

A century of wage statistics: the BLS contribution

Knowledge of the structure of and trends in wages is vital to appraisal of the economic status of the working population; over its first century of life, the Bureau has developed a consistent body of information on wages, and progressively more sophisticated techniques to analyze it

H. M. DOUTY

Wage and salary rates of pay remain at the heart of the labor bargain, although a new dimension has been created in recent decades by the rise of various forms of supplements to employee compensation. Information on the general movement of wage rates, and on the structure of rates by such characteristics as occupation, industry, region, union status, and sex, provides crucial insight on the status and well-being of the working population. In a complex industrial society, the development with limited resources of useful statistics in these areas, and more recently in the area of supplementary compensation, has been a formidable undertaking.

This article traces the work of the Bureau of Labor Statistics over the past century in the field of wage statistics, including the attention that has been given since World War II to the growth of wage supplements. An effort has been made to place this work in broad historical perspective. This account does not cover related Bureau programs, including the extensive work on consumer prices¹ and the important series of average hourly and weekly earnings by industry developed from employment statistics.²

H. M. Douty is a former Assistant Commissioner for Wages and Industrial Relations, Bureau of Labor Statistics.

19th century beginnings

The years 1875 to 1900 were in many ways a period of extraordinary economic growth and change in the United States. It was marked by the closing of the geographic frontier. An impressive expansion of the transportation network³ facilitated the settlement of the West, and contributed to a large increase in farm output. At the same time, manufacturing expanded at a rapid pace, accompanied in many industries by larger scale operations, consolidations of firms, and the growth of monopoly practices.

The last quarter of the century also saw substantial changes in the size and industrial composition of the labor force. Between 1880 and 1900, the number of "gainful workers" increased by almost 12 million. In 1880, the gainfully employed work force was about equally divided between agricultural and nonagricultural employments, but by 1900 the agricultural share, while still rising in absolute terms, had declined to approximately 37 percent of the total. The proportion of employment in manufacturing, transportation, and construction had increased significantly over the same period.⁴

These changes were accompanied by economic fluctuations of considerable magnitude, including an unusually severe depression beginning in 1893. As a result, there arose new currents of thought with respect to wage determination,

trade unionism, and the role of government in relation to labor,⁵ and various comprehensive movements for social reform emerged.⁶ In particular, the impulse toward collective action to defend or improve labor standards began to acquire momentum among the growing wage-earning population. Of major although short-lived significance was the meteoric rise of the Knights of Labor, the membership of which reached about 700,000 in 1886 but declined precipitously thereafter. Of much greater long-run importance was the formation of the American Federation of Labor (AFL) in 1881 as a permanent trade union center. The Federation survived the long depression of the 1890's, and union membership began to climb sharply toward the end of the decade—rising from 447,000 in 1897 to 868,500 in 1900, mainly in unions affiliated with the AFL.⁷ (These figures include Canadian members of labor unions with headquarters in the United States.)

It was during this period that the Bureau of Labor Statistics was created, with a broad mandate to “. . . collect information upon the subject of labor, its relation to capital, the hours of labor, and the earnings of laboring men and women. . . .” The creation of the new agency in 1884 reflected a growing demand for information on labor conditions to provide a basis for improved labor standards. With respect to earnings or wages, there were few guides for the work of the new Bureau. Some experience with wage surveys had been accumulated by a few State agencies, notably in Massachusetts.⁸ At the Federal level, the only important previous effort to develop statistics of wages by occupation was a special study conducted for the decennial census of 1880. This report, which was not published until 1886, gave annual average wage rates by occupation for “typical” establishments in 53 industries back, where possible, to 1860 or even earlier. The data, which were collected by mailed questionnaires, were published in great detail.⁹

The new Federal Bureau was extraordinarily fortunate in its first commissioner, Carroll D. Wright, who had headed the Massachusetts Bureau of Statistics of Labor since 1873.¹⁰ Wright would prove an authentic pioneer in the development of labor statistics both here and abroad.¹¹ With respect to the collection and presentation of wage survey data, a number of general principles reflected his experience in Massachusetts and at the Federal Bureau. These related basically to the compilation and presentation of data designed to throw light on the structure of wages, although, as we shall see, the new Bureau's studies also would provide the basis for most of our knowledge of the trend of wages well into the present century.

With regard to the collection of wage data by occupation, Wright felt strongly that the use of trained field agents rather than mailed questionnaires was required to ensure the adequacy and quality of response. In the absence of modern sampling procedures and establishment universe information, he favored the coverage of “typical” or “representative” establishments, which in practice meant those that

had been in business for some time. Concerning the presentation of wage statistics, Wright was insistent upon the use of well-defined occupational classifications. In view of the observed dispersion of wage rates within occupations, he tended to favor presenting survey results in the form of wage distributions, where feasible, rather than by occupational averages alone. “Of late years,” he wrote in 1892, “the demand has been that employees should be classified not only minutely as to occupations, but as to rates of pay as well.”¹²

Appropriately, in view of the times, the first annual report of the Commissioner dealt with industrial depressions. It included the results of the first occupational wage survey conducted by the Bureau. The data related to 1885 and were taken directly by Bureau agents from the payroll records of 582 establishments in about 40 industries overwhelmingly in the manufacturing sector. The results were published in the form of daily average wage rates by occupation, industry, and State; estimates were presented separately for men, women, and children and youths.¹³

The Commissioner's fifth annual report (1889) on railroad labor developed occupational wage statistics in great detail for 60 carriers. The Bureau's field agents found more than a thousand job titles in the payroll records of these railroads. Many of these involved similar duties. The most detailed wage statistics were shown in table 11 of the report, where distributions of daily rates or earnings by occupation were presented, together with distributions of annual earnings.¹⁴ The claim was made that “. . . the chief value of this report, so far as time and wages are concerned, is to be found in a thoroughly scientific classification, not only of the time employed of each individual employee of the roads considered, but of rates by day and by year,” as shown by the payrolls.¹⁵

These studies, together with two other extensive wage surveys conducted during the early 1890's,¹⁶ provided the Bureau with invaluable experience in occupational classification, data collection, and the presentation of survey results. They prepared the way for a highly fruitful survey stemming from a Senate resolution of March 3, 1891, which instructed the Committee on Finance to study the effects of tariff legislation on wages and prices. In accordance with the resolution, Senator Nelson W. Aldrich asked Wright to undertake the task of developing wage and price statistics for the years 1840–91.

The problem of locating establishments with payroll records for all or most of this long period obviously was difficult. The study ultimately provided data for more than 500 occupational series in 22 industries, mainly in manufacturing. Comparatively few of the establishments had usable payroll records prior to 1860. The publication of the data for two payroll periods in each year by industry, establishment, and occupation, took up almost 1,300 pages of the Senate Committee's report.¹⁷ The Committee observed that “. . . no other investigation has been made with so wide a

scope, such a variety of detail, and covering so extensive a period."¹⁸

The significance of this study for the Bureau's work in the field of wage statistics was twofold. It gave experience in the collection of data over an extended period in the past, and it provided the basis for measurement of changes in the level of wages through the construction of wage indexes. The latter represented an innovation of signal importance for which credit must go to Professor Roland P. Falkner of the University of Pennsylvania, who was employed by the Senate Committee to analyze the survey data. Using 1860 as the base year, Falkner prepared indexes for each occupation by establishment, for each of the 22 industries included in the survey, and for the 22 industries combined.¹⁹

Despite its many limitations, the Bureau's work for the Aldrich Committee is the major source of information on the structure and course of wages in this country from 1860 to 1890, and yields some insight for the years back to 1840. The study's wage trend estimates have been analyzed and reworked a number of times, most recently by E. H. Phelps Brown and Sheila V. Hopkins and by Clarence D. Long.²⁰

The next major wage study undertaken by the Bureau undoubtedly was influenced by experience gained in surveys for the Aldrich Report, and foreshadowed the nature of work to be done into the 20th century. This study provided average daily wage rates by year for each of 25 selected occupations in 12 major cities for the period 1870-98.²¹ The occupations selected were those "susceptible of accurate definition," and the data were taken directly from the payroll records of at least two establishments in each city for the occupations covered. The report's text tables showed average daily wages by year for all occupations combined, and the percentage change since 1870 for each year from 1871 to 1898. The latter estimates were deemed to be "quite indicative" of the movement of wages generally. Similar data were shown for three cities in Great Britain and for one city each in France and Belgium. The foreign data were compiled by the authorities in the countries concerned at the request of the Bureau.

