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PART I

THE MEANING AND MEASUREMENT OF UNEMPLOYMENT AND FULL EMPLOYMENT

THE MEANING AND MEASUREMENT OF FULL EMPLOYMENT

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1. Introduction

THE prevention of mass unemployment is now universally considered a primary goal of economic policy. Most of the literature on full employment has been concerned with policies by which full employment can be reached or maintained. This paper will not cover such policies. Rather, it will deal first with the definition and measurement of full employment, with ways of determining when full employment has been reached and when departures from it begin. The second part of the paper will deal with factors that affect the level of full employment as defined and measured in a specific way. These factors can change full-employment levels over time and cause them to differ from one economy to another. Looked at in another way, the problem of this paper is to measure frictional unemployment. Frictional unemployment must here be defined broadly enough to include all unemployment, not excepting seasonal, that exists in the presence of "adequate" total demand for commodities and labor in the economy.

At the outset, I recognize that not everyone thinks it desirable to define or measure full employment precisely. Beardsley Ruml has taken this position, holding that full employment should, like liberty and justice, be a broadly conceived goal of a democratic society.[1] Others have taken the view that the definition of full employment is primarily a political matter. Thus Allan G. B. Fisher feels that in practice, governments will be content to define full employment as "avoiding that level of unemployment, whatever it may happen to be, which there is good reason to fear may provoke an inconvenient restlessness among the electorate."[2]

Although such views may have merit, I feel that economic and sta-

Note: While preparing this paper, I was a Research Associate of the National Bureau of Economic Research. I am indebted to several members of the staff of the National Bureau for valuable assistance. Geoffrey Moore, Clarence D. Long, Phillip Cagan, and Leo Wolman have read a previous draft and made helpful suggestions; Millard Hastay gave advice on some statistical problems, and Harry Eisenpress did the seasonal adjustments.

[1] *Full Employment Act of 1945, Hearings*, Senate Committee on Banking and Currency. 79th Cong., 1st sess., 1945, p. 398.

[2] A. G. B. Fisher, *International Aspects of Full Employment in Great Britain*, London, Royal Institute of International Affairs, 1946, p. 19.

tistical definitions of full employment are valuable for two purposes. First, they may serve as one guide, though not usually as the sole guide, to government and central bank policy in monetary and fiscal matters, and to public and private policy in other areas of decision-making related to employment. This is, of course, the primary motive for interest in full employment. Second, measures of full employment are of interest for analytical purposes, in defining conditions of tight or balanced labor markets and their consequences. In this sense, measures of full employment cannot be replaced by measures of cyclical peaks, which may fail to reach full employment. The peak of 1937 is an example. It is also conceivable that in a period of very tight labor markets there could be a mild cyclical trough that never fell below a full-employment level according to some definition.

Some aspects of the concept of full employment are still, on occasion, sources of confusion. The concept, as it is generally used, is not analogous to the concept of capacity for physical plant. The full-employment level does not indicate the maximum number of man-hours of gainful employment that can be obtained from a given population, since it assumes that labor-force participation is voluntary and that hours of work are not abnormally high. Under unusual conditions, such as total war, both labor-force participation and hours of work can be raised much above peacetime full-employment levels by a combination of incentives and legal requirements.

A closely related aspect of the full-employment concept is that not all reductions in labor input at full employment create departures from full employment. In the usual sense of full employment and its sense in this paper, such departures arise only from decreases in demand or the failure of demand to grow as rapidly as supply. A decrease in supply will be considered as altering the full-employment level, except to the extent that it is induced by a change in demand.

This implies that the definition of full employment does not involve the knotty problem of the shape of the supply curve of labor for the economy as a whole, or the shape of the underlying indifference surfaces relating leisure to real income. Thus if at a given level of real wages workers choose to increase the time they devote to leisure and to decrease the time they devote to productive employment, the shape or position of the supply schedule is altered without creating a departure from full employment. A departure from full employment exists only when involuntary idleness rises above its full-employment level, when more workers seek employment at the current level of wages and cannot find it. In practice, however, it may sometimes be difficult to distinguish between voluntary and involuntary idleness.

A complication would arise if the level of real wages of fully employed workers fell during periods of less than full employment. In such circumstances there might be workers who were unwilling to work at the current level of real wages but were willing to work at the full-employment level. Their unemployment would not be involuntary in the usual sense, but it would be involuntary in the sense that it would arise from a cyclical change in real wages and not from an autonomous change in tastes that placed a higher value on leisure.

However, it is usually true that the real wages of fully employed workers tend to rise in business contractions, since money wages are generally less flexible downward than consumer prices. Unemployment arising in business contractions is therefore involuntary whether it is defined at the current or the full-employment level of wages and whether wages are defined in real or money terms.[3]

Given the demand for labor and the size of the labor force, an increase in labor turnover or a decrease in the efficiency of the labor market in handling turnover (effecting job transfers) will also cause a fall in employment and a rise in frictional unemployment. Since it does not result from a decrease in demand, this rise in frictional unemployment is also considered a change in the full-employment level rather than a departure from it.

It would be comforting to declare with confidence that there is some one best definition and measure of full employment, and to defend this declaration successfully. I cannot see my way clear to do so. Rather, there seem to be a number of possible measures, each having advantages and disadvantages. Since I know of no systematic exploration of these possibilities, some clearing away of underbrush seems to be needed more than an attempt to blaze the one best trail. In connection with each measure discussed, an example or illustration will be presented from the employment statistics of the United States or Great Britain.

This discussion of measures of full employment is not intended to be exhaustive. A great many measures and definitions of full employment have been advanced, and it is not possible to explore all of them here. Those included are intended to cover the important general cases; most of the omitted measures are variants of those included.

Definitions of full employment can be classified on at least two bases. The first is the extent to which the avoidance of unemployment is given priority over other and possibly competing objectives of economic policy. The second is the technical basis of the definition: What

[3] For further discussion of this point, see my "Wage Determination and Involuntary Unemployment," *Journal of Political Economy*, April 1951, pp. 143-153.

kind of statistical series does it employ and how does it employ them? These two bases are not entirely independent. It is possible at times to follow alternative statistical paths to the same objectives; at other times the technical nature of a definition has definite implications for its policy orientation. The discussion here will proceed on the basis of a technical classification of definitions, with implications for policy pointed out along the way whenever possible.

2. *Measures of Full Employment*

MINIMUM UNEMPLOYMENT APPROACH

The measures discussed in this section all define full employment as existing when unemployment is at a minimum. This minimum is determined historically; it is the lowest unemployment previously reached. Such measures are probably the most widely used of all measures of full employment. Often they are the real basis of definitions that seem at first to be based on something else.

The basic advantage of the minimum unemployment concept is its relative simplicity and freedom from ambiguity. It gives a very low estimate of the unemployment permissible under a full-employment policy, which accounts for part of its popularity. However, a minimum unemployment concept rules out the possibility of overfull employment, and considers minimum and optimum unemployment the same; anything more is considered less than full employment. The historical minimum of unemployment in a given economy may be associated with inflation or with labor shortages, but these are not taken into account. Thus, as a guide to policy, minimum unemployment definitions seem to imply necessarily what Viner has called "full employment at whatever cost."[4] The same is true of the maximum employment definitions that will be discussed later.

To turn the concept of minimum unemployment into an operational definition, certain limits must be specified. Firstly, are any circumstances or conditions to be ruled out in selecting the minimum? I assume that there is general agreement that periods of total war should be excluded; for example the years from 1941 through 1945 in the United States or 1939 through 1945 in Great Britain should not be used in selecting a minimum unemployment figure. The labor market conditions produced by total war cannot be duplicated in peacetime, and no one would want to duplicate them merely to reduce unemployment. On the other hand, it is not clear that partial or limited war, such as the Korean War, should be excluded, and I have not excluded it. The

[4] Jacob Viner, "Full Employment at Whatever Cost," *Quarterly Journal of Economics*, August 1950, pp. 385-407.

degree of tightness in labor markets created by the Korean War could probably have been created by peacetime monetary and fiscal policies.

