An investigation into balancing the UK national and financial accounts, 1985-7

Introduction

1. This article is a progress report on experimental work, carried out by the Central Statistical Office (CSO)*, aimed at providing balanced national and financial accounts for the years 1985 to 1987. The article explains the background to the work, the way in which balancing has been approached, and presents some preliminary results. It makes an assessment of the work so far, and discusses how it might be taken forward.

2. The work reported here was foreshadowed in the press notice which accompanied the publication of *"United Kingdom National Accounts" (The "Blue Book")* last September. It was set up primarily in response to the very large balancing items that have appeared in the sector accounts in the last few years, particularly for 1987. The CSO declared its intention to examine the feasibility of producing balanced accounts for the period 1985 to 1987. These accounts would eliminate the residual error (the difference between the expenditure and income measures of gross domestic product (GDP)) and the sector balancing items by adjusting those elements of the accounts which are known to be most uncertain or where it is suspected that there may be deficiencies in coverage. In the press notice, the CSO said it would publish an article on the exercise "within the next six months".

3. The current exercise was, and still is, seen as experimental. Its main aims were to assist in the interpretation of the existing accounts, using subjective assessments, and, through these, to identify more clearly the likely areas of weakness in the accounts. A subsidiary, and longer term, aim was that balancing should be looked at as a possible way of producing more coherent accounts on a regular basis. But it was not the intention that any figures produced by the current exercise should replace the existing published accounts. In September, 1988, it was said that this was to be a CSO contribution to the debate about the quality of the national and financial accounts. The CSO would welcome the views of others on the work described in this article, and on balanced accounts in general.

4. Over the last six months, the work has been carried out by collecting, specifically for this exercise, assessments of the reliability of the series provided by compilers of the statistics, and then using them as an input to the production of balanced sets of accounts. This information has necessarily been subjective, and some results have been seen to be sensitive to the assumptions made by compilers. Because the accounts that have been produced balance within the accounting framework, in this one important sense they are more coherent, and they offer possible interpretations of what has been happening in the UK economy over the period 1985 to 1987. However, the CSO cannot yet attach confidence to these interpretations, which remain surrounded by considerable uncertainty.

5. There are enough positive aspects of the work to suggest that it is worth continuing with the experiment. Although the model is sensitive to a number of the subjective assumptions of compilers, it does show some signs of robustness. In particular, certain items (such as company profits and transactions in securities) are subject to substantial adjustment, in the same direction, over a fairly wide range of different assumptions. Indeed, the adjustments in the accounts in general tend to be of a similar pattern for most reasonable changes in the assumptions. However, the balancing starts from accounts with some clear inconsistencies, and it is almost inevitable that, in some areas, the balancing process will lead to adjustments in a particular direction, whatever the error ranges assumed. Overall, compilers' reassessment of the error ranges and the balancing process itself have tended to confirm the views that the CSO has long held about the weaknesses in the accounts. Although it is not yet felt that the model has produced firm enough evidence for the CSO to reassess its priorities in allocating its resources to particular areas of research, the possibility of using balanced accounts in this way in the future has not been ruled out.

Background

6. The national and financial accounts, which are compiled quarterly and annually, provide the basic description of the economy on which the Government's macro-economic policy is judged. They are also widely used outside Government. The accounts generally are compiled from a wide variety of sources, such as administrative or survey data. The key aggregate in the national accounts is gross domestic product (GDP), which is measured in three ways- from the sum of final expenditures (GDP(E)), from the sum of incomes (GDP(I)), and from net output (GDP(O)). GDP(E) is measured at both current and constant prices, GDP(I) only at current prices, and GDP(O) only at constant prices. The "residual error" in the accounts is defined as the difference between GDP(E) and GDP(I), at current prices.

7. Estimates are compiled for different sectors of the domestic economy and for the overseas sector. For each sector, the current and capital accounts (including inter-sectoral transfers which do not enter into the calculation of GDP and therefore do not affect the residual error)[1] generate a financial surplus/deficit. The financial accounts[2] complete the accounting framework and show how these surpluses or deficits are invested or financed. For each sector, the financial surplus/deficit, and the total of net financial transactions, should, according to the framework, be equal. Given the complexity of the economy and the myriad and general independence of data sources used in preparing the accounts, it is not surprising that the estimates based on the data collected do not balance. For each sector, the difference between the financial surplus/deficit and the total of net transactions represents the balancing item for that sector. The sum of the sector balancing items is equivalent to the residual error (with sign reversed).

8. These imbalances, as they appeared in the 1988 Blue Book, are shown below. (Later figures have been published in January *Economic Trends*. Because the full detail required for the balancing exercise is available only annually, the present exercise is based on the earlier Blue Book data.) A summary analysis of current, capital and financial transactions, by sector,

* Although the work has been undertaken in CSO, it has relied, as does the regular compilation of national and financial accounts, on major contributions from other government departments and the Bank of England.