In short, during the last 15 years of the 19th century, the Bureau accumulated considerable experience in the planning and conduct of surveys of wages and standard hours of work. The merits of data collection from payroll records by personal visit were established. Much insight was gained into the difficult problem of job classification at a time when formal job descriptions were uncommon and titles for the same job could vary widely among establishments. Problems in the presentation of occupational wage data related to the observed dispersion of rates of pay were recognized. Finally, the introduction of index numbers in the Aldrich Report provided a convenient means for measuring the movement of wages over time. The development of sophisticated survey sampling techniques was, of course, far in the future.

1900 to the Great Depression

The Bureau's work in wage statistics during the first three decades of the 20th century achieved a coherence that distinguishes it from its 19th century origins. This cohesion was attained despite the great economic and social changes that occurred during the period, including U.S. participation in World War I. Between 1900 and 1930, gross national product in constant dollars rose at an average annual rate of 3.1 percent.²² The sharpest downturn in economic activity was the comparatively short postwar recession beginning toward the end of 1920. The civilian labor force grew by about 20 million, with nonfarm workers accounting for approximately 77 percent of total employment by 1930. The automobile began to provide greater mobility for both people and industry. The growth in trade union membership that had begun in 1897 continued with only minor pauses to 1920, when membership reached 5 million. A sharp decline occurred during the postwar recession, but membership stabilized at about 3.6 million by 1924.²³ Finally, a substantial body of protective social legislation was enacted at the State level during this 30-year period, largely with reference to work performed by women and children.

During the winter of 1900-01, the Bureau began a major study of occupational wages by industry, with the data carried back to 1890. The study was undertaken with the view that ". . . the constant demand for current data could be met only by a very painstaking and complete investigation which would result in thoroughly representative figures for a period of years and which would serve as the basis for the regular annual collection and presentation of data concerning wages. . . ."²⁴ Due to staff limitations, the study required several years for completion. Data for 1902 and 1903 were included in the final results of the investigation, which appeared in 1905 as the Commissioner's *Nineteenth Annual Report*, a volume of almost a thousand pages.

The study was confined to "the leading manufacturing and mechanical industries" and to the "distinctive occupations which are considered representative of each industry," and covered payroll periods most nearly representing "normal conditions" of operations for each establishment during each year.²⁵ In all, 67 industries, 519 occupations, and 3,475 establishments were surveyed. Industry coverage was largely confined to manufacturing and the building trades.

Each year from 1890 to 1903, the Commissioner's *Annual Report* presented average rates of pay by occupation, industry, and region, and for selected occupations, by city and State. Complete wage distributions also were given for the occupations included in the city and State tabulations. An outstanding achievement was the presentation in a text table of an overall index of hourly rates, computed from averages of industry relatives weighted by aggregate wages paid by each industry as shown by the census of 1900.²⁶ As Paul H. Douglas pointed out in his great study of real wages in the United States from 1890 to 1926, the Bureau's

index computations were for some years the preferred statistical basis for generalizing on the trend of wages.²⁷ (Actually, the correspondence between the Bureau's wage-weighted index and Douglas' own wage rate index for manufacturing, which was prepared from the same data but differently constructed, is strikingly close. For example, both indexes show wages in 1903 to be 16 percent higher than the average for 1890–99.²⁸)

The general format of the 1890–1903 study was followed in annual surveys during the next 4 years. The results of these studies were reported in the Bureau's bimonthly bulletin.²⁹ The surveys again were confined largely to manufacturing, but their scope was limited to industries in which wages paid amounted to \$10 million or more as shown by the 1900 census. The 1904 survey, for example, covered 350 selected occupations, 3,732 establishments, and 42 industries. The 1904 wage index for all industries was linked to the general index for 1890–1903 on the basis of changes in those establishments studied in both 1903 and 1904, and this chaining procedure was followed for subsequent years to 1907.

After 1907, there was a 4-year interruption in the Bureau's wage survey program. This was due primarily to the pressure of other work, notably a large investigation into the conditions of women and child wage earners and a study of wages, hours, and working conditions in the iron and steel industry, both of which were published as Senate documents. The program was resumed in 1912 with two series of surveys. The first consisted of studies based on payroll records of rates of pay (or of earned rates for incentive workers) in selected occupations in 12 industries: cotton, wool, and silk textiles; lumber, millwork, and furniture; boots and shoes; hosiery and knit goods; cigars; clothing; iron and steel; and building and repairing of steam railroad cars. Except in the case of cigars and clothing, data were carried back to 1907. Within the next few years, five of these industries (silk, millwork, furniture, cigars, and car building) were dropped while slaughtering and meatpacking was added. The industries that remained in the program were surveyed approximately every 2 years until 1933.

The 1912 survey of cotton-goods manufacturing and finishing illustrates the essential nature of this group of studies.³⁰ Bureau agents obtained data for the "principal occupations" directly from mill payroll records. An innovation was the publication of job descriptions in the survey report. The coverage of establishments was considerably broader than in earlier studies of cotton-goods manufacturing, and the data, as previously noted, were carried back to 1907. Distributions of workers by hourly rates of pay at 1-cent intervals were shown by occupation for the industry as a whole and by State. The Bureau's continued interest in the trend of wages was manifest by the linkage of annual wage changes during 1907–12 to the existing 1890–1907 index for cotton textiles.

The second group of studies begun in 1912 were concerned with union wage scales and standard hours of work in the building industry, newspaper printing, book and job printing, marble and stone work, metal trades, baking, and millwork. In all, 49 crafts were surveyed in 39 cities. The initial report states that the data were ". . . in every case furnished by officials of the local unions to special agents of the Bureau of Labor Statistics, and wage scales, written agreements, and trade union records were used wherever possible."³¹

As with the payroll studies, the union wage data were extended back to 1907. Wage scales were shown by trade and city for each year from 1907 to 1912, and indexes of the movement of scales back to 1890 were computed for many of the crafts in the industries covered. These studies, with some changes in industry coverage, were to continue on an annual basis for almost 80 years.

These payroll and union wage studies had the great virtue of providing a large measure of consistency in the Bureau's occupational wage survey program over a period of roughly two decades. They also provided a measure of continuity with the major survey that had produced the 1890–1903 report on occupational wages and with the annual surveys of 1904–07. They developed data on the structure of wages by skill and sex for manual jobs in a variety of relatively low-wage and high-wage industries. Data provided by locality and State yielded a measure of insight into interarea wage differences.

