

RESURRECTING THE U.K. HISTORIC SECTOR NATIONAL ACCOUNTS

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The U.K. national accounts no longer provide a full set of sector income and expenditure data before 1987, a weakness that seriously impedes macroeconomic research. Using a strict accounting framework to combine the best quality official data taken from alternative sources, I show that a historic sector dataset can be resurrected, albeit at a high level of sector aggregation. Particular attention is paid to transfer incomes and associated inter-sector flows. Household saving and corporate retentions data are also derived. Benefits of the historic dataset are described and implications drawn for research and data management.

1. INTRODUCTION

According to the United Kingdom's official statistical agency, the Office for National Statistics (ONS),¹ its system of accounts for the household, company, government, and overseas sectors provides "an essential framework of the integrated economic accounts of the nation" (Turnbull, 1993). So it is perhaps surprising that the ONS no longer publishes a full historic sector dataset.² Comprehensive sector figures are available, but only from 1987.

Although some weaknesses in the official record are long-standing, many of the current problems can be traced to a single cause: the 1998 conversion of the U.K. national accounts to the statutory standard set by the European System of Accounts of 1995 (ESA95). At the time of the conversion, a hard-pressed ONS felt obliged to provide at least ten years of history—that is, back to 1987—but provision of sector income and expenditure figures beyond the minimum requirement was mainly confined to the public and non-financial corporations sectors. After conversion, the household, financial corporations, and overseas sectors were fully articulated in the required national accounts format from 1987, but not before. Furthermore, as a result of database management weaknesses, many pre-1987 sector series subsequently became corrupted, rendering the historic sector dataset "not fit for purpose" (Statistics Commission, 2007). This state of affairs compares

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¹The ONS operates under the supervision of the U.K. Statistics Authority.

²This description refers to the official dataset published in December 2008.

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very unfavorably with previous standards of provision. Prior to ESA95 conversion, sector income and expenditure data were available annually from 1948 and quarterly from 1963.

The absence of an adequate historic sector dataset seriously impedes analysis. Time-series decompositions and unit root tests are best performed using long datasets,³ but for the U.K. it is not possible reliably to perform sector time-series analysis similar to that undertaken by, for example, Barbosa-Filho *et al.* (2008) on the U.S. economy, for which long runs of historic sector data are readily available. Similarly inhibited are tests of the opacity of the “corporate veil,” a controversy that has implications for the behavior of consumers, who may react to the profit retentions of corporations in which they are shareholders (Feldstein, 1973), and for the appropriate national accounting treatment of corporate retentions (Dalgaard *et al.*, 2000). Sumner (2008) has to test the U.K. corporate veil using unrevised and truncated pre-ESA95 data because the “adoption of the ESA95 has reduced the series on retentions . . . to post-1986 observations . . .” Estimation of private sector expenditure functions, at one time an active research agenda (Bennett, 1986), and still pursued in the U.S. (Godley *et al.*, 2008), has come to a halt, partly as a result of U.K. sector data deficiencies.

It is the aim of this Note to show that missing historic sector income and expenditure data can be reliably backfilled for the U.K., albeit at a high level of sector aggregation mainly confined to the government, overseas and aggregate private sectors. The backfilling rests on the integration of three sets of official accounts: the sector income and capital accounts, the public sector finance accounts, and the balance of payments accounts. Successful implementation of this procedure requires detailed accounting knowledge and an awareness of the sources of data corruption. Alternative methodological approaches considered below seem less likely to produce acceptable results for similar effort.⁴

A simpler method to backfill history, suggested by the ONS (Statistics Commission, 2007), requires researchers to reconcile, and link, current ESA95 data with earlier ESA79-based series available up to 1996, and last published in the 1997 edition of ONS National Accounts “Blue Book.” By carefully reconciling the classifications of financial instruments, Sbano and Chavoix-Mannato (2006) use this procedure to backcast financial balance sheets.

For the sector income and capital accounts, however, this approach suffers from several drawbacks. There are material differences between the current dataset and the unrevised pre-ESA95 figures in the 1997 Blue Book, which deploys different classifications and concepts (Brueton, 1998; Doggett, 1998; Dolling, 1998; Martin, 2007a). Comparison of new and old vintage data is typically limited to a ten-year period of overlap, a weak basis for backwards extrapolation of many series. Crucially, the process of reconciling and linking individual series may unwittingly breach important accounting constraints.⁵

³In the absence of structural change, the probability of making a type II error in standard unit root tests declines as the data span increases (Shiller and Perron, 1985; Haug, 2002).