(1) These transactions are said to be "above the line", that is above the line drawn at the financial surplus or deficit.

(2) These transactions are said to be "below the line".

is given for 1987 in Table 1. GDP(E) is shown in Box B, and GDP(I) in Box A. Further details about the construction of the national and financial accounts may be found in the CSO publications *"United Kingdom National Accounts - Sources and Methods"* (HMSO, 1985), and *"United Kingdom National Accounts" (The Blue Book)* (HMSO, 1988).

TABLE A
Balancing items

£ billion

	1985	1986	1987
Personal sector	-9.1	-16.4	-21.7
Industrial & commercial companies	4.8	4.6	14.1
Monetary sector	-0.7	0.1	-0.9
Other financial institutions	0.0	-1.2	9.6
Public sector	0.4	1.2	1.0
Overseas sector	5.7	14.4	3.5
Total*	1.1	2.7	5.7

*The residual error with sign reversed

9. In the normal course of events, the residual error reduces as the estimates are revised in the light of later and more complete information. The residual errors for the years to 1986, shown in the Table, are substantially lower than those which were published in the previous year's Blue Book, and, by January 1989 *Economic Trends*, the residual error for 1987 had been halved. Even so, differences in the residual error from one year to the next can imply significant differences in annual growth rates shown by GDP(E) and GDP(I), particularly when estimates are first published. Further, the sector balancing items remain at unacceptably high levels. The persistently negative figure for the personal sector has grown substantially in the last few years, while erratic figures are evident for the industrial and commercial companies (ICCs) sector (particularly 1987), the overseas sector (particularly 1986) and the other financial institutions (OFIs) sector (1987). These large and persistent errors in the accounts led the CSO, in September, 1988, to embark upon an investigation into the advantages of balancing the accounts.

Balancing the accounts

10. The essence of the balancing process is the fitting of statistical estimates into the theoretical accounting framework on the basis of their assessed reliability, using a mathematical technique of minimising a weighted sum of squares of the differences between published and balanced values. Balancing was undertaken at the detail of Table 1 (but also including a rough breakdown of the monetary sector and OFI figures of current transactions). The estimates cover GDP(E) and GDP(I), and are at current prices; information about GDP(O) has not been incorporated in this balancing exercise. Each item in Table 1 has associated with it a degree of reliability - an error range. It is reasonable to make greater balancing adjustments to the less reliable series, and this is the starting point of the balancing process. However, adjustments are constrained by the accounting framework. For example, the pattern of adjustments needed to reconcile the GDP figures may be different from that needed to eliminate the sector balancing items. A description of the methodology used in the CSO's balancing work is given in the Annex .

11. The assembly of input data needed as a basis for balancing has been undertaken by CSO, with contributions from data suppliers in other government departments and the Bank of England. Contributors were asked to provide an assessment of the quality of the data for each series for which they are responsible. This assessment had to be quantified in two respects. Where it was thought that the estimates might be too low or too high, prior adjustments were estimated. For all series, error ranges were required. Some of this information was already available, although not in sufficiently quantified form to be used directly. For example, *Sources and Methods* shows in which of three broad error ranges the accuracy of the main components of GDP(E) and GDP(I) is likely to fall, while qualitative information on the quality of financial transactions information is contained in the *Financial Statistics Explanatory Handbook*. The information on error ranges obtained in the study is considered to be a material improvement on that available previously.

12. The prior adjustments, which reflect possible omissions or inconsistencies, cover three kinds of uncertainty in the figures. First, the adjustments reflect the use of provisional data, where there is a suspicion of underestimation or overestimation. For some series these adjustments have reflected revisions coming on stream at the end of last year. Secondly, there may be known gaps or misallocations in the statistics. Thirdly, there may be unresolved differences in concept and definition. In general, where biases are suspected, prior adjustments are already made to the estimates in the published figures. However, in a few instances, there is great uncertainty about the values to be imputed, and no adjustments are made. For the balanced accounts exercise, compilers were asked to incorporate more speculative assessments of bias, which in some cases might be little more than hunches.

13. The second set of adjustments is error ranges. Compilers were asked to estimate for each series the 90 per cent probability range within which the true value would be expected to fall. (The figure of 90 per cent was chosen because this is the level used in *Sources and Methods*. In practice, it is the relative error amongst series which is relevant to the balancing). The assessment of error was easier in some cases than others. For example, where estimates are essentially sample-based, a statistical estimate could be calculated, although this is likely to be overlaid with non-sampling (eg reporting) errors. In most cases, though, a largely qualitative assessment of accuracy needs to be turned into a quantitive error range. There are special problems for financial transactions, many of which are measured on a net basis and from counterpart sources. "Net" in this sense relates to the netting out of transactions between organisations in the same sector, and also to a concept of net flow, that is the overall effect of a large number of transactions in offsetting directions. The attribution of error ranges to items which are compiled as residuals in the accounts (for example many of the personal sector transactions) raises its own problems. These have generally been based on errors in the components from which the residual has been derived. The errors have been combined assuming they are independent.