As previously mentioned, these surveys were the source for the manufacturing and building components of the seminal Douglas study of money and real wages from 1890 to 1926. Shortly after World War I, the Bureau itself ventured to put together an annual general index of wages in response to inquiries that ". . . have generally related to recent years but . . . frequently ask for an index that shall compare Civil War changes with those during and following the late World War."³² The index was prepared (with some hesitation) from "all sources available," and was published initially for the period from 1840 to 1920. It was later extended in several stages to 1934.³³

Two additional observations should be made concerning the Bureau's work in wage statistics during this period. The first is that World War I had minimal impact on the generation of wage data. Although several Government agencies were established to deal with wartime labor problems, there was no effort, as there would be during World War II, to impose comprehensive wage controls. Wage adjustment efforts for particular industries (such as shipbuilding) tended to focus on those made necessary by rising living costs, which led to the establishment of the Bureau's Consumer Price Index. Toward the end of the war, the War Industries Board asked the Bureau to undertake wage surveys in a number of industries for use in the solution of labor problems and to provide a record of industrial con-

ditions at the height of the war effort. These surveys, with occupational wage data for 28 industries, were not completed until after the war, and the results were published in 1920.³⁴

The second observation is that, while generally continuing the group of payroll studies begun in 1912, the Bureau extended its wage survey activity to additional industries during the 1920's. A number of these were manufacturing industries essentially new to the 20th century, including motor vehicles, rubber tires, synthetic textiles, and airplane and aircraft engines. Several nonmanufacturing industries also were added to the program, most notably bituminous coal mining and air transport.

This major phase of the Bureau's work in wage statistics came to an end about 1932. Although the surveys of the period were confined to manual jobs and largely to selected industries in the manufacturing sector, they provided a reasonably consistent body of data on both the structure and trend of wages for industrial workers. They undoubtedly also played a role in private wage determination through collective bargaining and employer personnel administration. In their absence, we should know much less than we do about economic conditions during the first three decades of this century.

Depression and war, 1930–45

The Great Depression began toward the end of 1929. Unemployment, which was estimated at 3.3 percent of the civilian labor force during the years 1923–29, rose to an estimated 25 percent in 1933. Recovery was only partial during the remainder of the decade; even in 1940, the unemployment rate was estimated at 14.6 percent. However, the steady expansion of war production and of the Armed Forces after mid-1940 brought the rate to 1.2 percent by 1944.³⁵

The singular decade of the 1930's witnessed the beginning of an unprecedented and continuing involvement of the Federal Government with the economy. Aside from social insurance programs, this development expressed itself with respect directly to labor in two major forms. The first was machinery through the Davis–Bacon Act of 1931 and the Walsh–Healey Act of 1936 for the establishment of wage standards for workers employed by contractors or subcontractors on public construction or in the provision of materials and supplies to the Federal government, and, by the Fair Labor Standards Act of 1938, for minimum wages for most workers engaged in or producing goods for interstate commerce. The second, embodied in the National Labor Relations Act, protected the right of workers to join unions and imposed upon employers the duty to bargain collectively over wages and other terms of employment. Partially as a result of this latter act, U.S. union membership, which had declined to 2.7 million by 1933, reached 14.3 million by 1945,³⁶ and collective bargaining was extended to many strategic sectors of the economy. During the same year that

the act was passed, however, a deep split occurred in the trade union movement, a breach that was not to be closed for 20 years.

By the time the United States became involved in World War II as a combatant on December 7, 1941, the economic impact of the conflict had already begun to be felt and measures to deal with its consequences had emerged. One group of measures designed to contain the inflationary consequences of resource diversion to war production was comprehensive control of changes in wage rates and prices.³⁷ This had a decisive effect on the Bureau's wartime wage statistics program, and postwar consequences as well.

The early 1930's had seen the end of the relatively small but systematic program of payroll-based industry wage surveys that had been conducted during the previous two decades. The annual survey of "common labor entrance rates" was discontinued in the early 1940's in large part because of the increasing ambiguity of the concept of "unskilled" or "common" labor.³⁸ Dropped also, in 1934, was the occasional publication of the broad annual wage index that had first been published in 1920, having been pieced together from such data as were available.³⁹ Its discontinuance appears to have been related to the institution in 1932 of the Bureau's average employment and payroll reporting system.

Between 1932 and the beginning of the defense buildup in 1940, the Bureau's wage survey activity was largely, although not entirely, geared to the informational needs of the new Federal agencies concerned with labor standards. Thus, a number of studies were undertaken for use in the administration of the short-lived National Industrial Recovery Act of 1933 which provided by industry for "codes of fair competition" containing minimum wage and maximum hour provisions. At the direct order of the President, an especially noteworthy study was made in the cotton textile industry covering pay periods in 1933 and 1934, following a general strike in that industry in 1934. Several surveys were undertaken in cooperation with the Works Progress Administration. Work was done also in connection with prevailing minimum wage determinations under the Walsh–Healey (Public Contracts) Act of 1936, which covered work performed by Federal government contractors.⁴⁰

The pace of survey activity accelerated after the passage of the Fair Labor Standards Act (1938), which initially provided for Federal minimum wage determination (above a statutory level) on an industry basis. During 1938 and 1939, about 45 industry wage surveys were conducted for use in minimum wage proceedings. Most of these studies developed data on the distribution of workers by pay rates or straight-time hourly earnings, without occupational detail. They typically related to relatively low-wage consumer-goods industries. In a few cases, they provided the basis for appraisal of the wage and employment effects of minimum wage orders before these effects were masked by the upsurge of economic activity associated with the war.

Concern with minimum wage determinations faded as the defense program got underway in mid-1940. With expansion of the defense effort, unemployment declined, shortages of skilled workers began to appear, and the incidence of strikes rose sharply during the first half of 1941. In March of that year, a tripartite National Defense Mediation Board was appointed to assist in the settlement of labor disputes; this agency was superseded in January 1942 by the National War Labor Board, which was given the additional function of stabilizing rates of pay as part of a comprehensive economic stabilization effort.

As a consequence of these developments, the Bureau's wage survey activity shifted initially from consumer-goods industries to heavy industries essential to war production. Occupational wage studies were undertaken in such industries as shipbuilding, aircraft, rubber, nonelectrical machinery, and the mining, smelting, and refining of nonferrous metals. Beginning in 1941, special studies were also requested for use in the settlement of specific labor disputes in industries vital to the war effort.

With the beginning of comprehensive wage stabilization under the War Labor Board, the governmental need for wage statistics increased manifold. This led to a substantial expansion of Bureau staff and the establishment of regional offices to parallel those set up by the Board. For the most part, two types of wage information were provided for Board use. The first involved data on wage rates or straight-time earnings by occupation, industry, and labor market for Board decisions in thousands of claims for increases on interplant wage inequity grounds,⁴¹ together with some studies in connection with specific labor disputes. The second was a general wage rate index to measure the effectiveness of the wage stabilization program.

The surveys for use in Board decisions in inequity cases involved special procedures to expedite data collection and presentation. These included the development of patterns of "key" jobs by industry, the preparation of uniform job descriptions, and the standardized presentation of survey results. Altogether, job patterns, each typically including from 10 to 20 occupations, were prepared for more than 120 manufacturing and nonmanufacturing industries. It was reported in 1945 that, under this crash program, data on pay rates in key occupations had been collected from more than 100,000 establishments, and that some 8,000 reports on an industry-locality basis had been transmitted to the Board.⁴² This was an extraordinary achievement over a period of little more than 2 years, and represented a vital contribution to the wartime wage stabilization program.

The second Bureau contribution to the wage stabilization effort was the construction of an occupationally based index of urban wage rates. Because the War Labor Board sought to stabilize basic rates of pay rather than earnings, such an index was needed to provide some measure of its effectiveness. A properly constructed index can eliminate many of the factors that affect earnings rather than rates, including premium pay for overtime and late-shift work, interindustry

employment shifts, and changes in occupational skill ratios.

The urban wage index was based on data for key occupations in about 6,000 establishments, and covered selected manufacturing and nonmanufacturing industries in some 69 labor markets. It was issued semiannually beginning in April 1943, but was estimated back to January 1941 for the manufacturing sector.⁴³ Discontinued largely for budgetary reasons in 1947, this index would have been a valuable tool for the analysis of postwar wage movements. Its final publication gave estimates of wage-rate change for manufacturing between January 1941 and September 1947, and for selected nonmanufacturing industries between April 1943 and April 1947.⁴⁴

Postwar program adjustment, 1945-47

For more than 3 years, almost all of the Bureau's expanded resources for wage survey purposes had been devoted to data needs for wage stabilization and labor dispute settlement. By the beginning of 1945, the pressure of these needs had eased substantially. The war was coming to an end, and problems of industry reconversion to peacetime production were being discussed. It was now necessary to devise an interim program to meet anticipated requirements for wage statistics during the immediate postwar period.

