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Sources and Methods for the Estimates of Wage Supplements

The NBER estimates of wage supplements per hour at work are derived from the series published by the National Income Division, Office of Business Economics, U.S. Department of Commerce, on supplements to wages and salaries in manufacturing.¹

In obtaining the estimates of this paper, the basic problem was to allocate the Commerce series between supplements to wages and supplements to salaries. This task was made easier because the National Income Division kindly furnished some unpublished data on supplements to wages and salaries in manufacturing by type; these separated employer contributions to social insurance from other labor income.

The first step taken was to reduce the total of supplements to wages and salaries in manufacturing in each year by a rough estimate of an unimportant item that would not be received by wage earners. This is the detailed item "other" under the general heading "other labor income" in the table "Supplements to Wages and Salaries by Type" in the 1954 edition of *National Income*. For manufacturing the largest component of this item is directors' fees. For the years 1929-43 and 1946-53, it was assumed that the ratio of "other" to "other labor income" was the same in manufacturing as in all industries. For the years 1943-46, special adjustments were made; for 1954-57, this deduction was made by extrapolation.

The balance of supplements to wages and salaries in manufacturing was allocated between wage earners and salaried workers in two parts. Employer contributions to social insurance were assumed to be the same

¹ For the sources and methods used in deriving this series, see *National Income*, 1954 edition (a supplement to the *Survey of Current Business*), pp. 73-75.

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annual dollar amount per employee for wage earners and for salaried workers. This implies that contributions to social insurance are a smaller percentage of payrolls for salaried than for wage workers, a result of the fact that there is a "ceiling" on the amount of annual earnings per employee on which contributions must be paid.

The allocation of the remaining part of "other labor income" was a bit more complicated. For each year it was allocated by a pair of percentages, one of wage-earner payrolls and the other of aggregate salaries, such that the second percentage was 1.24 times the first. Annual aggregate wages and aggregate salaries in manufacturing were estimated from the National Income Accounts, the Censuses of Manufactures, and the BLS payroll index.

These rules of thumb for the allocation of supplements were developed from the data in BLS Bulletin 1186, *Problems in Measurement of Expenditures on Selected Items of Supplementary Employee Remuneration*. This bulletin gives the results of a pilot study of manufacturing firms for 1953, undertaken with financial assistance from the National Bureau of Economic Research. The study used a stratified probability sample of approximately 1,100 establishments and received 550 usable returns.

Bulletin 1186 has been used to make rough estimates of aggregate 1953 wage supplements in manufacturing in the two categories "contributions to social insurance" and "other." These aggregates are the product of three factors: (1) employer contributions for items in each category as a percentage of payroll for employers with such expenditures, (2) the percentage of reporting employers with expenditures for such items, and (3) total manufacturing payrolls. The aggregates were subtracted from the corresponding Commerce Department aggregates for supplements to wages and salaries to get supplements to salaries in each category. The relations between these estimates of supplements to wages and to salaries in 1953 yielded the rules of thumb mentioned earlier. The rules developed from the 1953 data were followed for all years.

The method just described is crude for at least three reasons. First, the BLS data are subject to both sampling error and response bias; since there was no field follow-up of nonrespondents, the latter could be considerable. Second, the BLS data report employer premiums to insured workmen's compensation plans, whereas the Commerce Department totals being allocated include the compensation for injuries received by workers and their survivors; the two can differ in any year by administrative costs and changes in reserves. Third, the extension of the 1953 estimates to other years could involve large errors. However, the method seemed to be the best available; the alternative was to ignore wage

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supplements entirely. This would surely have given a much less accurate picture of total compensation.

In using the results of Bulletin 1186 it has been assumed that firms which did not report an expenditure on an item of wage supplements had no expenditure on this item, rather than that they had one which they failed to report. This is an assumption the BLS itself was unwilling to make; the bulletin cautions frequently that the results apply only to the firms responding. To the extent that this assumption is in error, wage supplements have been understated by allocating to wage earners too small a part of the total of supplements to wages and salaries.

Since the method used in estimating "other labor income" of wage earners expressed it as a percentage of wages, this percentage could be applied to average earnings per hour at work to get other labor income in cents per hour of work. The method of estimating employer contributions to social insurance yielded an amount in dollars per wage earner per year. This was divided by hours of work per wage earner per year, which was a by-product of the estimates of average hourly earnings.

The estimates of wage supplements per hour of work for 1954-57 given in this paper differ from those in *Wages, Prices, Profits, and Productivity*. The present estimates are based on more recent Department of Commerce data on supplements to wages and salaries.

Another important source of data on wage supplements is the biennial surveys of fringe benefits conducted by the Chamber of Commerce of the United States. I have not relied on these for two reasons. First, they cover, in addition to wage earners or production workers, any salaried employees or non-production workers who are paid on an hourly basis. Second, the sample seriously overrepresents large firms, as will be shown below.