14. Some thought was also given to the importance of inter-related error terms, or covariance, between series. For example, if series B were derived from series A, there would be a covariance between the error ranges of the two series, and adjustments made to the two series in the balancing process would be in some ways related. In the event, insufficient work has been done on covariances and it was decided not to include any in the results presented in the article.

15. In undertaking the balancing exercise, an arbitrary level of aggregation had to be selected. The use of the detail shown in Table 1 for collecting input data and balancing the accounts largely reflects the need for compromise between a sufficient degree of disaggregation and excessive detail, which both increases the complexity of the calculation and impairs understanding of the results. To improve assimilation of the information, the input data

and the results are shown in a more aggregated format than in Table 1. In combining error ranges for this format, the assumption of independence has been made.

16. Error ranges and prior adjustments were provided by a number of different compilers in a number of different organisations. Methods of estimation varied, reflecting the wide range of data sources. The CSO's role of co-ordinator included the task of trying to ensure consistency of approach in the estimation of these input data. This was achieved first by defining the information required. Then the whole set of input data was circulated to all compilers, who were asked to reconsider their own estimates in the light of others. As a result, some initial estimates were revised. Given the diversity of data sources, and problems of estimation, a degree of subjectivity underlying the figures of error ranges and prior adjustments used in the analysis inevitably remains.

17. It would be possible to balance the different measures of GDP (that is eliminate the residual error) using only the information on the components of the current and capital transactions which go to make up GDP(E) and GDP(I). Some work of this kind has been done (see references at end). This approach has the advantage that it can be applied to constant or current price data. Some exercises have also exploited production data. However, most studies have ignored information on financial transactions. The balancing process used in this experiment aims to use the sector accounting information as well. It balances sectoral income and expenditure data, including transfers not included in GDP(E) and GDP(I), alongside financial transactions. As financial transactions and transfers are available only in current prices, the balancing exercise has been confined to an analysis in current prices.

The Input Data

18. The basic data to be balanced for 1985, 1986 and 1987, consistent with the 1988 Blue Book, are given in Tables 2A, 3A and 4A.

(a) Prior adjustments

19. The prior adjustments for each of the years 1985 to 1987 are shown in tables 2B, 3B and 4B. These take account of the more subjective views of compilers, and are not firmly enough based to include in official statistics. For the main components of GDP(E) and GDP(I), the prior adjustments are summarised in Table B below. In GDP(E), upward adjustments are included for both consumption and capital formation, partly reflecting revisions becoming available at the end of last year. The present estimates for exports of goods and services have been adjusted downwards to reflect more closely the definition of insurance services used in the domestic accounts.

20. On the income side, prior adjustments largely result from the availability of recent evidence. Positive adjustments are proposed for income from employment, largely reflecting a possible understatement of income in kind and of the earnings of those below the tax threshold. Within "gross profits and other trading income," positive adjustments for income from self-employment more than offset negative adjustments to profits. The latter reflects further information on the split between the monetary sector's profits from charges, fees, etc (which contribute to national accounts profits) and from net interest receipts (which feature as inter-sector transfers).

TABLE B
Prior adjustments [1]

£billion

	1985	1986	1987
GDP(E)			
Final consumption	-0.4	-0.9	-1.7
Gross domestic capital formation	-0.7	-0.6	-1.3
Exports of goods and services	0.9	1.4	1.4
Imports of goods and services	-0.1	-0.1	-0.1
Factor cost adjustment	0.0	0.0	0.0
Total	-0.3	-0.2	-1.7
GDP(I)			
Income from employment	0.7	0.8	1.1
Gross profits, and other trading income[2]	0.2	0.5	0.3
Other factor incomes[3]	0.0	0.6	1.0
Total	0.9	1.8	2.4
Financial transactions			
Personal sector	-1.7	-3.0	-3.1
Industrial & commercial companies	-0.5	-0.2	-0.2
Monetary sector	1.6	2.1	0.6
Other financial institutions	-1.6	-2.5	4.8
Public sector	0.0	0.0	0.0
Overseas sector	2.5	4.8	-2.9

(1)See note on sign convention on Appendix contents page.

(2)Income from self-employment, gross trading profits of companies, and trading surpluses of public corporations and general government enterprises.

(3)Income from rent and the imputed charge for non-trading capital consumption, *less* stock appreciation.

21. Perversely, by raising estimates of income more than expenditure, the effect of the prior adjustments is to increase the residual error in all three years. The expectation was that such adjustments would tend to reflect deficiencies in early estimates, and should therefore lead to greater congruence between GDP(E) and GDP(I).

