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JOHN MAYNARD KEYNES AND THE DEVELOPMENT OF NATIONAL ACCOUNTS IN BRITAIN, 1895–1941

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This history of National Accounts in Britain is done with two specific considerations in mind. First, the role of the economist John Maynard Keynes—as theoretician, compiler, supporter and user—is addressed. This role is substantial and has been greatly misunderstood or misrepresented by a large part of the literature. Second, the pioneering contributions made at the start of the 20th century by Alfred Flux, Arthur Bowley and Josiah Stamp, and later by Colin Clark, are detailed. The debates between these men mark the emergence of National Accounts as a serious discipline. Their work was supported by the earlier theoretical contributions of Alfred Marshall, and by practical developments, in particular the instigation of a Census of Production in 1907. Taken together, the two considerations tell a good part of the story of the emergence of National Accounting on the world stage.

"We are in a new era of joy through statistics."
(Keynes, probably in 1941, cited by Lundberg, 1984)

1. Introduction

André Vanoli (2005, p. 29), as Patinkin (1976, p. 1109, n. 36) before him, bemoans the lack of a history of National Income Accounting in Britain.[1] This paper is an effort partially to rectify this state of affairs. It is done with two specific considerations in mind. First, the role of the British economist John Maynard Keynes in that unwritten history is addressed. This role is substantial and has been greatly misunderstood or misrepresented by a large part of the literature. Second, the pioneering contributions to National Accounting made at the start of the 20th century in Britain are detailed. Taken together, these considerations tell a good part of the wider story of British National Accounting.

According to the interpretation here, there are mythological aspects to some of the conventional presentations of the history of National Accounting. James Meade and Richard Stone in Britain and Simon Kuznets in the U.S. are often celebrated as if no others were involved, a conventional wisdom bolstered by awards of Nobel Prizes. In Britain, Meade and Stone built their accounting frame-

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[1]The tradition was originally referred to as "National Income Accounting," perhaps because of the initial preoccupation with estimating national income; national accounts came later. In line with current practice I drop "income."

work on the very rich foundations laid by a number of eminent statisticians and economists since the end of the 19th century (but that extended back even to the 17th century). These estimates were not developed for "Keynesian" models of the economy, as suggested by other conventional wisdoms, but were rooted in a wider interest in the development and prosperity of the British economy and the ultimate beneficiaries of that prosperity (which was no doubt fostered by changes in the political landscape as the Labour Party began to emerge as a potent force at the end of the 19th century).

The contributions of Alfred Flux, Arthur Bowley and Josiah Stamp are examined as a crucial backdrop to the central story of Keynes. Their work amounts to a first phase of National Accounting in Britain. Many of the debates between these men anticipated those that continue today. The discussion here emphasizes changes in the technical processes underpinning published estimates. Long-standing income-based techniques, rooted in tax data, became supplemented with the production approach, following the instigation of the Census of Production in 1907. Later, the expenditure approach would draw on the wide range of sources that were beginning to emerge as the range of official statistics was extended. The existence throughout of real terms measures, based on various aggregate prices indices, is also a striking part of the story. That said, the aim is not to elucidate all the detailed differences between measures in terms of definition and coverage, rather to illustrate that, as Keynes's work began, the measurement of national income was well developed in terms of both theory and practice.

In the 1930s, perhaps a second phase of developments, Colin Clark took the baton as the leading National Accountant. He was the first to produce an expenditure measure of economic activity, the first to produce quarterly rather than annual estimates, and the first to attempt macroeconomic analysis of his results. These contributions all preceded the work of Simon Kuznets.

Keynes's own role was multifaceted: he was a user, supporter and producer of economic statistics. Initially he sought reasonable empirical estimates of economic activity to support his advocacy of one policy over another. As he developed his own theoretical explanation of economic activity, his framework was adopted as a framework for the measurement of the economy. In particular, when he advocated use of Richard Kahn's multiplier, a specific need for national income and expenditure information was identified. And with that need he argued at every opportunity for the substantial development of economic statistics. He engaged highly proactively with all those who sought to produce such figures. When it came to his classic wartime work, *How to Pay for the War* (Keynes, 1940a), he became directly involved in the construction of National Accounts and the third phase of developments began. When he arrived at HM Treasury for his wartime advisory role, he advised Stone and Meade on their early efforts. Finally, Keynes wrote the text for the celebrated first official estimates of U.K. National Income and Outlay in April 1941. *How to Pay for the War* also included rudimentary statements of what are now known as sector accounts, based on a need to assess resources available from household taxation against resources required for government expenditure. With this work, activity began to shift from national income measurement to national income accounting, or the "accounting approach" as Vanoli (2005, p. 16) calls it. Meade and

Stone took these historical foundations, and set upon the intellectual effort of providing an accounting framework for a national economy or society within which the emerging concepts and measures could be positioned. Vanoli (2005) provides the account of how this framework emerged and evolved, initially and in particular, in Britain, the United States, the Netherlands and Sweden.

Yet, as noted, the history of National Accounts does not have Keynes so prominent. Section 9 contains an examination of the relevant literature. There are problems with the wider interpretation of Keynes's economics, which remains the subject of great controversy among scholars (albeit not in the standard textbooks). The discussion here addresses the conventional wisdom that Keynes gave impetus to the development of National Accounts through his development or fostering of macroeconomic models of the economy. Keynes's theory did not lead to such models, and indeed he was quite scathing in his criticism. The conventional wisdom on National Accounts fits conveniently with conventional wisdoms on the nature of his economic theory. I argue that the reality is quite different: the econometric-model-building agenda and associated data demands originated with other scholars and policy makers.

A distinction is often made between official and unofficial estimates of National Accounts. My view is that this distinction has served to undervalue the theoretical and practical contributions to National Accounting prior to the instigation of official estimates. In Britain valuable estimates had been made for many years, but a number of professional statisticians, economists and others saw that the information necessary for fuller and more accurate estimates of National Accounts would require the sort of effort that could really only be achieved by a central body with powers to command and coordinate information from the private sector. Bowley, Stamp, Clark and Keynes were, from the early years of the 20th century, tireless advocates of such a system.[2] History concedes Keynes giving the final and successful push, though international developments through the United Nations may have also had a significant influence (see Section 9). Hopes came to fruition in the war, with the establishment of the Central Statistical Office, the instigation of the annual publication of National Accounts, and, after the war, with the 1947 Statistics of Trade Act, allowing for a range of statutory powers in collecting data. From that moment on, Britain was provided with official economic statistics that were, and remain, the most important and reliable guide to activity and prosperity for both economic policy and wider interest. Keynes must be saluted for that effort, but so must those who had done so much under the auspices of research and the desire for an understanding of what would well serve the national interest.

2. National Accounts, 1895–1930

Kendrick (1970) and Vanoli (2005) detail the developments in National Accounting from the 17th to 19th centuries. In Britain the notion and practice of regularly measuring the economy appears to have become quite firmly established

[2]From the Board of Trade, Flux, the only official statistician, was opposed.

and debated in a substantial manner in the first quarter of the 20th century.[3] These developments followed: (i) a theoretical lead from Alfred Marshall, the British economist; (ii) a practical lead from three individuals: Arthur Bowley, Alfred Flux and Josiah Stamp; and (iii) institutional developments through the availability of wages, population and tax data and then the instigation of censuses of production.

In his masterpiece, *Principles of Economics*, Marshall (1920 [1890]) included some discussion of notions of National Income which today would be referred to as gross domestic product (GDP) from the income perspective, defining concepts of National/Social Income and Dividend.[4] His discussion seems to conflate production and income concepts, but identifies key processes and factors:

> . . . the inquiry how the three agents of production, land (that is, natural agents), labour and capital, contribute to producing the national income (or the national dividend, as it will be called later on); and how that income is distributed among the three agents. (Marshall, 1920 [1890], II.IV.25)
>
> Social income may be estimated by adding together the incomes of the individuals in the society in question, whether it be a nation or any other group of persons. We must however not count the same thing twice. If we have counted a carpet at its full value, we have already counted the values of the yarn and the labour that were used in making it; and these must not be counted again. (*ibid.*, II.IV.29)
>
> The limiting word "net" is needed to provide for the using up of raw and half-finished commodities, and for the wearing out and depreciation of plant which is involved in production: . . . And net income due on account of foreign investments must be added in. (See above II.IV.6) This is the true net annual income, or revenue, of the country; or, the national dividend . . . [T]he services which a person renders to himself, and those which he renders gratuitously to members of his family or friends; the benefits which he derives from using his own personal goods, or public property such as toll-free bridges, are not reckoned as parts of the national dividend, but are left to be accounted for separately. (*ibid.*, VI.I.48)

There are here, and throughout his work, discussions of some sophistication. Marshall defined a production boundary, considered the "national" concept more relevant than the "domestic" and used "net" to mean less intermediate consumption and the consumption of fixed capital.