However, beginning in 1949 the Chamber of Commerce data provide a useful independent check on the NBER estimates. (The 1947 data do not provide enough detail for our purposes.) The two sets of figures are compared in Table 9. The level of the Chamber of Commerce figures is slightly higher throughout; this probably reflects both differences in the types of workers covered and the large-firm bias in the Chamber of Commerce data. The trend of the two series is quite similar.

The figures shown from the Chamber of Commerce data include only a portion of what the Chamber regards as fringe benefits—the portion comparable with the NBER estimates of wage supplements. Much of the rest is already included in our average earnings per hour at work, which include payments for vacations, holidays, and sick leave not worked. Payments for paid rest periods, lunch periods, and other minor items of time not worked are not included anywhere in the NBER estimates of

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TABLE 9

Wage Supplements as a Percentage of Payroll, Manufacturing, 1949-57

	NBER	Chamber of Commerce ^a
1949	5.3	6.0
1951	7.1	7.6
1953	7.0	7.8
1955	7.8	8.6
1957	8.9	9.5

SOURCES: Table 1 and Chamber of Commerce of the U.S., *Fringe Benefits*, 1949-57.

^a Covers non-production workers paid on an hourly basis. The items included here are employer contributions to pensions and insurance plans and legally required payments.

total compensation, but are included in the Chamber's total fringe benefits.

At several points above, it has been stated that the Chamber of Commerce figures are biased upward by the overrepresentation of large firms. Large firms are overrepresented in part because the smallest firms are excluded from the sample to which the Chamber sends questionnaires. For 1953 and earlier years, firms with fewer than 500 employees were excluded; beginning in 1955, firms with fewer than 100 employees were excluded. There is also evidence that within the included size classes the rate of response was higher for the larger firms. Table 10 compares the size distribution of firms responding to the Chamber of Commerce questionnaire with an estimated distribution of all manufacturing firms.

The overrepresentation of large firms is important because the Chamber of Commerce sample is not stratified by size (that is, the respondents in the smaller size classes are not given heavier weight to allow for the fact that they are underrepresented) and there is evidence that the larger firms pay more in wage supplements. In *Fringe Benefits, 1957* it is reported that firms with 100-499 employees have fringe benefits of 19.5 per cent of payrolls, as compared with 20.3 per cent for all size classes and 23.2 per cent for firms with 5000 employees and over.² (These figures are based on the Chamber's broad definition of fringe benefits.) In BLS Bulletin 1186, it is shown that large establishments have higher private fringe benefits than small establishments, and somewhat lower legally required payments, but with the former outweighing the latter.³ The in-

² Chamber of Commerce of the U.S., p. 35.

³ Table 17, pp. 53-54 and Table 18, pp. 55-56.

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TABLE 10

Percentage Distributions of Manufacturing Firms by Number of Employees

Number of Employees	Percentage Distributions		
	Chamber of Commerce Survey 1957	Census of Business, 1954 (Estimated) ^a	
		All Firms	Firms with 100 or more Employees
Under 100	none	88.8	—
100-499	37.5	8.6	76.6
500-999	23.9	1.4	12.2
1000 and over	38.6	1.2	11.2

SOURCE: First column computed from data furnished in correspondence by the Chamber of Commerce. Remaining columns computed from U.S. Bureau of the Census, *Company Statistics, 1954*, Censuses of Business, Manufactures, and Mineral Industries, Bulletin CS-1, 1958; and U.S. Bureau of the Census, *Size of Establishments, 1954*, Census of Manufactures, Bulletin MC-203, 1955.

^a Distributions of firms by number of employees are available only for multi-unit firms. The estimates shown here are made by assuming that the single-unit firms are distributed by number of employees in the same way as all manufacturing establishments. This assumption is obviously incorrect, since in 1954 the average number of employees per establishment for single-unit firms was 24 and the average number of manufacturing employees per manufacturing establishment for multi-unit firms engaged primarily in manufacturing was 299. The assumption made here therefore overstates the proportion of firms in the larger size classes. (The preceding estimate of the number of employees per establishment for multi-unit firms was made by subtracting data for single-unit firms from *Company Statistics* from those for all manufacturing establishments.)

crease in cost of supplements with size of establishment is greater for time paid for but not worked, covered in Section 1 of this paper, than for wage supplements as defined in this section. The information by size of establishment is relevant to the Chamber of Commerce sample because we know that larger firms tend to have larger establishments (see note *a* to Table 10).

The discussion of the Chamber of Commerce sample above is not intended as criticism of the very valuable work of the Chamber on fringe benefits; it is only intended to justify a mild preference for the first of the two sets of estimates shown in Table 9. The Department of Commerce data for private supplements to wages and salaries also have serious shortcomings, and these data are of course the basis for the estimates made in this paper.

Sources and Methods for the Estimates of Wage Supplements

In many areas of statistics, good estimates have been made only after a subject has become so important that users of statistics have been forced to make poor estimates rather than do with none. It is to be hoped that the publication of these inadequate estimates of wage supplements will stimulate the provision of the resources needed to make good ones as a regular operation of government statistical agencies.

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