

**PUBLIC EXPENDITURE IN THE UK:
HOW MEASURES MATTER**

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Journal of the Royal Statistical Society, Series A, forthcoming.

Earlier versions of this paper were presented at the Annual Political Studies Association Conference, April 5-7th 2002, Aberdeen, Scotland, and the Conference on Budgetary Policy Change, Nuffield College, Oxford, March 8-9th 2002. We owe a special debt of gratitude to Michelle Meyer and Robert Bowles for their assistance in assembling our new budgetary data, to Russell Hubbard, Stuart Mitchell, Allan Ritchie, Eleanor Ball, and Philippa Todd of HM Treasury for their generous guidance throughout the process, and to many others for comments on the research, particularly Frank Baumgartner, Ian Budge, Erin Dyck, David Heald, Brian Hogwood, Peter John, Bryan Jones, Richard Parry, Stephen Smith, *JRSS* editor Peter Lynn, and especially David Cox. The data collection and analysis have been supported by a grant from the Nuffield Foundation.

Abstract

Studying spending over time requires reliable data. It is not clear that such data exist in the UK, however. The two published sources of functional spending numbers – the ONS *Blue Book* and HM Treasury’s *Public Expenditure Statistical Analyses* (PESA) – rely on estimates of past spending, using a link-year method, rather than re-calculating actual spending figures when functional definitions change. In this manuscript we assess the different measures of spending in the UK. Specifically, we do two things. First, we present a new, third set of spending numbers applying temporally-consistent functional definitions to PESA micro-data. Second, we compare the three measures. Our analyses indicate that the ONS and PESA data differ quite markedly, especially for certain functions: That is, in some cases the two measures imply completely different histories. The differences between the original PESA data and our new measures are less pronounced on average, though significant differences are evident, especially on a year-to-year basis.

PUBLIC EXPENDITURE IN THE UK: HOW MEASURES MATTER

There are significant problems with all published data on UK general government spending by function. This news admittedly does not come as a surprise to many working in the field. Treasury staff, the Office for National Statistics (ONS), and a considerable number of academics agree on the poor state of functional spending estimates (e.g., Heald 1995; Hogwood 1992). As John and Margetts (2003) make clear, the lack of quality data has seriously impeded scholarly work in the UK. Nevertheless, little effort has been made to improve the time series – a particularly disheartening situation given the potential importance of these data for policymakers, and for academic analyses of UK policymaking and budgetary politics.

Studying spending by function rather than department is particularly worthwhile for those interested in using expenditures as a measure of government policy. The Department for Constitutional Affairs, the Home Office, and the Northern Ireland Court Service administer criminal policies and programmes that can be united under a ‘Law and Order’ function. An ‘Environmental Services’ function can combine expenditures managed by the Department for Environment, Food, and Rural Affairs, the Office of the Deputy Prime Minister, the Office of Water Services, and various regional governments and agencies. Functions bring similar programs in different departments together under the same rubric. In effect, they capture the broad aims of policies and programs; they provide valuable information about the fiscal and policy priorities of governments.

Studying spending over time requires reliable data and, as following sections demonstrate, this has not existed in the UK. The two published sources of functional spending figures

present estimates rather than calculations for many years, and the resulting series suggest inaccurate histories. We examine this problem in detail below, assess the accuracy of estimates made in the ONS *Blue Book* and HM Treasury's *Public Expenditure Statistical Analyses* (PESA), and present a new body of spending figures based on primary data provided by the Treasury. The new data reflect temporally-consistent functional definitions from FY1980-81 to FY1999-2000, where FY designates 'fiscal year', which for the UK government runs from 1 April of one year to 31 March of the next. A basic comparison of the data indicates that the different measures of spending do indeed differ in important ways. Within both the current *Blue Book* and PESA datasets there are questions to be addressed about coding accuracy, especially at lower levels in the functional coding hierarchy.

THE CURRENT STATE OF UK FUNCTIONAL SPENDING DATA

There are two sources of UK general government spending data by function. The ONS *Blue Book* is the most commonly used resource. Until 1997, the *Blue Book* presented expenditures by function based on General Government Expenditures (GGE), a measure of government spending including a number of financial transactions but excluding public corporations. From 1997 onwards, *Blue Book* figures are based on Expenditure of General Government (EGG), a measure adjusted to be in line with the 1995 European System of Accounts (ESA95). This post-1997 data are not comparable with the pre-1997 numbers.

The more significant difficulty is that even pre-1997 functional data are unlikely to be directly comparable over a long period of time. Functional definitions change slightly (or not so slightly) each year, so that a program may be included in Health for one year and Environment the next. When functional definitions change the ONS does not re-calculate

most previous years' spending data based on the new definitions. Rather, only the most recent year's ($t-1$) spending is re-calculated. The difference between the original number and the new calculation of spending at $t-1$ is then used to create a factor by which all preceding years' data are multiplied. If, for example, the new calculation of spending on Education at $t-1$ is 1.1 times greater than the original estimate, then values for Education in all preceding years are multiplied by 1.1 in an effort to bring them in line with the new functional definition. The resulting data thus represent only an estimate of previous spending as it might look using the new functional definitions. Problems are compounded year-by-year, so that by 1997 the 1988 data may have been re-estimated nine times.