⁴A referee and the editor helpfully suggested the need for a methodological assessment.

⁵The historic financial balance sheet data published by the ONS (Sbano, 2008) do not satisfy the constraint that stocks of financial assets net of liabilities should sum to zero across sectors, after adjusting for official gold and SDR holdings.

Balancing techniques, such as Stone's RAS approach (Stone, 1961) or other well-known biproportional methods (Lahr, 2004), could be applied to the combination of pre-ESA95 and the latest figures to produce a coherent, identity-observing sector dataset. But the extra effort is unnecessary for the task in hand: with very few exceptions, the ESA95 consistent information required at a high level of sector aggregation can be obtained, albeit with difficulty, from official sources. Balancing techniques might be usefully deployed at lower levels of sector aggregation, but these are beyond the scope of this Note. It is relevant to observe that the high computational overhead and need for scarce, quality metadata have thus far dissuaded the ONS from adopting automated balancing techniques (Akers and Clifton-Fearnside, 2008).

Martin (2007b) describes in detail the manner in which a historic sector dataset has been recovered.⁶ This Note describes the broad accounting principles involved, briefly describes their implementation, and draws out some of the implications for macroeconomic research and database management.

2. ACCOUNTING PRINCIPLES: COUNTERPART SECTORS

In order to describe the accounting principles, it is helpful first to clarify the concept of "income." The ESA95 emphasizes the notion of a sector's "primary" income, defined as the sum of factor income (such as wages and profits) that arises from involvement in production, and property income (such as receipts of interest and dividends) that arises from the ownership of productive assets. For my purposes, it is more helpful to begin with the observation that the sum of sectors' factor incomes equals the economy's gross value added (GVA)⁷ while the sum of sectors' net receipts of transfers, such as social security benefits, is zero. Property income is usefully construed as another type of transfer paid out of, or received in addition to, factor income. It is the distinction between factor and transfer incomes that informs the accounting identities described below.

Three sectors are considered: a "private" sector (comprising households⁸ and private corporations) denoted by the subscript "v"; a "state" or "public" sector (comprising central and local governments and public corporations) denoted by the subscript "s"; and a "Rest of the World" sector, denoted by the subscript "w." The Rest of the World sector is a fiction, albeit a convenient one, since no attempt is made to record all overseas incomes and expenditures. With few exceptions, the only transactions recorded are those that take place between residents and non-residents. A U.K. balance of payments credit (debit) scores as a debit (credit) in the Rest of the World accounts.

Private sector income and expenditure data missing before 1987 can be inferred from counterpart public sector and balance of payments information

⁶The resurrected data can be downloaded from: http://www.cbr.cam.ac.uk/people/martin_bill.htm.

⁷Measured at "factor cost," that is, excluding *all* indirect taxes and subsidies. GVA was previously referred to as the "income measure of GDP." The ESA95 places greater emphasis on the concept of "basic prices" which are struck after the deduction of indirect taxes (and subsidies) that relate specifically to products but not those that relate solely to production.

⁸References to "households" or the "household sector" should be interpreted to include non-profit institutions serving households.

available from other official accounts. These alternative sources are not presented in the same format but are, in principle, consistent with the ESA95. Public sector finance data, available from 1946, conform to the presentation in the U.K. Government's Financial Statement and Budget Report (FSBR);⁹ balance of payments data, available in some cases from 1946, conform as far as possible to the format described by the IMF *Balance of Payments Manual*, 5th edition.

The connection between the FSBR and balance of payments figures and the missing national accounts private sector data can be explained by manipulation of simplified identities:

$$(1) \quad GVA \equiv GVA_V + GVA_S + GVA_W$$

$$(2) \quad GDP(E) \equiv C_V + I_V + C_S + I_S + X - M$$

$$(3) \quad GVA + ERR \equiv GDP(E) - FCA_S - FCA_W$$

$$(4) \quad Z_V + Z_S + Z_W \equiv 0$$

$$(5) \quad FS_V \equiv \{GVA_V + Z_V\} - (C_V + I_V)$$

$$(6) \quad FS_S \equiv \{GVA_S + Z_S + FCA_S\} - (C_S + I_S)$$

$$(7) \quad FS_W \equiv \{GVA_W + Z_W + FCA_W\} - (X - M)$$

$$(8) \quad FS_V + FS_S + FS_W + ERR \equiv 0.$$

Identity (1) equates the economy's GVA (measured at "factor cost," that is excluding indirect taxes and subsidies) with the sum of each sector's GVA. *Private sector GVA*, GVA_V , comprises the compensation of employees, the mixed incomes (previously known as "self-employment incomes") of sole traders and the gross operating surpluses of private corporations. *State GVA*, GVA_S , comprises the operating surpluses of general government (central and local governments combined, equal to consumption of fixed capital) and of public corporations. *Rest of the World GVA*, GVA_W , comprises the compensation of non-residents employed in the U.K. less the compensation of U.K. residents employed overseas.

Identity (2) equates the expenditure measure of the gross domestic product ($GDP(E)$) measured at "market prices," that is inclusive of indirect taxes and subsidies, with the sum of private and public final consumption (C), of investment in fixed capital and inventories (I), and of exports of goods and services (X) less imports (M).¹⁰

Identity (3) links GVA and the expenditure measure of GDP. The national accounts residual error (ERR), which captures the difference between the income

⁹Golland *et al.* (1999) give a detailed description.

¹⁰To simplify exposition, the identity ignores net acquisitions of "non-produced, non-financial assets." These transfers sum to zero across the economy.

and expenditures measures of GDP, is added to GVA at factor cost; the factor cost adjustment (*FCA*), comprising all indirect taxes (less subsidies) on production and imports, is deducted from *GDP(E)* at market prices. The identity distinguishes between the indirect taxes and subsidies that accrue to government and those that accrue to the Rest of the World.

Identity (4) expresses the fact that the transfer incomes (*Z*) of the three sectors sum to zero. Transfer incomes are defined to include capital account items, such as investment grants and capital taxes, as well as items on current account, like property income and social welfare.

Identities (5) to (7) define each sector's financial surplus (*FS*), also known as "net lending," as the difference between disposable income and expenditure. Disposable income components (shown within curly parentheses) comprise factor and transfer incomes, including capital transfers—a departure from the standard national accounts definition of disposable income, which is confined to items on current account. Also included as part of state and Rest of the World sectors' disposable incomes are their receipts of indirect taxes less payment of subsidies. Limited to transactions between residents and non-residents, the Rest of the World account records expenditure as U.K. exports less imports.

Identity (8), the corollary of the preceding identities, shows that the sum of sectors' financial surpluses is zero after allowance for the national accounts residual error.

A useful additional identity comes from the summation of sectors' disposable incomes (*YD*):

$$(9) \quad YD_V + YD_S + YD_W \equiv GDP(E) - ERR$$

where:

$$YD_V \equiv GVA_V + Z_V$$

$$YD_S \equiv GVA_S + Z_S + FCA_S.$$

$$YD_W \equiv GVA_W + Z_W + FCA_W.$$

Re-arrangement of identity (9) gives an expression for private disposable income:

$$(10) \quad YD_V \equiv GDP(E) - ERR - YD_S - YD_W.$$

Re-arrangement of identity (2) gives an expression for private total expenditure (*E_V*):

$$(11) \quad E_V \equiv C_V + I_V \equiv GDP(E) - \{C_S + I_S + X - M\}.$$

The private sector's financial surplus is defined by:

$$(12) \quad FS_V \equiv YD_V - E_V.$$

Identities (10) to (12) express private sector series in terms of the expenditure measure of GDP, the residual error and counterpart sectors' disposable income and expenditure. Data for all these components are available from official sources before 1987. It may be noted that total private disposable income could be inferred instead, and with computational ease, from the summation of the private sector's financial surplus, derived from the across-sector identity (8), and private expenditure (identity (11)). For some purposes, this procedure may be perfectly adequate. However, many macroeconomic questions require information on the composition of disposable income. A comprehensive approach that accounts for each category of income also provides an essential check on the coherence of the dataset.

Two refinements can be usefully introduced. First, as an alternative to the private sector, a "market sector" is constructed from the summation of the private and public corporations sectors. The counterpart sectors are the Rest of the World, as before, and the general government sector (the summation of central and local government sectors). The "market" sector definition is preferred empirically as it circumvents most, though not all,¹¹ of the data distortions that arise from the U.K.'s history of nationalization and privatization.