22. For the financial accounts, Table B shows relatively large adjustments for some of the sectors. The greater detail in the tables at the end of the article indicates that the main adjustments relate to UK and overseas securities. Prior adjustments for transactions of non-reporting OFIs (including securities dealers) have led to a substantial increase being made to the estimates of OFIs' investment in securities in 1987. This has had the effect of changing, from net investment to net disinvestment, estimates of both UK company securities for the personal sector, and overseas securities for the overseas sector. Other prior adjustments have been postulated for notes, bills, etc., reflecting difficulty in sectorising sales of government floating rate notes; for bank deposits, relating to the treatment of discrepancies in interbank transactions and to incomplete coverage of OFIs' holdings of bank certificates of deposit; and for bank lending, where writing-off debt has distorted estimates of transactions.The adjustment for the overseas sector in 1986 is, again, largely in securities.

23. The net effect of all the prior adjustments is to modify the sector balancing items, as indicated in Table C below. Thus, for 1987, for example, despite a worsening in the residual error, the prior adjustments improve the balancing items for all sectors except the monetary and overseas sectors. In particular, for the personal sector the balancing item reduces from minus £21.7 billion to minus £17.8 billion, while for the OFIs sector the improvement is from £9.6 billion to £4.9 billion. In the previous

two years the balancing items for both monetary and other financial institutions sectors were worsened, whilst that for the overseas sector improved. Prior adjustments for the public sector are negligible.

TABLE C
Effect of prior adjustments on balancing items

£ billion

	Blue Book 1988	Prior adjust-ment	Adjusted
1987			
Personal sector	-21.7	3.9	-17.8
Industrial & commercial companies	14.1	-1.6	12.5
Monetary sector	-0.9	-0.7	-1.6
Other financial institutions	9.6	-4.7	4.9
Public sector	1.0	0.0	1.0
Overseas sector	3.5	3.7	7.2
Total	5.7	0.6	6.3
1986			
Personal sector	-16.4	4.3	-12.1
Industrial & commercial companies	4.6	-1.1	3.5
Monetary sector	0.1	-2.3	-2.2
Other financial institutions	-1.2	3.1	1.9
Public sector	1.2	0.0	1.2
Overseas sector	14.4	-4.1	10.3
Total	2.7	-0.1	2.6
1985			
Personal sector	-9.1	2.9	-6.2
Industrial & commercial companies	4.8	-0.9	3.9
Monetary sector	-0.7	-1.9	-2.6
Other financial institutions	0.0	2.6	2.6
Public sector	0.4	0.0	0.4
Overseas sector	5.7	-2.0	3.7
Total	1.1	0.6	1.7

b) Error Ranges

24. The error ranges are shown in Tables 2C, 3C and 4C. A selection is given below in Table D for 1985 (for which the accounts are near-final), for 1986 and for 1987, for the main components of both GDP(E) and GDP(I). Given that more recent data are more provisional, error ranges generally become progressively wider over the years 1985 to 1987.

TABLE D
Main error ranges[1] for GDP components

£billion

	1985	1986	1987
Final consumption	2.4	3.0	3.4
Gross domestic capital formation	1.5	1.5	2.5
Exports of goods and services	1.6	1.5	1.6
Imports of goods and services	1.5	1.4	1.5
Factor cost adjustment	0.0	0.1	0.2
Income from employment	2.8	2.9	3.7
Gross profits, and other trading income[2]	3.1	3.5	4.5
Other factor incomes[3]	1.0	1.2	1.6

(1)Defined as half the difference between the upper and lower limits of the 90 per cent range

(2)Income from self-employment, gross trading profits of companies, and trading surpluses of public corporations and general government enterprises.

(3)Income from rent and the imputed charge for non-trading capital consumption *less* stock appreciation

25.For the financial accounts, the major uncertainties are in the estimates of UK company securities and overseas securities (where certain information about the transactions of securities dealers is not available), and, within "other domestic transactions", of trade credit (where coverage is only partial) and life assurance and pension funds.

Results

26. It should be emphasised that the results depend, in part, on the structure of the imbalances in the accounts and, in part, on the assumptions fed in - for example, the allocation of adjustments above and below the line, or between series, depends on the assumed relative errors.

27. The results, given in Tables 5A, 6A and 7A, are based on the prior adjustments and error ranges shown in Tables 2, 3 and 4. They are expressed as balanced accounts covering 1985, 1986 and 1987, and have been constrained to balance to the GDP(A)* estimate for each year, as published in the 1988 Blue Book. Tables 5B, 6B and 7B give the differences between the balanced accounts and the published series, and Table 8 shows these differences for each of the six sectors for all three years.

28. Because the residual error is negative in each of the three years under study (that is, expenditure is less than income) and there is a negative balancing item in the personal sector account, there is an inherent conflict for any balancing process. Balancing GDP to GDP(A) requires income to be reduced and expenditure to be increased; however, balancing the personal sector account, which includes the two largest components of GDP - income from employment and consumers' expenditure - tends to require an increase in sources of funds and/or a reduction in uses of funds. This, together with the large positive balancing items in the ICC sector, will almost inevitably lead the balancing process to adjust company profits downwards, fixed capital formation upwards, and to smaller net financial investment by the personal sector.