The most significant Bureau decision with regard to the wage program was to conduct a large number of nationwide occupational wage surveys on an industry basis, with regional and locality breakdowns whenever possible. Between 1945 and mid-1947, such studies were made in no fewer than 70 manufacturing and 11 nonmanufacturing industries. Each presented data on rates of pay for selected occupations and rate distributions for all plant workers on a national and regional basis, and virtually all contained occupational data for specific localities. Information typically was shown on occupational earnings by size of establishment, size of community, method of wage payment, and unionization, and for such plant practices as scheduled hours of work, shift differentials, paid vacations and sick leave, and insurance and pension plans. Most of the studies also contained data on salaries for a few office occupations.

This large group of nationwide studies were issued in a special series of wage structure reports in mimeographed form. Unfortunately, few were published in the Bureau's series of numbered bulletins, but many summary articles based on the surveys appeared in the *Monthly Labor Review*.⁴⁵

During this period, the Bureau continued its annual surveys of union wage scales in building, printing, and several other industries. Of great importance in subsequent survey planning were studies of clerical salaries on a cross-industry basis in a few local labor markets. A variety of special studies relating to such issues as guaranteed wage plans in the United States, the economic status of registered nurses, and the experience of workers in various industrial reconversion situations also were conducted.

Particular notice should be given to the rise of a broad analytical capability within the Bureau during this period. This, no doubt, was a function of staff size stimulated by the exceptional volume of statistical information generated during 1945–47. Several notable studies were produced, including an analysis of changes in wage differentials by skill for manual workers between 1907 and 1947 in manufacturing and the building trades.⁴⁶ This pioneer study pointed up striking changes that had occurred in supply-demand conditions in the labor market over the four decades. A companion study, confined to manufacturing, dealt with the course of regional wage differentials during the same period.⁴⁷ Other studies relating to the immediate postwar period dealt with such topics as shift differentials in manufacturing, vacation practices in major industry groups, and the prevalence of insurance and pension plans.

Reshaping wage programs, 1947–70

In mid-1947, the Bureau experienced a sharp reduction in its budget—in effect a postwar readjustment—although its resources remained substantially above the prewar level. With respect to wage statistics, this budget reduction, together with other factors, led to a major reexamination of programs.

A basic question was whether continued concentration on nationwide industry surveys represented the best use of the available resources. Experience during the war had indicated the great importance of data at the level of the local labor market, where most wage decisions occur. It was clear, moreover, that the white-collar segment of the labor force had shown impressive growth and would continue to expand. In pay determination for most types of white-collar workers, the importance of the local labor market was, if anything, greater than for manual workers. Most white-collar jobs are found in a great variety of industries, suggesting the need for some type of cross-industry survey for this type of employment.

Other influences also were at work. The rapid spread of trade unionism in the 1930's and during the war, and the "rounds" of wage increases during the years immediately following the war, produced great interest in the dynamics of wage adjustment. Another influence was the spread of supplementary benefits, public and private, representing income to workers and cost to employers. Aside from the existence of a broad demand for data for use in private wage decisions and for public policy purposes, great academic research interest also had developed.⁴⁸

A general factor that contributed importantly to program development during this period was the emergence during the late 1940's of efficient modes of probability sampling in government statistical surveys.⁴⁹ With relation to the Bureau's studies of occupational wages, pathbreaking work was done in adapting probability sampling to universes of establishments.⁵⁰ The use of probability sampling, rather

than purposive sampling, permitted a more efficient use of survey resources, the more reliable calculation of population values, and the estimation of sampling errors.

The essential problem in 1947 was to devise, with limited resources, a program that would throw as much light as possible on the structure of occupational wages and salaries, on supplementary forms of compensation, and on the dynamics of wage development. Considerable thought and experimentation suggested that two occupational wage survey systems were needed, together with several other types of recurring reports.⁵¹ The principal ingredients of the revised program are summarized below.

Cross-industry labor market surveys. In 1948, pilot studies on the collection of salary data for office clerical occupations on a cross-industry basis were undertaken in a few large labor markets.⁵² These were successful technically, and the response from users of wage data in the markets covered was encouraging. In 1949, experimental surveys were made in a number of smaller cities. The occupational coverage was broadened in these studies to include selected skilled and relatively unskilled manual jobs that were not unique to particular industries. The skilled manual occupations were drawn primarily from those involved in plant maintenance, and the unskilled from material movement, warehousing, and custodial work. Out of this experimental effort grew the concept of the community wage survey.⁵³

As it happened, this exploratory work was coming to a close at the outbreak of the Korean War in June 1950, which called forth another wage stabilization effort. The National Wage Stabilization Board, formed in September 1950 to administer wage controls, concluded that community wage studies were well suited for use in its work. It provided resources for the conduct of such studies in a large number of labor markets, with occupational coverage extended to jobs peculiar to major industries in each area surveyed. The results of these and other Bureau wage studies and reports were extensively used in Board decisions,⁵⁴ and provided the basis for a series of analyses of interarea differences in the level of wages, occupational differentials, fringe benefits, extent of unionization, and the formalization of wage structures.⁵⁵

Wage Stabilization Board budgetary support for the labor market survey program ended after the Korean emergency. The Bureau's own resources could provide for only about 20 community surveys annually, with coverage limited to cross-industry occupations. It was decided as a matter of policy to conduct these surveys in the same metropolitan areas each year. This decision was based largely on the fact that the use of survey data in wage determinations by employers and unions depends on its currency. Extensive support developed for the surveys in the communities in which they were made. Numerous requests for community surveys in other areas had to be firmly rejected.

In light of the widespread interest in the cross-industry type of survey, a rational basis was sought for a more elaborate program. The result was a proposal for annual surveys in a sample of metropolitan areas (approximately 80 of the 183 then existing), selected to represent all such areas. The sample was designed to include all metropolitan areas with employment of 250,000 or more. This would permit estimates of the level and distribution of wages for a significant group of white-collar and manual jobs for all metropolitan areas—in effect, for the urban economy. It would provide a basis for national estimates, separately for office and plant workers, of scheduled hours of work, holiday and vacation provisions, the incidence of private insurance and pension plans, and collective bargaining coverage. Wage comparisons among areas and broad regions also could be made.

The budgetary requirements for this program were met toward the end of the 1950's when an urgent Federal need developed for national data on white-collar salaries in private industry to implement a comparability pay policy for the 1.7 million Federal white-collar and postal employees. An interagency technical committee concluded that the annual 80-area survey design was an appropriate survey vehicle, with additional data collected from a subsample of establishments for selected professional, managerial, and technical jobs.⁵⁶ The Congress approved funds for this program, and for expansion of other aspects of wage survey activity, for fiscal 1960 (then beginning July 1959). When Congress passed the Federal Salary Reform Act of 1962, this cross-industry survey system had been tested in 2 years of operation.⁵⁷

With some changes in the design and size of the sample, refinements in occupational definitions, the inclusion of a number of additional occupations, and modifications of data collection procedures, this survey system has continued on an annual basis for more than two decades.

Industry wage surveys. Occupational wage studies on an industry basis were not abandoned with the development of the community wage survey program. Such studies remained highly important for insight into the structure of wages and benefits for nonsupervisory workers in establishment groupings differentiated by product, technology, labor force composition, extent of unionization, and other factors. Partly for economy in the use of resources, there was a shift in emphasis during the late 1940's from the industrywide surveys of the 1945–47 period to surveys in major areas of industry concentration. The intent behind this industry-locality program was the annual study of wages and related benefits in some 25 manufacturing and non-manufacturing industries, together with less frequent industrywide studies in a few industries where wages were determined on a national basis. The long-term program of union scale studies in a few industries was continued.