The other difficulty with *Blue Book* data is that, in order to bring them in line with all other tables in the *Blue Book*, and in line with the fiscal year for most other European governments, government spending is reported by calendar rather than by UK fiscal year (1 April to 31 March). Calendar year estimates are not particularly useful for those interested in policymaking, since spending is allocated and spent by fiscal year. *Blue Book* spending data thus represent an amalgam of decisions made in both the current and previous fiscal years. Since spending will vary considerably by quarter, it is impossible to estimate spending by fiscal year based on calendar estimates.

Thankfully, the Treasury presents functional spending by fiscal year from FY1980-81 in *Public Expenditure Statistical Analyses (PESA)*. *PESA* tables are based on a slightly different measure of government spending – Total Managed Expenditure (TME), including public corporations but excluding financial transactions (it includes current and capital spending only). If only because spending is aggregated by fiscal year, we should expect the *PESA* tables to more accurately reflect policymaking decisions. This is even more true since 2004, as *PESA* tables use more detailed and valuable functional

categories. Importantly, the *PESA* figures are generated from the database maintained by HM Treasury, where the decisions on allocation of expenditure are made. By contrast, the ONS data, when these first appear for a particular year, are the statistical recording of outturns at considerable distance from policy-making.

The one difficulty with *PESA* data is that previous years rely on an estimating procedure similar to that used by the ONS. When functional definitions change, data are *re-calculated* using the new definitions for the current year and the preceding four years, because the Treasury maintains 5-year databases. Data previous to year *t-4* are then *re-estimated* using the same methodology described above, referred to by the Treasury as the ‘link year method’.

Data-gathering methods by the ONS and Treasury reflect their different needs, of course. The ONS priority is statistical record-keeping, increasingly (and necessarily) in ways that are in line with EU requirements. The Treasury is concerned with the operational needs of government. So it is good that the operational department has a run of fiscal-year data for as long as 20 years. The burden of re-calculating 20 years of data is too great, however, and so problems of repeated re-estimation remain. And as a consequence, neither the ONS nor Treasury datasets provide what researchers may require. That is, for the empirical testing of theoretical models, researchers may need long fiscal-year time-series of robust data, not subject to possibly-frequent reassignment of expenditure between functions.

So the current state of UK general government spending data is suspect. Analysts tend to use *Blue Book* data – repeatedly re-estimated data aggregated by calendar year. The relatively new *PESA* publication allows researchers to use data aggregated by fiscal year,

but the problem of using estimates rather than calculations remains. Now, let us see whether and how the measures differ..

THE DATA

We have re-calculated the figures for every year since FY1980 using FY2000 functional definitions. Using these new data, we can compare the spending series published in *PESA*, *estimated* by the Treasury link-year method to match FY2000 definitions, with series actually *calculated* from the original raw data using FY2000 definitions. Results offer an important gauge of the quality of current time series of UK general government functional expenditures. Moreover, they point to the important differences reliable measures of functional spending can make.

Our analyses are based on three measures of general government functional expenditures. First, we examine the General Government Expenditures (GGE) data drawn from the 1962, 1971, 1980, 1989, and 1997 *Blue Books*. These particular Blue Books were selected by starting with the 1997 Blue Book – the last before these data were brought in line with the ESA. Then Blue Books were selected at 9-year intervals, as data are given for ten years in each, and our estimation procedure (described below) requires one overlapping year. We do not expect our results to be sensitive to the choice of particular years.

Because functional definitions change and data are repeatedly re-estimated, any given entry for spending on a single function in any given year will differ from one *Blue Book* to the next. In order to avoid introducing shocks into our series that are simply the product of changing *Blue Books*, we employ the same methodology as the ONS and Treasury: data are gathered for an overlapping year from the old and new *Blue Books*, factors are calculated, and the old series is multiplied by this factor to bring it in line with the new

functional definitions. This is not an ideal approach, of course, but we – like the ONS and Treasury before us – have to make do the best that we can.

Second, we examine the Treasury’s original series on Total Expenditure on Services (TES-O) series, as presented in Table 3.2 of *PESA*. Note that Total Expenditure on Services (TES) is just a subset of Total Managed Expenditure (TME), where the latter includes public sector debt interest, net public service pensions, allowance for shortfall and unallocated special reserve, and other accounting adjustments (see *PESA*, Chapter 3). These items apply only to the ‘total’ expenditure series, however; although it is reported in *PESA* as TME by function, functional spending is by definition TES. To be absolutely clear, FY1995-FY2000 data for these series are calculated using FY2000 definitions; all preceding data are the product of re-estimations to account for changes in functional definitions.