Second, for both the private and market sectors, an adjusted measure of disposable income (YDX) is introduced, derived by adding the national accounts residual error to observed disposable income. The underlying assumption is that the estimation errors that create the gap between the income and expenditure measures of GDP are most likely to arise from errors in the measurement of private sector flows.

In the case of the private sector:

$$(13) \quad YDX_V \equiv YD_V + ERR$$

$$(14) \quad YDX_V \equiv GDP(E) - YD_S - YD_W.$$

The adjusted private sector financial surplus (FSX) is defined by:

$$(15) \quad FSX_V \equiv FS_V + ERR.$$

By implication, the following relationships also hold:

$$(16) \quad FSX_V \equiv YDX_V - E_V$$

$$(17) \quad FSX_V + FS_S + FS_W \equiv 0.$$

3. ACCOUNTING PRINCIPLES: INTER-SECTOR TRANSFERS

The national accounts provide broadly coherent historic figures for factor incomes and the main expenditure components of GDP. Consequently, it is largely

¹¹Reclassifications of activity between public corporations and the general government sectors distort market sector data.

pre-1987 series for the various types of private sector transfer receipts and payments that have to be inferred from public and Rest of the World sector counterparts. Private sector transfers are derived by residual using their zero-sum property expressed in identity (4):

$$(18) \quad Z_V \equiv -(Z_S + Z_W).$$

This procedure can be applied to each major category of transfer: taxes on income and wealth, including capital gains tax (*YTAX*); other current taxes, including some duties and local taxes (*OTAX*); taxes levied irregularly on the value of assets, including inheritance tax (*KTAX*); the balance (*SBB*) of social insurance contributions and social benefits, including pensions; the adjustment for the net equity of households in pension fund reserves, which measures the excess of private pension contributions over payments (*PE*); the balance (*OCTB*) of other current transfers credits and debits, which include a miscellany of transfers such as net non-life insurance premiums and claims, and payments to, and receipts from, the European Union; the balance (*OKTB*) of miscellaneous capital transfer credits and debits such as investment grants and large compensation payments; and the balance of property incomes (*PIB*).¹²

Total private sector transfers are given by:

$$(19) \quad Z_V \equiv TTAX_V + SBB_V + PE_V + OCTB_V + OKTB_V + PIB_V$$

where:

$$(20) \quad TTAX_V \equiv YTAX_V + OTAX_V + KTAX_V.$$

The same identities apply, *mutatis mutandis*, to all institutional sectors.¹³

One matter requiring further attention concerns sector consolidation. Transfer credits and debits taken as separate items will not add up to zero across the economy. Moreover, aggregated sectors may include transfers between sub-sectors. A practical solution is to calculate transfer balances—credits less debits—a procedure that automatically nets out intra-sector transfers.

A second matter of importance concerns the provenance of transfer income, which becomes relevant should the scale of the transfer be dependent on sector-specific characteristics. Property income flows that depend on sectors' balance sheets and instrument-specific rates of return are an example. The information required directly to identify such flows is typically incomplete but it is possible to estimate the sector source of private transfers from knowledge of transfer balance flows that occur between the public and Rest of the World sectors.¹⁴

To illustrate, consider the expansion of the zero-sum transfer balance identity (18), making explicit the sector source of the public and Rest of the World transfer balances:

¹²The sector accounts distinguish between various types of property income: interest income, corporate distributions including dividends, reinvested earnings on foreign direct investment, property income attributable to insurance policy holders, and rent income.

¹³Sub-sectors additionally record intra-aggregate sector transfers.

¹⁴Martin (2007b) provides a more formal description of the method.

$$(21) \quad Z_V \equiv -(Z_{SV} + Z_{SW} + Z_{WV} + Z_{WS})$$

where double-lettered subscripts denote the provenance of each transfer. Z_{WS} , for example, denotes the balance of transfers that occur between the Rest of the World and the public sector seen from the overseas point of view. Since: $Z_{WS} \equiv -Z_{SW}$, identity (21) can also be written:

$$(22) \quad Z_V \equiv -(Z_{SV} + Z_{WV}).$$

This identity can be implemented given Z_{WS} . It is worth emphasizing that no extra assumptions are required to estimate the provenance of transfer incomes; the missing data are inferred using official figures and accounting constraints.

