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ECONOMIC BACKGROUNDS OF THE RELIEF PROBLEM

by

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DIRECTOR'S PREFACE

No more serious economic and political question confronts the American people today than that arising from the twin problem of unemployment and relief. And the problem is peculiarly acute in the highly industrialized and urbanized areas, of which the Pittsburgh district is a conspicuous example. In its origins the problem is an economic one, but its inevitable repercussions are political as well as economic, as we have well learned during the past few years. In its essence the issue comes to this: Our economic system is operated primarily on a commercial basis. On the strictly commercial basis, the economic system provides nothing for unemployable persons or unemployed workers, except as they have consumable funds or funded income. An economic system, if it is to endure, must provide for all the people dependent on it a continued access to those goods and services essential to life. Isolated instances of starvation may perhaps be tolerated, but society cannot withhold that minimum access from a considerable body of its members without incurring the risk of social upheaval.

In recognition of the demonstrable fact that the commercial-economic system does not fulfill this essential function for all the population at any time and that the failure extends to vast numbers of the population in periods of depression, society has long accustomed itself to the operation of a supplementary system designed to provide essential goods and services, on a noncommercial basis, to those unprovided for on a strictly commercial basis. This supplementary distribution system works in various ways, through persons, religious and fraternal bodies, private and quasi-public social agencies, and local, state, and national governmental agencies. The trend has been pointing clearly toward increasing public participation; and in the recent years of profound depression the Federal Government was forced by economic, financial, and political circumstances to take over major responsibility for the relief load. Out of that assumption of major Federal responsibility has come a whole chain of problems involving our financial, economic, social, and political stability.

The present monograph represents an exploration of the relief problem in its economic setting. The statement and analysis of the problem in its basic aspects is national in scope and applies as forcefully to any other large industrial center as to Pittsburgh, but the statistical analysis is confined to the record for Allegheny County as a specific case study. Although the manifestations of distress are local, the major phases of the relief question find their origins in a broad national and even international setting; and it is at the present stage scarcely subject to debate that social solutions of this problem cannot be limited by regional bounds. Consequently, this study is presented by the Bureau of Business Research as a contribution toward an understanding of the problem in both its Pittsburgh district setting and its national setting with the hope that the analysis may be helpful in the local and national search for a constructive solution.

The author requests that special acknowledgment be made to two of his staff colleagues, Messrs. Wilbert G. Fritz and Theodore A. Veenstra, and to Mr. Emmett H. Welch, Director of Research and Statistics of the Pennsylvania State Emergency Relief Board. Mr. Fritz gave painstaking statistical assistance on the methods of making numerous estimates. Mr. Veenstra aided materially in the interpretation of the 1934 unemployment data used in Chapter 6 and in the compilation and interpretation of the 1929 family income data used in Chapter 12. Mr. Welch made available unpublished information from the unemployment survey of 1934. The tables were prepared in the Bureau's statistical laboratory under the supervision of Mr. Robert H. Nelson, and the statistical checking of the manuscript was done by Mr. Nelson and Mr. David Schenker. The charts were prepared in the Bureau's drafting room under the supervision of Mr. Charles W. Hammers. Proofreading was supervised by Mrs. Gladys M. Gardner.

A word is in point concerning the origin of this investigation. It was planned originally as the Bureau's contribution to the Social Survey of Pittsburgh and Allegheny County, which has been under way during the past two years under the direction of Dr. Philip Klein, of the New York School of Social Work, supported by a large committee of civic leaders in Pittsburgh, under a grant from The Buhl Foundation, of Pittsburgh. As the inquiry proceeded it became clear that the economic importance of the problem warranted a special Bureau monograph, and the plans were

expanded accordingly. A copy of the first draft of the manuscript was submitted, in the latter part of 1936, to Dr. Klein, who was given full permission to use whatever part of it might serve the purposes of the report arising from the Social Study. Because of subsequent revisions in the study here presented, there are minor differences between parts incorporated in Dr. Klein's report and the revised form of corresponding parts contained herein. The revisions, however, have been only in the direction of more refined estimates, fuller data, and clarified treatment, not in the basic story of need in its economic setting.

This study represents a part of the Bureau's program in regional economic research under a grant from The Buhl Foundation, of Pittsburgh.

RALPH J. WATKINS
Director

June, 1937

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APPENDIX A

MEANING OF THE CENSUS TERM "GAINFUL WORKER" IN 1930

A "gainful worker," under the census definitions in 1930, was a person aged 10 or more who was considered to "follow" a "gainful occupation," although he may not have been employed when the census was taken.[1]

A "gainful occupation" meant an occupation by which the person who pursued it earned money or the equivalent of money or in which he assisted in the production of marketable goods. An occupation, even though yielding some earnings, was not included if it did not then provide or had not in general provided at least the equivalent of a day of work per week; but paid part-time work equivalent to a day or more a week was a "gainful occupation."

A person who had previously followed a gainful occupation but had been, even for a long time, out of work because of change in industry, introduction of machinery, or decline of production in his industry was to be considered a gainful worker if he was able and willing to work. Persons, such as common laborers or longshoremen, following highly irregular and uncertain occupations, were considered to be gainful workers, even though they had been idle a long time and had no immediate prospects of finding work.

Enumerators were instructed not to class as gainful workers those who had retired from active service; those who were physically or mentally so incapacitated that they seemed unable to work; those who were living on income or accumulated funds, without working; and those who for any other reason declined to work or did not choose to work. Women and children doing household work or other domestic chores, not on a wage basis, were not to be classed as gainful workers. All these exclusions appear to have been proper ones, in terms of the (presumable) purpose of finding the number of persons who either (a) then had at least partial work at gainful occupations or (b) had previ-

[1] The description of "gainful worker" is abstracted from Fifteenth Census of the United States: 1930, *Population*, Vol. V, pp. 3 and 29-30, and *Unemployment*, Vol. II, pp. 604-608.

ously had such work and were at the time of the census able and willing to work.