Third, we of course include our new revised spending estimates for Total Expenditure on Services (TES-R). These estimates use consistent FY2000 functional definitions for the entire period. They are created by using the 1985, 1990, 1995, 2000 and 2001 five-year Treasury PES databases, and which contain all expenditures on services at a very low level of aggregation, namely, the sub-program code, or SPROG. In short, we – with considerable help from various people at Treasury – have re-calculated functional spending estimates by aggregating spending by SPROG for FY1980 to FY1994, using FY2000 functional definitions. This involved attributing functions to an average of about 4000 SPROGS in each of five PES databases.

This was done in a two-stage process. First, functional categories were assigned using a ‘Lookup Sheet’ – an Excel spreadsheet macro which seeks to automatically attribute

functions to each SPROG. This sheet is maintained by Treasury. We used the FY2000 Lookup Sheet, which predictably has a very good success rate in recent years, but cannot assign an increasing number of SPROGs as we move back to FY1980. To be specific, the number of elements that were unassigned by the macro was negligible in recent databases – none in the 2000 and 2001 databases, and just 32 in the 1995 database (out of 3430 final, functionally-assigned SPROGs). In early databases, however, the number of elements left unassigned was considerable – about 1100 (of 4935) in the 1990 database and 1400 (of 3440) in the 1985 database.

The second stage of the process involved assigning functions to these remaining elements by hand. The difficulty with which this was done varies considerably. In some cases, it was possible to assign functions using the department code, which indicates which department spent the money. In other cases, we needed to consider the brief description of the SPROG included in the database; sometimes this could be compared with successfully-assigned SPROGs in subsequent years, and a functional category assigned in that way. In a limited number of cases, it was necessary to combine the information from a number of codes to assign a function. There is necessarily some subjectivity in these decisions, then, though no more than there is in any effort to assign spending to functions, either historically or currently. The important point here is that the bases for assigning functions to SPROGs remained constant across the entire period – that is, we worked with a single set of functional definitions. We benefited enormously here from working with the Treasury staff—indeed, work on the 1985 database was done over the course of 2002 in the Treasury offices themselves.

[Table 1 here]

Tables 1 and 2 provide some further details about the information in the PES databases, and both the difficulty and importance of revising current ONS and Treasury estimates. Table 1 shows the difficulty of re-estimating functional spending, using Trade and Industry as an example. The table shows, in descending order of size, the largest SPROGs in the Trade and Industry function, which account for over 50% of the expenditure in this domain. This list includes most of the departments whose PESA returns were aggregated in the Trade and Industry function (see also McLean et al 2003, para. 4.8.1). The table testifies, then, to the significant differences between departmental and functional spending. Moreover, it shows just how heroic an assignment of all SPROGs to an appropriate function of government is. Unless immersed in the data, the analyst may underestimate – or simply mis-estimate – the variety of public expenditure in a modern industrial state.

In short, the taxonomy of functions of government is not like the taxonomy of naturally occurring organisms, which Dawkins (1986, p. 259) labels ‘perfectly nested’. He goes on:

This property of perfect taxonomic nesting is not exhibited by books, languages, soil types, or schools of thought in philosophy. If a librarian draws a ring round the biology books and another ring round the theology books, he will find that the two rings overlap. In the zone of overlap are books with titles like ‘Biology and Christian Belief’.

So it is with functions of government. In the UK, the Ministry of Defence is responsible for the defence of the realm, and the Department of Work and Pensions for the payment of social security benefits. So who pays social security benefits to former defenders of the realm and their relicts – i.e., War Pensions? It could be either department, but the function

must be assigned to just one. And War Pensions have been moved from one to another function – that is, the relevant SPROG has been re-classified – over time.

Thus, even pairs of functions that seem remote from one another have a common frontier across which SPROGS are shifted from time to time. The result is that apparent changes in spending are sometimes only partly related to changes in spending, and partly to changes in functional definitions. Spending on SPROGs can move around extensively every year, after all. Table 2 shows how much this can happen within a single functional category.

[Table 2 here]

Table 2 shows the movement in the top eight Transport SPROGS in each of the four FYs from 1998 to 2001. These eight SPROGs account for about 80% of UK public expenditure for this function. During the period in question, the Strategic Rail Authority was created. It has now been abolished, and by the same administration that introduced it. A substantial proportion of London transport expenditure was moved from London Underground to London Regional Transport, and then back again. Expenditure on the Channel Tunnel rail link fluctuated hugely. The first two of these sets of movements are bookkeeping changes; the last is (probably) a real change in public expenditure. The aim of our research was to separate these two sets of changes. Our measure TES-R assigns all SPROGs back to FY1980 to the function to which they were assigned in FY2000. TES-R thus allows the analyst, as TES-O does not, to isolate the *real* changes in public expenditure, such as those on the Channel Tunnel, by assigning these sub-programmes to the same function of government for each year since FY1980. The assignment is

necessarily partly arbitrary, but it is *consistent* over time. This is why we see an advantage to TES-R over TES-O and GGE.

