

3 Preparing the Historical Analysis 1907 to 1970

Some of the difficulties of compiling a time series, linking the first United Kingdom census for 1907 with the census for 1970, the first to be held within the new system of industrial statistics, were obvious from the outset. Over the years the scope and range of censuses varied from the fully detailed quinquennial censuses to the sample censuses of the nineteen-fifties and the "business unit" type censuses of the nineteen-sixties, apart from the pre-war Import Duty Inquiries. Certain activities were included in the census for some years but excluded in other years and the definition of the scope of trades, or industries as they were later termed, changed significantly. The exemption limit, below which firms were not required to submit detailed returns, changed successively from nil in 1907 to six persons employed in 1912, later to eleven, and later still to twenty-five persons employed. The geographical area covered differed from the censuses of 1907 and 1912 when the whole of Ireland was included in the United Kingdom. It would not be possible to reclassify individual returns prior to 1963. Changes in procedures also contributed to the lack of comparability between censuses.

The project began with a feasibility study of industries within three Orders of the 1968 SIC for the main census years from 1907. It was found that a considerable amount of information of reasonable comparability could be shown for most years and it was decided to continue with the project.

The first task was to study the relationship of each industry within each census to its 1968 counterpart. The introduction to each industry report usually gave details of any changes that had taken place between one census and its predecessors. These changes, linked backward from the 1968 SIC as far as possible, provided a framework of the development since 1907 of an industry as defined in 1968.

The scope of about twenty industries, for example, Cocoa, chocolate and sugar confectionery, Brewing and matling, Rope twine and net, and Leather industries, remained virtually unchanged over the years. More usually the definition of an industry changed, and the difference compared with 1968 tended to be greater the earlier the census was held. Some industries increased in importance over the years, in some cases starting as specialist sub-divisions within industries in earlier censuses and later appearing as separately distinguished industries for which a full range of industrial statistical data was published, such as Soft drinks, Printing ink, Aluminium and aluminium alloys, and Refrigeration machinery industries. Conversely, some industries important in the earlier censuses declined in importance and were relegated to sub-industry status such as Wallpaper, Matches, and Pens, pencils and artist's materials industries. Many activities, once regarded as being within the scope of the census of production, were subsequently transferred to the distribution or service sectors, and there are also instances of the reverse happening.

Most manufacturing industries in the 1968 SIC are defined to cover establishments making similar product lines — the principal products of the industry — and one of the main difficulties in the Analysis was to gauge the

effect on the results of a census industry for a given year of the changes in principal product coverage compared with 1968. Most of these transfers of principal products vary from one industry to another within the same Order of the 1968 SIC, but transfers to different Orders however were not infrequent. It was assumed that all establishments classified to an industry or to a sub-division of an industry were equally affected by the movement of principal products.

Extraction of data

Working sheets were drawn up listing the following headings; they cover the most important information common to a large number of the censuses

- Number of enterprises
- Number of establishments
- Numbers employed
 - Operatives
 - Administrative, technical and clerical employees
 - Total (including working proprietors)

Wages and salaries

- Operatives (total, and amount per head)
- Administrative, technical and clerical employees (total, and amount per head)
- Total (also as a percentage of net output)

Total sales and work done*

- Gross output
- Total purchases
- Payments to other organisations
 - For work done on materials given out
 - For transport

Stocks and work in progress*

- Total at end of year
- Total change during the year (+ or -)
- Total of materials, stores and fuel at end of year (and also as a percentage of purchases during the year)
- Total of goods on hand for sale and work in progress at end of year (and also as a percentage of sales and work done during the year)
- Change during the year of materials, stores and fuel (+ or -)
- Change during the year of goods on hand for sale and work in progress (+ or -)

Net output (total and per person employed)

- Capital expenditure*
 - Total (acquisitions less disposals)
 - New building work
 - Land and existing buildings
 - Acquisitions
 - Disposals
 - Plant and machinery
 - Acquisitions
 - Disposals
 - Vehicles
 - Acquisitions
 - Disposals

*The working sheets also provided for showing total sales and work done, stocks and work in progress and capital expenditure headings in the "business unit" censuses for some years.