Another exclusion, however, seems very doubtful, namely, the exclusion of the young employables who were not then employed and had not previously had gainful employment. In a growing population, it is a normal expectation that the number of new workers will somewhat exceed the number of persons passing out of the employable group, the result of the difference being an increase in the total number of workers. The Federal census shows that from 1920 to 1930 there was a significant increase in the population of the county; and data available from the local school censuses indicate that the growth took place throughout most, if not all, of the decade. But records of employment offices indicate that for several years prior to 1929 the number of jobs offered failed to keep pace with the number of applications for work.[2] It is reasonably certain, therefore, that there was in April, 1930, a significant number of young people who had not succeeded in getting gainful work and, therefore, were not included among the gainful workers. Consequently, it seems reasonably certain that the number classed as gainful workers was too low to represent properly the total number of employables. Inasmuch as data are not adequate to make possible an accurate adjustment, the number of gainful workers reported in the census will be used without adjustment. It will be used, however, with the understanding that it is probably too low.

In Allegheny County, the total population on April 1, 1930, was 1,374,410; persons aged 10 years or more numbered 1,109,331 in the county; and the number classified as gainful workers was 537,097.

The number of gainful workers in Allegheny County, total, male, and female, according to industry groups, is shown in Table 1, presented in Chapter 5. Of the total population, 39.1 per cent were classed as gainful workers; 48.4 per cent of all those aged 10 or more were so classified. Of all males, 60.6 per cent were gainful workers; 75.2 per cent of the males aged 10 or more were so classified. Of all females, 17.0 per cent were gainful workers; 21.1 per cent of the females aged 10 or more were gainful workers.

[2] Josephine McLaughlin, "Activities of Selected Employment Agencies in Pittsburgh," *Pittsburgh Business Review*, February, 1931, p. 15; and data on the Junior Employment Service in an unpublished manuscript from which the cited article was abstracted.

TABLE A-1

NUMBER OF GAINFUL WORKERS IN PITTSBURGH, BY AGE, APRIL, 1930*

Age at Preceding Birthday	Total			Male			Female		
	Population in Age Group	Gainful Workers		Population in Age Group	Gainful Workers		Population in Age Group	Gainful Workers	
		Number	Per Cent of Age Group		Number	Per Cent of Age Group		Number	Per Cent of Age Group
			%			%			%
10–13	49,617	40	0.1	24,520	30	0.1	25,097	10	†
14	12,298	118	1.0	6,198	65	1.0	6,100	53	0.9
15	12,198	555	4.5	6,024	261	4.3	6,174	294	4.8
16	12,699	3,062	24.1	6,205	1,563	25.2	6,494	1,499	23.1
17	12,061	5,538	45.9	5,879	2,838	48.3	6,182	2,700	43.7
18–19	25,424	15,985	62.9	11,842	8,236	69.5	13,582	7,749	57.1
20–24	62,497	42,647	68.2	29,110	25,551	87.8	33,387	17,096	51.2
25–29	57,304	36,833	64.3	27,765	26,849	96.7	29,539	9,984	33.8
30–34	54,388	33,670	61.9	27,398	26,825	97.9	26,990	6,845	25.4
35–39	54,996	33,967	61.8	28,066	27,514	98.0	26,930	6,453	24.0
40–44	46,867	28,918	61.7	24,276	23,769	97.9	22,591	5,149	22.8
45–49	41,473	25,009	60.3	21,423	20,844	97.3	20,050	4,165	20.8
50–54	34,316	20,231	59.0	17,686	16,980	96.0	16,630	3,251	19.5
55–59	25,663	14,077	54.9	12,815	11,883	92.7	12,848	2,194	17.1
60–64	19,679	9,597	48.8	9,750	8,253	84.6	9,929	1,344	13.5
65–69	13,618	5,203	38.2	6,509	4,503	69.2	7,109	700	9.8
70–74	8,359	2,111	25.3	3,831	1,829	47.7	4,528	282	6.2
75 and over	6,844	886	12.9	2,754	781	28.4	4,090	105	2.6
Unknown	268	144	53.7	132	92	69.7	136	52	38.2
Total	550,569	278,591	50.6	272,183	208,666	76.7	278,386	69,925	25.1

* Fifteenth Census of the United States: 1930, *Population*, Vol. V, pp. 240–245. Figures under "Total" supplied.
† Less than 0.05 per cent.

Inclusion of children down to 10 years of age and of persons in the higher age groups raises the question of the extent to which children and aged persons were actually included. The available data for Allegheny County do not show the number of gainful workers according to age. Approximate proportions may be noted in the Pittsburgh data, given in Table A-1. Children aged less than 16 years constituted only a minor proportion. About one-fourth of those aged 16 are included; about 46 per cent of those aged 17; nearly 63 per cent of the combined group 18-19 years of age. Of all gainful workers in Pittsburgh, only 3.3 per cent were less than 18 years of age—about one of every thirty. Among the adults, of course, were some rather aged persons. Somewhat

TABLE A-2

GENERAL COMPOSITION OF THE GROUP NOT CLASSED AS GAINFUL WORKERS IN PITTSBURGH, APRIL, 1930*

Classification	Number	Per Cent of Those Not Gainful Workers
Total population	669,817	
Gainful workers	278,591	
Not gainful workers	391,226	
Not gainful workers, age not reported†	124	
Not gainful workers, age reported	391,102	100.0%
Not gainful workers aged 16 or less—total	202,285	51.7
Children aged less than 10 years	119,248	30.5
Children aged 10–16 not gainful workers	83,037	21.2
Not gainful workers aged 17 or more—total	188,817	48.3
Women aged 17 or more not gainful workers	166,368	42.6
Men aged 17 or more not gainful workers	22,449	5.7

* Based on census data. All figures except total population derived from Table A-1.
† A few of these, presumably, belong in each of the age groups used; but their allocation would have no significant effect.

less than 3 per cent, however, were aged 65 or more—about one of every thirty-four. In short, the gainful workers with which we are dealing were predominantly in the age range 18-64.