The new data resulting from our re-estimation are contained in Appendix A. Note that these data necessarily end in FY1999. For years previous to FY2000, UK government spending was controlled on a cash basis, where payments and receipts were recorded in the year in which they actually occurred. The *2000 Spending Review* marked the beginning of resource budgeting, however, where resources are recorded as they are consumed (rather than paid for). A concise description of the difference between cash and resource budgeting is provided in *Resource Budgeting and the 2000 Spending Review*. For our purposes, the move to resource budgeting means that data gathered from FY2000 onwards are not directly comparable with preceding years' data.

COMPARING NEW AND OLD MEASURES

Having described the data, we now move on to some preliminary analyses. All analyses include those years for which data are available for all three data series: 1980 to 1996. All spending series are also transformed into constant 1987 British Pounds using a GDP deflator (1987=1.00). A calendar-year deflator for GGE estimates and a fiscal-year deflator for TES estimates were calculated from the monthly series (CHAW and CBAB, available from the ONS).

[Table 3 about here]

Table 3 presents basic descriptive statistics for the GGE, TES-O, and new TES-R series by all available budget functions. Recall that TES-R series start in FY1980, and GGE series end in 1996, which limits our analyses to 1980-1996. Also recall that yearly data for GGE

are necessarily by calendar year (1985=Jan1985 to Dec1985), while TES-O and TES-R data are by fiscal year (1985=Apr1985 to Mar1986). Also, functions listed in the *Blue Book* are not identical to those listed in *PESA*, so data are missing in some of the cells.

In Table 3 we can see some significant differences between the spending series. Housing estimates, for instance, are much higher for GGE than for TES-O or TES-R; Trade and Industry estimates are lower. Differences between ONS and Treasury functional definitions are a likely culprit, but even the TES-O and TES-R series show differences in some domains, including Culture Media and Sport, Housing, Trade and Industry, Transport, and International Development. Significant differences do not exist between the three spending estimates across all domains, however, and this is a leitmotif for our examination: Although there are important differences between the various spending series, the magnitude and direction of these differences varies considerably across functions. The difference between TES-O and TES-R for Defence tells us nothing about the differences between these series for Education.

[Table 4 about here]

Consider the correlations presented in Table 4. The table shows pairwise Pearson's correlations between the three series for 1980-1996. Correlations are shown for both levels and differences. For differences, the value for a series at t is equal to the level of spending in year t minus the level of spending in year $t-1$; these correlations accordingly capture the extent to which *changes* in two series are the same. Predictably, the correlations tend to be lower in differences than in levels, though this is not always true, such as for the correlation between the two TES measures for Central Administration. The mean and median correlations are substantially higher in levels, however.

Three patterns are worth noting. First, evidence again suggests that there are considerable differences across domains. GGE, TES-O, and TES-R series do closely track each other in some areas, but not in others. The Education and Law and Order functions display relatively high correlations in both levels and differences; Transport correlations are low, at least when including the GGE series; Trade and Industry correlations are consistently low.

Second and perhaps most striking are the comparatively low correlations between the GGE measures on the one hand and the two TES series on the other. This is understandable, given that both the functional definition and period of aggregation are different for GGE than for TES. Still, mean correlations of only about 0.78 in levels and 0.57 in changes between GGE and either TES series point to some rather significant differences between the spending measures. In particular, these differences raise serious questions about the value of aggregating spending by calendar rather than fiscal year. EU regulations aside, it appears that GGE estimates simply *cannot* provide accurate indication of UK budgetary policy.

Finally, there are potentially significant differences between TES-O and TES-R measures in certain areas, particularly Housing, International Development, Other Environmental Services, and Trade and Industry. The lack of congruence between these two TES series is likely the product of two ongoing phenomena: (1) some programs are particularly difficult to categorise by function, and (2) for some functions, definitions change more frequently over time. Even for seemingly straightforward functions like Defence and Health, the different measures produce slightly different estimates. But the low correlation in differences for Other Environmental Services is a signal that particular SPROGs in this diffuse group have been frequently moved around from one main function

of government to another. For corroboration, note that the UK government department with Environment in its title has been sometimes the department whose core function is managing central-local government relations (Department of the Environment in the 1970s; Department of the Environment, Transport, and the Regions in the 1990s); and at other times the department whose core function is managing the countryside (Department for the Environment, Food and Rural Affairs since 2002). That TES-R carefully controls for such transfers of function make it a better analytic series than TES-O, which does not.

That differences exist between TES-O and TES-R confirm the potential importance of recalculating historical data using current functional definitions. Even so, it is clear that this matters more in some domains than others. Some of this variation is systematic – functions in which spending is less incremental, in which yearly changes tend to be proportionally greater, such as Trade and Industry, tend to change more from recalculation than do functions in which spending is very highly autocorrelated, such as Education. This is predictable, since the Treasury’s ‘link year method’ – described above – will tend to minimize what Jones et al (1998) define as ‘punctuations’ in spending. (See a further discussion of this below.)

