, the replacement in periods when DEF < 0 of the popularity deficit by our instrument for GDP causes no further worsening of prediction. Thus, all the apparent superior forecasting ability of a politico-economic model rests on the inclusion of real wage rates and the balance of payments. Once again, *the estimates offer no empirical support for the elimination of GDP from expenditure functions in periods of popularity deficit, and the apparent confirmation of the Frey–Schneider model rests on this arbitrary and unwarranted restriction.*

2.2 Comparison of Forecasts from Full Models

It is more useful to compare the two full models directly. We shall show that our full model consistently outperforms the Frey–Schneider model in terms of its *ex ante* forecasting performance. Moreover, the transparently weak feature of the Frey–Schneider model is exactly its distinguishing feature – the use of the popularity deficit as a central explanatory variable.

The test of forecasting performance is performed on the two major categories of government expenditure for the United Kingdom. These are current expenditure on goods and service (consumption) and current grants to persons (transfers). We employ the models described in Frey and Schneider (1978) and Alt and Chrystal (1981). In order to avoid results based on arbitrary choice of data period, we choose six successive dates for ending the estimation and starting the forecast. An average for the performance of these six forecasts is then compared. Thus, the first set of estimates is for 1955.1 to 1976.1 with the forecast period 1976.2 to 1979.4. The sixth set of estimates is for 1955.1 to 1977.2 with a forecast for 1977.3 to 1979.4.[2] In all

TABLE 1. Comparison of *Ex Ante* Forecasts

Expenditure	Model	Root mean squared forecast error	Average absolute percentage deviation per period
Government consumption	Alt–Chrystal	.48	1.32
	Frey–Schneider	2.54	5.49
Transfer payments	Alt–Chrystal	.73	3.65
	Frey–Schneider	.92	4.11

Note: All statistics are averaged over six forecast simulation experiments, with forecasting periods beginning in each quarter from 1976.2 through 1977.3 and ending in 1979.4. The data and methods are described in the text and in note 2.

cases where a lagged dependent variable appears, the lagged forecast value is substituted in the forecasting exercise. The results of the test are provided in Table I. Two statistical tests are provided. The first is the square root of the mean squared error of the forecasts (RMSE). This will give the same ranking of results as the Theil inequality coefficient presented by Frey and Schneider. The other is the average absolute percentage deviation. Small values of both these statistics are perferred to large ones as this indicates that predicted values are closer to observed values.

In all the statistics reported, our model outperformed the Frey–Schneider model. In the case of transfers the difference between models is small. Indeed, it is possible to choose shorter forecast periods in which the Frey–Schneider model marginally outperforms ours. This result is not a surprise, however, since the main variation of transfers about trend is explained by unemployment, which now appears in both models.

The main contrast appears in the consumption expenditures equation, where the Frey–Schneider model does consistently poorly. This result is the opposite of the one they present from their forecast simulations. There are several reasons for the difference in results. First, our model now contains unemployment to capture the use of expenditure policy for stabilization purposes. Second, there will be differences between our data sets due to different price indices, adjustments, and definitions. However, the main reason for the failure of their model is that consumption expenditures in the late 1970s do not exhibit the characteristics of re-election effort, or unrestrained spending when political popularity is dangerously low. This is made clear in Figure 1, which shows the tracking performance of both models.

Figure 1 presents the forecasts based upon the estimation period 1955.1 to 1976.1. For the first two periods of the forecast both models track consumption expenditure fairly closely. However, in the fourth quarter of 1976 the Labour government popularity in the opinion polls takes a dramatic dive. Having been at most two or three points behind the Conservatives, they fall 15 points behind, and remain at least 10 points behind for a whole year. This certainly puts them in a period of popularity deficit. In the Frey–Schneider model GDP drops out and from 1977.1 the government should expand spending to increase re-election chances. The forecast reflects exactly this central claim of the Frey–Schneider model. What actually happens is the opposite. Government expenditure is cut. Our model picks up the reduction of expenditure as a response to the sustained decline in GDP growth after the mid-1970s recession. Once off track, the Frey–Schneider model stays off track until the new government arrives in 1979.3 and GDP re-enters their equation.