During the 1950's, the Bureau also undertook under contract many surveys, largely of the wage distribution type, for use in appraisal of the effects of minimum wage actions

under the Fair Labor Standards Act, and as a basis for decisions on minimum wage policy. These studies continued into the 1960's as minimum wage coverage was extended to retail trade, service industries, and other areas of employment.

The industry wage studies program was enlarged and systematized as part of the planning process that produced the 80-area community wage survey proposal. Provision was made for recurring studies in approximately 50 manufacturing and 20 nonmanufacturing industries, either nationally or in areas of major concentration.⁵⁸ Most of these industries were scheduled for survey on a 5-year cycle, with others, predominately in textiles and apparel, on a 3-year cycle. The few studies based on union scales rather than employer payroll records would continue on an annual basis. Altogether, about 20 surveys would be planned for each year.

At the time of their selection, the 70 industries included in the program accounted for about three-fifths of manufacturing and a third of nonmanufacturing employment. The 3- or 5-year periodicity for most of these studies was not ideal, but industry wage structures (that is, relative rates of pay) tend to change slowly. These surveys developed data for selected jobs, such as plant maintenance, that cut across industry lines, and also for selected processing jobs peculiar to each industry. Data for the distribution of rates of pay or straight-time hourly earnings for all production or non-supervisory workers were collected, together with information on establishment practices, such as shift work, and supplementary benefits provisions.

Thus, by the end of the 1950's, two well-articulated occupational wage survey programs had been developed, one on a local labor market and the other on an industry basis. The latter program also provided for a considerable amount of information by labor market or region. Together, they shed much light on the level and structure of wages and salaries in the U.S. economy, and provided data for a variety of governmental uses, private wage and salary decisions, and research.

Supplementary remuneration surveys. Beginning in the second half of the 1930's, a variety of supplements to basic rates of pay began to assume significance in the U.S. wage structure. These supplements, some legally required and others established through collective bargaining or employer personnel policy, provided additional money income, paid leisure, or income security for workers, and represented a cost to employers.

It was clear by 1950 that benefits supplementary to basic wages would continue to account for an increasing share of worker compensation. In 1951, with close industry cooperation, a study was made of supplementary expenditures in basic steel. In 1953, a methodological study of problems in the measurement of employer expenditures on major benefits in manufacturing was undertaken.⁵⁹ This was followed in 1956 by a study of benefit expenditures in the electric

and gas utility industry, conducted as part of an industry wage survey, and by a 1958 survey of the composition of payroll hours for factory workers.

Finally, in 1959, a continuous program was launched. The initial study measured employer expenditures on benefits for production workers in manufacturing. Data were developed by major industry group, region, level of wages, size of establishment, collective bargaining coverage, metropolitan or nonmetropolitan location, and the composition of payroll hours.⁶⁰ This broad-based study was repeated in 1962, following benefit expenditure surveys in the mining and finance, insurance, and real estate industries. At the request of the Civil Service Commission, a special survey was made in 1963 of benefit expenditures for white-collar workers in metropolitan areas in a broad segment of U.S. industry. During the following 2 years, numerous studies were conducted in individual manufacturing and nonmanufacturing industries.

In 1966, an initial survey was made of compensation expenditures in the entire private nonfarm economy.⁶¹ Data were shown separately for manufacturing and nonmanufacturing, by establishment size, and, for nonoffice workers, by union status. This study, in essence, rounded out more than a decade of experimental work and studies in limited industrial sectors. Future surveys were to be conducted biennially for the entire private nonfarm economy, with studies in selected industries in the intervening years.⁶²

Current wage changes. During the years immediately following World War II, enormous interest developed in changes in wage rates and employee benefits in major collective bargaining situations. This reflected the growth of collective bargaining as a mechanism for wage determination, and the influence that major settlements might have on the wage bargain—union and nonunion—in other firms and industries.

To facilitate response to inquires, the Bureau began publication of a monthly report entitled *Current Wage Developments* in January 1948. This report, available on a subscription basis, sought to list general wage changes and changes in benefit provisions in all collective bargaining settlements covering 1,000 workers or more. Because the report was based largely on secondary sources, the names of the unions and employers concerned in the settlements were identified.

This monthly periodical has become a major source of information on current wage behavior. The year 1954 saw the inclusion for the first time of quarterly and annual statistical summaries of newly negotiated wage rate changes.⁶³ During the mid-1960's, procedures were devised for estimating the cost of supplementary benefits, and since 1966, data have been presented on the total change in compensation in bargaining settlements affecting 5,000 workers or more. In 1968, statistics were developed on wage adjustments *put into effect* from (1) settlements during the year;

(2) deferred changes under agreements negotiated in earlier years; and (3) provisions for adjustments geared to changes in the cost of living. The coverage of the report was extended in 1979 to State and local government collective bargaining settlements involving 5,000 workers or more.

Somewhat related to the monthly report on current wage developments was the inauguration, also in 1948, of a series of reports on changes in wages and supplementary benefits in a limited number of key collective bargaining situations. Through periodic supplements, these wage chronologies summarized the history of wage and benefit changes resulting from negotiations between unions and such major employers as United States Steel, General Motors, and Lockheed Aircraft. The bargains covered were important in themselves and were thought in many cases to have significant pattern-setting effects in wage determination. By the beginning of the 1970's, about 35 chronologies were being maintained.⁶⁴

Wage rate trends

Several of the survey systems devised after 1947 provided, as a byproduct, data on the trend of wages for important groups in the working population.

From the monthly reports on current wage developments, annual median and mean adjustments and wage indexes were developed for workers in the universe of major collective bargaining agreements, thus providing the basis for index computation. On the basis of the occupational surveys by labor market, annual indexes of wage change were constructed for office workers, skilled maintenance workers, unskilled plant workers, and industrial nurses in all metropolitan areas, nationwide and by region, over the period 1961–74.⁶⁵ These indexes were discontinued in 1974 (with the last report published in 1975) when the method of computing wage changes in the separate labor markets was revised and a more comprehensive wage rate index, described in the following section, was introduced. The annual report on salaries for selected professional, administrative, technical, and clerical jobs has provided the basis since 1961 for developing measures of salary trend for these occupational groups.

In the early 1950's, the Bureau also began to issue a series of reports on the trend of salaries for important groups of government employees. The initial report for white-collar Federal workers covered the period 1939–50; for city public school teachers, 1925–49; and for firemen and policemen, 1924–50. These reports were based on Congressional salary actions for classified employees in the Federal service; on reports on teacher salaries published by the National Education Association; and on several data sources for firemen and policemen.

The reappraisal of the Bureau's work in wage statistics that began in 1947 produced over two decades a multidimensional program that sought to meet, within the budget

constraints under which it operated, a wide variety of governmental and private needs for information. It provided significant insight into (1) the structure of wage and salary rates of pay for major groups of workers, manual and white-collar; (2) the rise of and expenditures for supplementary benefits as part of compensation for work; and (3) the dynamics and trend of wage developments.

The turbulent years, 1970-84

The 1970–84 period provided a turbulent backdrop for developments in wage statistics programs. Wide cyclical swings in the economy, coupled with Federal activities—wage and price controls and guidelines, minimum wage adjustments, and reevaluation of pay setting for Federal employees—affected Bureau wage programs. The number and scope of such programs grew substantially through 1978, but then contracted abruptly and leveled off in the face of Federal budget constraints.

Employment Cost Index. During the early 1970's, Federal wage and price controls highlighted a major shortcoming in the Nation's economic intelligence system. Information was lacking on changes in employers' compensation costs (or labor costs), free from influences unrelated to cost change, such as employment shifts among occupations and industries with different labor cost levels. Without such information, it was virtually impossible to gauge the effects of wage controls in the same way that price controls were assessed on the basis of the Bureau's Consumer Price Index. (A similar need had been addressed when the Bureau developed the short-lived, occupationally based "urban wage rate index" to measure the War Labor Board's effectiveness in stabilizing wage rates during World War II.)