Since only about 39 per cent of the people are included among gainful workers, a proper question relates to the general composition of the group not classed as gainful workers. Age distributions of gainful workers in the county are not available, but approximate proportions may be shown by the use of Pittsburgh data. The Pittsburgh data on those not gainfully employed are summarized in Table A-2. Of all those who were not gainful workers, 51.7 per cent were children aged not over 16, and 42.6 per cent were women (aged 17 or more). In other words, 94.3 per cent were women and children, and only 5.7 per cent were men (aged 17 or more).

APPENDIX B

MEANING OF THE CENSUS TERMS "AT WORK" AND "UNEMPLOYED" IN 1930

These terms applied only to gainful workers, defined in Appendix A. In general, with qualifications to be noted presently, a gainful worker was considered "at work" if he worked "any part" of his last preceding regular working day.[1] A professional man, a business man, or one in other pursuits who was not on a salary basis or a wage basis but was self-employed was "at work" if he spent any part of the latest regular working day at his place of business, even though he may not have made any sales nor have done any work for which he received pay. Indeed, a man in charge of an office, store, shop, or factory was "at work" if his business continued to run under his orders, even though he may have been absent in the preceding regular working day. And teachers, highly skilled workmen, salesmen, foremen, superintendents, and managers—groups having jobs on a salary basis and not losing pay for occasional absence from work—were "at work" without respect to whether they actually worked in the preceding working day. Thus, at least some were "at work" without earnings and some were idle with pay.

All part-time workers having work ordinarily equivalent to a day or more a week, whether limited to one or more full days or done a few hours each day,[2] were included if they did the usual day or the usual number of hours of work on their latest working day. If the backward time limit for employment in this group be assumed to have been one week prior to the visit of the census enumerators, being "at work," for any person in the group, would relate to any day of the preceding week. And if the work of part-time workers be assumed (a) to have been spread evenly through-

[1] Definitions from Fifteenth Census of the United States: 1930, *Unemployment,* Vol. II, pp. 1-3 and 603-608.

[2] Specific examples given are (a) waitress working regularly three hours a day, and (b) seamstress or laundress working regularly one or more days a week. *Op. cit.,* p. 604.

out the week[3] and (b) to have averaged half-time,[4] only half of them would have been at work on any specific day. The actual effect of the method of dealing with part-time workers, of course, cannot be measured. But at least, in the face of the general rule applicable to the preceding work day, inclusion of the part-time workers who did not actually work on the workday preceding the visit of the enumerator resulted in overstatement of the number "at work."

Thus, the characteristics of the data justify two reasonably certain conclusions: First, the number actually earning money on any day at the employment levels prevailing when the census was taken was somewhat smaller—perhaps considerably smaller —than the number called "employed" under the census definition, the consequence being an understatement of unemployment.[5] Second, the average daily number of man-days of work going on when the enumeration was made must have been materially smaller than the number called "employed."[6]

One further question is involved in the meaning of "at work." At what time should the data be considered applicable? The enumeration of the total population was meant to represent the number on April 1. Presumably, therefore, the enumeration could not have been begun until April 2. The probable volume of work per enumerator suggests that the enumeration required a number of days.[7] And the question whether one was at work did not relate to April 1 but to the last regular working day preceding the visit of the enumerator. According to information received directly from the Bureau of the Census (by letter), the instructions called

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[3] Assumed by the Bureau of the Census in its estimates of part-time work from data on Class B unemployed in 1930. Fifteenth Census of the United States: 1930, *Unemployment,* Vol. II, p. 355.

[4] That is, an even gradation from a little more than no work to almost full-time work. Cf. section entitled "Part-time Work in April, 1930," in Chapter 5.

[5] Cf. Robert R. Nathan, "Estimates of Unemployment in the United States, 1929-1935," *International Labor Review,* Vol. XXXIII, No. 1, January, 1936, p. 63. Nathan concluded for other reasons that there was national understatement. The Brookings Institution had access to Nathan's estimates prior to publication and agreed, on the basis of their own calculations, that Nathan's conclusion regarding the understatement of unemployment was fully justified. Edwin G. Nourse and Associates, *America's Capacity to Produce,* pp. 493-495.

[6] The probable average level of work is considered in Chapter 8.

[7] For the country as a whole, there were about 100,000 enumerators. Fifteenth Census of the United States: 1930, *Population,* Vol. V, p. 3.

for the completion of the enumeration in incorporated places by the middle of April. Presumably at least part of the unincorporated territory was enumerated after the middle of April. In the incorporated places it is likely that results were accelerated toward the middle of the month, as untrained enumerators got into the swing of their job. It seems likely, therefore, that the data on employment represent conditions centered near the middle of the month. They are used in this study as if the enumeration had been made on April 15, 1930.

APPENDIX C

INDEX OF EMPLOYMENT IN ALLEGHENY COUNTY

It is common practice to estimate employment at a given time by the use of (a) a known total and (b) change in an employment index from the date of the known total to the date for which an estimate is sought. This method is employed in Chapter 5 for some short-time adjustments and is used in Chapter 7 for monthly estimates over the period 1929-1936.