Secondly, how far back in time should one go to find a minimum? In principle, it can be argued that the period should be limited to two or three decades; there can be such fundamental changes in labor market structure over longer periods that earlier minima would no longer be meaningful. In practice, the problem does not arise for either the United States or Great Britain, because of the lack of available statistics. Except in section 2, the data used in this paper begin with January 1946 whenever possible.

Thirdly, over what time period should the minimum be taken? The longer the time period allowed, the greater is the spread of the data around their trough, and the higher the resulting estimate of the minimum. It would seem unreasonable to base a definition on the experience of one month or a few months, even if the data for these months are seasonally adjusted. I have used a period of twelve months in selecting minima because it eliminates errors that might arise from faulty seasonal adjustment.

Finally, what measure of unemployment is to be minimized? Several alternatives are examined in the following sections.

Minimum Total Unemployment. For the United States, the series most frequently used is the Bureau of the Census series on unemployment.[5] This series is obtained from the monthly sample survey of the labor force, taken for one week in each month.[6] Those counted as un-

[5] The alternative is the Bureau of Employment Security's series on insured unemployment. This series has advantages for some purposes, as well as some special disadvantages. I will not discuss these here, since the focus of this paper is differences in concepts of full employment rather than alternative measures for any given concept.

[6] For a thorough discussion of the methods used in these surveys, see Louis J. Ducoff and Margaret J. Hagood, *Labor Force Definition and Measurement: Recent Experience in the United States*, Social Science Research Council, Bull. 56, 1947, and *Current Population Reports*, Bureau of the Census, Series P-23, No. 2, July 30, 1954.

The sample used contains 24,000 to 26,000 dwelling units and other living quarters, and completed interviews are obtained from 20,000 to 22,000 households each month. Estimates based on this sample differ from the results of a complete enumeration because of sampling variability. The Bureau of the Census estimates that for unemployment, the chances are about nineteen out of twenty that sampling variability is less than approximately 8 per cent.

In January 1954, the Bureau began to use a new sample containing the same number of households as the old one but taken from a larger number of geographical areas (230 rather than 68). For January 1954, there was a discrepancy of 728,000 between the estimates of unemployment based on the two samples. This is approximately 24 per cent of the larger estimate. For discussion of the sources of this discrepancy, see the paper by Gertrude Bancroft in this volume and the

employed are those "who did not work at all during the survey week and were looking for work. Also included as unemployed are persons who would have been looking for work except that (1) they were temporarily ill, (2) they expected to return to a job from which they had been laid off for an indefinite period, or (3) they believed no work was available in their line of work or in the community."[7]

The top line of Chart 1 shows unemployment as just defined as a percentage of the civilian labor force, both seasonally adjusted. The ratio to the civilian labor force rather than an absolute number is used to avoid a rise in minimum unemployment over time as a result of labor-force growth.

The minimum unemployment for any twelve-month period is 2.3 per cent of the civilian labor force for the twelve months ending October 1953. Prior to the business contraction of 1949, the minimum for any twelve-month period was 3.3 per cent for the twelve months ending October 1948. In January 1949 the seasonally adjusted monthly series rose sharply above this level.

It has been suggested that for purposes of defining full employment, the unemployment data should include certain subcategories of the category "with a job and not at work." These subcategories cover persons temporarily laid off with definite instructions to return to work within thirty days and persons waiting to start a new job or business to which they were scheduled to report within the following thirty days.[8] The suggestion concerning temporary layoffs conforms to British practice which includes in unemployment the partially corresponding category, "temporarily stopped."

The Bureau of the Census considers the temporary layoff group as employed because they have jobs, and although they are not working at them, they are not seeking work, and new jobs need not be found for them. It is pointed out that the scheme of classification used by the census gives priority to "unemployed" over "temporary layoff"; thus any worker on temporary layoff who distrusted the promise of rehire sufficiently to seek other work would be counted as unemployed.[9]

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mimeographed report of the Special Advisory Committee on Employment Statistics, August 1954.

In the charts that accompany this paper the segments labeled "new" show data from the new (230 area) sample.

[7] Quoted from the official definition of the Bureau of the Census.

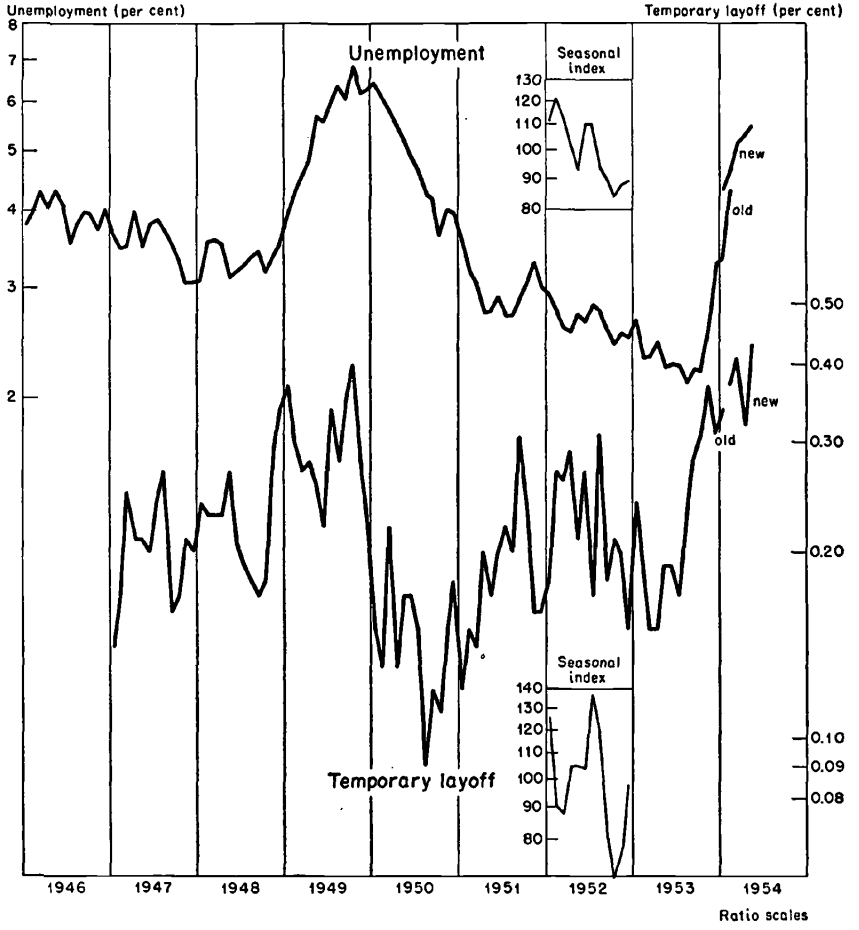
[8] See Russ Nixon, "Correction of Census Bureau Estimates of Unemployment," *Review of Economics and Statistics*, February 1950, pp. 50-55; and T. K. Hitch, "The Meaning and Measurement of Full or Maximum Employment," *Review of Economics and Statistics*, February 1951, pp. 1-11.

[9] See Charles D. Stewart, "The Definition of Unemployment," *Review of Economics and Statistics*, February 1950, p. 58.

On the other hand, the loss of work by this group resembles unemployment because it is involuntary, and its rather clear inverse conformity to the business cycle suggests that a principal cause of temporary layoffs is lack of demand. Data for this group are available

CHART 1

Percentage of the Civilian Labor Force Unemployed or on Temporary Layoff, 1946-1954



since 1947 and are shown, seasonally adjusted, on the bottom line of Chart 1. The number of persons on temporary layoffs rises significantly from September 1948 to October 1949, and again in the last half of 1953. This series seems to lead unemployment at its troughs. Thus in 1948 it rose sharply from October to December, when the rise in unemployment was too small to be considered very meaningful;

similarly in 1953 it rose sharply from July to October, though unemployment in October was still below the July level.