Considerable changes took place in the definition of the headings listed, which are described in the footnotes to tables.

Estimation and calculation

The estimation of figures involved a considerable amount of work. Where for example a specialist group in an industry in an earlier census was transferred to a different industry to achieve comparability with the 1968 SIC, calculations had to be made for both the exporting and importing industries and a balance struck to total the revised industries and the Orders to which they were classified. In some instances it was impossible to estimate figures for a particular year and they were suppressed, although they are frequently included in Order totals. The estimates were based on total employment.

The apportionment, admittedly somewhat crude, applied equally to total sales and work done, wages and salaries, stocks, etc. A similar procedure was adopted if part of an industry was made out of scope of the census and where other adjustments to figures had to be made. Estimates included an allowance for small establishments and for unsatisfactory returns classified to the original industry.

Preparation of tables

The contents of the working sheets described so far provided material for six tables, an analysis of basic industry data (Table 1); percentage distribution within manufacturing industry (Table 2); Import Duty Inquiries (Table 3); capital expenditure, stocks and work in progress (Tables 4 and 5 — separate tables for establishment and for "business unit" based data); and employment, wages and salaries (Table 6). Attention then turned to providing further analysis, covering employment size of establishments by industry, a country analysis of employment and net output by industry, a sales analysis by industry, and enterprise analysis by employment size and by size of net output.

Employment size analysis (Table 7)

An employment size analysis has been compiled from published results for each industry, insofar as information was available, for all years in which full censuses were held, commencing with the 1930 census. The analysis for that year relates to the size of returns received but the censuses of 1935, 1948, 1951, 1954, 1958, 1963, 1968 and 1970 were analysed according to establishment size, including combined returns covering more than one establishment. A census was not taken in Northern Ireland in 1948 but estimates based on the results from the 1949 census were used to provide United Kingdom figures for that year.

The size ranges used in the industry reports were too narrow for this analysis. A broad size structure was decided upon as follows: 1 to 24; 25 to 99; 100 to 499; 500 to 999; and 1,000 and over. The size analysis is confined to employment and net output. For 1958, however, net output was not available in a size distribution.

The size analysis in the industry reports frequently varied, because there were no entries for a particular size cell, or, disclosure considerations prevented their being shown in the standard presentation. In most industries size bands could however be added together to match the size structure above.

Where a specialised group was transferred from the industry of its original report to a different industry as defined in the 1968 SIC, estimates of the size breakdown of establishments were made. The totals had to be

reconciled with the basic industry analysis (Table 1) for which total employment and net output had already been established. An added complication was that figures for size analysis had to be taken from the current census report whereas the Table 1 figures had been taken from the latest published report. No size breakdown is given for those years where the match with the 1968 SIC for an industry was unsatisfactory.

The number of establishments allocated to the smallest size cell could not be counted for the earlier years nor could the number of unsatisfactory returns. For 1970, unsatisfactory returns have been included in the size cells appropriate to their employment size, but for the earlier years they have been included in the smallest size cell; the bulk of unsatisfactory returns are normally in this category.

Country analysis (Table 8)

A country analysis has been compiled from previously published data showing employment and net output detail for England, Wales, Scotland and Northern Ireland and the whole of the United Kingdom at industry and Order level, confined to the years in which a full census was taken (except 1912). Information for the sample census years (1952 and 1953 and 1955 to 1957) has not been included as the separate country results published for those years were in respect of selected industries only and difficulties over their alignment with the 1968 SIC prevented the provision of reasonable estimates.

In the report for 1907, figures for England and Wales were combined for the purpose of country analysis but for the years 1924, 1930 and 1935 it has been possible to derive separate information for the two countries from the publication of regional data for England. The figures shown for Northern Ireland for 1907 relate to the whole of Ireland, but for most industries this had little significant effect on the results. A census was not taken in Northern Ireland for 1948 but estimates have been made from the results of the census taken for 1949.