[Figure 1 about here]

Many of the differences between the various spending series are unpredictable, however – that is, there is no simple story about how one set of spending estimates differs from the other. The various potential differences in measures are illustrated in Figure 1, which plots GGE, TES-O and TES-R for three functions – Defence, Transportation, and Trade and Industry – during the period between FY1980 to FY1996. The functions are selected because they show the general ways in which the series might differ. In some cases, such

as Defence, the differences in the measures are mostly in levels, and these actually can be quite sizable. The gap between the GGE estimates and the two TES series is virtually 10% of the TES-O (or TES-R) Defence budget. Things are much the same for Transportation, though here we can detect level differences across all three measures. We also can detect significant differences in year-to-year changes over time, at least between the GGE series on the one hand the two TES series on the other. For Trade and Industry, differences exist in both levels and changes throughout for all three measures. The history of spending on this function depends almost entirely on which measure is used.

Some of the differences between measures must be due to varying periods of aggregation – GGE being aggregated by calendar rather than fiscal year – or differences in the functional definitions used by the ONS and the Treasury. In many cases, however, the differences between series are by and large the product of repetitive re-estimates of spending by function, precipitated by over-time (and unrecorded) changes in functional definitions. For budgetary scholars, simply identifying these differences is an important task. For others, the importance of this work relies in large part on demonstrating that the differences in spending series have real effects on substantive analysis. We address this below.

AN EXPOSITORY ANALYSIS: POLICY PUNCTUATIONS

Figure 1 suggests that our re-estimates of functional spending may make significant differences to more developed quantitative analyses of government spending. To make this point more clearly, however, we draw here on the recent literature on punctuations in government spending. Baumgartner and Jones' (1993) punctuated equilibrium model of policy change has received increasing attention in recent years, both in the US and

elsewhere. The model posits that policy will tend to move incrementally most of the time, due to a combination of institutional constraints and the bounded rationality of individual decision-making. (For more complete discussions of the incrementalist model of policymaking, see Lindblom 1975; Wildavsky 1984; Jones and Baumgartner 1997.) Punctuations in policy also will occur, though less frequently, due for instance to the change in the party control of government or else substantial shifts in the perceived need for spending (see, e.g., Wlezien, 2004). Ultimately, then, policy should be characterized by a great number of small changes and a few very large changes – long periods of equilibrium with occasional but considerable punctuations.

Jones et al. (2003) find that a wide variety of political time series – budgetary and otherwise – are characterized by long periods of stasis interspersed with dramatic punctuations. Moreover, the extent to which political series fit the punctuated equilibrium model increases as ‘costs’ increase – systems in which information is hard to get and where there are considerable institutional constraints on decision-making, for example, fit the punctuated equilibrium model particularly well. Public budgeting is one such system, as evidenced by the distribution of percentage changes in spending over time. A histogram of percentage changes in US functional spending reveals a *leptokurtotic* distribution: a non-normal distribution characterised by a slender peak (the product of incremental change) and heavy tails (the product of infrequently large change).

[Figure 2 about here]

John and Margetts (2003) recently tested Jones’ hypothesis in the UK using the GGE database we compiled for the present study. These authors compare the distribution of changes in spending across a number of domains from 1951 to 1996, exploring variations

in leptokurtosis, and find ample evidence of punctuated equilibria in UK functional spending. How would such an analysis differ using the three spending measures we use here? Figure 2 directly compares distributions for GGE, TES-O and TES-R, from 1978 to 1996. It relies on percentage changes – as do the Jones (2003) and John and Margetts (2003) analyses – in the three spending series (in constant 1987 pounds), for all eight functions for which all data are available. A normal curve is shown in each graph, as are summary statistics.

Figure 2 indicates that the distributions of percentage changes in all three series do indeed exhibit abnormally high peaks and long tails, in line with work by Jones et al. (2003) and John and Margetts (2003). The pattern in the figure is supported by estimates of Pearson's k , which provide indication of kurtosis (see Anscombe and Glynn 1983) and reveal positive kurtosis in all three distributions. Note that this is not the ideal test, as summing different normal distributions – even with the same means – but with different variances can produce leptokurtosis. There are in this case differences between the three measures, however. GGE exhibits the most leptokurtotic distribution; that is, it shows the greatest proportion of large punctuations, well above and below the zero point. (For the sake of clarity of illustration, the graph – though not the k statistic – for GGE estimates excludes a single point at +203.6% change for Trade and Industry in FY1989.) By contrast, the TES-O series shows a higher peak at about 0, indicating a considerable amount of incremental change, and relatively few large punctuations. TES-R is somewhere in between, as illustrated by both the graph and k statistic.