Of the three individuals of particular interest in terms of practical developments, two were Marshall's pupils; all three became Presidents of the Royal Statistical Society (RSS) and received knighthoods.

- Arthur L. Bowley (1869–1957) was educated in economics and statistics at Cambridge under Marshall, joined the LSE staff in 1895, was appointed Professor of Economic Statistics in 1915, and was the first incumbent of the University of London's full time chair in statistics when it was created in

[3]The leading individuals and developments prior to this are discussed in Ward and Doggett (1991, pp. 8–19); those involved are listed in an Appendix to this paper, based on Stamp's later work (see below).

[4]He does not claim precedence, and implies that the concepts, if not his specific definitions, were familiar. Pigou (1920) discussed the relationship between Marshall's concepts and a wider notion of "economic welfare."

1919. He won a Guy Medal in 1933 and was President of the RSS from 1938 to 1940.

- Alfred W. Flux (1867–1942) was President of the RSS from 1928 to 1930 and winner of the Guy medal in gold in 1930. He was educated at Cambridge, originally in mathematics but then in economics under Marshall. He became a lecturer, but in 1908 joined the Board of Trade, the British Civil Service department that had been in the lead on statistical matters since the early 19th century. His arrival coincided with the passing of the first Census of Production Act; he was Director of the Census in 1911 and was responsible for publication of the final Report. He was, however, a thorn in the side of those who advocated a central statistical office (see Section 3).
- Josiah C. Stamp (1880–1941) left school and joined the Inland Revenue at the age of 16. By 1916 he had risen to "assistant secretary," and outside work took an economics degree and PhD at the LSE (under Bowley's supervision). His thesis was published as *British Incomes and Property* (Stamp, 1916). He was President of the RSS from 1930 to 1937.

These academic and official statisticians produced a series of estimates of economic activity and associated discussions of theory and technique, often explicitly referring to the definitions set out by Marshall. They debated matters in careful reviews of each other's work.

Bowley's first attempt at a measure of National Income was published in an article in the June 1895 edition of the *Journal of the Royal Statistical Society*, entitled "Changes in Average Wages (Nominal and Real) in the United Kingdom Between 1860 and 1891." The article was motivated by a desire to understand the development of the modern economy:

> Of all the economic and social questions now to the front there is none on which such diverse views are held, or which is so much in need of settlement, as this: Who are benefiting most by the development of industry; those who obtain profits or interest, or those who receive wages? (Bowley, 1895, p. 224)

His practical technique, in common with his predecessors from the 17th century onward, was through estimates of income, and aggregate measures of prices.

> The first step towards answering this question is to find the actual changes in the total sum paid in wages and the average money wage, and also in the gross receipts of profits and interest, and the average income of the nation as a whole.
>
> The second step is to find the variations in the purchasing power of money, both in the hands of wage-earners and of the richer classes. (*ibid.*)

To answer this question, from a mass of sources,[5] Bowley derived a rudimentary measure of GDP(I)—"Whole National Income." The key components are

[5]For example, Reports of the Commissioners of Inland Revenue, Return of Wages, 1830–86, Reports of Trade Unions, Market Shipping Returns, Reports on the Commission on Depression of Trade, 1886, Returns of Wages in Textile Trades and Mines and Quarries and the Annual Commercial History and Review in *The Economist* (Bowley, 1895, p. 226). Pivotal to his technique was an earlier estimate as follows (see footnote 3 above): "Dr. Giffen gave an estimate in the aggregate for recent years in evidence before the Labour Commission, and many of the details leading to that estimate have been published." Robert Giffen was head of the statistical department at the Board of Trade from 1876.

TABLE 1
BOWLEY'S ESTIMATE OF WHOLE NATIONAL INCOME (£ MILLION)

		Total Income Not Received as Wages		
	Total Annually Paid in Wages	Subject to Income Tax	Not Subject to Income Tax	Whole National Income
1860	392	376	64	832
1866	464	485	81	1,030
1870	486	521	85	1,092
1874	609	635	100	1,344
1877	591	652	130	1,373
1880	567	652	126	1,345
1883	609	696	122	1,427
1886	605	715	125	1,445
1891	699	782	130	1,611

Source: Bowley (1895, p. 248, table VII).

shown in Table 1, with the decomposition following from the nature of his sources as well as the nature of his inquiry. The figures included an adjustment for tax evasion, with the associated description implying that he was aiming at the "national" concept of income (*ibid.*, p. 245).

The article went on to examine matters in real terms using "Sauerbeck's index number."[6] Such analyses were commonplace in the early statistical assessments, with practitioners well aware of the necessity to remove the effects of price. He concluded that "average income and average wages have increased at nearly equal average rates" (*ibid.*, p. 251).

Bowley (1895) was the first in a series of contributions over the next 30 years; the main items are summarized in Table 2.

The source for Bowley's measures was income data. A most significant event in the development of National Accounts was the taking of a Census of Production in 1907. In the "General Introduction" to the *Final Report* (Cd. 6320), Flux summarized the results of the census including estimates of value added by industry. The final section of the introduction was entitled "Production, Consumption and Income of the UK." Here Flux made an estimate—the first?—of National Income that did not use the income approach.

First, he estimated value added for all production industries, according to the classification detailed in Table 3. Second, he supplemented these figures with estimates for agriculture and fishery and presented the estimates in a rudimentary (and aggregate) supply and use presentation, with domestic production allocated between direct consumption, materials and exports, and then adding on imports (also by intermediate/final use). In the final section of his introduction, he then

[6]The Sauerbeck index was a measure of commodity prices, produced seemingly under the sole initiative of Augustus Sauerbeck. It was based on price indices for 45 different commodities, with a base period from 1867 to 1877 (it is unclear what the weights were based on: they may have all been equal). The measure was published in the *Journal of the Royal Statistical Society*, first in September 1886 and then (usually) in the March edition each year until the 1930s. Flux was a vocal critic of the methodological approach, and would eventually develop the Board of Trade Index of Wholesale and Commercial Prices (see, e.g. Flux, 1921). In 1894 Sauerbeck was awarded a RSS Guy Medal in Silver. After his death in 1912, *The Statist* took over the construction of the figures. (There is a possible confusion here with what is now known as the Sauerbeck index number formula.)

TABLE 2

KEY WORKS ON NATIONAL INCOME ESTIMATION, 1895–1937

Year	Author(s)	Title	Publisher/Journal
1895	Arthur Bowley	Changes in Average Wages (Nominal and Real) in the United Kingdom Between 1860 and 1891	*Journal of the Royal Statistical Society*
1900	Bowley	Wages in the United Kingdom in the 19th century	At the University Press, Cambridge
1910	Bowley	An Elementary Manual of Statistics	Macdonald and Evans, London
1912	Cd. 6320	Final report of the first census of production of the U.K. (1907)	HMSO, London
1916	Josiah Stamp	British Incomes and property	P. S. King, London
1919	Bowley	The division of the product of industry: an analysis of National Income before the war	Oxford University Press
1920	Bowley	The change in the distribution of the National Income 1880–1913	Clarendon Press, Oxford
1927	Bowley and Stamp	The National Income 1924	Clarendon Press, Oxford
1932	Colin Clark	The National Income 1924–31	Macmillan, London
1933	Colin Clark	The National Income and the Theory of Production	*Economic Journal*
1937	Colin Clark	National Income and Outlay	Macmillan, London

TABLE 3

FLUX'S ESTIMATES OF VALUE ADDED (£ MILLION)