In censuses prior to 1970, if two or more addresses were included in a single return estimates for the different addresses for each heading on the census form were made pro rata to the number of operatives employed at each address. For 1970, however, if a census return covered addresses in two or more regions an estimate was made of net output only when more than 80 per cent of the employees of the establishment(s) were located in the one region. The estimate was made by assuming that net output at each address covered by the return was proportionate to employment at the address. The residual net output was proportionate to employment at the address. The residual net output of the establishment was shown as "Unallocated". For 1970, therefore, net output has not been shown separately for the countries but has all been included in the figures shown for England although separate employment figures have been shown.

In many instances separate country figures were not available because the original figures were suppressed to prevent the disclosure of information relating to individual firms. Generally the information of the country affected has been included in the English figures but occasionally the figures of the other countries have been combined to prevent disclosure.

The main problem in compiling the table has been one of classification. Figures have only been shown

where there has been a reasonable match of the industry and Order totals shown in Table 1. Information has been suppressed for many years, but in some instances country analysis has been provided for groups of industries.

Sales of selected products (Table 9)

An analysis has been prepared showing the value of sales of selected products and the amount charged for work done by larger establishments obtained from the published results of the censuses of production in which commodity detail was collected. The Inquiries of 1933, 1934 and 1937 collected under the Import Duties Act (1932) are also included.

The commodities, or groups of commodities, have been shown in industry sequence but they do not represent the total value of sales and work done of each industry. They have been selected for their importance in terms of value as recorded in the 1968 census, mainly upwards of £14 million. This figure has not been rigidly adhered to as selection also depended upon the structure of industries, the homogeneity of the products and their meaningfulness for purposes of comparison. Commodities were frequently published originally as single items.

The amounts included represent the total value of the commodities sold or produced irrespective of the industries in which they were produced, i.e. production is included of firms classified to industries other than the industry in which a commodity is listed as a principal product according to the 1968 SIC. Prior to 1948, actual sales of commodities were not recorded and the figures in the table represent the amounts produced for sale or for addition to stock, and the amounts received for work done.

For the years since 1948 the value of goods sold are recorded as the net selling value, defined as the amount charged to customers whether on an ex-works or delivered basis, excluding any trade discounts, agents' commissions, allowances for returnable cases, etc. Goods charged on a delivered basis to customers overseas are included at the job value. Customs and Excise duty is included where appropriate but not purchase tax.

The figures have been compiled from the latest published results: the 1968 industry reports used to obtain 1968 and 1963 figures, and, working backwards, the 1924 reports to get 1912 and 1907 figures matching the headings as far as possible. The description of the commodities, based on that shown in the 1968 reports, include for the earlier years the commodities so far as the sales or production are recorded separately. Over the years many of the commodities shown fit broadly the 1968 description but where necessary footnotes to the table explain the main differences.

A minor factor affecting the comparability of commodity figures was due to changes in the size of establishments from which returns were received: for the years 1954 to 1968 the figures relate to establishments employing 25 or more persons, between 1924 and 1951 returns were in respect of 11 or more persons employed, for 1912 returns showed 6 or more persons, while 1907 returns were in respect of the whole return irrespective of size. Changes in the coverage of industries in the censuses also give rise to incomparabilities in the figures of sales of products. For example, textile converting was

included in some earlier censuses but excluded from the later ones. Sales on their own account were not regarded as principal products of the textile converters, and such sales were added to the principal products of other industries, in the earlier but not in the later censuses. Conversely, firms engaged for example, mainly in the heat treatment of milk were brought into scope of the 1968 census of production, but for most previous censuses their output of other products could not be added to the sales of principal products appropriate to other industries. Thirdly, a census was not taken in Northern Ireland for 1948 and although the effect of their sales in most industries was of little or no account the effect on others was more marked, particularly within the textile industries; similar considerations affect the results for 1912 and 1907 when the whole of Ireland was included in the total production figures for the United Kingdom. Fourthly, the results of the import Duties Act Inquiries of 1933, 1934 and 1937 are in some degree deficient as the Inquiries did not cover the whole of industry, so that any products of industries not covered could not be added to the principal products of those that were included.