The same is true when we look more closely at the shape of the tails in each distribution. This can be done in different ways (see Jones et al., 2003). We rely on the ratio of the root mean squared change in spending to the mean change in spending. (We have David Cox

to thank.) This ratio taps the length of the tails relative to a normal distribution of the same variance; it is 0.80 for Gaussian tails, i.e., a normal distribution, and a larger ratio indicates longer, thicker tails, much like the k statistic. The ratio can be calculated separately for the positive and negative tails of the distribution for each of the three measures. Results of doing so are presented in Table 5, and these generally confirm what we saw in Figure 2. First, for each measure, the ratio for the positive section is larger than that for the negative section. This indicates longer, thicker right tails. Second, for each tail, the ratio for GGE is larger than for both TES measures. This implies thicker tails for the GGE distribution, though especially in the positive section, as in Figure 2. Third, the ratios for TES differ only for the right tails, where TES-R shows less scatter than GGE but slightly more than TES-O. The difference is not fundamental, however

[Table 5 about here]

These results are perhaps what we should expect from the different series. For GGE, it may be that a combination of (1) changes in functional definition, and (2) aggregating the final quarter from the previous fiscal year and the first three quarters of the current fiscal year, enhances – or, rather, creates – punctuations in spending estimates. (The punctuations in GGE clearly cannot be the simple consequence of putting together data from different *Blue Books*, as the backward smoothing method we use to connect data over time serves to minimize punctuations as we move from one data source to another.) In contrast, TES-O aggregates by fiscal year, but relies on a good deal of backward estimating. This necessarily smoothes out fluctuations in the data. TES-R resolves both problems – the data are aggregated by fiscal year and rely on temporally-consistent calculations rather than backward estimates. The TES-R data consequently offer a more accurate picture of UK fiscal policymaking.

DISCUSSION & CONCLUSIONS

In spite of the potential value for both policymakers and policy analysts, there is no published, reliable source of UK general government expenditures by function over time. Practitioners and scholars alike rely on two set of time series: the GGE series from the *Blue Book* and the TME series from the Treasury. What we have shown is that these series differ in meaningful ways. The differences may in large part be the product of varying periods of aggregation – specifically, by calendar year instead of fiscal year. Continuously changing functional definitions and repeatedly re-estimated rather than re-calculated spending figures also appear to take their toll, however. Our new series reveal that published estimates, in some functions at least, are fundamentally incorrect.

The differences between spending series have real consequences. Different measures tell different stories, and we only hope that the new measures allow us to see things more clearly. Even as we have aimed to improve measures of functional spending in the UK, it is important to keep in mind that outlays are several times removed from budgetary policy itself. They are not spending ‘policy’ *per se*. What actually is spent ultimately reflects things that politicians cannot fully anticipate or manage. If we are interested in observing the effects of budgeting out in the world, the expenditures are of primary importance. If we are interested in capturing the government commitment to programs, budgetary *policy* is what matters. The problem is that finding reliable measures of actual policy in the UK is not easy; indeed, it may be impossible.

Such data are more readily available for the US, which makes clear distinctions between budget authority, obligations, and outlays. Appropriations bills in the US specify an amount of budget authority that is available to an agency or department for obligation, that

is, for making commitments to spend money. When money is actually spent, an expenditure or outlay occurs, which can lag well behind appropriations decisions and obligations. Appropriations and outlays, thus, are two different things, and the former is the preferable measure of budgetary policy (see Wlezien and Soroka 2003).

The reliance on outlays is an unfortunate fact of life for UK analyses, however. Our more accurate estimates of spending necessarily reflect a combination of recent budgetary decisions and the timing of actual expenditures, but they are still the best possible measure of UK governments' fiscal priorities. These series represent the first effort to develop temporally-consistent measures of functional spending in the UK. Our basic analyses indicate that they make a difference, especially in certain areas. The extent to which these data serve to support or refute existing research on the causes and consequences of UK public expenditures remains to be seen.

Appendix A: Revised Measures of TES by Function, in Billions of Current Pounds

<i>Function</i>	<i>Fiscal Year</i>									
	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
Education	12.882	14.009	15.053	15.849	16.412	17.541	19.227	21.007	22.684	24.997
Health	12.365	13.878	15.099	15.984	17.108	17.634	18.869	20.699	22.912	24.744
Personal social services	1.702	1.876	2.048	2.221	2.367	3.050	3.351	3.765	4.197	4.713
Transport	4.282	4.842	5.391	5.623	5.738	5.578	5.450	5.668	5.516	6.486
Housing	5.140	3.446	3.175	4.747	4.817	4.700	4.708	5.039	5.116	6.058
Other environmental services	3.307	3.417	3.835	4.167	4.340	3.832	3.932	3.864	2.965	4.502
Law order and protective services	3.886	4.536	5.031	5.543	6.096	6.386	6.925	7.685	8.530	9.739
Defence	11.203	12.641	14.441	15.534	17.161	17.933	18.185	18.856	19.079	20.760
International development assistance and other international services	1.159	1.168	1.230	1.336	1.484	1.659	1.777	1.827	2.048	2.282
Trade, industry, energy and employment	4.598	5.409	6.039	6.284	7.840	6.984	7.004	6.421	6.700	6.415
Agriculture, fisheries, food and forestry	1.642	1.675	2.171	2.449	2.439	2.781	2.111	2.318	2.098	2.051
Culture, Media and Sport	1.160	1.396	1.525	1.557	1.668	1.787	1.906	2.144	2.382	2.740
Social security	23.518	28.732	32.892	36.868	39.673	43.270	46.571	48.643	49.761	52.754
Central administration and associated expenditure	2.252	2.712	2.875	2.810	3.340	5.018	5.982	6.575	6.163	8.560
Total Expenditure on Services	89.096	99.739	110.804	120.971	130.482	138.153	145.998	154.510	160.151	176.803

Appendix A continued...

