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## APPENDIX

### DESCRIPTION OF STATISTICAL DATA ON HOURS AND EMPLOYMENT

The analysis presented in this paper is largely based on the hours and employment information provided by several collections of monthly data. For most purposes we used an industrial breakdown of the two-digit variety and only incidentally made use of skill, sex or other distinctions. As far as time coverage is concerned, we restricted the period analyzed to cover full peacetime business cycles during which data are available for all the industries included in the collection; for these reasons, some information available for the years 1932-1934 and 1942-48 is omitted from our study. Finally, we used only those data on employment for which there were comparable series on average weekly hours.

The collections are:

1920-41	20	NICB series, manufacturing
1932-41	14	BLS series, manufacturing
	14	BLS series, nonmanufacturing
1947-56	21	BLS series, manufacturing
	14	BLS series, nonmanufacturing
1947-56		Selected Census series on average hours and overtime.

Below is a brief description of the major characteristics of our statistical data.

#### *Hours and Employment Data Collected by the National Industrial Conference Board<sup>1</sup>*

Data on average hours of work per week and on employment were compiled and published by the NICB as part of a more general statistical description of labor market conditions. The data cover employment, manhours, payrolls, average hours per week, average weekly earnings

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<sup>1</sup>This description is largely based on M. Ada Beney, "Wages, Hours, and Employment in the United States 1914-1936," NICB Studies No. 229. Additional detail can be found in this source.

and average hourly earnings. Except for hours, the NICB data were published only in the form of index numbers. Employment was ascertained directly from members of the Conference Board or from cooperating trade associations; average hours worked were derived by dividing employment into total manhours.

Since manhours were taken from the payroll, the resultant hours of work per week are "hours paid for." The occasional reference in NICB publications to "hours actually worked" is intended to distinguish these from the nominal hours contractually agreed upon as constituting the "normal workweek." The distinction between "hours worked" and "hours paid for" was relatively unimportant during the interwar period when paid vacations and paid sick leave were the exception rather than the rule.

Information about the economic activities mentioned was compiled for 21 major industries, one of which (Foundries and Machine Shops) has 5 subgroups. For each of these industries, information on employment, average hours and average earnings is separately available for men and women; and within the male group, for unskilled and for skilled plus semiskilled. We have concentrated our attention on the 20 major industries,<sup>2</sup> and we have used the sex and skill classification only for the aggregate "all industry" level. This was done largely for purposes of economy; moreover, a few experiments with these finer subdivisions did not lead to any particularly interesting findings. Industries covered can be found in Table 14, Panel a.

*Time Period Covered.* The NICB began compiling the described labor market information in June 1920. Except for the first six months of 1922, the surveys were continued to July 1948. We restricted our collection of the data to the period 1920-1941 since later data are largely war-influenced. From 1932 on, BLS information becomes available for both hours and employment (data on employment alone were published from 1919 on). Whenever we wished to summarize the behavior of hours and employment during the whole interwar period, we used the NICB data through the Great Depression only, and BLS data thereafter.

*Sample Size.* The NICB sample covered, by the mid-thirties, not quite 2,000 plants. These plants reported directly to the compiling agency. The Board also received industry information from the American Iron and Steel Institute and from the Automobile Manufacturing Association. About 1½ million workers were represented in the survey. This constituted about 35 per cent of the workers employed in the industries

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<sup>2</sup>One industry, Cotton-North, was omitted because of its regional limitation and unrepresentative trends.

covered, and 20 per cent of the workers employed in manufacturing as a whole.

The NICB states that its reporting members ranged from very small to very large firms. This was arranged in order to obtain broad representation. If reporting members dropped out, the Conference Board attempted to replace them.

*Method of Collection.* The data were collected by questionnaire. The first full week of each month was the normal reporting week, unless a generally recognized holiday fell in that week—in which case the succeeding week was selected. Data were requested for wage earners only, classified as (a) unskilled males, (b) semi-skilled and skilled males, (c) females. Information was sought on three activities only—number of workers on the payroll, total number of manhours worked, and total payroll disbursed. All other measures were derived from this information.

*Averages for Each Industry.* Average hours worked per week for each industry were derived by dividing employment into manhours—separately for each labor group and for each industry as a whole. Thus the industry figure was derived directly—not as an index combining the subgroup results by means of any standardizing weighting system. This means that changes in the sex and skill composition of employment in the industry sample affect the average hours reported for each industry.

Furthermore, and very important, part time work was not distinguished from full time work. Thus in periods of high labor input and long hours of full time workers, the reported levels of average hours worked might be somewhat lowered by an increasing proportion of part time workers—a situation characteristic of periods with tight employment conditions.