	Gross Output – Selling Value or Value of Work Done (1)	Materials Used – Cost (2)	Work Given Out – Amount Paid to other Firms (3)	Net Output – Excess of Column (1) over Columns (2) and (3) (4)
Mines and quarries	148.0	28.5	0.0	119.5
Iron and steel, engineering and shipbuilding trades	375.2	212.2	9.9	153.1
Metal trades, other than iron and steel	93.5	81.3	0.2	12.0
Textile trades	333.6	235.0	4.2	94.4
Clothing trades	108.0	58.2	2.2	47.6
Food, drink and tobacco trades	287.4	197.7	0.2	89.5
Chemical and allied trades	75.0	53.5	0.0	21.5
Paper, printing, stationery, and allied trades	61.3	26.6	1.0	33.7
Leather, canvas, and India-rubber trades	34.9	26.2	0.0	8.7
Timber trades	46.4	24.8	0.2	21.4
Clay, stone, building, and contracting trades	116.7	49.7	6.6	60.4
Miscellaneous trades	8.3	3.8	0.1	4.4
Public utility services	77.1	30.8	0.3	46.0
Total	1,765.4	1,028.3	24.9	712.2

manipulated these figures to give national accounts-type estimates. He allocated production between consumption and investment, made an estimate of user cost (first table below) and added very bold estimates of the output of services (second table below).[7] In general terms, his approach was therefore to allocate production data into final demand/expenditure categories.[8]

	Million £
Goods used for personal consumption	1,248 to 1,408
Goods applicable to capital purposes:	
(1) Maintenance of existing capital	170 to 180
(2) Investments at home	170 to 190
Goods used to maintain or increase stocks of consumable goods, about	65
Goods exported, including such as afforded means of payment for new investment abroad	464

The final estimate was presented in a curious manner, seemingly based on income as expenditure plus saving:

> The total income of the United Kingdom in 1907 may now be roughly estimated as follows:
>
> | | Million £ |
> |---|---|
> | Goods consumed or exchanged for services by classes engaged in production and distribution | 1,248 to 1,408 |
> | Goods consumed or exchanged for services by classes engaged in supplying services | 350 to 400 |
> | Additions by all classes to savings and investments | 320 to 350 |
> | Total | 1,918 to 2,158 |
>
> The above range of income may be expressed as lying between 1,900 and 2,150 million pounds sterling.

At the close of the introduction, he confronted his estimate of £2.0bn with Bowley's income-based measure of £1.8bn. Bowley's (1913) response was extremely critical, containing no words of praise. His basic objection was that the very rough estimates of service activity, and arbitrary choices in the measurement of government output, led to totals that were not reliable:

[7]The approach to the service sector was necessarily very rough; survey data came *much* later: a Census of Distribution was first undertaken in 1950 and inquiries into certain service industries (e.g. catering, wholesale and motor trades) were carried out alongside other inquiries throughout the 1950–70s. The Annual Business Inquiry, first run in 1998, brought together the collection of annual data for manufacturing, distribution and service industries (see Smith and Penneck, 2009, section 7). The main categories of services that Flux identified can be condensed as follows: transport, post, central government services, professional and artistic services (e.g. clerical, engineering, banking)—similar to those in use today.

[8]The use of production data to estimate GDP through expenditure/final demand categories is not straightforward, and it is not always clear how Flux and others approached matters. The key point is that production measures of demand categories will include exports and exclude imports. This means that no aggregate adjustment for trade is necessary, as in the usual definition GDP(E) = $C + I + G + X - M$, but there are complexities arising from trade in intermediate goods and services.

> . . . these, and other considerations not arising from the report (such as the difference of marginal utility of money to persons of various incomes, and the continual changes in purchasing power of money), tend to show that Aggregate Income, however measured, is of the nature of a numerical total, whose contents depends on arbitrary definition, and has no very close relation to welfare. (Bowley, 1913, p. 60)

Flux made no such claim about welfare. G. Udny Yule (1913) was much more complimentary, concluding: "the Director and the Staff are to be heartily congratulated" (p. 321).

The early results of the Census of Production showed that statisticians had recognized the need to remove intermediate consumption and used the terminology gross and net output that under ESA 1995/SNA 1993 are known as output and gross value added.[9]

In between the taking of the Census and the publication of results, Bowley produced a textbook, *An Elementary Manual of Statistics* (1910). This included probably the first attempt at bringing the importance of National Accounting to a wider audience. The second part of two detailed all sources of official statistics, with chapter headings: "The Census," "Trade and Transport," "Prices," "Wages," "Employment," and "Other Statistics Relating to the Working Classes." The second to last chapter, "Income and Outlay," looked at Total National Income, opening with the following definition:

> By *Total National Income* is generally meant the aggregate of the incomes (including earnings) of the persons composing a nation; income is taken as meaning the money, or money value of goods, coming into a person's possession during a year for his own use (subject to rates and taxes), after all expenses connected with obtaining it are subtracted. (Bowley, 1910, p. 171)

Stamp's first contribution to the debate was published in 1916, though he notes that the work was largely completed before the War. The book was his DSc thesis, prepared under the supervision of Bowley,[10] who was thanked fulsomely in the introduction. Stamp's starting point was the great value of income tax assessments and returns as a source of information.[11] His stated aim was to provide a "work useful for reference" (Stamp, 1916, p. 13), and his analysis was hence a highly detailed explanation of the tax system, setting out all rates and changes over time, and presenting various continuous time series. The work contained only a brief discussion of National Income, proceeding from Marshall; as with Bowley, some prominence is given to the arbitrariness of measures, using as an example the work of a "shoeblack." That said, he concluded that the income approach was "a fairly comprehensible idea, free from important ambiguities, for ordinary comparative purposes" (*ibid.*, p. 416). He also included a very helpful summary of all historic estimates of British National Income, which is reproduced here as an Appendix.

[9]Though the U.S. seems to have used the term value added at the time—see Flux (1924, p. 357).
[10]See Stone (1987).
[11]The most important of these were the Reports of the Commissioners of Inland Revenue. Tax was organized according to four schedules: A, property; B, use of land; C, government securities; D, profits of business, including employment.

Bowley's (1919) next work included estimates of National Income for 1911 ("1,900[m] or less") and 1913–14 ("probably between £2,000m and £2,100m") and associated disaggregations. In Bowley (1920), he revisited the estimate for 1913 and provided a time series back to 1880, in order to examine distributional aspects. (He concluded that "The proportions to property and labour [in 1880] are $37^1/_2$ per cent. and $62^1/_2$ per cent., exactly as in 1913" (p. 25).)[12]

Bowley and Stamp (1927) produced an estimate for 1924, which alongside Flux (1929), brings what might be characterized as a first era of national income estimation to a close. Again matters are approached from the income perspective; though the authors look forward to help "explaining" their total with the 1924 Census of Production. Their work contained an examination of "different conceptions of 'total income' " (pp. 29–43), addressing a number of issues that remained controversial for some time; for example: the omission of owner-occupied housing, imputing flows of services for durables, and the omission of the money-value of "domestic services rendered by wives and daughters in their own homes" and "co-operative purchase" (p. 39). After adjusting for price and population, the authors concluded: "After reviewing all the evidence so far adduced we think that the *real home-produced income per head (when duplication is eliminated) in 1924 did not differ appreciably from that in 1911*" (p. 55).

Flux (1927) wrote a highly favorable review, not disputing the authors' conclusions. In 1929, as a Presidential Address to the RSS, he approached the analysis from a production perspective, using preliminary results of the 1924 Census of Production. His judgment still resonates today: ". . . it is of the greatest importance that the conception of the national dividend which underlies that procedure [Stamp and Bowley's] should be familiar to as wide a public as possible" (Flux, 1929, p. 7).

3. The Centralization of Official Statistics

While the British Census of Production was a significant development,[13] official statistics continued to be regarded as highly inadequate. Calls for improvements manifested in calls for the centralization of official statistics; Robert Giffen advocated such an arrangement from within the Board of Trade in 1877; Sir Charles Dilke, a President of the RSS, argued the case in 1907.

At the end of World War I, two of those who had fostered these early developments in National Accounts put their names to another attempt. Geoffrey Drage's (a leading statistician) campaigning resulted in a petition signed by a number of statisticians, businessmen and others being presented to the government in November 1919 (Ward and Doggett, 1991, p. 20). Drage, Bowley and Stamp served (with two others) on a RSS "Committee of Official Statistics," which prepared the petition that was published in the *Journal of the Royal Statistical Society*, under the authorship of the Committee (Committee on Official Statistics,

[12]Bowley's work handled the interface between technical and practical considerations; e.g. a discussion of conceptual differences between the income and production approaches led him to conclusions about the practical implementation of the anticipated next census of production (Bowley, 1922). Notably he was more positive about Flux's work than in his earlier review.

[13]As detailed by Smith and Penneck (2007), censuses were conducted for 1907, 1912, 1924, 1930 and 1935.