29. The results largely confirm this expectation. Table E below shows the total adjustment (including prior adjustments) and the prior adjustment for the components of GDP(E) and GDP(I) for each of the three years. The largest adjustment is a marked reduction in gross profits and other trading income. For 1987, downwards adjustments of £4¾ billion for company profits and £2 billion for monetary sector profits (partly the prior adjustment) more than offset an increase of £1½ billion in income from self employment. Income from employment is increased by about £2 billion in 1987. In GDP(E), capital formation is adjusted upwards by nearly £2¾ billion in 1987, but consumption is only marginally up and compares with a moderately large prior adjustment. Exports and imports, in contrast, are adjusted downwards.

*GDP(A) is the average of the expenditure, income and output measures of GDP. In base years, eg 1985, its level is the simple average of the expenditure and income measures; between base years, changes in the output measure are also taken into account.

TABLE E
Total adjustments and prior adjustment components[1]

£billion

	1985		1986		1987	
	Total adjustments	of which prior adjustments	Total adjustments	of which prior adjustments	Total adjustments	of which prior adjustments
GDP(E)						
Final consumption	0.4	-0.4	0.4	-0.9	-0.3	-1.7
Gross domestic capital formation	-0.8	-0.7	-1.0	-0.6	-2.8	-1.3
Exports of goods and services	0.4	0.9	0.4	1.4	0.5	1.4
Imports of goods and services	-0.5	-0.1	-0.9	-0.1	-0.8	-0.1
Factor cost adjustment	0.0	0.0	0.0	0.0	0.0	0.0
Total	-0.5	-0.3	-1.1	-0.2	-3.4	-1.7
GDP(I)						
Income from employment	0.7	0.7	0.4	0.8	2.1	1.1
Gross profits,and other trading income[2]	-1.1	0.2	-2.3	0.5	-5.1	0.3
Other factor incomes[3]	-0.1	0.0	0.3	0.6	0.7	1.0
Total	-0.5	0.9	-1.6	1.8	-2.3	2.4

(1) (2) (3) See notes to table B

30. Table F below shows the totality of adjustments for the current/capital account transactions and for the financial transactions. Overall, adjustments below the line tend to be greater than those above the line. Although this pattern is generally repeated in the accounts for individual sectors, the above-the-line adjustments (mainly company profits) contribute more in the ICCs sector. The removal of the erratically large balancing items for OFIs in 1987 and for overseas in 1986 are both achieved, mainly, by adjustments to financial transactions.

31. Table G below gives the total adjustment and the prior adjustments for some of the main sectoral components. For the personal sector, by far the largest adjustment is to transactions in securities (about £11 billion in 1987, of which about £3½ billion reflects a prior adjustment). A large adjustment for 1987 is also made to "other domestic transactions" which reflects, mainly, the estimates for life assurance and pension funds, and trade credit, for which information is incomplete. There are modest changes to income from employment, and, as can be seen from Table 8, income from self employment (within gross profits and other trading incomes) and transfers (essentially dividends and interest). For ICCs, the main adjustments are to company profits and securities. There are also significant adjustments to transfers, and, in 1987, capital formation. For OFIs, the adjustment to securities in 1987 is roughly the same as the prior adjustment. For the overseas sector, the main adjustment is to transactions in UK and overseas securities in 1986. Net transfer payments (interest, profits and dividends) are increased.

TABLE F
Adjustments above and below the line[1]

£billion

		1985		1986		1987	
		Total adjustments	of which prior adjustments	Total adjustments	of which prior adjustments	Total adjustments	of which prior adjustments
Personal sector	Above	2.7	1.2	3.4	1.2	5.5	0.8
	Below	-6.4	-1.7	-13.0	-3.0	-16.2	-3.1
Industrial & commercial companies	Above	-3.7	-1.4	-4.8	-1.3	-9.4	-1.8
	Below	1.0	-0.5	-0.2	-0.2	4.8	-0.2
Monetary sector	Above	0.8	-0.4	1.2	-0.2	0.4	-0.1
	Below	0.1	1.6	1.3	2.1	-0.5	0.6
Other financial institutions	Above	0.5	0.9	0.6	0.6	-0.8	0.1
	Below	0.5	-1.6	-0.6	-2.5	8.7	4.8
Public sector	Above	-0.1	0.0	-0.4	0.0	-0.3	0.0
	Below	0.2	0.0	0.9	0.0	0.7	0.0
Overseas sector	Above	-1.3	0.5	-2.7	0.7	-1.2	0.7
	Below	4.5	2.5	11.7	4.8	2.5	-2.9

(1) The adjustment to sector balancing items is equal to the adjustments above the line *less* the adjustments below the line