4. IMPLEMENTATION

Although simple in principle, the procedure of using counterpart identities is difficult in practice, for two reasons. First, the formats of the public sector finance and balance of payments accounts are each different from the format of the sector income and capital accounts. For example, the balance of payments accounts category “current transfers” includes not only the miscellaneous transfers identified in the sector accounts but also indirect taxes and subsidies on production, taxes on income, social contributions, and social benefits.

Using a minor amount of estimation¹⁵ and the extensive manipulation of intricate identities, it is possible to reconstruct a comprehensive three-sector history of income and expenditure from 1948. The main omission is the national accounts distinction between different types of property income, which is not replicated in the balance of payments accounts. However, the latter are sufficiently detailed to enable the identification of income flows between the Rest of the World and public sector and therefore of the provenance of the three sectors’ transfer balances. Martin (2007b) provides details.

The second source of practical difficulty concerns the variable quality of the historic data. Although the ONS has deleted many corrupted pre-1987 series from the sector accounts, the data that remain are not wholly trustworthy. In addition, various errors have been made in the reclassification of the Housing Revenue Account (HRA), affecting data across the 1987 divide.¹⁶ As a result, the national accounts record of local government and public corporations fixed investment is wrong between 1974 and 1991, the largest errors, worth between 1 and 2 per cent

¹⁵The partly estimated series are for Rest of the World transactions with the National Insurance Fund, Rest of the World total social contributions, and public sector overseas investment income credits and debits. The sums involved are typically small. In the case of general government debt interest payments abroad, where the sums involved are larger, use is made of a pre-ESA95 series before 1984. Some public sector finance series have no exact counterpart in the sector accounts but use may be made of comparable sub-totals.

¹⁶The Housing Revenue Account details local government housing activity, which under ESA95 should be treated as a public sector quasi-corporation and not part of local government (Kellaway and Shanks, 2007). The ONS has been adjusting the national accounts gradually to implement this reclassification since the 2001 Blue Book. Following the author’s enquiries, a number of related data errors have come to light. For their assistance, I am indebted to several ONS statisticians, notably James Ebdon, Alan Hewer, and David Vincent.

of GDP, occurring in the 1970s. Errors of this magnitude and persistence have a significant impact on the record of sectors' financial balances. Other, smaller but not insignificant errors affect the record of local government and public corporations quasi-dividend payments.

By contrast, the official accounts for GDP, public sector finances and the balance of payments are of high quality. Great care has therefore been taken to ensure that the best quality historic data are used from each source while maintaining consistency with the main GDP accounts.¹⁷ Apart from corrections to series affected by HRA errors, the sector national accounts are used from 1987. Identity checks for internal coherence are deployed across all periods.

To add some finer sector detail to the resurrected aggregate private sector data, use is made of an official series for household saving that currently runs back to 1963 and a suspended saving series, consistent with the still-published figures for the household saving rate, that extends back to 1948 alongside official data for household disposable income. These data are of doubtful quality but are too important to ignore.¹⁸ The historic household saving figures can be compared to those for the private sector, the latter derived by subtracting households' consumption from the resurrected figures for private disposable income, suitably adjusted.¹⁹ The deduction of household saving from private saving yields a series for corporate profit retentions. Although at an annual rather than quarterly frequency, these resurrected data provide the ESA95 consistent history that Sumner (2008) lacks in his study of the U.K. corporate veil.

5. SOME IMPLICATIONS FOR RESEARCH

It is beyond the scope of this Note extensively to consider the ramifications of the resurrected dataset. Attention is focused instead on two topics: a comparison with the pre-ESA95 dataset; and second, the implications for official database management. These topics, only briefly assessed, provide an agenda for further research.

The comparison with the pre-ESA95 dataset is of interest in view of the ONS suggestion that researchers might turn to the older data as a way to backfill sector history. A major difficulty with this suggestion is the discontinuity between the new and old datasets, a result of extensive changes of definition and concept and of revisions. The latter are noteworthy. At the time of ESA95 conversion the ONS "... took the opportunity to put through extensive long-run revisions ..."

¹⁷For example, general and central government taxes on production are calculated as residuals consistent with the national accounts factor cost adjustment. Equivalent procedures are used to constrain other public sector series that have an exact counterpart in either the expenditure or income measures of GDP. The resulting pre-1987 record of public sector income and expenditure is typically identical to that presented in the national accounts consistent public sector finance dataset.