Conceptually, there is a fairly strong case for including this group in the unemployed, or at least for considering both in defining full employment. The principal objection to considering them separately is a practical one. In sample statistics, the amount of sampling variability grows relative to the estimated size of a group as estimated size decreases. The temporary layoff group is often in the neighborhood of 100,000. At that level it has been estimated that there is 1 chance in 20 that the sampling error is as great as 39,000.[10]

Large relative sampling variability shows up in time series as relatively large random fluctuation and makes it difficult to adjust adequately for seasonal movements. This objection does not apply to combining unemployment and temporary layoffs, since the relative sampling error of the total would be less than that of either component.

There does not seem to be any strong reason for considering persons waiting to start new jobs or businesses as unemployed if the purpose is to show changes in the demand for labor. The idleness involved is by definition frictional, since it is connected with transfers to new work. One would expect it to be at least as high in prosperity as in depression. Since the time involved per person probably does not vary much over the cycle, the series basically measures the number of accessions. An examination of the series since it became available in 1947 shows some tendency for the level to fall early in contractions of general business activity. This occurs in the last quarter of 1948 and again in the last quarter of 1953 and is similar to the behavior of accession data in general. Thus adding workers waiting to start a new job or business to the unemployed would tend to offset in part the movement of unemployment and obscure or understate changes in the demand for labor.

As in the case of temporary layoff, work-seeking takes priority over waiting to start a new job. In the case of temporary layoff, however, there is a presumption that the idleness is involuntary even when there is no work-seeking, since layoffs are initiated by employers. This presumption is much weaker for persons waiting to start new jobs. Many such persons were previously not in the labor force. An interval between getting a job and starting work could often be requested by the employee rather than by the employer.

Minimum Total and Partial Unemployment. The data on total unemployment discussed above include only persons who did not work

[10] This estimate is an older one than that for unemployment given in note 6; it is based on data for 1948-1950. It is probable that an estimate comparable with that of note 6 would be higher.

at all during the survey week. It is frequently suggested that in measuring full employment, changes in partial unemployment should be taken into account. In census statistics, partially unemployed persons can be defined as those who worked at least one hour, but involuntarily worked less than a full week. These persons are now counted as employed. Theoretically, the increase in this group during a business contraction could be enormous. If, in response to a decline in demand, most employers were to reduce labor input by work sharing rather than by layoffs, millions of man-weeks of employment could be lost each week in involuntary idleness without appearing at all in the unemployment statistics.

It is unquestionably true that a significant amount of work sharing does take place in business contractions, and that it results in partial unemployment. It does not follow, however, that the statistics on total unemployment, as usually interpreted, understate the increase in total plus partial idleness during business contractions. This is because each new wholly unemployed worker is generally considered as adding a full workweek to the time lost in involuntary idleness, which is not always true. Some of the new wholly unemployed workers were previously part-time workers. Thus the usual way of looking at unemployment involves two errors working in opposite directions: it overlooks increases in partial unemployment and at the same time overweights increases in unemployment arising from the loss of jobs by part-time workers. It is not possible to state a priori which error will predominate.

Partial unemployment will be used here to mean the time not worked by involuntary part-time workers, or the amount by which time worked falls short of a full workweek. A full workweek is taken as 40 hours.[11] Following Hitch,[12] involuntary part-time workers are defined as (1) those who regularly work part time, yet prefer and could accept full-time work, and (2) those who usually work full time but were working part time during the census survey week because they had begun or

[11] The use of a constant full workweek greatly simplifies the calculations in this section. Forty hours is somewhat below the average number of hours worked by all persons in the labor force, including self-employed workers, agricultural workers, and persons with more than one job. This average has fluctuated between 41 and 42 hours since 1949. However 40 hours has been by far the most common single workweek; in 1949 more than 36 per cent of the labor force worked 40 hours in each survey week not containing a holiday; since then the percentage has risen to more than 40, reaching 46 in January 1954. Forty hours is also the standard workweek set in the Fair Labor Standards Act. It is thus reasonable to think of a person working 40 hours as working a full week even though in some cases he is working less than is normal for him. The choice of 41 or 42 hours as the full workweek would not make any appreciable difference for the analysis that follows.

[12] Hitch, *op.cit.*, p. 8.

ended a job during the week, or because of slack work, layoff, or repairs to plant and equipment. Those part-time workers not considered involuntary will be called "other part-time workers." They include (1) voluntary part-time workers, who usually work part time and do not prefer or could not accept full-time work; and (2) workers who usually work full time but worked part time during the survey week because of vacation, illness, bad weather, industrial disputes, and various personal reasons.

The error involved in overlooking increases in involuntary part-time work will be exactly offset by overweighting the loss of work by other part-time workers if the time not worked by all part-time workers, involuntary and other, remains constant. More generally, the cyclical increase in persons wholly unemployed, considered as representing full weeks of work lost, will correctly state, understate, or overstate the actual increase in time lost from partial plus total unemployment according as the time not worked by all part-time workers does not vary with the cycle, varies directly with the cycle, or varies inversely with the cycle.[13]

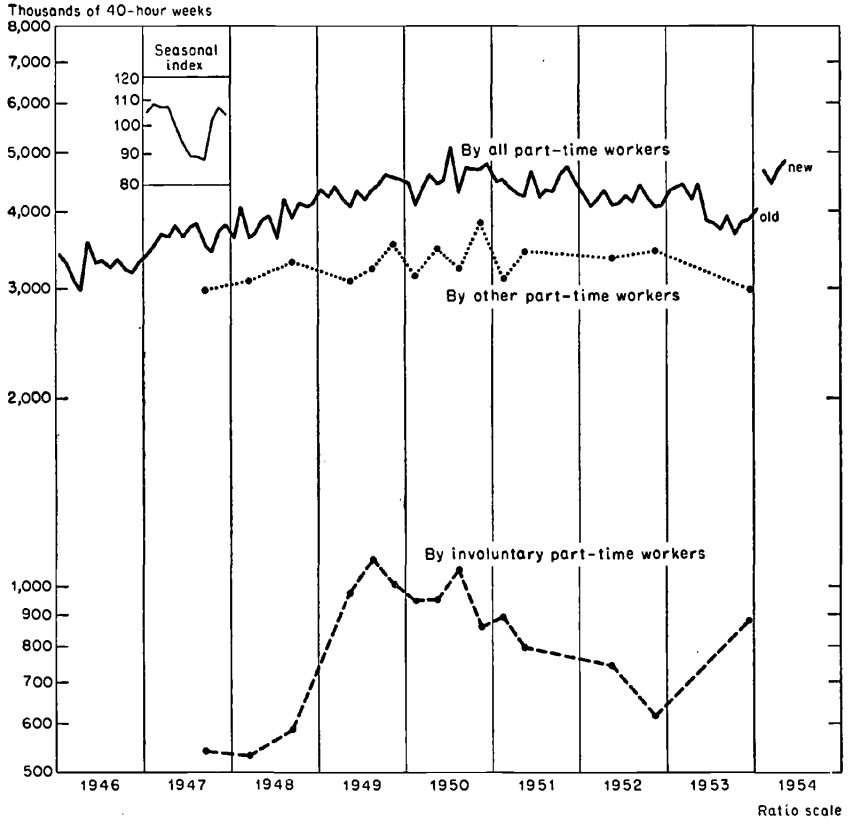
With this principle in mind, the available data can be examined to see what kind of bias is actually involved in the usual failure to consider partial unemployment in measuring full employment. The data consist of a monthly series on time not worked by all part-time workers and information on time not worked by involuntary part-time workers and other part-time workers for 15 months in which special surveys were made. The fifteen special surveys of part-time work are spread irregularly over the period from September 1947 to December 1953. Following census usage of the term "part time," the data refer to workers who worked less than 35 hours a week. Time not worked is computed from the number of workers in each of four intervals of hours and is expressed in units of 40-hour weeks. Thus each week of time lost in involuntary part-time work can be considered the equivalent of one wholly unemployed worker seeking full-time work.[14]

The data on time not worked by part-time workers are shown in Chart 2. The bottom line of this chart shows time not worked by involuntary part-time workers at the dates of the special surveys. This series shows marked conformity to the cycle in its general shape, and taken by itself might be the basis for contending that overlooking partial unemployment will cause a serious understatement of increases in the involuntary loss of work. In the total time not worked by all part-time workers (top line of Chart 2), no corresponding conformity

[13] For an algebraic proof of this proposition, see Appendix Note 1.
[14] For details of the derivation of these series, see Appendix Note 2.