Enterprise analysis (Tables 10 and 11)

Two tables have been compiled, the first analysing all enterprises by size of their total employment, and the second, by size of net output of private sector enterprises employing 100 or more persons. The tables cover the years 1958, 1963, 1968 and 1970. Returns from all establishments belonging to an enterprise were added together and the total employment used to stratify to the size bands in table 10 and the net output to the size bands in table 11. The results show enterprise and establishment counts and estimates of total employment, net output, net output per head, capital expenditure (net), and the value of stocks and work in progress at the end of the census year. Enterprise structure continually changes but the figures shown represent the position as far as it was known for a particular year. The presentation of the analysis differs for 1970 when the construction industry was not collected in the census for that year. In the analysis covering all enterprises, the private sector for 1970 includes details of mining and quarrying (except coal mining) along with manufacturing industries and estimates for unsatisfactory returns are included in the appropriate size cells, whereas for earlier censuses they are shown separately.

Terms used in the Analysis

The notes that follow describe the statistical terms used in the census and explain the more important changes in definitions that affect comparisons from year to year. Full definitions of the items are given in the introductory notes to the census reports. A number of analyses have been prepared and included in census reports for certain years that have not been included in the Analysis, e.g. employment analysed by age and sex; operatives on shift work; intermediate products; payments for certain services.

Statistical Units

Establishment

The establishment was the standard unit used for all censuses except the simple censuses from 1959 which were conducted on a "business unit" basis. For censuses up to 1957, the establishment was defined as

comprising the whole of the premises under the same ownership or management at a particular address (e.g. factory or mine). For 1958 the definition of the establishment was extended to include ancillary activities (such as merchandising or factoring, canteens, packing), whether or not these activities were carried on at the same address as the works, unless they were conducted by a separate company or a separate department with a separate set of accounts. For 1968, following the revision of the Standard Industrial Classification (1968) the establishment was defined as the smallest unit which could provide the information normally required for an economic census, for example, employment, expenses, turnover and capital formation.

The number of establishments of larger firms was shown in the census reports for 1930, 1935, 1948, 1949, 1950, 1951, 1954, 1958, 1963, 1968 and 1970 and for establishments of all sizes for 1951 and 1954 and in the combined report on the censuses for 1955, 1956 and 1957 and for 1958, 1963, 1968 and 1970. In the Analysis, the total number of establishments has only been shown for the latter years as reasonable estimates could not be provided by reclassification of firms, particularly the smaller firms, for earlier years.

Enterprise

An enterprise analysis was made of the census results for 1958, 1963, 1968 and 1970. An enterprise comprises one or more establishments within the scope of the census of production under the same ownership or control. Information about the constituent companies of enterprises has been obtained mainly from published sources such as the Stock Exchange Year Book supplemented by information from company reports. Prior to the 1963 census an inquiry was held into enterprise structure and the information obtained from firms helped to update the existing information held on the Census Office register. The enterprise can vary in size according to the level of analysis undertaken, e.g. at industry level, Standard Industrial Classification Order level, all manufacturing industry level.

Business unit

This is the unit used in the simple censuses from 1959 onwards, as opposed to the previous censuses where the establishment was the basic unit. The returns covered the whole of the business, a company or a group of companies, and could include ancillary activities normally outside the scope of the census, for example, wholesale and retail selling organisations, transport companies, etc. Where a firm was engaged in a number of quite different manufacturing activities, returns were required for each main activity.

Employment

Statistics of employment have been published for all census years between 1907 and 1970 with the exception of the "business unit" censuses of 1959 to 1962, 1964 to 1967 and 1969. Three separate categories are distinguished: working proprietors; operatives; administrative, technical and clerical staff. Until the 1948 census, working proprietors were included with administrative, technical and clerical staff. Outworkers (i.e. persons employed by establishments who worked in their own homes, etc. on materials supplied by the establishments) are excluded. Since 1958, the figures include persons employed in canteens, merchandising or

factoring, and transport organisations, etc. where particulars in respect of these activities could not be excluded from the return.

Definition of the different classes of workers has varied a little in the different censuses but usually working proprietors included all persons regarded as 'self employed' for National Insurance purposes and members of their families who worked in the business without receiving a fixed wage or salary; but such persons who worked less than half the normal number of working hours were excluded. Directors working in the business but not in receipt of a definite wage, salary or commission were included under this heading, but directors paid by fee only were not included.