*Combination of Industries.* The industry information was combined into an “All Manufacturing” series by using fixed weights, based on employment as reported in the Census of Manufactures of 1923. The averages for the various skill and sex groups were computed by using a 1927-29 weighting system based on the proportions of these groups within the NICB sample. Thus the averages for All Manufacturing—for the total or the skill-sex breakdown—do not reflect changes in inter-industry proportions.

#### *Hours and Employment Data Collected by the Bureau of Labor Statistics, 1932-1941<sup>3</sup>*

The Bureau of Labor Statistics published information on employment, payrolls and average weekly earnings for all of the interwar period. Up to 1922, the program covered 13 manufacturing industries. Later on,

other manufacturing industries were added and the program was extended to include nonmanufacturing employment. Only from 1932 on, however, did the Bureau begin to compile manhours and to publish average hours and average hourly earnings.

Up to 1935 the questionnaire schedules asked for total manhours actually worked. In 1936 firms were also asked to include paid vacations in the manhours reported. In 1937 paid holidays were added. The definition of manhours was not further amended until 1945 when paid sick leave was added to the list of items for which hours were to be reported. The successive revisions reflected the increasing importance of these fringe benefits. In the early thirties the difference between "hours worked" and "hours paid for" was not important. When it became important, the BLS reported "hours paid for."

The information was collected for about 90 individual manufacturing industries and 16 nonmanufacturing industries. For the purposes of this paper we used only the 14 major industry groups<sup>4</sup> in manufacturing and 14 selected nonmanufacturing industries. And we compiled employment information only for the period for which we could also obtain data on the length of the work week. In the case of one industry—private building construction—the BLS published only percentage changes in employment, not employment levels in absolute numbers. We decided to cumulate the month-to-month percentage changes into relatives, with the first month—July 1934—as a base. For purposes of cyclical timing, this procedure seems adequate.

The time series compiled and published by the BLS are classified by industry only. There is no breakdown by skill or sex, no distinction between full time and part time employed, no frequency distribution of hours.

*Time Period Covered.* Employment, payrolls and the derived weekly earnings are available for the whole interwar period. Manhours were collected from 1932 on and it became possible to compute average hours worked per week, and average hourly earnings. The sample reporting manhours expanded greatly between 1932 and 1934, largely because of cooperation by the various code authorities of the NRA. The following

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<sup>3</sup>This description of the hours data is largely based on A. Olenin and T. F. Corcoran, "Hours and Earnings in the United States, 1932-40," BLS Bulletin No. 697. For employment, see L. Talbert and A. Olenin, "Revised Indexes of Factory Employment and Payrolls, 1919 to 1933," BLS Bulletin No. 610. Additional information can be found in these sources.

<sup>4</sup>Instead of using the "Textile Group" in our analysis, we used the two sub-groups—Fabrics and Wearing Apparel. This was done because of the basic differences between these two groups, with regard to both technology and working conditions.

tabulation shows the years during which the hours series used in the present paper became available:

	<i>Manufacturing Industries</i>
1932	Iron and Steel and Their Products Machinery excluding Transportation Equipment Fabrics
1934	Rubber Products Chemicals Paper and Printing Transportation Equipment Stone, Clay and Glass Food and Kindred Products
1935	Leather Wearing Apparel Tobacco Lumber and Allied Products Nonferrous Metals and Their Products
	<i>Nonmanufacturing Industries</i>
1932	Class I Railroads Electric Light and Power Anthracite Coal Mining Street Railways and Buses
1933	Quarrying and Nonmetallic Mining
1934	Bituminous Coal Mining Metalliferous Mining Laundries
1935	Retail Trade Wholesale Trade Crude Petroleum Production Private Building Construction Hotels Dyeing and Cleaning

*Sample Size.* The sample reporting manhours was always smaller than that reporting employment. But while this difference was large in the early period of collecting hours information, it dwindled considerably in the course of time. In 1932, the firms reporting manhours employed only 28 per cent of all factory workers, while the wage earners in the firms reporting employment constituted about half of total factory workers. However, by 1940, firms representing 55 per cent of all factory workers reported manhours—the total reporting sample being only

slightly higher (59 per cent). At that time, about 23,000 establishments employing 4.7 million wage earners, reported manhours (and employment) and thus the basic data for the computation of average hours worked. Note that the aggregate sample is roughly three times as large as that underlying the NICB series.

*Method of Collection.* The manhour and employment information was secured by questionnaire and supplied on the basis of voluntary cooperation. The reporting period was the pay period ending nearest the 15th day of each month.