CHART 2

Time Not Worked by Part-Time Workers, 1946-1954



to the cycle is apparent. Judgments about the conformity of this series are more reliable than those about the series on involuntary part-time work because it is based on monthly data and it covers a longer period. Starting in 1946, the series rises steadily to a peak in December 1950.[15] The rate of rise does not increase perceptibly during the reference contraction of November 1948 to October 1949. After December 1950 the series falls, and the fall is accentuated rather than broken by the contraction in the last half of 1953. The data from the new sample for early

[15] The apparent peak in July 1950 is the result of imperfect seasonal adjustment; the survey week contained the Independence Day holiday. All or part of the rise in this series in the early years may be spurious, and results from the use of a constant full-time workweek. Average hours worked declined steadily from 1946 through 1949, and much of this decline was probably due to reductions in the standard workweek in some industries. The understatement of time not worked is therefore somewhat greater in the earlier years, but this defect would not prevent the series from reflecting any cyclical increase in time not worked.

1954 show a higher level of time not worked. It is not clear whether this represents a cyclical change or simply a difference between the two samples.

The fact that time not worked by involuntary part-time workers conforms to the cycle and time not worked by all part-time workers does not indicates a countercycle in time not worked by other part-time workers. The time not worked by this group on the dates of the special surveys is shown by the middle line of Chart 2. The data give some indication of a countercycle, but not a clear one. The original data for this group show marked seasonal fluctuation, since the number of persons working part time because of vacations, bad weather, and illness all have large seasonal amplitudes. The small number of observations and irregular intervals prevent seasonal adjustment by usual methods. The data shown were therefore obtained by subtracting the time not worked by involuntary part-time workers, not seasonally adjusted, from the seasonally adjusted data for all part-time workers. This procedure assumes that all the seasonal fluctuation of the total arises from the fluctuation in "other part-time workers," which is certainly not true. However, it is probably not very far wrong, and the result, though imperfect, is better than nothing.

There are at least two possible reasons for a countercycle in time not worked by other part-time workers. First, some of these workers may become wholly unemployed during a business contraction. Second, some usual part-time workers may want full-time work during business contractions because other members of their household become unemployed or work fewer hours; they would then become involuntary part-time workers.

From the previous discussion, it might be expected that the lack of conformity to the reference contraction in time not worked by all part-time workers in 1948-1949 demonstrates that the change in the wholly unemployed, considered as representing full weeks of involuntary time lost, is an approximately correct measure of the change in involuntary time lost. Before this can be asserted, an additional complication must be taken into account.

An increase in time not worked by "other part-time workers" has been treated as not involuntary because it does not arise from lack of demand. This is clearly true when the increase arises from an increase in the number of such workers. It is not equally true if the increase in time not worked arises from a decrease in the average hours worked, which might occur involuntarily through lack of demand even for a worker whose basic decision to work part time rather than full time was voluntary.

Changes in time not worked by "other part-time workers" are accounted for almost entirely by changes in the number of workers rather than changes in average hours worked. Average hours worked shows a slight seasonal pattern but no trace of a cyclical pattern. For the eleven special surveys starting with May 1949 the average hours of this group vary between 19.4 and 19.9 per week except for two August figures of 20.2 and 20.9.[16]

The data therefore seem to support the view that changes in the wholly unemployed viewed as representing full weeks of involuntary time lost are an approximately correct measure of the absolute amount of change in time lost in partial and total unemployment during the contraction of 1949. This conclusion is somewhat at variance with that of T. K. Hitch. A comparison of his methods with those used here may be found in Appendix Note 3.

It should be noted that the discussion above applies to changes in partial unemployment, not to levels. The number of wholly unemployed as a percentage of the civilian labor force does understate the amount of total plus partial unemployment. The understatement arises in two ways: (1) the numerator excludes partial unemployment, and (2) the denominator includes as full units the members of the part-time labor force. This understatement is offset in very small part by including as full units in the numerator the wholly unemployed seeking part-time work.

The understatement is present at all phases of the business cycle, and seems to be greater at peaks than at troughs. Correcting it would involve largely getting used to new magnitudes and would probably lead to smaller rather than larger estimates of the extent of departures from full employment.

Concepts that do not understate the amount of partial and total unemployment can be developed. One might be called full-time equivalent unemployment as a percentage of the full-time equivalent labor force. This would count people having or seeking full-time jobs as whole units. Persons holding part-time jobs by choice and seeking part-time jobs would be counted in appropriate fractions of full-time jobs. Persons involuntarily working part-time would be counted as full units in the denominator, and their time lost would be counted in appropriate fractions of full workweeks in the numerator. This measure can now be computed only for the dates of the special surveys of part-time work for May 1949 and after and cannot be seasonally adjusted.

For May 1949 full-time equivalent unemployment was 7.0 per cent

[16] Prior to May 1949, data are not available. Data for November 1952 are excluded since they are affected by the occurrence of Election Day during the survey week.

of the full-time equivalent labor force, and in May 1951 it was 3.9 per cent.[17] The corresponding figures for unemployment as a percentage of the civilian labor force (not seasonally adjusted) are 5.6 and 2.7. The relative decline is greater in the usual measure. Similar results can be obtained for other dates during the period from 1949 to 1953. They seem to indicate that partial unemployment varies less than total unemployment over the cycle, and adding it to estimates of total unemployment would decrease the relative amplitude of unemployment cycles.

The concepts involved in the present data on partial unemployment are subject to question. The question asked of usual part-time workers "Do you prefer and could you accept full-time work?" relates to attitudes and not, like most census questions, to behavior. The question "Are you seeking full-time work?" would be consistent with other census concepts. The Canadian labor force survey has recently begun to ask this question of part-time workers. The change in concepts involved would undoubtedly reduce the level of estimates of partial unemployment. What it would do to their movement over time can only be conjectured.

To conclude, the available evidence suggests that failure to consider partial unemployment does not lead to underestimates of the cyclical rise in total plus partial unemployment. However, this evidence leaves much to be desired. Better data on part-time work collected more frequently and regularly would be very valuable, and could reverse these conclusions.

Minimum Long-Duration Unemployment. The unemployment data that have been discussed are mixtures of frictional unemployment and cyclical unemployment, becoming almost purely frictional in the neighborhood of their troughs. To detect departures from full employment, it would be desirable to have some way of statistically separating frictional unemployment from cyclical unemployment.

At first thought, one might seek to do this by inquiring into the reasons for the loss of jobs. A person who quits a job voluntarily might be called frictionally unemployed while he seeks other work; a person who is laid off because of slack trade might be called cyclically unemployed. Further reflection reveals fatal weakness in this distinction. Even during full employment individual firms, industries, and localities may experience declines in demand. No one has suggested that maintaining full employment means maintaining every worker indefinitely in his own particular job.[18] This point was well stated by Lord Beveridge

[17] In this calculation, 40 hours is again taken as the full-time workweek.

[18] Lord Beveridge has gone so far as to suggest "the need for stabilizing the demand for labour, not merely in total, but in each of its main categories," William H. Beveridge, *Full Employment in a Free Society*, Norton, 1945, p. 269.

in 1909 when he wrote "The cause of a man's being unemployed is not that which led him to lose his last job but that which prevents him from getting another job now."[19] Loss of a job for any cause results in frictional unemployment if there are other jobs available reasonably well suited to the worker's abilities.