During the 1971–74 controls period, policymakers trying to track wage rates or compensation costs were faced with a wide array of Bureau information, all useful for some purposes, including estimates of average hourly compensation and average hourly and weekly earnings, data on collectively bargained wage adjustments, and surveys of occupational pay levels. The various wage measures, unfortunately, gave mixed and incomplete signals about developments in wage and compensation costs.

It was in this climate that the Bureau began a long-range effort to develop the Employment Cost Index (ECI), initially called the "general wage index." The ECI was designed to be a timely and comprehensive measure of labor cost change, covering all types of workers and industries in the economy and all elements of compensation costs (wages, salaries, and employer costs for employee benefits).⁶⁶

A critical feature of the ECI design was the use of fixed employment weights by occupation and industry. This feature specifies measurement of labor cost changes in much the same way that the Bureau's Consumer Price Index measures changes in the prices of a fixed market basket of goods

and services. Like the CPI, the ECI also yields subindexes (by broad occupational group, industry, union or nonunion status, and so forth) to provide insights into forces underlying overall wage and compensation cost trends.

The ECI was developed in stages to meet its design objectives. Quarterly measures of wage and salary change for workers in the Nation's nonfarm economy were first published in 1976. The series was broadened to cover changes in total compensation costs (employee benefit costs in addition to wages and salaries) in 1980. The following year, the ECI was further expanded to cover State and local government workers. Over the 1976–84 period, the number of ECI subindexes increased from 21 to 85.

The ECI—designated as a "Principal Federal Economic Indicator" in October 1980—now provides measures of quarterly compensation cost changes for 78 million private-sector workers and 13 million State and local government employees. It currently excludes farm, household, and Federal workers, although coverage may be extended to these groups in the future.

FLSA surveys. Prior to 1970, the Bureau conducted a wide range of surveys designed to shed light on the impact (or potential impact) of changes in the minimum wage and maximum hours provisions of the Fair Labor Standards Act (FLSA). The surveys, which developed data on employee wages and weekly hours of work, were narrowly focused on industries and areas judged to be most heavily affected by changes in the Federal minimum wage, such as men's and boys' shirt manufacturing, southern sawmills, retail trade, and nonmetropolitan areas of the South and North Central regions.

The focus broadened in 1970 with the first Bureau study of distributions of hourly earnings and weekly hours of work for nonsupervisory employees in the private nonfarm economy. With this study—designed to estimate the number of workers whose wage rates would be raised in response to potential changes in the Federal minimum, and the consequent increases in establishment wage bills—began a period of accelerated Bureau survey activity related to FLSA and funded by the Labor Department's Employment Standards Administration (ESA). Subsequent years saw several increases in the Federal minimum wage—from \$1.60 to \$2 an hour in May 1974 (the first adjustment since 1968), followed by a series of six adjustments that brought the minimum to \$3.35 an hour on January 1, 1981.

During the mid-1970's, the Bureau conducted surveys of industries and occupations exempt from FLSA minimum wage and overtime coverage (including small newspapers; truck-drivers and helpers in local cartage; and executive, administrative, and professional employees). Survey results were used by ESA in judging whether an exemption should be continued, based on the effect it had on wages and hours of work for affected employees. In the case of executive, administrative, and professional employees, the survey was

used to assist ESA in setting minimum salaries as one test for FLSA exemption.

The 1977 FLSA Amendments created a Minimum Wage Study Commission to help "resolve the many controversial issues that have surrounded the Federal minimum wage and overtime requirements since their origin in the Fair Labor Standards Act of 1938."⁶⁷ The responsibility for research on FLSA amendments shifted to the Commission in 1978. The Commission's request for Bureau surveys, which continued to be funded by ESA, resulted in broad-based studies similar to the 1970 survey of nonsupervisory employees in private industry. Also at the request of the Commission, the Bureau developed a panel study of establishments with which to gauge the effects of changes in the minimum wage on employee benefits within individual firms.

The Bureau's work on FLSA surveys and the panel study ended in 1981, as did the life of the Commission.

Federal pay comparability. As shown earlier, the adoption by the Congress in 1962 of a comparability pay policy for Federal white-collar employees led to the conduct by the Bureau of an annual nationwide occupational survey of salaries in private industry for use in policy implementation. The 1962 Act was amended by the Federal Pay Comparability Act of 1970. Under the amended act, the Bureau's annual study of Professional, Administrative, Technical, and Clerical Pay (the PATC survey) continues to provide a statistical basis for policy considerations. Its results are used by the President's Pay Agent (the Secretary of Labor and the Directors of the Office of Management and Budget and the Office of Personnel Management) in making annual recommendations to the President on pay adjustments needed to make salaries of Federal white-collar employees comparable to those of their private-sector counterparts.

The Federal pay determination process, including the PATC survey, is large, complex, and highly controversial.⁶⁸ It now affects the pay of more than 3 million employees (including the military) and has substantial impact on the Federal budget; every 1-percent increase in Federal pay scales costs about \$1 billion. The magnitude of the costs involved and the controversy surrounding the determination process have triggered no fewer than six procedural reviews and evaluations.

Review of the process began with a General Accounting Office audit in 1972. Subsequent evaluations were conducted by the President's Panel on Federal Compensation (the Rockefeller Panel) in 1975, the Personnel Management Project (the Carter Administration's task group on Federal Government reorganization) in 1977, the Grace Commission in 1982-83, the General Accounting Office again in 1983, and the Reagan Administration's Cabinet Council on Management and Administration in 1984. The reviews generated a variety of recommendations for improving the pay determination process, including:

- Expansion of the PATC survey to cover smaller establishments and more private-sector industries;
- Amendment of the 1970 Act to include State and local government workers in comparability surveys;
- Determination of Federal white-collar pay comparability on an area, rather than a national, basis for certain types of occupations, such as technical and clerical jobs; and
- Consideration of employee benefits as well as pay in comparability determination.

The recommendations from the 1972-77 reviews have already had direct impact on the Bureau's PATC survey. To date, improvements to the study include the establishment of national training programs for Bureau field representatives, and expansion of coverage to the mining and construction industries and to smaller establishments in a number of manufacturing industries.

Pressure to consider employee benefits as well as pay in the comparability process grew as private-sector benefit costs approached 30 percent of total compensation costs in the late 1970's. In 1978, the Bureau began construction of a comprehensive data base on employee benefits in private industry.⁶⁹ Developed from a survey of detailed employee benefit plan characteristics, the data base has been used experimentally by the Office of Personnel Management in estimating the effect of implementing a Total Compensation Comparability concept in the determination of Federal employee remuneration.⁷⁰

The annual survey of employee benefits was first conducted in 1979, and has become one of the richest sources of employee benefit data ever developed. It is nationwide in scope and covers the same industries and establishment size groups as the PATC survey. Data are collected on employee participation rates and detailed plan provisions for such benefits as paid leave, short- and long-term disability benefits, health and life insurance, and retirement plans.

Shifting program priorities. Expansion and contraction of the Bureau's wage statistics programs during 1970-84 followed patterns of the past: Growth in periods during which the Federal Government had pressing need for more economic intelligence or for data to administer Federal law, and cutbacks when dictated by budget constraints. Difficult priority decisions on cutbacks in wage programs included elimination of the biennial survey of employer expenditures for employee compensation; wage chronologies for about 30 major collective bargaining situations; union wage surveys in construction, printing, local transit, local trucking, and grocery stores; municipal government wage surveys in the Nation's 27 largest cities (initiated during the early 1970's); and FLSA surveys. However, the period also brought development and growth of the quarterly ECI series, construction of a rich data base on employee benefits, and expansion of the PATC survey—all contributing to a better understand-

ing of wages and compensation of the Nation's working men and women.