1920). Another committee of ten official statisticians, including Flux, was assembled to respond to the petition, and rejected it.[14]

The statisticians in government departments, and probably the government itself as well as HM Treasury, were seemingly content with existing arrangements. The pressure would intensify throughout the 1930s; instrumental to these calls would be Keynes.[15]

4. Keynes's Impetus

J. M. Keynes arrived at economics after having first studied mathematics, philosophy and statistics. His first major work, *A Treatise on Probability*, brought probability to bear on philosophy, and entailed an in-depth analysis of probability and statistical theory. (He began it in 1909; it was eventually published in 1921.) In 1909 he also put his mind to index number theory; his essay "The Method of Index Numbers with Special Reference to the Measurement of General Exchange Value" (Keynes, *CW* XI, pp. 49–156) won the Cambridge University Adam Smith Prize. This had been preceded by a controversy with G. U. Yule, concerning index number techniques adopted in a Board of Trade report on wages (Keynes, 1908, *CW* XI, pp. 180–2; Yule and Keynes, 1908). His review of Fisher's celebrated "Purchasing Power of Money" contained a substantial critique of both Fisher's index number theory and its practical application (Keynes, 1911, *CW* XI, pp. 375–81).

Keynes's economics was always focused on practical ends. From his earliest contributions in the field, he sought to expose flaws in economic policy. And to do so he required evidence of the mechanisms that drove activity and assessments of relative economic performance. He paid close attention to the developments in economic statistics and joined calls for improvements, first putting his name to the RSS petition in 1920. His 1931 *Treatise on Money* bemoaned "the present deplorable state of our banking and other statistics" (Keynes, 1930, p. 78, *CW* V). The Macmillan Report (Cmd. 3897), which he drafted in large part, repeated the plea, and he did so again and again over the next ten years.

The *Treatise* was his first attempt at a full theory of the economy, and Keynes did so through what is now known as a macroeconomic approach.[16] He attempted to explain the operation of an economy from the behavior of certain macroeconomic aggregates, claiming a critical role for fluctuations in the rate of fixed capital investment (Keynes, 1930, pp. 95–6, *CW* V). In Chapter 28 he made use of Flux's (1929) estimates.

As part of the theoretical scheme of the *Treatise* he articulated a set of "fundamental equations" which might be regarded as the first ever macroeconomic identities; these were closely related to the variables and relations underlying estimates of National Income. The first of these relations brought together volumes, prices and values:

[14]These attempts are discussed in detail in Ward and Doggett (1991, pp. 8–22).

[15]A referee draws attention to the importance to the argument for centralization of a 1929 Inland Revenue Report on National Income; the report only came to public attention in 1977 when it was published by the Cambridge University Department of Applied Economics.

[16]He also returned to a detailed critique of index number methods as applied to the construction of long-run price measures (chapter 8).

$$P = \frac{E}{O} + \frac{I' - S}{R}$$

Keynes defined the variables as follows:

> Let E be the total money-income or Earnings of the community in a unit of time, and I' the part of it which has been earned by the production of investment-goods, so that I' measures the cost of production of new investment . . .
>
> . . . let S be the amount of Savings . . . , so that $E - S$ measures the current expenditure on consumption goods.
>
> . . . let O be the total output of goods in terms of these units in a unit of time, R the volume of liquid Consumption-goods and Services flowing onto the market and purchased by consumers, and C the net increment of Investment, in the sense that $O = R + C$.
>
> Let P be the price level of liquid-Consumption goods, . . . (Keynes, 1930, p. 135, *CW* V)

This emphasis on macroeconomic relations and aggregates provided a very real demand for National Accounts, and in particular for a breakdown according to expenditure components.

5. The Multiplier and National Accounts

The demand for empirical investigation of Keynes's fundamental equations was soon reinforced by the need to estimate the multiplier. In the wake of the Great Depression many (not by any means just Keynes) began to advocate public works expenditure to support private economic activity. In June 1931, Richard Kahn published his famous multiplier article. He showed how a given increment of primary employment in the investment industries would have a "multiplied" effect on total income and then on employment. He produced an estimate of the relevant figures, and in doing so introduced Colin Clark, soon to be the greatest of the early pioneers of National Accounting, to the economics profession and the national accounting fraternity: "They are based, for the most part, on statistical material that has been placed at my disposal by Mr. Colin G. Clark, to whom I should like to express my great gratitude" (Kahn, 1931, p. 155).

Keynes quickly co-opted the discovery into the case for public works. In his 1933 pamphlet *The Means to Prosperity* (*CW* IX, pp. 335–66), he made a number of estimates of the multiplier. Under certain assumptions about leakages, he suggested "the multiplier works out at about $1^1/_2$, which might be considered to set a minimum limit to its value" (*CW* IX p. 344).[17,18]

[17]Moreover, this multiplied effect would effectively pay for the original expenditure outlay, a fundamental point that continues to be neglected in present debates about fiscal policy.

[18]Kahn wrote to Keynes, "The figures are really beautiful" (*CW* XIII, p. 412). However, subsequent dialogue indicated that, despite his enthusiasm for Clark's work (see below), Keynes to some extent mistrusted Clark's figures, seemingly because the imputation techniques adopted suggested that the multiplier was stable: ". . . I know for certain that the multiplier is not always 2" (letter from Keynes to Kahn, January 29, 1933, *CW* XIII, p. 413).

In the *General Theory*, Keynes set out the multiplier as $\Delta Y = 1/(1-c)\Delta I$, where Y was income, I, investment, and c, the marginal propensity to consume. In this form, the multiplier was directly linked to the expenditure components of GDP. However Keynes's discussion revealed ongoing dissatisfaction with the British figures:

> At present, however, our statistics are not accurate enough (or compiled sufficiently with this specific object in view) to allow us to infer more than highly approximate estimates. The best for the purpose, of which I am aware, are Mr Kuznets' figures for the United States . . . though they are, nevertheless, very precarious. (*CW* VII, p. 127)[19]

Comparing increases in National Income with increases in investment (he showed only Kuznets's investment figures in his book, sourced to the National Bureau of Economic Research, NBER), he concluded: "the multiplier seems to have been less than 3 and probably fairly stable in the neighbourhood of 2.5. This suggests a marginal propensity to consume not exceeding 60 to 70 per cent.—a figure quite plausible for the boom, but surprisingly, and, in my judgment, improbably low for the slump" (*ibid.*, p. 128).

In my view, it was the discovery of the multiplier that gave the greatest impetus to developments of National Accounts in the 1930s in both the U.K. and U.S. In 1938 Colin Clark wrote "Determination of the Multiplier from National Income Statistics," which summarized the issues to that point and set out national income and multiplier estimates for the period 1929–37. With spurious precision, he estimated the multiplier for 1929–37 as 1.532 and for 1934–37 as 2.082. But that is to jump ahead to the end of his career as a National Accountant.

6. 1930–1940: Colin Clark's National Accounts

In the 1930s, from Cambridge University, Colin Clark established himself as the world's leading economic statistician. He published his first major work, *National Income 1924–31*, in 1932. The book set out new estimates of national income, and was particularly notable for the first ever assessment of the expenditure perspective.[20]

Clark opened his work with a tribute to his predecessors, Bowley, Stamp and Flux. But then he attacked robustly the "disgraceful condition of British official statistics," and urged "the centralisation and proper coordination of the Government's statistical work" (*ibid.*, p. vii). His specific complaints concerned delays in publication of results, the use of an antiquated form of industrial classification, the use of five variants of that classification in five different government departments, and the refusal of companies to report profit information.

[19]In fact, prior to the 1930s, the development of National Accounts in the U.S. had lagged behind the U.K. (see Patinkin, 1976, pp. 1107–8). But in 1932 the Senate requested the preparation of official U.S. estimates. Simon Kuznets was put in charge, and in January 1934 "National Income, 1929–32" was issued by the Senate and as National Bureau Bulletin No. 49.

[20]See Arndt (1987, p. 428). On January 2 1933, Keynes wrote to Clark: "I have just finished reading your book carefully . . . I think that it is *excellent*. An enormous step forward. I hope it is selling all right" (*CW* XXIX, p. 58; Keynes's emphasis). He supported Clark's emphasis on gross figures, and produced his analysis that showed the multiplier was perhaps implausibly stable.