This line of reasoning suggests the duration of unemployment as a possible device for distinguishing frictional unemployment from other types. Unemployment might be considered frictional whenever the worker succeeds in finding a new job in a short period of time. Unfortunately, this is not precisely the information given by statistics of unemployment by duration. We would like the total duration of unemployment from start to end, and, to be thoroughly unreasonable, we would like to know this duration at the start. What we get, of course, is the duration up to the time the statistics are collected. Thus there is no way of telling currently how much short-duration unemployment is the beginning of long-duration unemployment.[20]

Nevertheless, the available statistics on unemployment by duration are of some value. I have taken unemployment of over 10 weeks as long-duration unemployment. The term is used by the Bureau of the Census to refer to unemployment of 15 weeks and over. Fifteen weeks seems a long period for the purpose of separating out frictional unemployment, but the major differences between long- and short-term unemployment can be shown about equally well by several possible dividing lines.

For the period since 1947 Chart 3 shows unemployment of over 10 weeks duration, and unemployment of 10 weeks duration and under, seasonally adjusted and expressed as a percentage of the civilian labor force. Published data on duration for prior years are classified by months and are therefore not comparable. The minimum long-duration unemployment for a twelve-month period occurs in the twelve months ending November 1953, when it was 0.5 per cent of the civilian labor force. Prior to the 1949 recession, the minimum for a twelve-month period was 0.8 per cent of the civilian labor force for the twelve months ending December 1948. In February 1949, the monthly series, seasonally adjusted, rises sharply above this level.

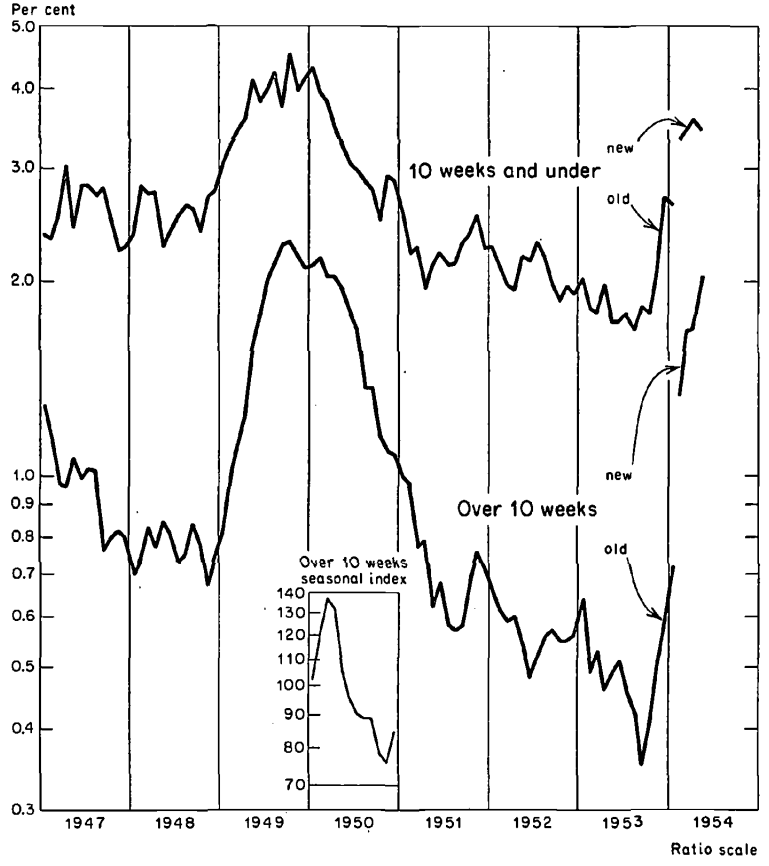
The series on long-duration unemployment has a much larger amplitude in the 1949 contraction than either short-duration unemployment or total unemployment. This, of course, is because it excludes most

[19] William H. Beveridge, *Unemployment: A Problem of Industry*, 2nd ed., London, Longmans, 1930, p. 114.

[20] This point is made with vehemence by H. W. Singer (*Unemployment and the Unemployed*, London, King, 1940, pp. 3-5). Singer also points out that "short duration" unemployment may start when a long period of unemployment is broken by a brief job.

CHART 3

Percentage of the Civilian Labor Force Unemployed, by Duration of Unemployment, 1947-1954



frictional unemployment. However, it does not represent only cyclical unemployment, for even at peaks in general business activity it includes between one-fifth and one-fourth of all unemployment. Long-duration unemployment at cyclical peaks represents largely the more stubborn frictions, those created by declining industries and localities. This kind of unemployment is sometimes called "structural." A second, though probably much less important, source of long-duration unemployment at cyclical peaks is the inclusion of marginal workers who are induced to seek work by tight labor market conditions but are nevertheless regarded by employers as unemployable. In American census statistics, the worker's concept of his own employability, as expressed in work-seeking activity, controls his inclusion.

The rise in short-duration unemployment during the contraction of 1948-1949 shows that this series includes some unemployment that is not frictional, because an unemployed worker must pass through this category to reach the long-duration category. For the same reason, one would expect the long-duration series to lag behind the short-duration series. Although this lag shows clearly in the seasonal patterns of the two series, it is not so evident at the cyclical turning points. The lag of long-duration unemployment at the trough in 1948 is too great to be explained on these grounds, and the two peaks coincide in 1949. At the trough in the fall of 1953, the one-month lag of long-duration unemployment is consistent with the reasoning above.

In addition to its greater cyclical amplitude, the long-duration series conforms more closely to the business cycle in its timing in 1948 than do short-duration or total unemployment. The trough in long-duration unemployment in November 1948 coincides with the peak in general economic activity as determined by the reference dates of the National Bureau of Economic Research. The trough in total unemployment leads the reference peak by eleven months; the trough in short-duration unemployment leads by twelve months. The series on long-duration unemployment is not used by the Bureau in setting reference dates; total unemployment is used.

The limited evidence available tends to support the conclusion that long-duration unemployment is a more reliable indicator of cycles in general business activity than total unemployment. It may therefore be more useful in formulating full-employment goals. It would probably be less useful for the quick detection of changes in business activity, since over a number of cycles long-duration unemployment might tend to lag at the reference turns.

MAXIMUM EMPLOYMENT APPROACH

The terms maximum employment and minimum unemployment are sometimes used interchangeably. By definition, employment plus unemployment equals the civilian labor force. The maximum ratio of employment to the population of working age would always coincide with the minimum ratio of unemployment to the population of working age if the rate of participation in the civilian labor force were always the same. Since it is not always the same, differences in timing between maximum employment and minimum unemployment are possible. However, only the effect of changes in the civilian labor force need be considered here, since in all other respects using maximum employment as a basis for defining full employment gives the same result as using minimum total unemployment.

As mentioned earlier, an autonomous reduction in labor-force participation is not considered a departure from full employment, but a change in the full-employment level. However, a change in labor-force participation induced by a reduction in demand should be considered capable of causing a departure from full employment. Here two kinds of effects are theoretically possible. The first is that predicted by the theory known as the "additional worker theory."[21] This theory holds that a depression increases the size of the labor force because the unemployment of primary wage earners (husbands and fathers) forces dependents to seek work. Exactly the opposite theory was widely advanced in the autumn and winter of 1953-1954. This theory holds that a decline in the demand for labor discourages some job seekers and induces them to leave the labor force.[22] The conflict between these theories concerns the direction of the net change in the labor force during contractions, since it is generally accepted that declining employment will produce some gross change in both directions. It is also possible that the net change would differ in direction at different stages of a contraction.

Since both theories regard the full-employment labor force as normal, neither would, if accepted, cause any change in the estimates of full-employment levels reached by the minimum total unemployment approach. Acceptance of either theory would, however, cause a change in the size of a departure from full employment as estimated from unemployment data. Although these theories are opposite in their basic content, each has been used to show that unemployment was underestimated by the statistics current at the time the theory was advanced. In 1940, when the additional worker theory was put forward, unemployment was estimated by subtracting employment estimates based on establishment reports from an estimate of the normal labor force extrapolated from the decennial census. If the estimate of the labor force was too low, so was the estimate of unemployment. At present, unemployment and employment are both estimated directly from household sample statistics. If a fall in the labor force is induced by lack of demand, the unemployment figure excludes an additional "disappearance of jobs" shown by the fall in employment.