TABLE G
Main adjustments

£ billion

	1985		1986		1987	
	Total adjust-ments	of which Prior adj-ustments	Total adjust-ments	of which Prior adj-ustments	Total adjust-ments	of which Prior adj-ustments
Personal sector						
Income from employment	0.7	0.7	0.4	0.8	2.1	1.1
Securities and unit trust units	-4.2	-1.7	-10.0	-4.4	-11.1	-3.5
Other domestic transactions	-0.9	1.1	-2.9	1.0	-4.0	1.0
Industrial and commercial companies						
Gross trading profits, etc	-1.4	0.0	-2.8	0.1	-4.7	-0.1
Inter-sector transfers	-1.6	-1.0	-1.3	-1.0	-2.3	-1.2
Gross capital formation	-0.6	-0.4	-0.7	-0.4	-2.4	-0.8
Securities and unit trust units	1.7	0.3	1.9	0.8	4.6	1.0
Monetary sector						
Inter-sector transfers:	2.0	1.3	2.4	1.1	1.8	1.2
Other financial institutions sector						
Notes, bills, etc	-0.3	-0.4	-2.1	-2.2	-0.5	-0.7
Securities and unit trust units	1.1	0.9	0.7	0.6	6.7	6.5
Overseas sector						
Inter-sector transfers	-1.2	-0.3	-2.2	-0.6	-1.0	-0.5
Securities and unit trust units	2.0	0.5	7.7	3.0	0.2	-4.0
Other overseas transactions	0.9	1.4	1.3	1.2	0.3	0.5

32. With two exceptions, all balanced series are within the specified error range. The two exceptions, in 1986 and 1987, are company profits and personal sector securities. In 1987, for example, for company profits, against the 90% error range of ± £3¼ billion, the series is adjusted (excluding the prior adjustment) by around £4½ billion. For securities within the personal sector the adjustment (again excluding the prior adjustment) of about £7½ billion compares with an error range of ±£5 billion. Of course, the methods of specifying error ranges are expected to produce some adjustments which are outside the ranges. They are ranges of probability not certainty. Further, the balancing process has the effect, where inconsistencies arise, of making it more likely that wide error ranges will be breached than narrow ones.

TABLE H
Derived statistics

	1985		1986		1987	
	Blue Book	Balanced	Blue Book	Balanced	Blue Book	Balanced
Growth rates (per cent increase over previous year)						
Income from employment			7.7	7.5	8.0	8.8
Industrial & commercial company profits			-4.4	-6.8	23.2	20.8
Personal sector consumption[1]			10.0	10.0	9.2	9.5
Gross domestic fixed capital formation			5.8	5.9	10.9	13.4
Exports of goods and services			-4.2	-4.2	9.2	9.1
Imports of goods and services			2.4	2.0	10.3	10.5
Other derived statistics						
Personal savings ratio (per cent)	*9.5*	*10.5*	*7.3*	*8.6*	*5.4*	*7.3*
Current balance of payments (£billion)	3.3	4.5	-0.2	2.5	-2.5	-1.5

(1)Consumers' expenditure

33. The accounts for each year have been balanced independently. In spite of this, growth rates of the key components of GDP between 1985 and 1986, and 1986 and 1987, shown below in Table H, generally appear to be within their likely range of accuracy. The Table shows that the personal saving ratio is increased in each year, although the downward trend present in the published accounts over this period is still evident. The overseas current balance is improved in all years, but particularly in 1986 when the balancing item was greatest.

34. The balanced accounts shown in Tables 5 to 7 are based on a single set of assumptions about GDP, prior adjustments and error ranges. Assumptions about the last two are, as has been said, subjective, and there are reasons why GDP(A) might itself be revised. We have, therefore, explored the sensitivity of the system to some alternative assumptions about (a) the level of GDP to which balancing is constrained, (b) error ranges, and (c) prior adjustments. This part of the exercise has been restricted to 1987. The results for all these analyses are presented in Table 9, which shows the differences in the balanced estimates, as between the Table 7A results and the particular variant, by sector, for the main series affected in the matrix. Unless otherwise stated, the prior adjustments and error ranges are as given in Tables 4B and 4C.

(a) Varying the assumptions about GDP

35. For variant 1, the level of GDP has not been constrained, but is freely estimated in the balancing process. The unconstrained version balances with GDP little different from GDP(A) - around £¾ billion (0.2 per cent) higher. There is also very little difference in the main component series as between the constrained and unconstrained approaches, with the financial accounts virtually unchanged.

36. Variant 2 balances to a level of GDP(A) above that used in Table 7A. The rationale underlying this is that, historically, initial estimates of levels of GDP have been revised upwards, and that the estimates of expenditure and income have tended to move closer together. As a simple assumption, the 1987 figures were balanced to the level of GDP(I) in that year, that is about £2¼ billion above GDP(A), and necessitating GDP(E) to be raised by £5¾ billion above its Blue Book level.

37. Compared with the GDP(A) constrained balancing of Table 7A, the 'additional' income and expenditure is well spread over the main components. In particular, final consumption and income from employment were both further increased by about £1 billion, while the reduction in company profits is some £¾ billion less than the constrained adjustment. Not surprisingly, the effect is negligible below the line.