TABLE 4

CLARK'S "ANALYSIS OF THE NATIONAL INCOME FROM THE EXPENDITURE SIDE" (£ MILLION)

	1924	1927	1928	1929	1930	1931
I. Consumption						
Imports:						
Food, drink and tobacco	357	344	347	354	332	304
Finished manufactures	119	128	136	139	139	121
Industrial output:						
Food, drink and tobacco	308	305	319	325	302	270
Manufactures and coal	847	960	910	943	887	798
Home agriculture and fisheries produce	283	264	264	271	256	250
Distributive and other services (including government)	1,180	1,361	1,306	1,458	1,621	1,492
Gross rent of dwellings	200	203	208	213	217	221
Total consumption	3,294	3,565	3,490	3,703	3,754	3,456
II. Investment						
Fixed capital and maintenance	589	605	604	650	648	624
Additions to stocks and work in progress	20	14	43	–44	–84	–40
Balance of commodity exports over imports	81	114	157	140	51	–67
Gold imports	–7	3	–13	–15	5	–35
Total investment	683	736	791	731	620	482
Gross Income	3,977	4,291	4,281	4,434	4,374	3,938

Source: Clark (1932, p. 117).

He moved on to the almost obligatory discussion of the definition of the National Income, followed by the building up of an estimate from the income approach, in much the same way as his predecessors. In addition, he provided a detailed account of government revenue and expenditure; the aggregate borrowing measure was labeled net surplus or "sinking fund" (which was positive in all years from 1924–25 to 1932–33, reflecting the conservative financial policies of the government at the time) (p. 81). Using various ingenious techniques, Clark also provided breakdowns from the production and expenditure side, and was therefore the first to articulate the three perspectives side by side.[21] Table 4 shows his expenditure decomposition; it should be noted that, as with Flux, his presentation is based on domestic production information rather than direct measurement of demand categories, supplemented by adjustments for trade (although it is not completely clear how this has been achieved—see footnote 8).

Clark closed his work with an analysis based on Keynes's "fundamental equations," perhaps the first detailed macroeconomic interpretation of national accounts estimates. He sought to demonstrate how the relationship between saving, investment, interest rates and the quantity of money might be examined. The issue was critical to economic debate at the time, with Keynes arguing that a lower rate of interest and higher quantity of money would lead to higher investment, and F. A. von Hayek arguing the reverse. Clark's basic

[21]His figures were free of "customs and excise"; while he stated that figures were gross "before making allowances for maintenance and depreciation" (p. 118), Keynes would later point out that Clark's adjustment for depreciation was erroneous.

approach was to try and quantify Keynes's "fundamental equations"; using some innovative graphical illustrations, he left his readers to draw their own conclusions.

Bowley (1933) reviewed the work for the *American Economic Review* in a rather ungenerous manner. Kuznets's review for the *Journal of the American Statistical Association* was more upbeat; he summed up:

> All in all, it is an assiduous, and often brilliant, attempt to fit a vast body of heterogeneous data into a consistent picture of a country's national income over a disturbed period. Mr Clark covers a much wider canvass than the earlier investigators in the field (Bowley, Stamp and Flux) especially in the completeness with which he traces the flow of income from its industrial sources to the channels of expenditure and saving. And if at some stages of the inquiry, data are strained perilously close to the tolerance point, the effort should nevertheless be accorded full credit. It is an effective stimulus toward further analysis and enrichment of available information as well as toward quantitative testing of some widely held current economic generalizations. (Kuznets, 1933, pp. 363–4)

Clark published many empirical and technical analyses over the next ten or so years. In 1933 he published an estimate of "social income" for 1932, and also advocated a "technique for the continuous measurement of the national income by two new and quite independent methods, one being based on statistics of consumption and investment, the other on statistics of wages and profits" (Clark, 1933, p. 205). The technique led to the first *quarterly* estimates of national income (from 1927 Q1 to 1933 Q1).[22] These estimates were again presented according to the definitions underlying Keynes's fundamental equations. From a theoretical point of view, he noted "the greater relative stability of consumption as compared with investment" (*ibid.*, p. 210).

His most substantial work, and the most substantial work on National Accounts to that date (of about 500 pages), was published in 1937, under the title *National Income and Outlay*. This time Bowley was full of praise:

> Mr. Clark has endeavoured to work these into a coherent whole, and though the results and methods may be subject to criticism, there can be nothing but praise for the patience and industry with which the problems have been attacked and the data exploited. (Bowley, 1937, p. 350)

Clark brought together and built on aspects of his previous work, publishing quarterly estimates from the production, income and expenditure perspectives, in both nominal and real terms,[23] and with associated discussions of more

[22]From monthly employment statistics and quarterly statistics of retail sales (produced by the Board of Trade and extending from the middle of 1929); investment was based on employment in certain industries. Patinkin (1976, p. 1109) confirms that ". . . once again . . . it is Colin Clark who has to be credited with having been the first one to provide estimates of national income for periods of less than a year."

[23]Based on deflation from the expenditure perspective; his deflators are shown in table 89, p. 197.

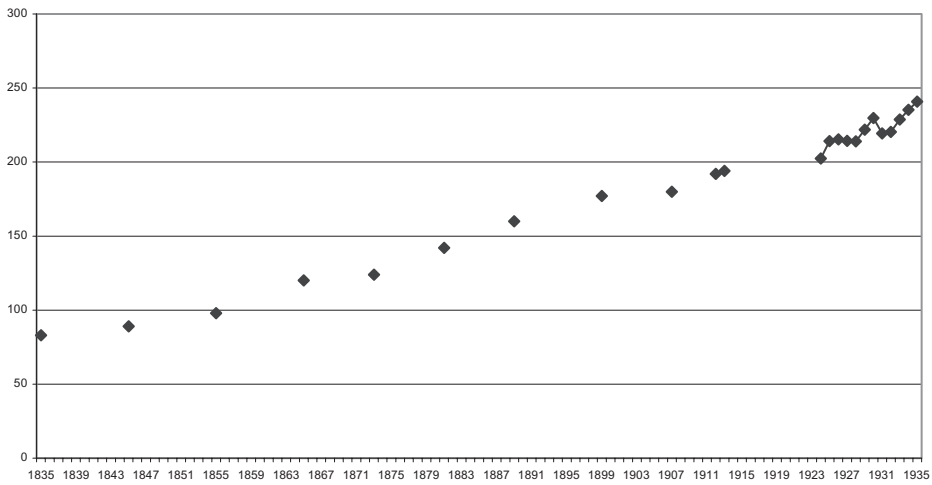

Figure 1. Clark's real income per head series

Source: Clark (1937a, Table 94).

detailed aspects of the distribution of income across the population and between industries.[24]

The book concluded with four analytical chapters; the first of these included a presentation of a long-run series of real income per head from 1830 to 1934, in a sense a summary of national income estimation to that date; the results are replicated in Figure 1.

In the penultimate chapter, he brought his estimates to bear on the economic issues of the day, namely the determinants of the cycle and estimation of the multiplier.[25] In the final chapter, "The Rate of Economic Progress," he attempted to characterize the nature of economic developments in Britain based on all the figures at his disposal, with assessments of growth, the economic cycle, productivity, trade and the accumulation of capital.

As before, he had opened his book with a discussion of the state of official statistics. Clark praised the Board of Trade for a "tremendous improvement in the statistics which they issue" (*ibid.*, p. vi), noting in particular the "powers under the Import Duties Act of 1932 to take what is in effect an annual Census of Production of the principal manufacturing industries," and commended improvements to the

[24]An analysis of the share of "Home produced national income" by industrial sector is of interest (*ibid.*, p. 238):

	1911	1924	1930	1934
Agriculture	8.0	3.4	3.8	4.1
Industry	39.3	49.2	45.4	49.3
Services	52.7	47.4	50.8	46.6

Tily (2006, p. 30) shows the service sector as 53 percent of GVA at the start of the 1970s, not greatly changed from this period; in 2003 the share was 75 percent.