In the examination of the census data in Chapter 5, attention is called to the necessity of distinguishing between the number classified in the census as employed and the total number having more or less employment in a given period. It is in point to consider the character of the available index, what change it reflects, and what types of error the use of the index may introduce into estimates made therewith.

General Character of the Index

The index of employment in Allegheny County is computed from industry group indexes for the Pittsburgh district, special weights being used for Allegheny County. The weights will be noted presently.

Over 350 firms in the Pittsburgh district make confidential reports on employment to the Bureau of Business Research of the University of Pittsburgh. Each firm is asked to report (a) the number on the payroll for the payroll period ended on or nearest the 15th day of the month and (b) the number on the payroll for the payroll period ended on or nearest the last day of the month. Firms having one payroll for the whole month report one number; that number is the total number of persons on the payroll in the whole month. Firms having two or more payroll periods report the two numbers requested, and the average of these two numbers is used in the construction of the index.

The construction of the Pittsburgh district indexes was explained in the *Pittsburgh Business Review* in April, 1931, and

May, 1933; and the explanation need not be extended here. Each index number for an industry group is a percentage of the corresponding 1929 average. No adjustment is made for trend or for seasonal variation. The indexes for the several manufacturing groups are combined into a weighted average index for manufacturing, the weights being assigned on the basis of Federal census data, supplemented by state reports; the manufacturing index and the several nonmanufacturing indexes are combined into a weighted average index of employment by all firms.

The special Allegheny County index of employment was computed from the district group indexes with special weighting for the county. The county weights, assigned on the basis of Federal census data and state industry data, are as follows, the district weights being given for comparison:

Industry Group	Weights[1]	
	Allegheny County	Pittsburgh District
Manufacturing	48.8	50.5
Public utilities	5.1	4.3
Railroads	9.2	9.6
Mines and quarries	3.5	14.0
Construction	8.9	8.6
Department stores	13.0	4.8
Wholesale trade	4.4	1.5
Banking	1.8	1.5
Miscellaneous	5.3	5.2
Total weights	100.0	100.0

Relationship between Total Number and Average Number on Payrolls

A payroll period less than a month is ordinarily a week, two weeks, or one-half of a month. Because of turnover, an average of two weekly payrolls, two fortnightly payrolls, or two semimonthly payrolls is less than the total number on all payrolls in the month. On the other hand, an average based on any of these periods is larger than the average daily number having payroll attachment. Therefore, the average on which the index of employment is based, being made up in part of monthly totals

[1] Weights for the district index were published in the *Pittsburgh Business Review*, May, 1933, p. 15. The weights used for the special county index have not been published previously.

and in part of averages for periods shorter than a month, lies somewhere between the total number on the payroll in the month and the number having actual payroll attachment on the average day.

Variation in the relationship between the average on which the index is based and the total number or the average number may be caused by inter-payroll duplication of names, by turnover, or by bias resulting from faulty construction of the index.

Duplication as a Cause of Discrepancy

The likelihood of distortion in the proportion as a result of a significant change in the extent of duplication seems small. When slack appears in one plant there is a considerable likelihood of slackness in other plants having similar work. Both the search of the employer for men acquainted with his type of work and the search of the worker for a job he understands seem likely to impede shifting to other kinds of jobs. In April, 1930, the median period since the last employment for classes A and B unemployed in Pittsburgh was in the interval 9 to 13 weeks. Only about one-twelfth of the number in these groups had been unemployed less than a week. More than four-fifths had been unemployed three weeks or more.[2] As we have noted in Chapter 5, of an estimated total of 55,500 unemployed at the time of the census, about 17,100 appear to have had some work in the preceding month. Because, fortunately, a large part of employment is on jobs lasting through a number of pay periods, the last job of a member of that group is likely to have been on work which had extended for some weeks or months. In other words, the extent of duplication, in relation to the total working force, probably was small in April, 1930.

Whatever the extent of inter-payroll duplication, the distortion resulting therefrom could not exceed the total possible distortion reflected in reported average turnover, for reported average turnover rates for groups of companies reflect the full influence of inter-payroll duplication.

Change in Turnover

The total number of persons having more or less work in a month is the initial number plus the number of accessions during

[2] Distribution in Table 3, in Chapter 5.

the month. The initial number is the number whose payroll attachment is carried over from the preceding pay period. Reported monthly accessions for any company are subject to the duplicating effect of rehiring old employes who had been on an earlier payroll in the same month. For all companies combined in the index, slight further inflation of the accession rate may be assumed because some workers transfer from one firm to another in the same pay period and, therefore, are represented twice in the group total. In consequence of these inflations in reported accessions, the difference between the true total of different individuals and the initial number is less than the reported number of accessions.

Complete information on payroll periods used is not available. It seems likely, however, that, although a significant number of firms report monthly total numbers on payrolls or weekly numbers, probably the greater part of the employes reported are on two-week or half-month payrolls. Therefore, the average on which the index is based probably does not differ greatly from an average based on two semimonthly payrolls.

For the purpose of exploring the relationships between this average and other numbers in which we are interested, let us use the following designations:

N = average of number on first payroll and number on second
E = initial number at the beginning of the month, i.e., carry-over from preceding payroll
T = total number having some work during the month
A = total accessions to payrolls
S = total separations from payrolls

In the absence of satisfactory data on the distribution of accessions and separations during the month, we shall assume that they are each equally divided between the two payroll periods. The two payroll periods will be assumed to be equal—differences in length of month being disregarded.