(b) Varying the assumptions about error ranges

38. There are numerous ways in which the sensitivity of changing assumptions about error ranges can be tested. This section first considers three variants in which the error ranges of a selected number of series have been increased by 50 per cent. The series chosen were those for which error ranges were thought to be the most uncertain. The figures have been balanced to GDP(A). The variants are:

Variant 3: above the line increases (of 50 per cent) to error ranges for personal sector consumption; for gross capital formation and stocks of the personal and ICC sectors, and for exports and imports of goods and services.

Variant 4: below the line increases (of 50 per cent) to error ranges for "other domestic transactions" of the personal and ICC sectors, "other overseas transactions" of all sectors, and the "securities" figure for the OFI sector

Variant 5: the combined effect of variants 3 and 4.

39. It can be seen from Table 9 that the broad impact of these adjustments for all the variants is, with few exceptions, comparatively small. For each of the three variants, compared with the Table 7A estimates, income from employment is reduced by around £½ billion, offsetting the smaller, negative adjustment to profits. In variants 3 and 5, where some of the above line errors are increased, consumption tends to be adjusted downwards, offset by adjustments to gross domestic capital formation and net exports. In all three variants, below the line, there are smaller adjustments for personal sector securities.

40. In Table 7A, the adjustments (excluding prior adjustments) to company profits and personal sector securities were about 50 per cent outside the limits of the error range. Variant 6 examined the effect on the other variables of constraining the adjustment to these two series to the size of the error range.

41. With company profits £1½ billion higher than in the Table 7A run, income from employment and monetary and OFI sector profits are both lower. Gross domestic capital formation and the net balance for exports of goods and services both have positive adjustments, offsetting the negative change for personal consumption of around £1 billion. Below the line, compared with Table 7A, there are smaller adjustments to transactions in securities by the overseas and ICCs sectors. Other changes for these sectors and for the personal sector are mainly evident for 'other domestic transactions'.

42. The constraints imposed on company profits and personal sector securities pushed the adjustments for two series - personal sector and overseas sector "other domestic transactions" - outside their error ranges. A further run (not shown in table 9) was undertaken in which adjustments for these two series were forced to the size of their range. This pushed ICCs gross domestic capital formation outside its range. However, in a third run (again not shown) in which this series was constrained, all adjusted series were within their error range.

(c) Varying the assumptions about the prior adjustments

43. Again, there are many ways in which the effects of the prior adjustments can be tested. The article considers only one variant. Doubts were expressed earlier about the prior adjustments included in the balancing because they increased rather than reduced the size of the residual error. There are also uncertainties about the extent to which the adjustments reflect genuine bias rather than asymmetric error distributions. In variant 7, balancing has been undertaken without any prior adjustments to the data of Table 1.

44. In the absence of prior adjustments, error ranges have been widened for those series where prior adjustments had been postulated. The accounts have been balanced again constraining GDP to GDP(A). The magnitude of the prior adjustments needs to be borne in mind when comparing with the Table 7A analysis. The negative adjustment to company profits is reduced by about £1 billion, the main offsetting change coming from income from self-employment. Consumption is £1½ billion lower compared with Table 7A, but exports are up by £1¾ billion. For the financial transactions, the main changes are again within "securities", where the prior adjustments were greatest. The difference for securities for the personal sector is comparatively small, the main change occurring in the overseas sector. The large adjustment evident in Table 7A for OFIs is reduced a little. There are a number of other changes of the order of £½ - 1½ billion in securities (ICCs) and also in other domestic and other overseas transactions, for various sectors. Further work is required before any conclusion can be reached as to whether it is adequate to balance without prior adjustments.

Summary of results

45. The main feature of the results is the size and consistency over different variants of the adjustment made to two series - company profits and personal sector securities - and the fact that, in both cases, the adjustments are well outside the postulated error ranges. There are no obvious reasons why company profits might be overstated, past revisions to company profits have tended to be upwards. Secondly, for personal transactions in securities, the effect of the large negative adjustment implies a very large reduction over the years in question in the sector's holdings of UK company securities at a time when the number of individuals owning shares has increased.

46. The analyses have suggested some other possible conclusions, although further work is required before they may be regarded as definitive:

(i) growth rates for most of the main series in the balanced accounts do not appear to be significantly changed from growth rates shown in the published figures:

(ii) when GDP is freely estimated in the balancing process, the level which emerges is not much different from the appropriate GDP(A);

(iii) in general, financial transactions appear to be adjusted more than current/capital transactions, although this varies by sector;

(iv) the results are sensitive to modifications in the input data, although the differences generally appear to be within the original error ranges of the series.

Assessment

47. The first and main conclusion to be drawn from the work that has been carried out so far is that it is still too soon to assess its value fully. This is not a surprising conclusion. The system of national accounts has been developing over the last 40 years or so, and its methods and procedures are constantly under review. It would have been hard to believe that six months' work of this kind could provide many answers to the problems that currently exist in the accounts. This is not to say that the exercise has not been of value. On the contrary, the CSO has decided that there are sufficient encouraging aspects of the work for the experiment to be continued.