Administrative, technical and clerical employees included managing and other directors in receipt of a definite wage, salary or commission; managers, superintendents and works foremen; research, experimental, development, technical and design employees; draughtsmen and tracers; editorial staff, staff reporters, canvassers, competition and advertising staff; travellers; and office (including works office) employees.

Operatives included all other classes of employees, that is, broadly speaking, all manual wage earners. They included those employed in and about the factory or works; operatives employed in power houses, transport work (including roundsmen); stores, warehouses, shops and canteens; inspectors, viewers and similar workers; maintenance workers; and cleaners. Operatives engaged in outside work of erecting, fitting, etc. were also included, but outworkers were excluded.

Output

Sales

Statistics of the total value of output prior to 1948 or sales subsequent to 1948 were published for every census year with the exception of the years 1964, 1965, 1966, 1967 and 1969.

The method of valuation has changed. From 1907 to 1935 the statistics related in principle to the actual production of each item specified, i.e. sales of goods made during the year by the firm plus the book value of stocks at the end of the year less that at the beginning of the year. The statistics for 1946 onwards for most industries related to sales made during the year. Payments to other firms for carriage outwards were excluded pre-war, but included (post-war) in the value of sales charged on a delivered basis.

From 1958 onwards, goods sold without being subjected to any manufacturing process (i.e. merchanted or factored) and canteen takings were included where particulars in respect of these activities could not be excluded from the return. From 1963 onwards, services rendered to other organisations (Amounts charged for hiring out plant, machinery or other goods, for providing transport or for technical or other services rendered) have also been included in the value of total sales and work done.

Where separate returns were made for different departments of the same firm, and goods produced in one department were used in another, the value of the goods is included in the sales of the first (producing department) and in the materials of the second (using department), on the common basis of the charge that would have been made to an independent purchaser. Goods transferred to a separate selling organisation

under the same control were valued on the same basis and estimation of a similar kind was sometimes entailed in valuing transfers between different firms belonging to the same enterprise. To the extent that transfers of these kinds were included, the figures for sales do not represent the value of goods coming on to the market.

Gross output

Statistics of gross output, that is, production for sales or stock plus work done are published for all census years from 1907 to 1970 in this volume except for the "business unit" censuses 1959 to 1962, 1964 to 1967 and 1969. Although gross output was not published in the original 1958 report, the calculation for that year was included with the figures in the 1963 report.

Net output

Statistics of net output are published for all census years from 1907 to 1970 shown in this volume (except for the years 1959 to 1962, 1964 to 1967 and 1969). Net output is a measure of the work done by each industry; it constitutes the fund from which wages, salaries, rents, rates and taxes, advertising, other selling expenses and all other similar charges as well as depreciation and profits, have to be met. Net output is additive over all industries within the industrial sector without any appreciable duplication, but it is not net relative to the economy as a whole since it contains payments for services rendered by firms, e.g. payments made for repairs, hire of plant, advertising, research work, etc. Net output is not therefore identical with the contribution of the industry to the gross domestic product, sometimes described as 'value added'. The net output of an industry is derived by subtracting from the value of gross output the aggregate of the cost of materials and fuel used, the amount paid for work given out and other payments recorded in the censuses. These have varied. From 1958, net output includes the gross margin on any merchantable goods sold and on canteen takings, and from 1963 the amounts charged for services rendered to other organisations. Normally any Customs and Excise duty on materials purchased was included in the cost of materials. Finished goods sold were valued as they were sold, duty paid or duty free. The amounts of duty, subsidies, allowances and levies receivable or payable on goods withdrawn from bond, produced or sold, where of substantial importance, were required to be stated separately, and the net amount of duty paid was deducted, and the net amount of subsidy received added, in arriving at net output.

Net output per person employed

The statistics of net output per person employed are published for the same census year in which net output is shown. The figures were obtained by dividing the net output by the average number of persons employed, including operatives, administrative, technical and clerical employees and working proprietors, but excluding outworkers. From 1958, but not for earlier censuses, persons engaged in merchanting or factoring or in the operation of canteens were included in the figures for the total average number employed.