Then

$$T = E + A$$
$$N = E + 3A/4 - S/4$$

Therefore,

$$T - N = \tfrac{1}{4}(A + S)$$

TABLE C-1

RATES OF ACCESSION AND SEPARATION, INDUSTRIAL PAYROLLS, U. S.*
(Percentages of average numbers on payrolls)

Item	Jan.	Feb.	March	April	May	June
1929						
Accession	4.98	4.36	5.20	5.77	5.09	5.01
Separation	3.06	3.20	4.17	4.58	4.42	4.20
½ of sum	2.01	1.89	2.34	2.59	2.38	2.30
1930						
Accession	3.95	3.94	4.15	3.55	3.28	2.92
Separation	5.09	4.72	5.37	5.21	5.17	5.31
½ of sum	2.26	2.16	2.38	2.19	2.11	2.06
1931						
Accession	2.97	2.82	3.67	3.06	2.79	2.41
Separation	2.88	2.69	2.95	3.41	3.83	5.09
½ of sum	1.46	1.38	1.66	1.62	1.66	1.88
1932						
Accession	4.15	2.75	2.75	2.76	2.59	2.70
Separation	3.35	3.32	4.37	5.73	5.11	5.63
½ of sum	1.88	1.52	1.78	2.12	1.92	2.08
1933						
Accession	3.48	2.56	2.22	4.87	7.21	10.21
Separation	3.56	4.40	4.60	2.78	2.36	2.47
½ of sum	1.76	1.74	1.70	1.91	2.39	3.17
1934						
Accession	5.81	6.71	6.33	5.18	4.19	3.58
Separation	3.43	2.89	3.22	3.38	4.88	4.60
½ of sum	2.31	2.40	2.39	2.14	2.27	2.04
1935						
Accession	6.33	4.23	3.79	3.63	3.01	3.18
Separation	3.04	2.79	3.24	3.73	4.38	4.49
½ of sum	2.34	1.76	1.76	1.84	1.85	1.92

Item	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1929							
Accession	5.21	4.61	4.91	3.91	1.95	1.24	4.35
Separation	3.94	4.12	4.16	3.62	3.15	2.49	3.76
½ of sum	2.29	2.18	2.27	1.88	1.28	0.93	2.03
1930							
Accession	2.51	2.71	3.27	2.56	2.05	2.13	3.08
Separation	5.84	5.75	5.00	4.49	3.91	3.79	4.97
½ of sum	2.09	2.12	2.07	1.76	1.49	1.48	2.01
1931							
Accession	3.02	2.60	3.58	2.75	3.63	3.29	3.05
Separation	4.67	3.67	5.62	6.22	3.92	3.43	4.03
½ of sum	1.92	1.57	2.30	2.24	1.89	1.68	1.77
1932							
Accession	3.01	4.21	5.04	3.72	3.07	3.07	3.31
Separation	5.24	3.85	4.47	3.46	3.39	4.06	4.29
½ of sum	2.06	2.02	2.38	1.80	1.62	1.78	1.90
1933							
Accession	9.48	8.59	5.53	3.97	3.71	3.37	5.48
Separation	3.49	3.40	4.26	4.58	4.79	4.69	3.83
½ of sum	3.24	3.00	2.45	2.14	2.12	2.02	2.33
1934							
Accession	3.71	3.24	3.61	4.09	4.32	6.14	4.74
Separation	3.85	4.50	5.12	5.30	4.55	3.45	4.10
½ of sum	1.89	1.94	2.18	2.35	2.22	2.40	2.21
1935							
Accession	4.17	4.60	4.95	5.23	3.63	3.30	4.17
Separation	3.67	3.77	3.19	3.13	3.55	3.76	3.56
½ of sum	1.96	2.09	2.04	2.09	1.80	1.76	1.93

* Source of separation and accession rates: *Monthly Labor Review*, June, 1930, p. 115; December, 1931, p. 153; February, 1932, p. 346; February, 1935, p. 388; March, 1936, p. 695. The general character of the accession rates and separation rates is explained in *Monthly Labor Review*, December, 1935, pp. 1584–1586.

In other words, the total number having work exceeds the average of two semimonthly totals by one-fourth the sum of accelerations and separations.

Accession rates and separation rates of extensive coverage are not available for Allegheny County. National figures of wide coverage will be used to illustrate roughly the margin of error that may arise in using the index. These figures are presented in Table C-1.

Two things should be noted about these rates. First, reporting companies are requested to omit office employes, when practicable. Because of the greater stability of office employment, these rates probably vary somewhat more than would comparable rates based on numbers including all office employes. Second, reporting companies are requested to report (a) the number of factory workers at the beginning of the month and (b) the number at the end of the month. Some plants, however, furnish the average of daily counts and some furnish an average of numbers on weekly payrolls.[8] The resulting base number probably is less than the average of the numbers on two semimonthly payrolls. Therefore, the rates, which are percentages of that base number, are probably a little higher than comparable rates applicable to the average which underlies the Allegheny County employment index.

For the group of companies on whose employment the rates in Table C-1 are based, the monthly values of ¼ (A + S) are given in the third line of the data for each year. The maximum value was 3.24, in July, 1933. The minimum value was 0.93, in December, 1929. For the seven-year period, the arithmetic mean value of ¼ (A + S) was 2.03; the median, 2.04. The maximum value exceeded the mean by 1.21 per cent of the average number employed. The minimum value fell below the mean by 1.10 per cent of the average number employed. There was only one other month (June, 1933) in which the actual value exceeded the mean by more than one per cent of the average number employed; and there was no other month in which the actual value was below the mean by more than one per cent of the average number employed. If one knew the average of two payroll periods for one month and had an index truly representative of change in that average, he could have estimated for each month the total number

[8] *Monthly Labor Review*, December, 1935, pp. 1584-1586.

having some work with the expectation that his estimates could differ from the actual numbers by more than one per cent of the average number in only 3 of the 84 months. In 73 of the 84 months the estimated numbers would have differed from the actual by not over one-half of one per cent of the average number on payrolls.