48. So, what has been achieved? When the CSO set out on the task last September it intended to examine the use of producing balanced accounts (a) to aid interpretation of what was going on in the UK economy, and (b) to see if it led to the identification of particular weaknesses.

49. From the outset, in the six months available, there was no expectation that the work would lead the CSO to a position where it could produce accounts on a regular basis that were "better" than the accounts as now published. This may be a worthy longer term aim, but it is still too soon to think in these terms. But, less ambitiously, has it helped in interpretation? The work has generated a number of accounts each of which is balanced, and each of which represents a possible alternative interpretation of what has happened in the period 1985 to 1987. However, each interpretation remains surrounded with considerable uncertainty. The inputs (error ranges and prior adjustments) are inevitably subjective, and the model is sensitive to variations in these assumptions. It would therefore be unwise to draw firm conclusions about the behaviour of the UK economy from the sets of balanced accounts produced so far. Even when balancing has been achieved, the adjusted data still have error ranges associated with them, although the balancing methodology means that these ranges will be no wider than those relating to the basic series. Balancing should lead to improved estimates, overall, but inevitably some individual series could be moved further from the "truth" than the original estimates.

50. The work has shown that, to achieve balanced accounts over the period 1985 to 1987, company profits and personal sector transactions in securities are the series that are adjusted most. This is, in part, a reflection of the error ranges included for these series relative to those for others, but it is also, in part, a consequence of the structure of the balancing items and residual error in the accounts. There are, for example, in all three years, three downward "pressures" on company profits in the balancing process. GDP(I) is higher than GDP(E). The ICC sector has a positive balancing item. Less directly, because the personal sector has a negative balancing item, there is, amongst other things, upward "pressure" on personal sector incomes, which will have downward "pressure" on income in other sectors, including the ICC sector. Alternatively the size of the adjustments to these two components could reflect the possibility that the error ranges attached to them have been overstated relative to the other error ranges in the matrix. Future work will need to look more closely at these "pressures", and how they interact with the pattern of error ranges.

51. How has this experiment helped to identify areas of particular weakness? It is clear that the reassessment of the error ranges and the estimation of prior adjustments has been useful in itself. The fact that all compilers have reconsidered the reliability of their figures at the same time and within the same framework has been especially rewarding.

52. The work, both in preparing the input data and balancing the accounts, has, so far, tended to confirm the CSO's views of where the accounts are weak. In particular, the large adjustments to transactions in securities, and compilers' estimates of error ranges and prior adjustments for this series, support existing plans to improve the information system on securities dealers, and the CSO's current investigation into the need for, and feasibility of, a share register survey to provide information on the holdings of securities by each sector. The large adjustments to transactions of companies (particularly profits) reflect the difficulties in collecting information for this sector. Although the work has not developed sufficiently to make the CSO reassess how its resources might be allocated to research work aimed at improving the quality

of accounts, it is quite possible that as the work is refined it will begin to influence this assessment.

53. Where does the work go from here? For a time, at least, the balanced accounts exercise will continue as an experiment, largely independent of other work being carried out to improve the quality of the national and financial accounts. There are the recommendations of the scrutiny report on government economic statistics to absorb.In addition to the more major initiatives to improve the statistics, such as securities dealers surveys and a possible share register survey, there are many other projects being carried out in the CSO and in other departments. One example of these is an internal review of balance of payments statistics, described in the February edition of *Statistical News*.

54. Over the next few months, the CSO will be giving consideration to a number of ways in which the work on balanced accounts might be developed and improved. Amongst these are:

(a) further examination of error ranges and prior adjustments, and their consistency across the accounts;

(b) further sensitivity tests, using different estimates of error ranges for the more uncertain series;

(c) the introduction of covariance terms in the error matrix;

(d) better representation of GDP(O) in the constraints;

(e) further investigation of the effects of balancing on derived statistics (possibly looking at the impact on certain balance sheet items such as UK net external assets); and

(f) an appraisal of the appropriateness of this approach to balancing. (For example, is it too mechanical?).

55. Finally, the CSO intends to begin work on 1988 as soon as data for the whole of the year become available. This will take some time to complete as the balancing exercise relies upon the co-operation of many statisticians throughout government and the Bank of England who have their own departmental priorities. However, the CSO intends to update the current exercise with results for 1988 and aims to publish a further article that will, in addition, address some of the issues raised above.

56. The press notice on the 1988 Blue Book, which announced the balanced accounts project, referred to the work as being "a contribution to the debate on the quality of economic statistics". Preliminary results have been published within six months of the announcement of the work, with the aim of encouraging others to comment on the approach, and more generally on the quality of the accounts and how they might be improved. Comments will therefore be welcomed, and will be taken into account, along with views within Government, when considering the future of the work on balanced accounts.