<i>Function</i>	<i>Fiscal Year</i>									
	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Education	26.591	29.181	31.505	33.029	34.604	35.573	36.143	37.181	38.766	40.680
Health	27.693	31.639	34.989	36.680	38.984	41.694	43.019	44.954	47.528	51.438
Personal social services	5.399	5.916	6.388	7.248	8.508	9.428	10.110	10.691	11.352	12.505
Transport	8.895	9.772	11.367	10.472	12.000	11.508	10.076	9.231	8.698	8.505
Housing	5.333	6.109	6.393	5.657	5.133	5.029	4.579	3.718	3.679	2.765
Other environmental services	7.241	7.653	7.767	7.669	8.727	8.498	8.639	8.817	8.712	10.054
Law order and protective services	11.314	12.755	13.949	14.502	15.127	15.737	16.375	17.007	17.475	18.760
Defence	21.709	22.913	22.910	22.622	22.522	21.631	21.324	20.946	22.634	22.717
International development assistance and other international services	2.531	2.924	3.137	3.260	3.269	3.303	2.952	2.869	3.165	3.429
Trade, industry, energy and employment	10.412	9.670	10.204	10.584	9.789	9.189	8.900	8.696	8.951	9.337
Agriculture, fisheries, food and forestry	2.919	3.058	3.182	4.089	3.657	4.170	5.409	4.686	4.647	4.408
Culture, Media and Sport	2.978	3.035	3.137	3.122	3.281	3.438	3.653	4.162	4.926	5.565
Social security	58.843	69.954	79.264	86.597	88.943	92.754	96.436	97.365	99.403	103.222
Central administration and associated expenditure	6.906	6.044	8.324	8.279	7.671	9.833	8.090	8.277	10.414	10.272
Total Expenditure on Services	198.765	220.623	242.517	253.811	262.214	271.784	275.705	278.600	290.349	303.656

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Table 1. SPROGs accounting for 50% of Trade and Industry functional expenditure in FY 1999

SPROG	Description	Department (s)	Total £Thousands
102601	YOUTH TRAININGPROGRAMME	Department for Education and Skills inc OFSTED	786971
121216	ES Administration	Department for Work and Pensions	759615
41317	British Nuclear Fuels Ltd (BNFL)	Department of Trade and Industry	477000
40220	Engineering and physical sciences research council	Department of Trade and Industry	404796
121807	New Deal for Young People	Department for Work and Pensions	352512
121905	ESF Payments in Advance of Receipts	Department for Work and Pensions	312967
151414	Scottish enterprise	Scottish Executive, The Scottish Office Education and Industry Department	307989
40221	Medical research council	Department of Trade and Industry	304538
40602	Consumer and Investor Protection	Department of Trade and Industry, Office of Fair Trading, Office of Telecommunications, Office of Water Services, Friendly Societies Registry, Department for Education and Skills inc OFSTED	274193
121805	Training for Work	Department for Work and Pensions	262309
102101	DEPARTMENTAL ADMINISTRATION	Department for Education and Skills inc OFSTED	241101
102001	CAREERS SERVICE AND Employment Development Projects.	Department for Education and Skills inc OFSTED	236984

Source: HM Treasury, PESA Team, 2001 GES database.

Table 2. Largest Sub Programmes in the Transport Function, £ million

SPROG	Description	98-99	99-00	00-01	01-02
060101	Highways Agency Programme	1,355.4	1,391.1	1,413.1	1548.3
060325	Strategic Rail Authority	—	—	147.8	1229.8
060311	OPRF (now within SRA)	1,024.2	890.4	603.8	—
060511/09	London Underground	241.0	178.8	—	483.0
060507	London Regional Transport	166.5	156.2	315.4	—
061005	Channel Tunnel	115.9	11.5	27.3	358.3
060307	Bus Fuel Grants	225.0	292.4	299.6	303.9
060779	Central Administration	113.0	112.0	118.9	102.0
	Total of these sub programmes	3241.1	3020.9	2898.6	4025.3
	Total spending	3904.0	3843.9	3486.4	4610.1

Source: DTLR (now DfT) returns to HM Treasury *PESA* database, collected and reported by McLean et al 2003, Table 4.3.1

Table 3. Descriptive Statistics for Different Budgetary Measures, 1980-1996 (in millions of 1987 British Pounds)