[25]Clark compared the annual money change in investment with annual money change in income as evidence that the multiplier had been broadly stable with a value of two.

index number of wholesale prices and the widening of the scope of retail trade statistics. On the other hand, he bemoaned the postponement of the construction of a cost of living index, the lack of information on returns of capital investment, the still limited coverage of wage statistics, a lack of a census of distribution and the ongoing refusal of industry to allow publication of any profit information. In closing, he pleaded:

> If the saying is true, that economics is eventually capable of benefiting the human race as much as the other sciences put together, it must be equipped not only with the scientific spirit, but also with the financial resources, of the older sciences. (*ibid.*, p. vii)

Shortly afterwards Clark withdrew from his work on National Accounts; fittingly, subsequent developments would soon be on an "official" footing.[26]

7. Keynes's *How to Pay for the War*

The decisive change for U.K. National Accounting came with World War II. In February 1940, Keynes's *How to Pay for the War* made the case for a system to defer some part of individuals' earnings until the end of the war. To do so, he utilized the then existing economic statistics to an unprecedented extent. His argument was that wartime production would increase greatly from pre-war levels, but this increase would be concentrated in the apparatus of war rather than in consumer goods and services. Civilians' employment and therefore total earnings would increase to reflect the increased production, so there would be more money chasing fewer consumer goods and services. Keynes argued that these earnings should therefore be restricted in order to avoid inflation. Equally, after the war, there would be a need for higher civilian consumption as government/wartime activity was curtailed:

> The appropriate time for the ultimate release of the deposits will have arrived at the onset of the first post-war slump. For then the present position will be exactly reversed. Instead of demand being in excess of supply we shall have a capacity to produce in excess of the current demand. (Keynes, *CW* IX, p. 405)[27]

His proposed technique was to "determine a proportion of each man's earnings which must be deferred—withdrawn, that is to say, from immediate consumption and only made available as a right to consume after the war is over" (*ibid.*, p. 379). Assessing this proportion required statistics of the economy. Again he bemoaned the general state of affairs:

> The statistics from which to build up these estimates are very inadequate. Every government since the last war has been unscientific and obscurantist,

[26]Clark published further articles on closely related themes (e.g. 1937b, 1938), but in 1937 he left Britain for Melbourne University, and then spent much of his life advising on economic policy in Australia (see Arndt, 1987).

[27]The discussion was based on a theory of inflation which Keynes is habitually accused of neglecting: "This analysis of how inflation works is fundamental. And it is fairly simple. But it is not yet understood by everyone—for the reason, surprising perhaps, that it is comparatively novel" (*ibid.*, p. 442).

> and has regarded the collection of essential facts as a waste of money. There is no one today, inside or outside government offices, who does not mainly depend on the brilliant private efforts of Mr. Colin Clark (in his *National Income and Outlay*, supplemented by later articles); but, in the absence of statistics which only a government can collect, he could often do no better than make a brave guess. The basis of what follows is given in more detail in Appendix I (p. 429), prepared with the assistance of Mr. E. Rothbarth. (*ibid.*, p. 381)[28]

Based on Clark's figures, Keynes set out the latest estimate of what he referred to as "national output" as follows:

> In the year ending 31 March 1939, the value of our output, measured at cost, including invisible exports, was about **£4,800** million. Of this amount:
>
> **£3,710** million was the current cost (inclusive of the cost of maintaining plant) of the consumption of the public;
>
> **£850** million was the current cost (inclusive of the cost of maintenance) of the services provided by the government, excluding "transfer" payments to pensioners and holders of the national debt, etc, since these are merely out of one pocket into another, but including capital expenditure;
>
> **£290** million was devoted to increasing our privately owned capital equipment in the shape of buildings, plant and transport. (*ibid.*, pp. 381–2)

As far as I am aware, this analysis was also the first time government final consumption expenditure had been separately identified.[29]

On the basis of these figures, and projections into the future, Keynes concluded that total economic activity might increase by £825 million, and that a total of £1,000 million of private incomes should be withdrawn from consumption. To assess how this might be achieved, Keynes turned to a rudimentary statement of what would now be known as "institutional sector" accounts.

In the Appendix, Keynes defined a concept of "taxable income," and decomposed it as follows:

	£ million
Private consumption at market prices (made up of indirect taxes and rates £670 million and current value £3,710 million including current depreciation as above)	4,380
Private saving (made up of £290 million new investment as above and £80 million lent to the government to cover the excess of the cost of government operations over revenue from taxes and trading profits	370
Direct taxes	550
	5,300

[28]Rothbarth was a German academic refugee who was later killed in action over Holland (Marcuzzo and Rosselli, 2005, p. 186).

[29]As with Flux and Clark, his decomposition seems to be domestic supply-side estimates of demand quantities; his aggregate figure of £4,800 million does not come to the same total of his estimates of demand at £4,850 with the difference potentially explained by the complexities touched on in footnote 8.

He then set out a government account:

Government income and outlay (central and local)

		£ million
Government income:	Direct taxes	550
	Indirect taxes	460
	Rates	210
	Government trading profits	50
	Loans from the public (net)	80
		1,350
Government outlay:	Transfer payments	500
	Government services	850
		1,350

And then Keynes brought both together as a series of income and expenditure accounts, starting with a household account:

Private income and outlay

	£ million
Private income:	
Wages and profits derived from current output	4,800
Transfer incomes	500
	5,300
Private outlay:	
Consumption at market prices	4,380
Saving	370
Direct taxes	550
	5,300

National output

Private and government consumption apart from making good wastage and depreciation	4,140
Making good wastage and depreciation	420
New investment	290
	4,850
Private wages and profits derived from the above	4,800
Government profits	50
	4,850

Gross investment

Net new investment	290
Making good wastage and depreciation	420
	710

Saving

Net new investment	290
Government deficit	80
	370

Distribution of private incomes	
Individuals below £250 a year	2,910
Individuals above £250 a year	2,340
Charities	50
	5,300

Keynes did not make any claims for his sectorization, but as far as I am aware it broke new ground (though it must have been predated by rudimentary balance of payments and government accounts). Keynes added that a more detailed discussion about the derivation of and the sources for the figures had been published in the *Economic Journal* (Keynes and Rothbarth, 1939, *CW* XXII, pp. 53–66). After publication of *How to Pay for the War*, he published another article that tackled conceptual differences between his and Colin Clark's approaches (Keynes, 1940b, *CW* XXII, pp. 66–73). First, he pointed out that Clark's measure, which he referred to as gross national income, double-counted depreciation. His own measure of "national output" was net of depreciation (because he was concerned with "War Potential" and the allocation of existing productive capacity/output to alternative/wartime uses, he assumed that depreciation would need to be made good). Second, he argued that "in most contexts" it was inappropriate to include indirect taxes ". . . if the population were to consume more grain in the form of bread, which is now subsidised, and less in the form of beer and whisky, which are taxed, gross national output would decline" (Keynes, 1940b, p. 52). Keynes's estimate amounted to "GDP at factor cost," the measure that would underpin the National Accounts for the next 50 years (until the implementation of System of National Accounts, 1993 and European System of Accounts, 1995).

8. Enter Meade and Stone

The scene is set for the final stage in the story: the publication of the 1941 White Paper that included the first *official* U.K. national accounts estimates, and the signing up of James Meade and Richard Stone to the ranks of national accountants. Stone (1913–91) graduated in economics at Cambridge University in 1935, though he began studying law. He recalled: "Clark was my teacher at Cambridge and his work was the main inspiration for mine" (Stone, 1984, p. 121). Deaton (1987, p. 510) records his "immediate interest in economic modelling, in measurement and in estimation." Before he moved to Whitehall he began a career as a city lawyer. Meade (1907–95) was based in Oxford, but had worked quite closely with Keynes's younger Cambridge colleagues over the 1930s (and made contributions to discussions as the *General Theory* was being developed). From 1937 to 1940, before he moved to Whitehall, he worked at the League of Nations alongside those developing "econometrics" (see Section 9). Harrod (1951, pp. 501–3) detailed how British economists were co-opted to the war effort; they were eventually divided between the newly established Central Statistical Office under Harry Campion and the Economic Section of the Cabinet Office under Professor Jewkes and then Lionel Robbins. He recorded how "Three or four times each week Mr. Stone visited Keynes [in HM Treasury], who took a meticulous interest in every detail" (*ibid.*, p. 503).

TABLE 5

Estimates of Net National Income and Expenditure in 1938 and 1940 (£ million)

	1938 Year	1940 Year	1940 1st Quarter	1940 2nd Quarter	1940 3rd Quarter	1940 4th Quarter
1. Rents	352	370	92	93	93	92
2. Profits and interest before deduction of National Defense Contribution and Excess Profits Tax	1,178	1,514	347	387	394	386
3. Salaries	980	1,135	264	276	295	300
4. Wages (including payments to armed forces and earnings of shop assistants)	1,820	2,483	562	622	647	652
5. Other income	85	84	21	21	21	21
6. Net national income (before deduction of direct taxes)	4,415	5,586	1,286	1,399	1,450	1,451
7. Personal expenditure at market prices	3,997	4,303	1,023	1,076	1,084	1,120
8. Expenditure by the government at home and abroad, and local authorities, on goods and services	849	3,100	558	646	887	1,009
9. Indirect taxes, rates, etc	–643	–868	–193	–205	–227	–243
10. Net investment, or disinvestment, at home and abroad	210	–949	–102	–118	–294	–435
11. Balance unaccounted for	2					
12. Net national expenditure	4,415	5,586	1,286	1,399	1,450	1,451

The official estimates were published as *An Analysis of the Sources of War Finance and an Estimate of the National Income and Expenditure in 1938 and 1940* (Cmd. 6261); Keynes wrote the text (Ward and Doggett, 1991, p. 34). In a section entitled "Estimation of the National Income and Expenditure in 1938 and 1940," three tables were presented that built on those in *How to Pay for the War*:

- Table A: Estimates of net national income and expenditure.
- Table B: Estimates of personal incomes, personal expenditure and personal savings.
- Table C: Estimates of the net amount of funds available for government purposes from private sources.