¹⁸At the time of conversion, the ONS used a spreadsheet to calculate the implications of the ESA95 for pre-1987 household saving and disposable income, although component series were not published. Subsequent revisions have been similarly handled. It is difficult to reassure oneself about the quality of these data, since the ONS has no detailed record of its original methodology. The disposable income series is frequently afflicted by identity-breaching errors before 1987, however. The ONS believes the historic saving series is of higher quality.

¹⁹The private disposable income figures are adjusted to conform to the official definition of disposable income by adding back net capital transfers.

(Brueton, 1998). Since then, regular improvements have led to significant revisions all the way back to 1948. The 2001 Blue Book revisions were especially large. As a result, known history today is different from the history portrayed and unchanged in the 1997 Blue Book.

The comparison between the new and old datasets might shed light on another question of interest: the validity of the proposition that data of different vintages are isomorphic representations of the same underlying economic structure that is never perfectly observed. Are the data differences just noise or do they signify fundamental change?

In the present case, the answer is likely to be more meaningful for comparisons of aggregate sectors that were not radically affected by ESA95 reclassifications. Comparisons between the household sector and the former personal sector are likely to be especially problematic. Under ESA95, partnerships, formerly included within the personal sector, were reclassified as “quasi-corporations,” the largest single change to affect the income measure of GDP according to Dolling (1998). In addition, property income received by life assurance companies and pension funds was redirected, in the first instance, from the former personal sector to insurance corporations and pension funds, a new sub-sector within the financial corporations sector.

The comparison of the new and old datasets is performed here in a simple fashion by checking for statistically significant differences in the averages of annual observations for a number of key variables: aggregate sectors’ financial surpluses, the composition of market sector expenditure and disposable income, and household and private corporate saving. Series are expressed as shares of GDP, shares being of greater intrinsic interest than the series levels. The “new” dataset used is consistent with the 2008 Blue Book with a correction for errors arising from the revised treatment of the HRA. The “old” dataset is consistent with the 1997 Blue Book, with some minor changes to improve coherence.

The maximal sample runs annually from 1948 to 1996. At a cost to degrees of freedom, the full sample is divided into two sub-periods of almost equal length. The comparisons for the sub-periods convey information about changes in the scale of differences between new and old datasets over time. Significant variation over time would materially call into question the validity of simple, but frequently used, backcasting procedures predicated on a constant absolute or proportionate link between new and old data.

Several points emerge from the comparisons shown in Tables 1 to 4.

- There is little sign of systematic difference between new and old datasets for certain summary variables at a high level of sector aggregation. The results show no statistically significant differences for mean²⁰ GDP shares of financial surpluses (Table 1) and private saving (Table 3), the latter suitably defined to exclude “stock appreciation.”²¹ Over the full sample period, the differences recorded for the Rest of the World, general government, and private sectors are trivial.

²⁰The results from standard *F* tests, available on request, suggest that a similar conclusion applies to series variances as well as to means.

²¹“Stock appreciation” is pre-ESA95 terminology for inventory holding gains.

TABLE 1
 ESA95 AND PRE-ESA95 DATA COMPARED: FINANCIAL SURPLUSES

Financial Surplus % of GDP	Annual Average		Mean Equality Test p-Value**
	1997 BB	2008 BB	
Rest of the World (1)			
1948–1972	–0.5	–0.5	0.90
1973–1996	0.7	1.2	0.36
Public sector (2) = (4) + (5)			
1948–1972	–1.6	–0.6	0.13
1973–1996	–3.9	–3.8	0.95
Private sector (3) = –[(1) + (2) + (8)]			
1948–1972	1.7	1.7	0.99
1973–1996	2.5	2.1	0.60
Public corporations (4)			
1948–1972	–1.8	–0.8	0.00
1973–1996	–0.4	–0.1	0.28
General government (5)			
1948–1972	0.2	0.2	0.91
1973–1996	–3.4	–3.7	0.67
Market sector (adjusted)* (6) = –[(1) + (5)]			
1948–1972	0.3	0.3	0.98
1973–1996	2.7	2.5	0.80
Market sector (7) = (3) + (4)			
1948–1972	–0.1	0.9	0.03
1973–1996	2.1	1.9	0.84
Memo: residual error (8)			
1948–1972	0.4	–0.6	0.00
1973–1996	0.6	0.6	0.89

Notes: Figures are subject to rounding error. *Includes the national accounts residual error. **Probability value for the Welch–Satterthwaite *t* test.