Cyclical variation in business activity in the Pittsburgh district is somewhat wider than in the nation as a whole.[4] That difference, if not counterbalanced by other influences, would cause turnover rates to be somewhat higher in this district than in the nation. Difference between the district average and the national average with respect to seasonal variation or with respect to policy of employers or policy of labor cannot be determined from available data. But if accessions and separations in this district were twice as high as those shown in Table C-1, the errors in estimates for the district similar to those discussed in the preceding paragraph would generally be less than one per cent.

The Question of Bias in the Index

In the absence of occasional full totals of commercial and industrial employment, a complete test of the index for bias is impossible. Preliminary tests have been made by the Bureau of Business Research on the basis of the Census of Manufactures and the Census of Distribution. Some bias has been found, and revisions are being made. The revisions, however, are not so great as to affect the broad purposes of this study.

Use of the Employment Index to Measure Change in Number of All Gainful Workers Employed

The only possible direct test of whether change in the index of employment, based on commercial and industrial employment, represents change in the number of all employed persons is the test with 1930 census data and data from the 1934 survey.

In Chapter 6, we have estimated that 374,971 were classed as employed in the survey of February, 1934. That classification, as we there noted, appeared to include practically everybody on payrolls or otherwise having a job connection, whether at work

[4] Wilbert G. Fritz, "Fifty Years of Business Activity in the Pittsburgh District," *Pittsburgh Business Review*, October, 1933, p. 20.

or not. Apparently, the most nearly comparable total in the 1930 classifications would be the sum of those classed as employed and classes B, D, F, and G of the unemployed (Table 2, in Chapter 5). The sum of those groups (without allocation from the unclassified group) is 499,809.

The "employed" group in February, 1934, therefore, appears to have been 75 per cent of the comparable group in 1930. Meanwhile, the employment index (Table 11, in Chapter 7) stood at 98.9 in April, 1930, and at 74.3 in February, 1934, the latter level being 75.1 per cent of the former. It seems conclusive, therefore, that no serious error is introduced by use of the employment index as a measure of change in the number of all employed persons.

APPENDIX D

MONTHLY ESTIMATES OF THE NUMBER OF EMPLOYABLES, 1929-1936

The number classed as gainful workers in the Federal census of 1930 was 537,097 (Table 1, in Chapter 5). That number probably was somewhat too low, because of the omission of younger persons who had not previously had employment but who constituted a normal increment to the employable group (Appendix A).

For reasons already explained,[1] the number of employables assumed for February, 1934, is 527,100, that number constituting the same proportion of the population as did gainful workers in April, 1930. Because of the shift of population during the depression, it is impossible to determine to what extent the probable understatement in the 1930 class of gainful workers is carried forward by the use of the 1930 ratio in 1934. No serious distortion, however, seems likely in this 1934 estimate.

Only a rough general judgment is possible regarding what happened to the number of employables (a) from the beginning of 1929 to April, 1930; (b) between April, 1930, and February, 1934; and (c) after February, 1934. The decisions made will be explained briefly.

Employables in October, 1929

There appears to have been an abnormal bulge in number of employables in 1929. The peak of the employment index (Table 11, in Chapter 7) was reached in October, 1929. We have estimated, in Chapter 5, that 504,331 persons had at least some work in April, 1930. From this number and the employment index, it is estimated that 541,046 had some work in October, 1929. By mere interpolation between the number of gainful workers in the county in January, 1920, and the number in April, 1930, we should reach a number of employables decidedly below the estimated number having work.

[1] Chapter 6, section entitled "Number of Employables Assumed for February, 1934."

Meanwhile, one may suppose, for two reasons, that there were some employables without work at the peak, i.e., that the number of employables appreciably exceeded the number employed. First, the distribution of the unemployed in April, 1930, according to period of idleness shows that a substantial number had been unemployed long enough to have been idle in October, 1929. Second, the peaks of employment for the various industry groups in the Pittsburgh district[2] came at various times in the year; and the weighted average[3] of those peaks is materially higher than the peak of the composite index.

No doubt, an appreciable shifting of workers took place from industries of slack opportunity to industries requiring labor in the month of highest employment; but there must have been numerous workers who found no opportunity to shift. Of the unemployed in Pennsylvania at the time of the census in April, 1930, 12.9 per cent had been unemployed 27 weeks or more.[4] We have noted in Chapter 5 that an estimated total of 55,511 were in the group classed as unemployed in April, 1930. On the basis of the state ratio, it is estimated that 7,160 of the unemployed in Allegheny County had been unemployed in October, 1929.

With 541,046 estimated to have been employed and 7,160 unemployed in October, 1929, the number of employables assumed (as a minimum) for October, 1929, is 548,200.

Employables in January, 1929

It is assumed that the abnormal bulge in number of employables noticeable at the peak was confined to 1929. For January, 1929, an estimate was made by straight-line interpolation between the census of January, 1920, and the census of April, 1930. In the 1920 census, the number classed as gainful workers was

[2] The reference is to the several indexes of employment in the Pittsburgh district computed by the Bureau of Business Research of the University of Pittsburgh and published monthly in the *Pittsburgh Business Review.*

[3] Weighted as the indexes are weighted in the composite. The weights are given in Appendix C.