*Aggregation for Each Industry.* The employment series were based on both census and sample information. Essentially, month-to-month link relatives, based on employment in identical establishments of a slowly growing sample, were chained to census levels and subsequent employment estimates. Revisions were made whenever new benchmark information became available. The data were published in the form of indexes. The base of the indexes was changed frequently.

Average hours worked per week were obtained by dividing employment into aggregate manhours. No attempt at standardization was made. Thus shifts in the skill, age, sex, etc. composition of the work force may be reflected in the industry average.

Again, the level of averages may be affected by changes in the proportion of part-time workers, as well as by short-time overtime, etc. Also labor turnover affects the average hours measure, since a worker on the payroll at any time during the reporting week was counted wholly as an employee although he might have contributed only a few hours to the total manhour count.

*Combination of Industries.* In the case of employment, industry data were aggregated into group or division totals by weighting the component indexes. Employment data, as shown by bi-annual censuses, were used as weights. In the early years, the weight base was frequently shifted—the years 1919, 1923, 1926, 1929 and 1923-25 serving successively as weight base for combining manufacturing industries. The industrial aggregates for manufacturing, used in the present study, were combined, with the three years 1923-25 serving as a fixed weight and percentage reference base. The employment aggregates for nonmanufacturing industries use 1929 weights and the index base  $1929 = 100$ .

For average weekly hours, industry measures were combined into groups, and finally into total manufacturing, with average hours information for each industry weighted by estimated employment levels. The employment, and hence the weights, changed from month-to-month. Thus the group averages reflect changes in industrial composition. Note that

this procedure differs from that used by the NICB, which combined the industry results with constant weights.

*Hours and Employment Data Collected by the Bureau of Labor Statistics, 1947-date*<sup>5</sup>

The recent BLS information on average hours and employment is part of the increasingly systematic inquiry of the BLS, in cooperation with state agencies, into labor market conditions. The industrial breakdown is finer than ever before and follows largely the scheme known as Standard Industrial Classification (SIC). This permits comparison of labor market data with other, similarly classified, economic activities such as production, value added, etc.

The hours and employment data cover about 100 minor manufacturing industries, organized into 21 industry groups. Similar information exists for about 50 nonmanufacturing industries. The information used in the present inquiry is largely restricted to the 21 major groups in manufacturing and to 14 selected nonmanufacturing industries. A list of the covered industries can be found on Table 14, Panel c, and Table 22, Panel b.

As mentioned before, the data give detail only by industry—no detail for different skill, age or sex groups is available. It is possible to obtain regional information from various cooperating state agencies.<sup>6</sup> For the various manufacturing industries employment measures are available for “all employees” and for “production and related workers.” The latter classification excludes supervisory employees (above the working foremen level) and clerical workers. The data on manufacturing employment used in this study refer to production workers only. This implies comparability with the data on average hours which are available only for this group. For nonmanufacturing industries, the available employment data refer to “all employees,” and the average hours in some cases to production workers (mining, laundries, cleaning and dyeing), in most cases to non-supervisory employees and working supervisors. Thus in nonmanufacturing industries the employment and average hours information is not entirely comparable. However, for purposes of a study of timing relationships, this does not provide a serious handicap. In industries for which

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<sup>5</sup>This description is based on BLS Bulletin No. 1168, Chapters 6 and 7. These chapters, and the bibliography given at their end, should be consulted for further detail.

<sup>6</sup>In many instances, information can even be had for groups of counties or other sub-regional areas.



we have information on total as well as on production worker employment, the cyclical turns of these two measures usually coincide.

*Time Period Covered.* Some of the information for minor industries has become available only since 1950 or even more recent years. However, the 2-digit (sometimes 3-digit) industry data used as a basis for our analysis are available for every month from at least 1947 on.

*Sample Size.* The sample providing information on the average work week is slightly smaller than that for employment, but nevertheless of a very satisfactory size. In manufacturing about 44,000 establishments with 11 million employees are covered—this amounts to more than two-thirds of all manufacturing employment. In nonmanufacturing industries the coverage ratio varies widely—for the industries used in this paper from 100 per cent in Class I Railroads to 19 per cent in wholesale and retail trade. However, the trade sample, though its coverage ratio is small, includes 60,000 establishments with almost two million workers. In view of the characteristics of that particular industry, this sample coverage is adequate for our purposes.

As was mentioned before, the sample reporting manhours is slightly smaller than that reporting on employment. We do not assume this to affect comparability of the hours and employment data in any significant way—particularly in view of the known stability of the average hour measure with regard to variations in sample size.