The evidence concerning the effect of changes in demand on the labor force has been thoroughly reviewed by Clarence D. Long.[23] He

[21] See the literature cited by Clarence D. Long in "Impact of Effective Demand on the Labor Supply," *American Economic Review*, May 1953, p. 459, note 3.

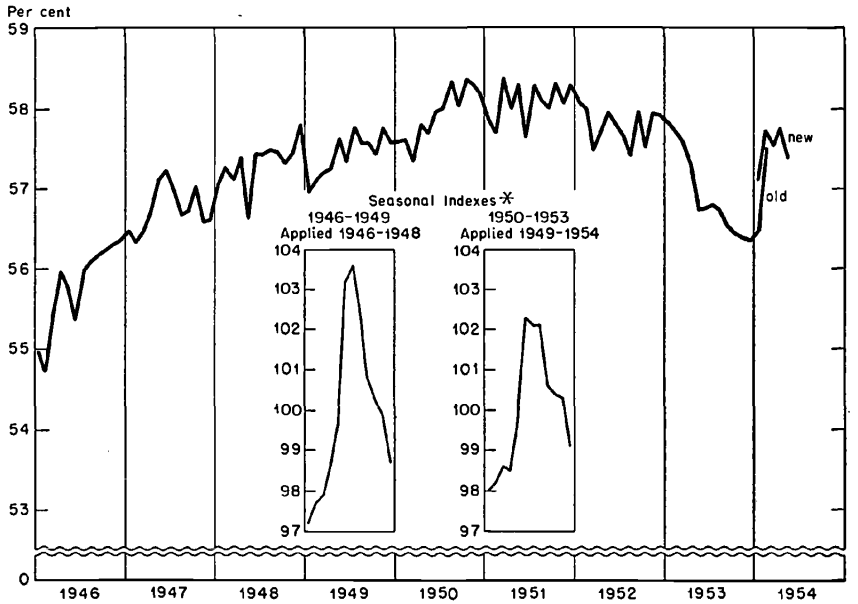
[22] For one of numerous examples of this view see the letter by Emil Rieve, Chairman, C.I.O. Committee on Economic Policy, in the *New York Times*, January 21, 1954, p. 30.

[23] Long, *op.cit.*, and references cited therein.

concludes that the depression of the thirties caused a decline in labor-force participation of about 2 per cent of population in the United States, and that the business contraction of 1948-1949 caused no significant change in either direction. The series on civilian labor force used in this paper confirms Long's conclusion for 1948-1949.[24] Chart 4 shows no significant drop in labor-force participation during the 1948-1949 contraction.

CHART 4

Percentage of Civilian Noninstitutional Population Fourteen and Over in the Civilian Labor Force, 1946-1954



* Scale for plotting seasonal indexes is chosen so that 1 unit is equal to 1/2 unit in the series plotted, which results in approximately equal percentage changes.

The scale chosen is very large, to enable the detection of even a slight drop. This makes prominent the random fluctuation caused by imperfect seasonal adjustment and sampling variability. There is no reason to believe, however, that these sources of error would entirely obscure any cyclical pattern.[25]

[24] Long's data are quarterly and his seasonal adjustment is based on the years 1946-1948. The data used here are monthly and the seasonal adjustments are based on the years 1946-1949 and 1950-1953.

[25] The Bureau of the Census has estimated that the chances are about 19 out of 20 that the sampling variability of an estimate of the civilian labor force is less than approximately 1.2 per cent. The chances of error persisting over several months are smaller than the chances of error in a single month (see Long, *op.cit.*, p. 464).

The decline in labor-force participation which began in April 1953 and continued throughout the year gave rise to the theory that unemployment estimates understated the decline in the demand for labor late in the year. The theory, however, fails to explain why falling demand should cause falling labor-force participation in 1953, but not in 1949. The labor-force participation of women and of men 14 to 17 was slightly higher in March 1953 than in March 1948, but these differences seem insufficient to account for the differences in the subsequent behavior of this series. The theory that discouragement with the lack of job opportunities was the reason for withdrawal from the labor force in 1953 also fails to explain why workers were so easily discouraged. They apparently left the labor force too quickly to show up even briefly in unemployment statistics. The theory would be much more plausible if advanced to explain a fall in employment concurrent with a smaller rise in unemployment, but this is not what happened from April to August.[26]

In January and February 1954, the fall in labor-force participation was sharply reversed, and the general level of 1952 and the first quarter of 1953 was regained. This rise in labor-force participation is evident in data from both the old (68 area) and the new (230 area) samples. The rise in labor-force participation coincided with a substantial rise in unemployment, suggesting that it was not the result of increased demand. Nor did it coincide with any striking change in foreign relations or military commitments. It may result from an intensified effort of enumerators to get a complete count of the labor force; because of the January discrepancies between the two samples, special training sessions for enumerators were held prior to the February survey.

It seems safe to say that there is no substantial evidence upholding the view that labor-force participation declines when there are moderate decreases in the demand for labor. Therefore, in the absence of further evidence, there is no clear conceptual advantage in using employment data rather than unemployment data to measure the extent of departures from full employment, except in periods of severe de-

[26] The drop in labor-force participation in 1953 is discussed at some length in the *Economic Report of the President*, January 1954 (pp. 149-151). This discussion points to evidence that the demand for labor was still strong in the months when labor-force participation dropped most. It seeks to relate the drop to the "yielding of China on the prisoner-repatriation issue on March 28," and points to a similar drop under somewhat analogous circumstances in 1945.

Members of the staff of the Bureau of the Census regard this decline as an error of measurement rather than a real phenomenon. They point out that a large part of the decline in employment took place among government workers, for which there is no explanation.

pression.[27] Further evidence on the cause of changes in labor-force participation such as those of 1953-1954 might be obtained from seasonally adjusted monthly data on labor-force participation by sex and age groups.

TURNOVER APPROACH

Lack of adequate turnover data prevents using this approach to measure full employment. Nevertheless, it is worth exploring for the additional insights it gives into the full-employment concept.

The amount of unemployment can be considered as the product of two factors: the number of accessions (one measure of turnover), and the length of the period of work-seeking that precedes each accession.[28] The advantage of considering unemployment in this way is that it partially reduces reliance on historical minima that characterizes the definitions of full employment discussed previously. Full employment can now be defined as existing when the average duration of work-seeking per accession is at a minimum. A departure from full employment would arise if this duration increased (as shown later, this is not the same as the average duration of unemployment reported in unemployment statistics), but a departure would not arise if unemployment increased solely because the number of accessions rose, while average duration remained constant. This would mean only an increase in frictional unemployment arising from an increased amount of friction to be overcome. It could take place because of a greater inclination on the part of workers to change jobs or to move in and out of the labor force, which cannot be condemned as inherently bad.

[27] This statement is intended to apply to employment and unemployment data of equal accuracy. For some purposes, employment data based on establishment reports may be more accurate than sample-survey data on unemployment.

[28] Accessions rather than separations are the appropriate measure of turnover, since each accession can be thought of as preceded by a period of job-seeking. At the limit the length of this period is zero when no working time is lost between jobs, or a new entrant to the labor force begins work as soon as he enters. It is not true even in this sense that every separation is followed by a period of job-seeking, since many separations occur when workers die, retire, or leave the labor force for other reasons. Although a "common-sense" notion of unemployment views it as caused by layoffs and discharges, it is actually quite difficult to approach the number of instances of unemployment from the separations side. To do so we should have to take the total number of separations, subtract those occasioned by withdrawal from the labor force, and add the number of entries into the labor force. In approaching the problem from the accessions side, it is necessary to omit unemployment that is terminated by withdrawal from the labor force.