[4] Fifteenth Census of the United States: 1930, *Unemployment,* Vol. I, pp. 840 and 876-877. For classes A, B, C, D, F, and G, the number unemployed for periods of 27 weeks or more was 47,000; the number for whom period of idleness was reported was 364,527. If the median date of the census enumeration in 1930 was as late as April 15 (refer to concluding paragraph of Appendix B), the number unemployed at the beginning of the preceding October and continuously thereafter through the enumeration date was presumably a little smaller than the number unemployed 27 weeks or more.

473,918.[5] The corresponding number in April, 1930, was 537,097 (Table 1, Chapter 5). The interpolated figure for January, 1929, is 529,392.

Employables in March, 1933

Business levels in the district had already risen considerably above the bottom levels when the survey of 1934 was made. The lowest level of the general business index of the Pittsburgh district was reached in March, 1933. It is assumed that the decline in population which appears to have taken place between April, 1930, and February, 1934, had taken place by March, 1933.[6] Therefore, the number of employables estimated for February, 1934, is assumed also for March, 1933.

Employables in December, 1936

By December, 1936, the index of general business activity in the Pittsburgh district had risen above the April, 1930, level. The employment index, however, was still somewhat below the April, 1930, level; but the generally sharp rise of business activity is likely to have drawn labor back to the county somewhat in excess of the actual re-employment. On this point, of course, no certainty is possible. But it is believed to be reasonable to assume that the number of employables in the county in December, 1936, was about the same as the number in April, 1930, namely, 537,100.

Summary

The several monthly figures, then, from which the monthly estimates of employables used in the preparation of Table 12 (Chapter 7) were made are as follows:

Month	Number of Employables
January, 1929	529,392
October, 1929	548,200
April, 1930 (Census)	537,097
March, 1933	527,100
February, 1934	527,100
December, 1936	537,100

Estimates for intervening months were made by straight-line interpolation.

[5] Figure not published; furnished directly by the United States Bureau of the Census.

[6] There may have been greater decline, with subsequent rise, but there is no available test.

APPENDIX E

MEASUREMENT OF AVERAGE UNEMPLOYMENT IN THE PITTSBURGH DISTRICT, 1929-1936

Data relating specifically to Allegheny County are not adequate to provide a basis for estimating average employment and unemployment. The estimates of amount of work, discussed in Chapter 8, were made mainly through the use of Pittsburgh district data. The primary steps involved were (a) the computation of an index reflecting the change in total amount of work from the average level of 1929 (Table 14); (b) adjustment of change in total amount of work to allow for change in number employed, leading to the index of average amount of work per person employed (Table 15); and (c) interpretation of the latter index in terms of its probable significance at its highest level in 1929, with the result of translating the index of average amount of work on the basis of the 1929 average (Table 15) into estimated percentages of full time worked (Table 16).

In the computation of an index of total amount of work, each monthly index of man-hours worked by wage earners in manufacturing industries in the Pittsburgh district was multiplied by the ratio of (a) the index of total payrolls, all firms, to (b) the index of payrolls in manufacturing, for the corresponding month.

The respective levels of the total payrolls index and the manufacturing payrolls index are equated as 100 at the average level of 1929. It is assumed that for the period here considered the difference between the actual levels of these indexes, i.e., difference in deviation from a common base, is attributable approximately to difference in aggregate working time. This assumption necessarily involves the assumptions (a) that change in the average actual hourly earnings of all manufacturing employes was approximately proportional to change in average actual hourly earnings of manufacturing wage earners and (b) that change in average actual hourly earnings of all employes represented in total payrolls was approximately proportional to change in average actual hourly earnings of all manufacturing employes combined.

In the competitive economy, it is an accepted assumption that the change in compensation rates for one large employed group will be in the same direction as the change for another large employed group. Since adjustments in rates of pay are slow, change in comparative levels of compensation among different groups is slow. And a combined index of payrolls for two large groups would reflect only a part of a slowly cumulative difference.

In the four-county Pittsburgh Industrial Area in 1929, the average number of all manufacturing employes was 260,271; and, of these, 33,050, or only 12.7 per cent, were salaried employes. Salaried employes were not reported for all the counties of the area; but, for 26 Pennsylvania counties which are so reported, in an average of 1,033,389 employes, 129,458, or 12.5 per cent, were salaried employes.[1] In 1930, the four-county Pittsburgh area included about 84 per cent of all gainful workers attached to manufacturing in the eleven-county area[2] to which the payrolls indexes used in this analysis are related; and the ratio of salaried workers to total employes in the eleven-county area is not likely to differ materially from the comparable ratio for the four-county area. Therefore, the index of total manufacturing payrolls is not likely to reflect more than about one-eighth of whatever slowly cumulative difference there may have been between the change in average hourly earnings of salaried employes and change in average hourly earnings of wage earners. In other words, change in the index of combined manufacturing payrolls may be read, for purposes of estimate, to represent approximately the change in the payrolls of manufacturing wage earners.

In the construction of the index of total payrolls in the district, manufacturing payrolls have a weight of 50.5 per cent (Appendix C). Therefore, the total payrolls index reflects less than half the slowly cumulative difference, if any, between change in average hourly earnings of manufacturing employes and the comparable change for nonmanufacturing employes. Since change of average hourly earnings for the manufacturing group seems unlikely to have been much out of proportion to the comparable change for the nonmanufacturing group, the divergence between the total

[1] Fifteenth Census of the United States: 1930, *Manufactures, 1929*, Vol. I, pp. 242 and 247.

[2] Bureau of Business Research, University of Pittsburgh, *Industrial Databook for the Pittsburgh District*, pp. 1-2 for description of areas, and p. 10 for data from which the percentage is computed.

payrolls index and the manufacturing payrolls index is believed to represent approximately the divergence between total man-hours for all workers and man-hours for manufacturing wage earners.