These were presented clearly and elegantly; they were in *account form* where expenditure equaled income; as in Clark, the tables included quarterly estimates. Moreover, as Kendrick (1970, p. 308) observed, the accounts "stressed the 'national income and outlay account' idea. That is, income (factor cost) and expenditure were looked on as the two sides of a double-entry production account for the entire national economy." Table A is reproduced here as Table 5 (the original was produced over two pages with the income account on the left and the expenditure account on the right).

Shortly after the publication of the White Paper, Meade and Stone (1941) produced a technical article presenting a fuller framework of accounts for a national economy: "The Construction of Tables of National Income, Expenditure, Saving and Investment." Vanoli (2005, p. 20) observed that the publication of the

article came "following Keynes' suggestion" (though the extent of Keynes's contribution to the substance of the article is not known). While noting the system was incomplete, Vanoli (*ibid.*) commended the approach: "the set of tables published in 1941 represents indeed a system of national accounts in the form of a linkage among a coherent set of macroeconomic totals."

The White Papers would become annual events, published alongside HM Treasury Budget Reports; they led to the U.K. "Blue Books," formally entitled *National Income and Expenditure*, and renamed in 1984 as *United Kingdom National Accounts*, as they continue today.

9. The "Conventional Wisdom" Concerning Keynes's Role

I have argued that Keynes had a very important role in the history of British National Income Accounting. Throughout his early career, as a user, he took a close interest in both the availability and reliability of economic statistics as well as in technique, most notably in index number theory. As a prominent public figure he regularly pressed the need for improvements to official statistics, in particular in the Macmillan Report and his *Treatise*.

The theoretical content of the *Treatise* provided great impetus for National Accounts, in that the macroeconomic theory of an investment-driven economic cycle demanded empirical verification. Then in 1931 Richard Kahn's articulation of the multiplier, and Keynes's application of it in his 1933 *Means to Prosperity*, meant a very real need for GDP data according to categories of final demand.

Keynes supported Colin Clark's work, but challenged his figures and entered into a vigorous debate about important technical matters such as the treatment of depreciation and taxes on production. In his 1940 *How to Pay for the War*, he constructed his own National Income Accounts, based on Clark's work, but also for the first time setting out rudimentary institutional sector accounts for the government and household sector. He then successfully advocated official production of these figures; he advised Meade and Stone and wrote the text of the first U.K. National Income and Expenditure White Paper. In sum, he was a leading and demanding advocate, user, and producer of economic statistics.

History has not done justice to either Keynes's contribution or that of his predecessors. The literature on the history of National Accounts tends to restrict Keynes's contribution to only two roles. In Role One, he is portrayed as only a supporter of the development of national accounts information; some even have him doing so reluctantly. In Role Two, a fairly vague interpretation of his theory—often linked to claimed associated requirements for macroeconomic modeling—is accepted as having provided some impetus to the developments. A stronger form of this role is that his work provided impetus for the macroeconomic or econometric models that came to prominence at the end of World War II. These models required national accounts information as a basic ingredient.

These interpretations greatly undervalue Keynes's contribution. He is generally not portrayed as having been involved in the preparation of the figures, and I have never come across any emphasis on the specific impetus from the multiplier, and only one or two mention *How to Pay for the War*. Equally, the work of Bowley, Flux and Stamp tends not to be regarded as particularly significant in its

own right. It is generally presented as an afterthought, following laborious detailing of the far more *ad hoc* and sporadic initiatives prior to the 20th century. Instead, the literature tends to accord the greatest prominence to Kuznets, sometimes alongside Colin Clark, and then, of course, to Meade and Stone. For reasons of space, the key contributions are cited only briefly.

The first attempt at articulating Keynes's role was (probably) Harrod's biography (1951). Here Keynes is in Role One, as an agent for change. Harrod (1963, p. 140) reiterated this interpretation, having Keynes "encouraging" research before World War II and "getting this work put in hand in the British Central Statistical Office during that war" (Harrod, 1963, p. 140). Studenski's (1958) celebrated and influential study of *The Income of Nations*, paints a somewhat different picture. At points he is disparaging ("Keynes himself was not interested in statistics and was not particularly skilful in using them"; p. 25), but generally he permitted Keynes Role Two through his theoretical advances: "Keynes (1883–1946) gave a new orientation to modern economics and in doing so affected modern thinking in the field of national income analysis" (p. 25). Kendrick's (1970) broad, condensed and very scholarly view of "The Historical Development of National-Income Accounts" has Keynes in Roles One and Two: with his theory giving an impetus for estimation, and his advocacy influential.

The most substantial account of Keynes's part in the development of National Accounts is Patinkin (1976). Again he has Keynes in Role Two, but he seeks even to demean Keynes's contribution in a manner that I hope is answered by this article. Even Stone himself has tended to diminish Keynes's achievement so that he is only an advocate and user of others' work (e.g. Stone, 1984). In the *New Palgrave Dictionary of Economics*, Simon Kuznets is celebrated as "the foremost pioneer" of "conceptualising and measurement" (Easterlin, 1987, p. 70). Keynes is mentioned only in the context of Role Two. Finally, in his great work, Vanoli (2005, p. 19) does likewise.

It is the second role that has caused the most confusion, particularly in its stronger form with National Accounts becoming the raw material for *econometric modeling*. Studenski (1958, pp. 25–6) goes on to argue that Keynes's "followers" used his theoretical approach to develop models to forecast the future national income or as guides to policy. The underlying purpose of Patinkin's work appears to be to make a similar link: the title of the paper is "Keynes and Econometrics: On the Interaction between the Macroeconomic Revolutions of the Interwar Period." Today, the notion that National Accounts were developed to support econometric modeling has of course become a "conventional wisdom." Keynes hence becomes identified with National Accounts merely as they provide the raw material for the "Keynesian" economics, econometric model building and the associated economic policies of the post-war world.

More generally, and going beyond the history of National Accounting, my own judgment is that history has severely distorted both Keynes's theory and associated policy proposals. Those initiatives with which he has been most closely associated and those that he has been most greatly distanced from seem to me an exact reversal of the true state of affairs. In particular, I have argued that too much prominence has been given to his views on fiscal policy, whereas his primary concern was monetary policy (Tily, 2007).

The conventional history of National Accounts builds on a misinterpretation of Keynes's theory as providing the groundwork for macroeconomic model building. That, after the war, academic and practical economists gave great importance to macroeconomic models of the economy and the consequent need to measure the relevant quantities is undeniable. But such models have very little to do with Keynes. Certainly his *The General Theory of Employment, Interest and Money* (1936) was (what is now known as) a macroeconomic theory of the economy. For me, the greatest difference from previous models of the economy was that it gave *demand* a role in the determination of aggregate activity and employment in both the long and short runs.[30] While the textbook interpretation sets Keynes's model as a system of simultaneous equations, many other have rejected this approach. In the *General Theory*, Keynes gave a fundamental role to his notion of *uncertainty*, so that something as intangible as expectations of the future could change actual outcomes, and matters cannot be so straightforwardly modeled:

> A monetary economy, we shall find, is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction. But our method of analysing the economic behaviour of the present under the influence of changing ideas about the future is one which depends on the interaction of supply and demand, and is in this way linked up with our fundamental theory of value. (*CW* VII, p. xxii)

It appears that macroeconomic models based on simultaneous equations were emerging in parallel to Keynes's work. Backhouse (2006, p. 35) has commented:

> However, it is arguable that these aspects of his theory [true uncertainty] were taken up by only a few economists. Many economists ignored these aspects of the book, focusing on the mathematical relationships (the consumption, investment and demand-for-money functions) that could be used to construct formal models.