In retrospect

There are many omissions in this review of 100 years of work by the Bureau in the compilation of wage statistics. But the main lines of development have been made clear, and it may not be inappropriate to recap briefly the significance of this effort.

Without the Bureau's surveys and studies, with all their limitations, we would know far less than we do about the money return for work during the past century in our highly complex and dynamic economy. The Bureau has provided a reasonably consistent body of information available from

no other source. This reflects an underlying consistency and continuity of program, despite adaptations necessitated by fluctuating budgetary levels, special governmental requirements for survey data, changes in the industrial composition of the working population, and the increasing complexity of the wage bargain.

In substantial measure, the wage statistics program has been shaped by Federal Government needs for information for administrative and policy purposes. But, in line with general Bureau policy, the results of surveys and studies consistently have been made available to the public. They have found extensive use over the years in wage determination through collective bargaining and employer personnel action, and in university and other private research. □

—FOOTNOTES—

ACKNOWLEDGMENT: The author thanks George L. Stelluto, currently Associate Commissioner for Wages and Industrial Relations, Bureau of Labor Statistics, for a careful review of the manuscript and for drafting the account of the Bureau's work in wage statistics between 1970 and 1984.

¹ See *The Consumer Price Index: Concepts and Content Over the Years*, Report 517 (Bureau of Labor Statistics, May 1978).

² For a description of the early development of the average hourly and weekly earnings by industry series, see *Hours and Earnings in the United States, 1932-40*, Bulletin 697 (Bureau of Labor Statistics, 1942), pp. 34-46.

³ Railroad mileage more than doubled between 1880 and 1900, reaching 198,694 miles in the latter year. See U.S. Bureau of the Census, *Statistical Abstract*, 1919, p. 797.

⁴ U.S. Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970*, Series D152-166 (Washington, U.S. Government Printing Office, 1975), p. 138.

⁵ See particularly Francis A. Walker, *The Wages Question* (New York, Henry Holt & Co., 1876).

⁶ Leo Wolman, *Ebb and Flow in Trade Unionism* (New York, National Bureau of Economic Research, 1936), table 5, p. 16.

⁷ Joseph Dorfman, *The Economic Mind in American Civilization* (New York, Viking Press, 1949), vol. 3, chap. vi.

⁸ Prior to 1884, about a dozen States had established labor bureaus, but few of these had made any significant effort to compile wage statistics.

⁹ Joseph D. Weeks, "Report on the Statistics of Wages in Manufacturing Industries," *Tenth Census, 1880*, vol. XX (Washington, U.S. Government Printing Office, 1886).

¹⁰ For a general account of Wright's work, see James Leiby, *Carroll D. Wright and Labor Reform: The Origin of Labor Statistics* (Cambridge, Mass., Harvard University Press, 1960). See also Wendell D. Macdonald, "Carroll D. Wright and His Influence on the BLS," *Monthly Labor Review*, January 1955, pp. 3-10.

¹¹ Lombardi goes so far as to say of Wright that "largely as a result of his personal contacts with European statisticians at the sessions of the International Statistical Congress, of which he was a member, and through the influence of his reports, which were widely circulated, every European and Australian state created labor bureaus before the opening of the twentieth century." John Lombardi, *Labor's Voice in the Cabinet* (New York, Columbia University Press, 1942), p. 48. See also E. H. Phelps Brown and M. H. Brown, "Carroll D. Wright and the Development of British Labour Statistics," *Economica*, August 1963, pp. 277-86.

¹² Carroll D. Wright, "The Evolution of Wage Statistics," *Quarterly Journal of Economics*, January 1892, pp. 158-59.

¹³ Commissioner of Labor, *First Annual Report, 1886, Industrial Depressions*, text table, pp. 143-74; appendix A, pp. 295-410.

¹⁴ Commissioner of Labor, *Fifth Annual Report, 1889, Railroad Labor*, table 11, pp. 514-791.

¹⁵ *Ibid.*, p. 75.

¹⁶ These studies were published as the Sixth and Seventh Annual Reports of the Commissioner of Labor, 1890 and 1891, and dealt with the cost of production in a number of industries, including iron and steel, coal, textiles, and glass.

¹⁷ For the 1840-91 wage series compiled by the Bureau for the Aldrich Committee, see *Wholesale Prices, Wages, and Transportation*, Report by Aldrich, 52d Cong., 2d sess., Report 1394, Mar. 3, 1893, parts 2, 3, and 4, table XII, pp. 293-1560. The Bureau also compiled wage rate data for 15 specified occupations in a large number of cities, and for important occupations in a few industries, for the 28-month period June 1889-September 1891. For these data, see *Retail Prices and Wages*, Report by Aldrich, 52d Cong., 1st sess., Report 986, July 19, 1892, part 3, table IV, pp. 1903-2009, and table V, pp. 2010-39.

¹⁸ Aldrich Report, Mar. 3, 1893, part 1, p. 11.

¹⁹ *Ibid.*, pp. 110-77.

²⁰ E. H. Phelps Brown and Sheila V. Hopkins, "The Course of Wages in Five Countries, 1860-1939," *Oxford University Papers*, June 1956, pp. 226-95; Clarence D. Long, *Wages and Earnings in the United States, 1860-1890* (Princeton, N.J., Princeton University Press, 1960).

²¹ *Wages in the United States and Europe, 1870-1898*, Bulletin 18 (Bureau of Labor Statistics, September 1898).

²² Bureau of the Census, *Long Term Economic Growth, 1860-1965* (Washington, U.S. Government Printing Office, 1966), appendix table A1, p. 166.

²³ Wolman, *Ebb and Flow*, table 5, p. 16.

²⁴ Commissioner of Labor, *Nineteenth Annual Report, 1904, Wages and Hours of Labor*.

²⁵ *Ibid.*, p. 9.

²⁶ *Ibid.*, p. 20.

²⁷ Paul H. Douglas, *Real Wages in the United States, 1890-1926* (Boston and New York, Houghton Mifflin Co., 1930), p. 75.

²⁸ For the Douglas index, see *ibid.*, table 24, p. 108. The Douglas series on real, but not money, wages in manufacturing for the period 1890-1914 has been effectively revised by Albert Rees, *Real Wages in Manufacturing, 1890-1914* (Princeton, N.J., Princeton University Press, 1961).

²⁹ See *Wages and Hours of Labor in Manufacturing Industries, 1890 to 1904*, Bulletin 59 (Bureau of Labor Statistics, July 1905); similar articles for 1905, 1906, and 1907 appeared in Bulletin 65, July 1906; Bulletin 71, July 1907; and Bulletin 77, July 1908.

³⁰ *Wages and Hours of Labor in the Cotton, Woolen, and Silk Industries, 1890-1912*, Bulletin 128 (Bureau of Labor Statistics, 1913).

³¹ *Union Scale of Wages and Hours of Labor, 1907 to 1912*, Bulletin 131 (Bureau of Labor Statistics, 1913).

³² "Index Numbers of Wages per Hour, 1840 to 1920," *Monthly Labor Review*, February 1921, pp. 73-74.

³³ "Index Numbers of Wages per Hour, 1840-1934," *Monthly Labor Review*, August 1935, pp. 429-30.

³⁴ *Industrial Survey in Selected Industries in the United States, 1919*, Bulletin 265 (Bureau of Labor Statistics, 1920).

³⁵ Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970*, series D-86 (Washington, U.S. Government Printing Office, 1975), p. 135. The data on the civilian labor force apply to persons 14 years of age and over.

³⁶ *Handbook of Labor Statistics, 1975-Reference Edition*, Bulletin 1865 (Bureau of Labor Statistics, 1975), table 158, p. 389.