Other writers who use the turnover approach have not specified the concept of turnover involved; they speak simply of "job changes" (see Alvin H. Hansen, *Economic Policy and Full Employment*, McGraw-Hill, 1947, p. 108; Beveridge, *Full Employment in a Free Society*, pp. 127-128; and A. C. Pigou, *Unemployment*, London, Williams & Norgate, 1913, p. 29).

The number of accessions would be measured currently from turnover data; only the duration of work-seeking per accession would need to be taken as a historical minimum. The result would be a concept of minimum unemployment that changed through time with the amount of friction to be overcome. The unchanging portion of the concept can be viewed as the maximum efficiency previously achieved in overcoming given amounts of friction.

Two types of data on accessions are available for the United States, and neither is well suited to the purpose of this section. The Bureau of Labor Statistics publishes accession rates for manufacturing and for a few nonmanufacturing industries. These are conceptually correct for our purpose, but both incomplete in coverage and of somewhat doubtful accuracy as to level. The Bureau of the Census in its series on gross changes in the labor force estimates total additions to nonagricultural employment. These are complete in coverage but concern additions to nonagricultural employment taken as a whole, rather than accessions to the work force of individual employers. Thus shifts from unemployment, agricultural employment, and outside the labor force to nonagricultural employment are included in total additions to nonagricultural employment, but shifts from one employer to another within nonagricultural employment are excluded unless at least a week of unemployment or time spent outside the labor force intervenes between jobs. Complete turnover coverage could be obtained by adding questions to the monthly survey of the labor force. Each employed worker whose status as now defined had not changed since the preceding month would have to be asked whether he had changed employers, and each worker who had changed employers or become employed since the preceding month would have to be asked how long he had been without work while looking for his new job. From these answers, including the instances where the duration of work-seeking was zero, an average duration could be computed.

The possible use of such data can best be illustrated by a hypothetical example such as that shown in Table 1. This table assumes a labor market in which all separations and all accessions take place on the first day of each month. In "full-employment equilibrium" the workers hired are those who became unemployed on the first day of the preceding month, so that the average duration of unemployment is one month. This is the situation shown for month 1. In the succeeding months, a larger volume of unemployment is generated by a reduction in the number of accessions, then absorbed again as accessions rise. It is assumed that the first workers to become unemployed are the first to be rehired.

TABLE 1

A Hypothetical Example Showing the Relation of Turnover to Unemployment

Month (1)	*Number of Separations* (2)	*Number of Accessions* (3)	*Number Unemployed During Month* (4)	*Average Duration of Completed*[a] *Unemployment (Months)* (5)
1	100	100 (0)	100 (1)	1
2	100	50 (1)	50 (1) 100 (2)	
			150	1
3	100	0	50 (1) 100 (2) 100 (3)	
			250	...
4	100	50 (1)	100 (2) 100 (3) 100 (4)	
			300	3
5	100	100 (2)	100 (3) 100 (4) 100 (5)	
			300	3
6	100	100 (3) 100 (4)	100 (5) 100 (6)	
		200	200	2.5
7	100	100 (5) 100 (6)		
		200	100 (7)	1.5
8	150	100 (7)	150 (8)	1
9	150	150 (8)	150 (9)	1

[a] Derived from the detail of column 3. These figures refer to the average duration of unemployment of those hired in each month.

Note: Figures in parentheses refer to the month in which workers were separated from their previous jobs.

Starting with month 8, the number of separations rises to 150, and the number of accessions rises correspondingly starting with month 9. This increases the level of unemployment; however, it does not represent a new departure from full employment, as might be inferred from

the number of unemployed alone. This can be seen by looking at the average duration of unemployment, which does not rise. The average duration figures of this example show completed duration, unlike usual duration data, which show duration up to the time of a count of the unemployed. Completed duration data would also differ in practice by including the instances of zero duration (which do not occur in the example). These, of course, cannot be obtained from a count of the unemployed.

Only statistics of completed duration can be combined with the number of accessions to produce a volume of unemployment. In practice, however, similar conclusions could be drawn from the usual duration data. A rise in unemployment without a rise in its average duration implies increased turnover even though the corresponding turnover data are not available. Hence the collection of complete turnover data may not be worth the costs involved. The concept is nevertheless useful in clarifying the problem of measuring full employment.

UNFILLED VACANCIES APPROACH

This approach to the measurement of full employment is suggested by the definition of Lord Beveridge that full employment "means having always more vacant jobs than unemployed men."[29] Definitions based on a ratio of unemployment to unfilled vacancies are completely free from the dependence on historical experience that is present in the definitions discussed previously. Instead, the standard is taken from the kind of balance that is desired in the labor market. Whereas a historical minimum provides a unique standard, the unfilled vacancies approach permits selection from a broad continuum of standards. At one extreme are large and constant excesses of vacancies over unemployed workers, in the middle is an approximate equality between the two, and at the other extreme are excesses of unemployed workers over vacancies not exceeding specified limits. The choice of a standard along this continuum will depend on the relative strength of the desires to avoid unemployment and to avoid inflation.

The measurement of ratios of unemployment to vacancies requires data on the number of unfilled vacancies—the best source of these is an extensive and widely used system of public employment offices. For the United States, no data are available.[30]

Canada publishes complete data on the unfilled vacancies listed at

[29] Beveridge, *Full Employment in a Free Society*, p. 18.

[30] Data are published on the number of unfilled vacancies "in clearance," i.e. those of which notice was sent to employment service offices other than the one where they originated because they could not be filled locally. These are only a part of the total number of listed vacancies, which in turn are only a small part of the vacancies in the economy.

employment service offices. However, as in the United States, the use of the employment service is voluntary for employers and is by no means universal. Hence even in years of low unemployment, the number of unemployed greatly exceeds the number of listed vacancies. For 1951, a year of very low unemployment in Canada, the average number of unemployed at the dates of the quarterly surveys of the labor force was 109,000. For the four first of the month dates closest to these surveys, the average number of unfilled vacancies was only 55,000. Despite the incompleteness of Canadian data on vacancies, they have been used to compute a series of ratios of unfilled vacancies to applications for employment;[31] the results do not seem to be very useful in defining levels of full employment, although the movements of the series are informative.

For Great Britain, it is possible to compute ratios of unemployed workers to unfilled vacancies for the period since late 1947. During most of this period, the listing of vacancies with employment exchanges was compulsory for most employers. During the rest of the period, use of the exchanges was voluntary, but so widespread that the changes from a compulsory to a voluntary basis and back to a compulsory basis again produce only minor breaks in the series.

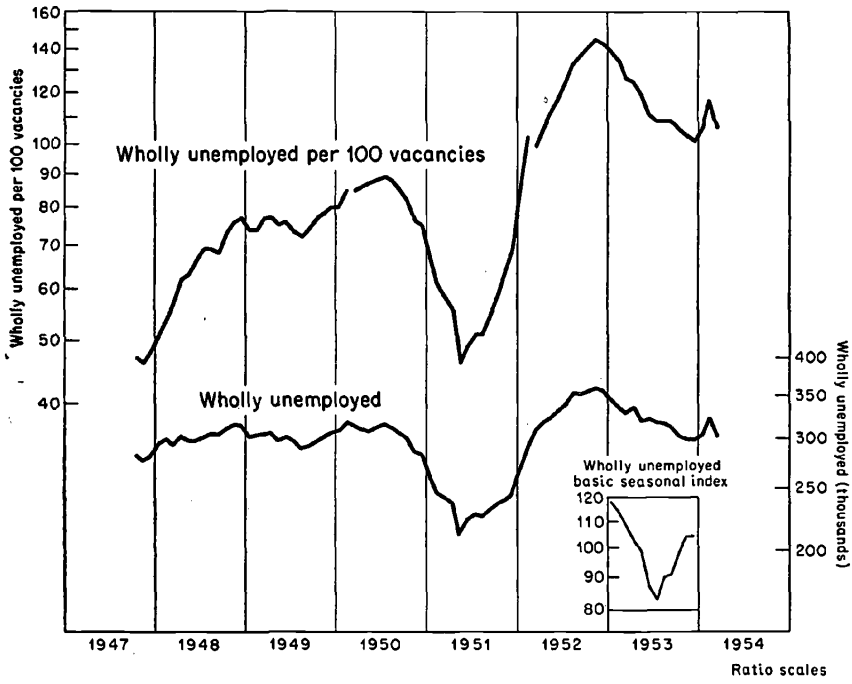
The top line of Chart 5 shows the number of wholly unemployed per 100 unfilled vacancies, seasonally adjusted, for Great Britain since October 1947. The series is shown in three segments: during the first period, from October 1947 to February 1950, the amended Control of Engagements Order was in effect; during the second period, from March 1950 to February 1952, there was no compulsion to list vacancies; during the third period, from March 1952 on, the Notification of Vacancies Order was in effect. The height of the breaks between segments shows the approximate effect of these administrative changes. Workers who are temporarily stopped have been excluded from the unemployment data, since they are presumably not seeking new jobs.[32] The number of vacancies listed is less than the total number of vacancies in Great Britain even for the periods of compulsory listing. This is true for two reasons: (1) some industries and some groups of workers are excluded from the provisions of the Notification of Vacancies Order, and (2) some employers give standing orders to the employment exchanges to refer all suitable applicants without specifying a number of vacancies. The extent of the resulting understatement of vacancies cannot be estimated from published data but could perhaps be esti-