Analysis of Costs

Wages and salaries

Statistics of wages and salaries obtained in the census are given from 1948 to 1970 inclusive with the exception of the "business unit" censuses 1959 to 1962, 1964 to 1967 and 1969. Separate figures are given for amounts paid during the year to operatives and to administrative, technical and clerical employees. A separate table includes for 1924, 1930 and 1935 details of the total wages bill, based on voluntary inquiries conducted by the Ministry of Labour but excludes particulars of salaries which were not obtained prior to 1948.

Materials and fuel

Statistics of the total cost of materials and fuel purchased or used are given for all census years from 1907 to 1970 shown in this Analysis (except for the "business unit" census years). Purchases of goods for merchanting or factoring, and canteen supplies are included from 1958 onwards.

Work given out

Statistics of the amount paid to other firms (including other establishments within the same enterprise) for work done on materials given out to them were included for all census years (except the "business unit" census years). Payments for work done by individual outworkers or payments for business and other services are excluded.

Transport payments

Statistics of transport payments were included for the census years 1948 to 1970 (except for the "business unit" censuses). The payments for 1948, 1949, and 1950 relate to outwards transport only; those for other years cover both outwards transport on finished goods sold and inwards transport on materials and fuel purchased. They include payments to other establishments, and to any separate transport organisation of the same establishment, but exclude the value of transport services provided by employees of the business covered by the return.

The items included are payments for hired cartage and for inwards and outwards carriage by all forms of inland transport, i.e. railways, road haulage, canals, coastwise shipping, air, etc. Payments made for sea and air freight on goods sold to customers overseas and on materials and fuel purchased from overseas suppliers are excluded. For 1970, the cost of parcel post, etc. is included but not for earlier years.

Investment

Stocks and work in progress

The values of stocks held at the beginning and end of the year (or the change during the year, plus or minus) were reported in the censuses from 1946 onwards, and from 1958 onwards, the figures include any stocks of goods held for merchanting or for canteens, although these are not separately distinguished. The values include duty in the case of dutiable goods held out of bond. Values given are for stocks of goods on hand for sale, for stocks of materials and fuel and the value of the work in progress.

Capital expenditure

Estimates of capital expenditure on fixed assets were published for every year from 1948 onwards. The capital expenditure figures generally include progress payments on capital goods in course of construction.

The items shown in census reports were:

- (a) Capital expenditure on new building and other new constructional work of a capital nature.
- (b) Acquisitions and disposals of new and second-hand plant and machinery.
- (c) Acquisitions and disposals of new and second-hand vehicles.

Details of acquisitions and disposals of land and existing buildings were collected for 1948, 1963, 1968 and 1970. (This information was also collected in the "business unit" censuses 1959 to 1962, 1964 to 1967 and 1969 but was not reported at industry group level and only total acquisitions and total disposals of land and existing buildings relating to all firms in the United Kingdom were shown.) For the proceeds of items disposed of during the year, the figures from 1948 to 1957 include the estimated proceeds of insurance claims for plant, etc. destroyed or damaged. Architects' and surveyors' fees and legal charges, stamp duties, agents' commissions, etc. were excluded from 1948 to 1957 but were included from 1958 in the cost of new building work and in land and existing buildings acquired. Similar

information is included in the figures for 1951 to 1957, and again in 1970, in some instances resulting from supplementary inquiries. The figures for all years exclude government financed expenditure.

Sampling

Sampling methods were employed in the simple censuses taken in Great Britain beginning in 1952 and to a more limited extent in the full censuses of 1958, 1963 and 1968. Estimation for incomplete data has been used in compiling provisional results from the returns first received, in estimating final figures to take account of small firms not required to make detailed returns and in respect of unsatisfactory returns.

Symbols Used

The following symbols are used throughout the Analysis:

- ... not available
- nil or negligible (less than half the final digit shown)

Rounding of figures

The figures in the tables have been rounded to the nearest final digit. There may, therefore, be discrepancies between the sums of the constituent items and the totals shown.