³⁷ See H. M. Douty, "The Development of Wage-Price Policies," in *Problems and Policies of Dispute Settlement and Wages Stabilization During World War II*, Bulletin 1009 (Bureau of Labor Statistics, 1950), pp. 104-54.

³⁸ The final publication in this series appears to have been *Hourly Entrance Rates of Common Laborers in Large Cities, Spring and Summer of 1943*, Bulletin 775 (Bureau of Labor Statistics, 1944).

³⁹ No description of the precise composition of this index has thus far been located.

⁴⁰ The 1936 edition of the *Handbook of Labor Statistics*, Bulletin 616 (Bureau of Labor Statistics, 1936), pp. 873-1090, contains brief summaries of Bureau and other wage studies published between 1931 and 1935. Similar summaries will be found in the 1941 edition of the *Handbook*, Bulletin 694, vol. II, pp. 21-369, for the years 1936-40.

⁴¹ For Board policy on interplant inequities, see *The Termination Report of the National War Labor Board*, vol. I (Washington, U.S. Government Printing Office, 1947), pp. 226-39. See also Robert J. Myers and Harry Ober, "Statistics for Wage Stabilization," *Journal of the American Statistical Association*, December 1943, pp. 425-37; and *Activities of the Bureau of Labor Statistics in World War II* (Washington, U.S. Government Printing Office, 1947), pp. 86-94.

⁴² *Fact Finding Activities of the Bureau of Labor Statistics*, Bulletin 831 (Bureau of Labor Statistics, 1945), p. 14.

⁴³ Robert J. Myers, Harry Ober, and Lily Mary David, "Wartime Wage Movements and Urban Wage Rate Changes," *Monthly Labor Review*, October 1944, pp. 684-704. For the use of the index in appraisal of the wage stabilization program, see *The Termination Report of the National War Labor Board*, vol. I, pp. 57-59.

⁴⁴ Frances Jones Clerc and Eleanor K. Buschman, "Trends in Urban Wage Rates, September 1947," *Monthly Labor Review*, January 1948, pp. 45-50.

⁴⁵ Because of their publication in mimeograph form, the full reports on industry wage studies during the immediate postwar period are almost fugitive materials. They are on file at the Bureau and may perhaps be found in some university and public libraries. They are listed in *A Catalogue of the Wage Studies of the Bureau of Labor Statistics, January 1945-June 1948*, a Bureau publication in mimeographed form prepared by Edward K. Frazier.

⁴⁶ Harry Ober, "Occupational Wage Differentials, 1907-1947," *Monthly Labor Review*, August 1948, pp. 127-34.

⁴⁷ Joseph W. Bloch, "Regional Wage Differentials, 1907-46," *Monthly Labor Review*, April 1948, pp. 371-77.

⁴⁸ The heightened academic interest in wage research is reflected in a conference report by Lloyd G. Reynolds on *Research in Wages* (New York, Social Science Research Council, 1948). The conference was attended by leading academic students of wages and by Bureau officials responsible for the wage statistics program.

⁴⁹ See Joseph W. Duncan and William C. Shelton, *Revolution in United States Government Statistics, 1926-1976* (Washington, U.S. Government Printing Office, 1978), pp. 32-70.

⁵⁰ Major credit for the adaptation of probability sampling to universes of establishments for occupational wage survey purposes belongs to Samuel E. Cohen, then statistician in the Bureau's Wage Analysis Branch.

⁵¹ Some of the thinking that went into the new program is reflected in

H. M. Douty, "Conceptual Problems in the Development of an Adequate Program of Occupational Wage Statistics," *Proceedings, Industrial Relations Research Association*, 1950, pp. 220-30.

⁵² The results of these studies were summarized in *Salaries of Office Workers in Selected Large Cities*, Bulletin 943 (Bureau of Labor Statistics, 1949).

⁵³ See H. M. Douty and Toivo P. Kanninen, "Community Approach to Wage Studies," *Monthly Labor Review*, October 1949, pp. 1-6.

⁵⁴ For an account of the Bureau's work for the wage stabilization effort during the Korean war, see Wage Stabilization Board, *Wage Stabilization Program, 1950-1953*, vol. II (Washington, Economic Stabilization Agency, 1953), pp. 181-99.

⁵⁵ See *Wage Differentials and Rate Structures Among 40 Labor Markets, 1951-52*, Bulletin 1135 (Bureau of Labor Statistics, 1953). Summary statistics for the 40 areas surveyed will be found in *Wages and Related Benefits, 40 Labor Markets, 1951-52*, Bulletin 1113 (Bureau of Labor Statistics, 1952).

⁵⁶ The report of the interagency committee may be found in House Committee on Post Office and Civil Service, *Hearings on Revision of Major Federal Salary Systems*, part I, 87th Cong., 2d sess., pp. 79-125.

⁵⁷ The summary report on the first round of surveys in the expanded labor market program appeared as *Wages and Related Benefits, 60 Labor Markets, 1959-60*, Bulletin 1265-62 (Bureau of Labor Statistics, 1961). Coverage was expanded to 80 areas in the following year. For the initial report designed for use in Federal salary determination, see *National Survey of Professional, Administrative, Technical, and Clerical Pay, Winter 1959-60*, Bulletin 1286 (Bureau of Labor Statistics, 1960).

⁵⁸ See Toivo P. Kanninen, "New Dimensions in BLS Wage Survey Work," *Monthly Labor Review*, October 1959, table 2, p. 1083, for a tentative list of the industries included in the survey proposal.

⁵⁹ *Problems in Measurement of Expenditures on Selected Items of Supplementary Employee Remuneration, Manufacturing Establishments, 1953*, Bulletin 1186 (Bureau of Labor Statistics, 1956).

⁶⁰ *Employer Expenditures for Selected Supplementary Remuneration Practices for Production Workers in Manufacturing Industries, 1959*, Bulletin 1308 (Bureau of Labor Statistics, 1962).

⁶¹ *Employee Compensation in the Private Nonfarm Economy, 1966*, Bulletin 1627 (Bureau of Labor Statistics, 1969).

⁶² See Alvin Bauman, "Measuring employee compensation in U.S. industry," *Monthly Labor Review*, October 1970, pp. 17-23.

⁶³ The annual statistical summary of wage changes in major agreements has become quite elaborate. See William M. Davis and Joan D. Borum, "Wage Adjustments Under Major Bargaining Agreements At All-Time Low in 1983," *Current Wage Developments*, April 1984, pp. 45-69.

⁶⁴ As an example of a wage chronology, see *Wage Chronology: The Firestone Tire and Rubber Co. and the B. F. Goodrich Co. (Akron Plants) and the Rubber Workers, 1939-1979*, Bulletin 2011 (Bureau of Labor Statistics, 1979).

⁶⁵ See *Area Wage Surveys: Metropolitan Areas, United States and Regional Summaries, 1973-74*, Bulletin 1795-29 (Bureau of Labor Statistics, 1976), table A-28, pp. 87-88.

⁶⁶ The Employment Cost Index is published quarterly in news releases that are typically issued in January, April, July, and October. It also appears in *Current Wage Developments* and the *Monthly Labor Review*, monthly publications of the Bureau.

⁶⁷ *Report of the Minimum Wage Study Commission*, vol. 1, May 1981, Preface, pp. XIII-XIV.

⁶⁸ See George Stelluto, "Federal pay comparability: facts to temper the debate," *Monthly Labor Review*, June 1979, pp. 18-28.

⁶⁹ See Robert Frumkin and William Wiatrowski, "BLS takes a new look at employee benefits," *Monthly Labor Review*, August 1982, pp. 41-45.

⁷⁰ Dollar costs were calculated by OPM using mathematical and actuarial models that took account of the demographic characteristics of the Federal work force. See "Total Compensation Comparability: Background, Method, Preliminary Results" (U.S. Office of Personnel Management, July 1981).