These models were given great impetus by the League of Nations: Haberler's (1937) *Prosperity and Depression* set out theoretical arguments and Tinbergen (1939) developed what are now known as econometric techniques. Prior to publication, matters were overseen by a group of prominent economists from across the world,[31] though Keynes and his closest Cambridge colleagues were conspicuous by their absence.

Keynes was deeply skeptical about Tinbergen's work. The two authors' exchange of views was published in the *Economic Journal* (Keynes, 1939, 1940c, *CW* XIV, pp. 306–18, 318–20; Tinbergen, 1940).[32] Keynes set out a number of detailed complaints, but his fundamental concern was the *inductive assumption*. Econometric modeling techniques assumed that the future was a function of the

[30]Demand was a function of the MPC, the long-term rate of interest (which according to the theory of liquidity preference could be set by the authorities), and entrepreneurs' expectations of the yield on investment (reflected by the marginal efficiency of capital).

[31]According to League of Nations records, the following economists were present at a meeting in June/July 1934 to discuss emerging conclusions: D. Robertson, G. Haberler, O. Anderson, J. M. Clark, L. Dupriez, A. Hansen, O. Morgenstern, B. Ohlin, C. Rist, L. Robbins, W. Ropke and J. Tinbergen.

[32]A letter from Keynes to Richard Kahn is more matter of fact: "I do not know if it is obvious that I think it all hocus—worse than Haberler [*Prosperity and Depression*]. But everyone else is greatly impressed, it seems, by such a mess of unintelligible figurings" (*CW* XIV, p. 289).

past, and hence negated any role for uncertainty and the unpredictability of expectations. He concluded his re-rejoinder to Tinbergen as follows: ". . . that this brand of statistical alchemy is ripe to become a branch of science, I am not yet convinced. But Newton, Boyle and Locke all played with alchemy. So let him continue" (Keynes, 1940c). This skepticism has not gone unrecognized:

> Clearly, Keynes would have shown the same scepticism towards Tinbergen's successors, the Cowles Commission's econometric programme . . . , and the "Keynesian" efforts to use macroeconometric models to "fine-tune" the economy. (Hoover, 2006, p. 92)

That is not to doubt the validity of econometric model building as an explanation for the almost incomprehensibly rapid international flourishing of National Accounting from 1941 onwards. The econometric story is, however, misleading as an explanation for the development of U.K. National Accounts. While it may be complementary to the present story for the U.K., it has served to overwhelm that story and the associated achievements of *all* involved. It lends itself to the key developments coming only in the 1930s, so Kuznets, and sometimes Clark, can be celebrated, but it has events prior to these as not so significant.

In fact, the key contributions to the literature on the *early* history of National Accounts tend to dwell on developments prior to the 20th century, and make only brief mention of the work of Bowley, Flux and Stamp. For example, Studenski has laborious detail on the former and devotes only four paragraphs to English developments from 1900 to 1917 (Studenski, 1958, pp. 142–3). Marshall is accorded two parts of one sentence (though it is conceded that he "greatly clarified the concept" of National Income (*ibid.*, p. 118)); Flux merits no mention at all (beyond being the source for one table); Colin Clark is mentioned in the history only by name, and no importance is attributed to the instigation of the Census of Production. Studenski's account of the "extraordinary flourishing" from 1918 to 1939 instead gives most prominence to U.S. developments, in particular at the Brookings Institute and the NBER. Kendrick (1970) affords Bowley (whose work is described as "eclecticism") and Stamp only one paragraph (pp. 299–300); Flux is again not mentioned. Stone did likewise in his Nobel Prize material. Vanoli (2005) offers only a paragraph, though, in fairness, his emphasis is more firmly on the history of the accounting framework rather than the measurement of national income (see below), and his call for a history of British efforts has been cited at the start of this paper. The various entries in the *New Palgrave Dictionary of Economics*, both the overviews of the development of National Accounts and biographies of specific individuals, take a similar approach. The entry for Bowley (by Stone) barely mentions his national accounts work, likewise the entry for Flux. Clark is generally better treated, and in his entry (though not in Kuznets's) is described as the "co-author, with Simon Kuznets, of the statistical revolution" (Arndt, 1987, p. 428). None pays any attention to the role of a census of production, nor the distinct evolutions of income, production and expenditure estimates.

Finally, the econometric dimension perhaps provided the specific impetus for the more extensive national income *accounting* approach. The view that an economy could be modeled would come to demand the complete articulation of all monetary transactions between all the actors in the economic process that is

reflected in the national accounts framework. Vanoli's (2005, pp. 16–18) tracing of the origins of the accounting perspective has certain overlaps with the development of econometrics. In particular he emphasizes the role of Irving Fisher and Ragnar Frisch: from 1931 to 1934, Fisher was the first President of the Econometric Society; from 1933 to 1954, Frisch was the first Editor of *Econometrica* (the journal of the Econometric Society).[33]

The very rapidly achieved consensus over the necessity of econometric modeling may have been a critical factor in the *official* endorsement of National Income Accounting in the U.K. So that Keynes, in Role One, was pushing on a door that had been well oiled, perhaps by Meade, freshly returned from the League of Nations—where he had worked alongside Tinbergen, Koopmans and Haberler. Indeed, as far as I am aware, no history of the National Accounts has ever drawn attention to the 1939 United Nations mandate, referred to in a later report as follows:

> At its eighth session, held in April 1939, the Committee of Statistical Experts decided, in accordance with its general mandate under the International Convention relating to Economic Statistics, to include in its programme the statistical measurement of national income (United Nations, 1947, p. 5).[34]

10. Conclusion

In 1963 Roy Harrod paid tribute to the achievements of British National Accountants:

> The British still appear to hold the first place in the compilation of national income statistics; but it has now become common form in all countries that attempts should be made, even when the basic data are very imperfect, to furnish such statistics. Their provision has proved to be of the utmost value to economic researchers. (Harrod, 1963, p. 140)

With Bowley, Flux and Stamp, Britain led academic and practical developments of National Accounting throughout the first quarter of the 20th century. The breadth and depth of Colin Clark's work in the 1930s—funded from his own resources, it should be added—marked him out as the most resourceful and innovative National Accountant of them all. Keynes's long-standing interest and involvement came to great fruition with his return to HM Treasury in 1940. By 1941, British National Accountants had surmounted many conceptual and technical challenges, so that the three measures had been articulated, equality was reinforced through a presentation in account form, rudimentary sector accounts had been produced, real and nominal techniques developments and both annual and quarterly measures made available. Meade and Stone were poised to take these achievements to the rest of the world.

[33]On their role in the history of econometrics, see Morgan (1990, pp. 83–100).

[34]A footnote continues: "Cf. Document C.133.M.85.1939.II.A.(C.E.S.145), Geneva, 27 April 1939)."

Appendix: Estimates of the National Income

Year	Total Income £ million	Authority
1688	43	Davenant and Gregory King
1740	64	Decker
1783	200	Giffen
1800	230	Mulhall
1812	431	Colquhoun
1835–40	515	Giffen
1851	646	Levi
1852	440	W. Farr
1860	700	Bowley (1910)[1]
1864	814	Levi
1867	961	Levi
1867	814	Baxter
1870	950	Bowley (1910)[1]
1875	1,200	Giffen
1880	1,150	Bowley (1910)[1]
1881	1,168	Levi
1883	1,270	Giffen
1883	1,274	Levi
1883	1,289	Mallet
1888	1,300	Mallock
1889	1,285	Mulhall
1890	1,350	Bowley (1910)[1]
1891	1,600	Bowley
1900	1,650	Bowley (1910)[1]
1903	1,750	Giffen
1904	1,710	Money
1907	1,800	Bowley
1907	1,945	Bowley
1907	1,844	Money
1907	1,964	Mallock
1907	2,038	Whittaker
1907	2,025	Flux[1]
1908	1,800	Bowley (1910)[1]
1908	1,920	Fabian Society
1911	1,900	Bowley (1919)
1911	1,988	Stamp and Bowley (1927)
1911	2,038	Clark (1932)
1913	2,050	Bowley (1919)
1913	2,165	Bowley (1920)
1914	2,100	Money
1924	3,803	Stamp and Bowley (1927)
1924	3,975	Flux (1929)
1924	3,878	Clark (1932)
1928	4,152	Clark (1932)

Notes:

[1]Not reported by Stamp.

[2]Where necessary, financial year figures are allocated to the first calendar year; when ranges given in original source, the mid-points have been used.

Source: 1644–1908 and 1914: mainly Stamp (1916, p. 426); others: the author.

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