Source: 1997 BB: 1997 Blue Book, Economic Trends Annual Supplements; 2008 BB: December 2008 UK national accounts; author's calculations. The 1997 BB figures are largely as published (or inferred from published data) with minor changes to improve internal consistency.

- Exceptionally, a significant difference exists between new and old datasets in the case of public corporations financial surplus GDP share in the first sub-period, a difference that also affects the market sector comparison. However, differences in the national accounts residual error fully offset the impact on the adjusted market sector financial surplus.²²
- At a more detailed level, there are many statistically significant differences between the two datasets. Prominent examples include the comparisons for market sector (that is, household) consumption, market sector value added and net transfer income, both in total and split between property income and other transfers (Table 2), and for household and company saving, even adjusted for stock appreciation (Table 3).
- Average differences between new and old datasets also vary over the two sub-periods. Statistically significant variations between sub-periods are found in 17 of the 22 comparisons shown in Table 4. It is noteworthy that

²²This offsetting impact is not the result of any assumption in these calculations and may be regarded as coincidental.

TABLE 2
ESA95 AND PRE-ESA95 DATA COMPARED: MARKET SECTOR

Market Sector % of GDP	Annual Average		Mean Equality Test p-Value
	1997 BB	2008 BB	
Total expenditure (1) = (2) + (3)			
1948–1972	79.5	78.0	0.00
1973–1996	77.5	77.7	0.76
Consumption (2)			
1948–1972	66.4	64.7	0.05
1973–1996	62.1	61.1	0.05
Investment (3)			
1948–1972	13.1	13.4	0.73
1973–1996	15.4	16.6	0.02
Disposable income (4) = (5) + (6)			
1948–1972	79.4	78.9	0.35
1973–1996	79.6	79.6	0.96
Gross value added (5)			
1948–1972	85.3	88.0	0.00
1973–1996	84.9	87.0	0.00
Net transfers (6) = (7) + (8)			
1948–1972	-5.9	-9.1	0.00
1973–1996	-5.3	-7.4	0.01
Property income (7)			
1948–1972	4.3	2.5	0.00
1973–1996	3.4	1.8	0.00
Other transfer income (8)			
1948–1972	-10.2	-11.6	0.00
1973–1996	-8.7	-9.2	0.47

Notes and Source: See Table 1.

TABLE 3
ESA95 AND PRE-ESA95 DATA COMPARED: SAVING

Saving % of GDP	Annual Average		Mean Equality Test p-Value
	1997 BB	2008 BB	
Household sector* (1)			
1948–1972	4.3	1.9	0.00
1973–1996	7.2	6.2	0.02
Private corporations* (2)			
1948–1972	8.9	10.6	0.00
1973–1996	10.6	9.5	0.03
Private sector* (3) = (1) + (2)			
1948–1972	13.3	12.6	0.26
1973–1996	17.8	15.7	0.00
Household sector (4)			
1948–1972	4.1	1.9	0.00
1973–1996	7.0	6.2	0.06
Private corporations (5)			
1948–1972	8.0	10.6	0.00
1973–1996	8.8	9.5	0.16
Private sector (6) = (4) + (5)			
1948–1972	12.1	12.6	0.45
1973–1996	15.8	15.7	0.80

Notes and Source: See Table 1.

*Saving calculated before the deduction of “stock appreciation” in the case of the 1997 Blue Book figures; all other figures are net of stock appreciation.