Function	GGE		TES-O		TES-R	
Agriculture	2498	(446)	2537	(481)	2486	(430)
Central Admin	—	—	5604	(707)	5099	(1260)
Culture, Media And Sport	—	—	1980	(256)	2081	(229)
Defence	17736	(1255)	16882	(1491)	16951	(1454)
Education	21255	(2478)	20341	(2361)	20679	(2137)
Health & PSS	—	—	25343	(4615)	25771	(4962)
Health only	21881	(3706)	21224	(3441)	21786	(3638)
PSS only	—	—	4119	(1205)	3984	(1351)
Housing	8090	(1606)	4383	(1178)	4602	(1019)
International Development	—	—	1852	(222)	1888	(271)
Law And Order	8037	(1760)	8293	(1773)	8131	(1789)
Other Env Services	—	—	4921	(492)	4792	(904)
Social Security & PSS	53614	(9964)	—	—	—	—
Social Security	—	—	48725	(8973)	48838	(8939)
Trade And Industry	5527	(2800)	7230	(976)	7031	(1007)
Transport	5182	(1059)	7388	(728)	6567	(943)
Total for functions listed	143820		180822		180686	

Note: Table entries are mean levels of spending; numbers in parentheses are standard deviations.

Table 4. Correlations Among Budgetary Measures, in Levels & Differences, 1980-1996 (in millions of 1987 British Pounds)

Function	GGE - TES-O		GGE - TES-R		TES-O - TES-R	
	levels	diffs	levels	diffs	levels	diffs
Agriculture	.869	.867	.895	.863	.975	.966
Central Admin	—	—	—	—	.676	.740
Culture, Media And Sport	—	—	—	—	.980	.942
Defence	.967	.664	.964	.596	.997	.980
Education	.987	.810	.984	.759	.994	.920
Health & PSS	—	—	—	—	.998	.918
Health only	.996	.685	.993	.647	.992	.919
PSS only	—	—	—	—	.991	.647
Housing	.855	.638	.786	.725	.844	.863
International Development	—	—	—	—	.950	.733
Law and Order	.996	.821	.997	.861	.996	.889
Other Env Services	—	—	—	—	.730	.442
Social Security & PSS	—	—	—	—	—	—
Social Security	—	—	—	—	1.000	.999
Trade & Industry	.521	.119	.282	.195	.469	.346
Transport	.031	.016	.186	.166	.896	.889
Mean	.778	.578	.775	.566	.877	.675
Median	.918	.725	.930	.686	.980	.889

Note: Table entries are Pearson's correlation coefficients. N=17 for levels, N=16 for differences.

Table 5. A Numerical Assessment of the Tails

	Spending Measure		
	GGE	TES-O	TES-R
Right Tail	2.39	1.59	1.82
Left Tail	1.59	1.38	1.40

Notes: Statistics represent the root mean squared change in spending divided by the mean change in spending.

Figure 1. Comparing Spending Measures

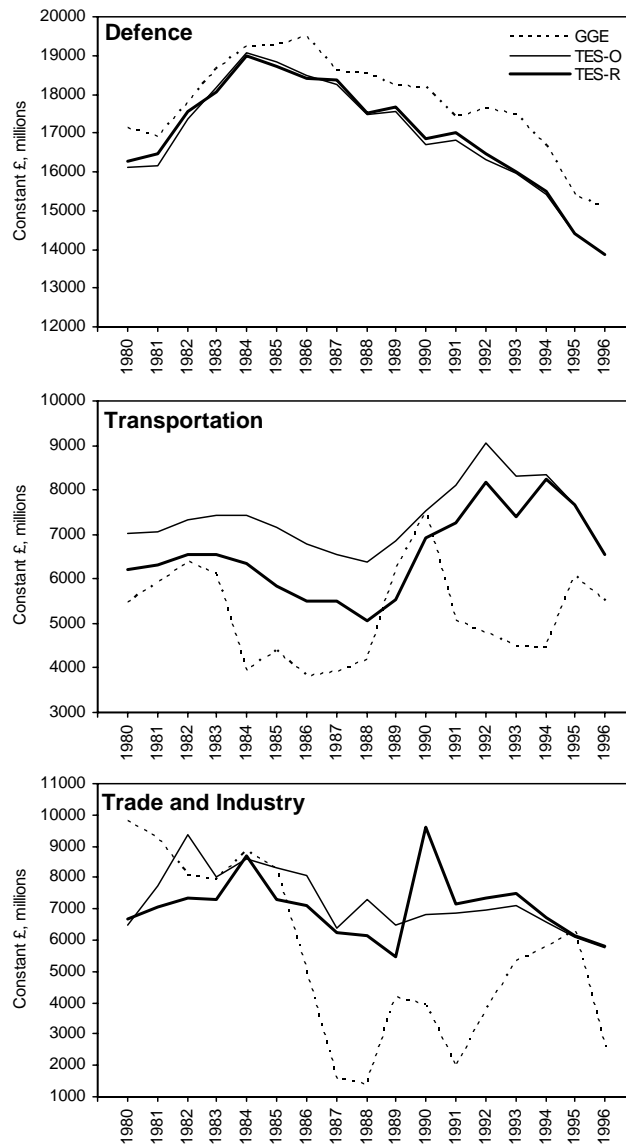


Figure 2. Comparing Spending Measures: Policy Punctuations