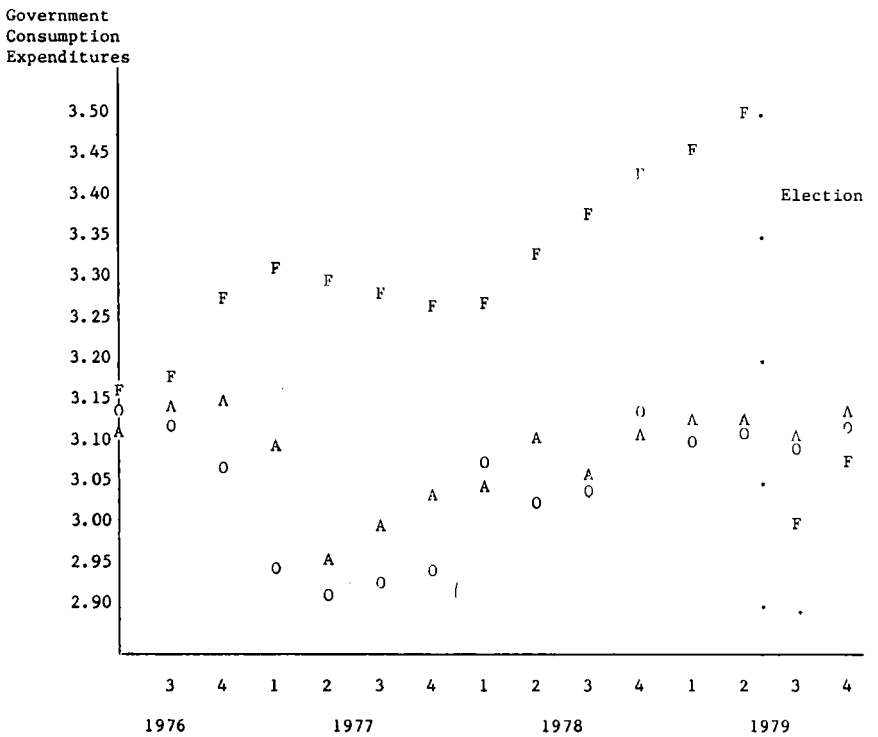

Fig. 1. Tracking performance of the models, 1976.2–1979.4.

Note: O = observed value, A = Alt–Chrystal forecast, F = Frey–Schneider forecast. Consumption expenditures are in 1,000 millions, at 1970 prices.

3. CONCLUSION

Our model is more parsimonious, rooted in actual institutional behaviour, and leaves no particular events unexplained. Statistically, it performs as well as or better than the Frey–Schneider model. Their forecasting claims are badly wrong, based on biased comparisons with a subset of our model. Indeed, forecasts with both full models show that their model for government consumption fails on exactly a critical test, the failure of expenditures to increase in line with the government's hypothesized re-election effort.

NOTES

1 The exclusion of factors from their model is justified as we do not employ the same constraint terms in our expenditure model. What we are showing at this point is that if neither model contains a constraint, their forecasting power is approximately equal.

2 In all cases, the coefficient we obtain for our model are more or less identical to those reported in Alt and Chrystal (1981). Our model is the basic permanent income formulation (lagged dependent variable plus GDP instrument) with the addition of unemployment in both cases and a dummy for the Labour

incumbency of 1964–70 and a fourth quarter intercept dummy after 1971 in the case of transfers. Our efforts to replicate the Frey–Schneider model produce goodness-of-fit statistics and patterns of coefficient signs identical to those they report, though some of the coefficients are not consistently statistically significant. Coefficient magnitudes will differ because we do not use their indices for price deflation. Our data on expenditures are taken from *Economic Trends*, though note that our series for transfer payments are summed from unemployment benefit and social security payments, and are not published in the annual supplements. We will be pleased to supply anyone interested with a listing of our data and the forecast simulation programme we employed.

REFERENCES

Alt, J. E. and Chrystal, K. A. (1981). 'Electoral Cycles, Budget Controls, and Public Expenditure,' *Journal of Public Policy* 1, 37–59.

Alt, J. E. and Chrystal, K. A. (1983). *Political Economics.* Berkeley: University of California Press; London: Wheatsheaf.

Chrystal, K. A. and Alt, J. E. (1981). 'Some Problems in Formulating and Testing a Politico-Economic Model of the UK'. *Economic Journal* 91, 730–6.

Frey, B. and Schneider, F. (1978). 'A Politico-Economic Model of the United Kingdom', *Economic Journal* 88, 245–53.

Frey, B. and Schneider, F. (1982). 'Politico-Economic Models in Competition with Alternative Models: Which Predict Better?', *European Journal of Political Research*, 10, 241–54.

Friedman, M. (1957). *A Theory of the Consumption Function.* Princeton: National Bureau of Economic Research.

Knott, J. H. (1981). *Managing the German Economy: Budgetary Politics in a Federal State.* Lexington, Mass.: Lexington Books.

Price, R. W. R. (1978). 'Public Expenditure', chapter 3 of *British Economic Policy 1960–1974* by F. Blackaby *et al.* Cambridge: Cambridge University Press.