*Method of Collection.* The data are collected by questionnaire, for the week ending nearest the 15th. Data are supplied on employment, payroll, and manhours. Average hours worked per week and average earnings (weekly and hourly) are derived. Each year, some of the sampling weeks contain holidays which might be expected to affect the total manhours reported and hence the computed average length of the workweek. Actually the data show, at most, minor responses to these holiday weeks. In explanation of this fact, it should be observed that the ascertained manhours are not "hours worked" but "hours paid for." Hence, to the degree that holidays are paid, they would not affect the reported length of the work week.

*Aggregation for each industry, and Combination into Industry Groups.* The methods of deriving industry and group averages are basically similar to those described, in the previous section, for the interwar period.

The employment estimates are derived by the benchmark and link-relative technique. This procedure takes advantage of the levels established by state unemployment insurance counts. From these benchmarks the course of employment is estimated on the basis of changes in identical

establishments contained in successive samples. A so-called bias adjustment factor attempts to compensate, on a current basis, for a downward bias stemming from the use of identical establishments. The adjustment to new benchmarks is carried out once every year.

Statistics of hours are not subject to benchmark adjustments as are the employment statistics. The reason is the high stability of the average hour quotient, which is not easily affected by moderate changes in the sample. Revisions of manhours are derived by multiplication of the revised employment and the unrevised average hours.

The BLS has recently begun to publish, on a monthly basis, separate data for overtime hours, in 21 major industries. Overtime hours are those paid at premium rates—whether in excess of 40 hours per week or not. The latter case may arise if the normal workweek is less than 40 hours or when overtime is determined on a daily basis. These data are a welcome addition to our information on hours. However, at the time of this writing the period covered by the data is too short to make them very useful for analytic generalizations.

#### *Hours and Employment Data Collected by the Bureau of the Census*

Some information on employment and hours is also available from the Census' Monthly Report on the Labor Force.<sup>7</sup>

In the course of its monthly survey of labor force characteristics, the Bureau of the Census asks members of households about the hours actually worked during the survey week, as distinguished from the "hours paid for" which form the basis of the BLS statistics. The Census asks, among other information, for the total of all hours worked, be it at one or at several jobs. The census taker has to rely on the recollection of the worker or the family member interviewed.

*Time Coverage, Sample Size and Sample Period.* The described surveys have been carried out monthly since 1940. In our study, information is used for the period after World War II only. During most of these years the survey sample was based on about 20,000 interviewed households; in May 1956 the number of interviewed households increased to 35,000

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<sup>7</sup>For detailed description of concepts and methods see *Current Population Reports*, Series P-23, No. 2, "Concepts and Methods Used in the Current Labor Force Statistics prepared by the Bureau of the Census," July 30, 1954; and Series P-23, No. 3, "Expansion of the Current Population Survey Sample, 1956," July 15, 1956. A summary of definitions and explanations can be found in the Annual Report on the Labor Force, published in Series P-50, and in the Monthly Reports of Series P-57.

(an additional 7,000 sample units are visited but not interviewed). At the same time the number of sampled areas was increased by a third. Up to June 1955, the sampling week was the calendar week containing the 8th of the month; after this date the calendar week containing the 12th. These sampling weeks frequently contain legal or religious holidays. Since the Census collects data on "hours worked" rather than "hours paid" such holidays are fully reflected in the average hours ascertained and reported. For certain purposes, it may be desirable to preserve in the record the importance of holidays on labor input. However, for purposes of cyclical analysis and, in particular, analysis of timing behavior of hours, the sudden movements created by the presence of a holiday in the sampling week present an unwelcome complication. We have made a simple adjustment by substituting interpolated values for the holiday-affected months (the character of the data made a more refined adjustment unfeasible).

*Character of Published Information.* The Bureau of the Census publishes average hours worked per week, by persons in all industries, in agriculture and in nonagricultural industries. Since September 1953 averages are also computed for wage-salary workers, by major industrial division, but these are not released for publication. The Bureau, however, permitted us to inspect this unpublished information.

Apart from these averages, the Bureau of the Census presents percentage distributions of all gainfully employed persons, or of wage-salary workers by length of workweek. That is, we are informed about the percentage of people working 1-34 hours, 35-39 hours, 40 hours, 41-47 hours, 48 hours, and 49 or more hours. This information is given for the total of all nonagricultural industries as well as by industry divisions. It can be obtained in roughly comparable form for most of the years after World War II. We utilized in this paper particularly the information on the percentages of persons working short time and of those working long hours.