The other major assumption is that an index constructed to show change of average employment per person on the payroll in the district may be used to represent approximately the change in average employment in Allegheny County. The district is predominantly industrial and commercial, and the indexes used here are weighted in accordance with that predominant characteristic. Not only is Allegheny County akin in industrial and commercial character to the rest of the Pittsburgh district, but this county is a financial, trading, and management center for much of the district outside the county. Change in Allegheny County, therefore, should be similar to that in the district outside the county not only because of similarity of composition but also because of direct sensitivity to change in areas financed, supplied, and managed. In addition, more than half of the gainful workers enumerated in the eleven-county district in 1930 were in Allegheny County. In the total employment index and the total payrolls index, therefore, only about half, or less than half, of the difference between change in Allegheny County and change in the district outside the county should appear. Finally, about 60 per cent of the gainful workers attached to manufacturing and mechanical industries in the district are in Allegheny County. Therefore, the district index of man-hours should reflect only about four-tenths of the difference between change in man-hours in Allegheny County and the comparable change in the district outside the county.

It has been noted in Appendix C that the index of number employed by business firms may be taken as a reasonably close measure of change in number of all gainful workers employed. The reasons should be considered for assuming that our estimated index of total gainful work may be used as if it covered all gainful workers. First, time worked by all gainful workers is in very large part time worked in industry and commerce. Second, the working days and hours in noncommercial pursuits are much in accord with commercial practice. Third, as we have pointed out in Chapter 2, irregularities of commerce and industry are reflected to a great extent in noncommercial pursuits. Of course we should prefer a direct measure. But, lacking that, we shall probably not miss the general truth very far by using the estimated index of

total work in industry and commerce as an index of total work for all gainful workers.

With the index of employment and the index of total work construed in terms of all gainful workers, the index of average work per worker is construed as average work per employed gainful worker, not merely per industrial or commercial worker.

Probable Average Working Time at the Peak in 1929

In the absence of direct measures, an approximate interpretation of the index of average work may be made by reference to what it probably signified in the month of best working time.

The peak of the index of average employment, in September, 1929, was 105.5, i.e., 5.5 per cent above the average for 1929 (Table 15). A decision regarding what the maximum probable percentage of full time was in that month immediately gives significance to the indexes for other months.

In the report of President Hoover's Research Committee on Social Trends, it was estimated that about 3,000,000 persons in the United States are disabled by sickness on almost any day.[3] That number amounted to approximately 2.4 per cent of the population. For industrial workers alone, the rate undoubtedly is lower. The Brookings Institution, in estimating the practical labor force in manufacturing, deducted 2 per cent of the theoretical labor force to allow for sickness and other temporary disability.[4] From statistics covering a seven-year record of the Boston Edison Electric Illuminating Company, it was found that respiratory troubles causing absences of a half-day or more each caused average losses of 3.2 days a year for men and 5.5 days a year for women. Diseases of the respiratory system caused about half of the absences from sickness and nonindustrial accidents.[5] Other diseases and injuries being allowed for, the losses might easily be twice as large, and the losses of time might exceed 2 per cent.

Industrial accidents which resulted in only temporary disability caused, in 1930, a loss of time equal to about one-fourth of one

[3] Harry H. Moore, "Health and Medical Practice," which is Chapter XXI of the Report of the President's Research Committee on Social Trends, entitled *Recent Social Trends in the United States.* Citation from pp. 1069-1070.

[4] Edwin G. Nourse and Associates, *America's Capacity to Produce,* p. 515.

[5] Dean K. Brundage, "Incidence of Illness Among Wage Earning Adults," *Journal of Industrial Hygiene,* November, 1930, p. 343, and December, 1930, p. 399.

per cent of full time; the loss from permanent partial disability was much larger.[6] The total accident severity rate in that year (for wage earners) was somewhat higher than it was in any of the years 1926-1929.[7]

The estimates of monthly numbers employed, in Chapter 7, have been made in terms of the total number having at least some work in the month. It will be observed in Table C-1 (Appendix C) that total accessions to industrial payrolls in the United States in September, 1929, were 4.91 per cent of the average number on payrolls. But separations were 4.16 per cent of the average on payrolls. An even spread of accessions and of separations being assumed, the average number having active payroll connection was less than the total number having work in the month by a total equal to 4.54 per cent of the average on payroll.[8]

Allowance of 2 per cent or more for sickness and disability after deduction of something like 4.5 per cent because of turnover suggests that, in evaluating probable employment for all persons sharing in the work, a deduction close to 6.5 per cent of full time should be made. It is recognized, however, that there probably was a considerable amount of overtime. Overtime would be a rapidly diminishing factor after the peak was passed. Unless some allowance is made in the estimate of average employment for overtime at the peak, the level of the estimates after the practical disappearance of overtime would be too low. The decision was to assume an average deduction of 4 per cent of full time, i.e., an average employment of 96 per cent of full time at the peak.

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[6] Reports covered 2,236,629 employes; there were 1,700,000 days of loss for those suffering temporary disability only. *Monthly Labor Review,* October, 1931, p. 93.

[7] *Monthly Labor Review,* May, 1932, p. 1029.

[8] In Appendix C, section entitled "Change in Turnover," it is shown that, under the assumption of two equal payroll periods a month and an even distribution of accessions and of separations, the total number exceeds the average of the numbers on the two payrolls by one-fourth the sum of accessions and separations. Under the same assumptions, the difference between the total and the daily average number actively on payrolls (i.e., with daily adjustments for ins and outs) is one-half the sum of accessions and separations.

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