TABLE 4
ESA95 AND PRE-ESA95 DATA DIFFERENCES OVER SUB-PERIODS

Annual Average % of GDP	2008 BB Minus 1997 BB		Mean Equality Text p-Value
	1948–1972	1973–1996	
Financial surplus:			
Rest of the World (1)	0.0	0.5	0.00
Public sector (2) = (4) + (5)	0.9	0.0	0.00
Private sector (3) = –[(1) + (2) + (8)]	0.0	–0.5	0.06
Public corporations (4)	1.0	0.3	0.00
General government (5)	–0.1	–0.2	0.25
Market sector (adjusted) (6) = –[(1) + (5)]	0.0	–0.2	0.20
Market sector (7) = (3) + (4)	1.0	–0.2	0.00
Residual error (8)	–0.1	0.0	0.00
Market sector:			
Total expenditure (9) = (10) + (11)	–1.5	0.2	0.00
Consumption (10)	–1.7	–1.0	0.00
Investment (11)	0.2	1.2	0.00
Disposable income (12) = (13) + (14)	–0.5	0.0	0.05
Gross value added (13)	2.8	2.1	0.00
Net transfers (14) = (15) + (16)	–3.2	–2.1	0.00
Property income (15)	–1.7	–1.6	0.26
Other transfer income (16)	–1.5	–0.5	0.00
Saving:			
Household sector* (17)	–2.4	–1.0	0.00
Private corporations* (18)	1.7	–1.1	0.00
Private sector* (19) = (17) + (18)	–0.7	–2.1	0.01
Household sector (20)	–2.2	–0.8	0.00
Private corporations (21)	2.6	0.7	0.00
Private sector (22) = (20) + (21)	0.5	–0.1	0.00

Notes and Source: See Tables 1 and 3.

*1997 BB data include stock appreciation.

the absolute differences between the datasets are often larger in the earlier sub-period, contrary to a pattern that might be expected to arise from a normal pattern of revisions.

Although it would be wrong to draw strong inferences from a limited sample, the results hint that the old and new datasets may be isomorphic representations of the economy at the very broadest level. However, many significant and time-varying differences exist at a more detailed level. This finding raises a clear warning over any attempt to use the pre-ESA95 dataset systematically to backcast missing ESA95 history.

The second topic of interest concerns the wider lessons of the ONS ESA95 conversion experience for official database management. It is beyond the scope of this Note and the author's knowledge of national accounting practices outside the U.K. to draw detailed lessons, but one key point stands out that may well have wider applicability.

It is relevant first to note the extent of the problems that had built up over a number of years within the ONS historic sector national accounts. The author's 2007 memorandum to the Statistics Commission, the then ONS watchdog, gives numerous examples of largely pre-1987 sector series for which figures were corrupted (Martin, 2007a). Based on the official June 2006 dataset, the memorandum drew attention to historic sector series that masqueraded as other series, series for

which data disappeared in odd years, other series that were out of date or, even if not, for which basic identities no longer held.

Accepting this evidence as “incontrovertible,” the Statistics Commission (2007) noted: “the number of corrupted data series identified in the memorandum looks to be much too large for a dataset (the sector national accounts) that is classified as National Statistics.” The ONS accepted that the dataset was “not fit for purpose” and implemented a series of improvements. In practice, this meant deletion rather than repair, reducing to a very few the number of series within the sector income and capital accounts that possessed a usable pre-1987 history.

Database managers who, with limited resources, must deal with recurrent changes to the system of national accounts, may draw lessons from this experience. The ONS decision taken under the pressure of ESA95 conversion not to provide a complete set of historic sector accounts proved to be very damaging. As detailed in Martin (2007a), the absence of a complete history meant that the national account compilers were unable to check for consistency across sectors prior to 1987. Partly as a result, they ceased properly to maintain the limited historic sector accounts, which were further undermined by revisions to public sector data, the preserve of compilers of the public sector finance dataset. Some of these revisions were incorporated in the historic sector national accounts, some not, with resulting incoherence.

The ONS experience underscores the advantages of a complete set of sector national accounts not only for researchers but also for database maintenance. Turnbull’s (1993) opinion cited at the beginning of this Note—that the sector accounts provide “an essential framework”—appears to be wholly justified.

6. CONCLUSION

A method has been described that enables the recovery, without need for extensive estimation, of the U.K.’s pre-1987 income and capital sector accounts at a high level of sector aggregation. The method pays particular attention to transfer incomes and associated inter-sector flows. Household saving and corporate retentions data are also derived. The results are fully consistent with the U.K. GDP, public finance, and balance of payments accounts.

To my knowledge, this dataset is the only one publicly available that provides a basis, albeit an incomplete one, for a serious examination of Britain’s post-war macroeconomic history. Coherent financial flow, balance sheet, and volume data, further sector disaggregation and quarterly data are required to complete the picture. Planned improvements by the ONS may assist this process, but full progress is unlikely unless researchers keep a watchful eye on valuable historic datasets and speak out when they fall short.

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