[31] See Emile Benoit-Smullyan, "On the Meaning of Full Employment," *Review of Economic Statistics*, May 1948, p. 132.

[32] For further details on the derivation of this series, see Appendix Note 5.

CHART 5

Number Wholly Unemployed and Wholly Unemployed per 100 Unfilled Vacancies, Great Britain, 1947-1954



mated by the Ministry of Labour. Despite the understatement of vacancies, the number of unemployed per 100 unfilled vacancies was consistently below 100 from September 1947 to January 1952.

The bottom line of Chart 5 shows the number of wholly unemployed, seasonally adjusted. The general shape of the two series is very similar, but the relative amplitude of fluctuations in the ratio of unemployed to vacancies is much greater than that of fluctuations in unemployment. This extreme sensitivity of the ratio arises because it records changes in the labor market simultaneously from both sides; the same forces that produce a rise in unemployment also produce a fall in unfilled vacancies, and the ratio reflects them in both terms. Users of such a ratio must take care that its sensitivity does not create undue concern over what are really small changes in labor market conditions. However, this sensitivity does not seem to create erratic or random fluctuation; on the contrary, the series of ratios is smoother than either of the component series, indicating a tendency for random movements of one component to be cancelled or damped by movements of the other.

This series of ratios permits a comparison of Lord Beveridge's verbal definition of full employment with his numerical definition, and with the official definition of the government of the United Kingdom. Beveridge's numerical definition is that full employment exists when the number of unemployed does not exceed 3 per cent of the number of employees.[33] This includes an allowance for seasonal unemployment. The official definition is in effect the same; the full-employment standard is "a level of unemployment of 3 per cent at the seasonal peak."[34] Statistics consistent in concept with this definition are not published for the United Kingdom but are published for Great Britain. Since the definition is stated in terms of the seasonal peak, only data for the peak month of unemployment (January) can be compared with the definition. If the definition had been stated in terms of seasonally adjusted data, it would not be subject to this limitation.

Since the ratios presented here are based on an incomplete reporting of vacancies, the condition of Beveridge's verbal definition that the number of vacancies exceed the number of unemployed will still be satisfied when the ratio stands at or perhaps somewhat above 100. It was not this high at any time from September 1947 to January 1952. In February 1952 it reached 103. In this month, when seasonal unemployment is near its peak, the unadjusted unemployment rate for Great Britain was 1.9 per cent. In January 1953, the ratio was 139; the unemployment rate, 2.2. In January 1954, the ratio was 105; the unemployment rate, 1.8. These ratios show less than full employment by Beveridge's verbal definition, unless the number of unreported vacancies was large. At the same time, there was more than full employment by the 3 per cent definition. It seems probable that for Great Britain, Beveridge's verbal definition of full employment would never permit as much as 3 per cent unemployment at the seasonal peak. However, at the time that he first used it, available statistics did not permit its translation into numerical terms by the means used here.

PRICE APPROACH

The fear has frequently been expressed that full employment, as defined in many of the ways previously discussed, could be attained only at the cost of inflation. Very low levels of unemployment can be

[33] Beveridge, *Full Employment in a Free Society*, pp. 126-128.

[34] Reply of the Government of the United Kingdom in *Problems of Unemployment and Inflation, 1950 and 1951* (United Nations, 1951, p. 80). This official standard was announced in Parliament on March 22, 1951. The concept differs from that of unemployment as a percentage of the civilian labor force by excluding from the base the self-employed and unpaid family workers. On the larger base, it would be about 0.025 per cent less. The numerator includes the "temporarily stopped."

reached by creating a vast demand for goods and services, which eliminates all unemployment except frictional and reduces the amount of frictional unemployment by shortening the time needed to find jobs. However, the creation of a vast demand for goods and services must also tend to raise prices. Recent experience in a number of countries seems to show that this is more than a theoretical problem. In the postwar years, Australia, Sweden, and the United Kingdom, among other countries, have experienced a combination of extremely low unemployment and very sharp increases in the price level.

The selection of a definition of full employment that would not be inflationary if adopted as a guide to policy can be made in several ways. A historical minimum of unemployment can be used as a starting point, but increased by an arbitrary allowance to reduce the danger of inflation if the previous minimum of unemployment was reached under conditions of rising prices. A ratio of unemployed workers to unfilled vacancies can be selected that is high enough to reduce the dangers of inflation. Finally, specifications about price behavior can be written into the definition of full employment. The last approach is the one chosen by Bertil Ohlin, who defines full employment as "the degree of employment that exists when the aggregate demand for commodities is at the highest level that is compatible with the condition that demand at existing prices is balanced by current domestic supply."[35]

This definition is one of a large family of possible definitions in which the goals of maximum employment or minimum unemployment are subjected to various kinds of constraints. For the constraint of stable prices could be substituted, for example, prices declining at specified rates, a constant or slowly rising quantity of money, or the maintenance of a fixed rate of exchange with some foreign currency. The question naturally arises whether such definitions are definitions of full employment in anything more than a purely formal sense; that is, do they imply reasonably low levels of unemployment? The discussion here will be restricted to the constraint of stable prices, both because it arises out of dangers that may be inherent in some unconstrained definitions of full employment, and because there is reason to believe that it does not restrict the concept of full employment so severely as to make it such in form but not in fact.

One would naturally expect some relation between the cyclical movements of employment and prices, because both are influenced by the general level of demand. The question is really how closely are the two

[35] Bertil Ohlin, *The Problem of Employment Stabilization*, Columbia University Press, 1949, p. 6. The word "domestic" precludes obtaining the necessary supply from abroad by means of foreign credits or the depletion of gold or foreign exchange reserves. The word "current" precludes obtaining it by drawing down inventories.

movements related.[36] In particular, does large scale unemployment persist during business expansions once prices have regained the level at which they are to be stabilized? If Ohlin's definition implies a policy of "choking off" some expansions, at what point does this occur?

In order to investigate these questions, some of the terms of the definition must be specified more precisely; these specifications are not necessarily the ones that Ohlin would have chosen. First, a way of measuring prices must be specified. I have chosen a general index of wholesale prices, largely because wholesale prices are more flexible than retail prices.[37]

The selection of a price index permits a search for data that will help in clarifying the cyclical relation of prices to unemployment. The data required are a monthly index of wholesale prices and a monthly series showing unemployment or employment. There should be no breaks in the statistical continuity of the series. The period should cover several business cycles, including some whose peaks reach high levels of employment, and it should exclude such extraneous disturbances as major wars.

These requirements are difficult to meet. In the postwar period, normal relationships between prices and employment have been distorted in many countries by direct price controls and currency devaluations. No major free economy had high levels of employment during most of the 1930's, and the further back in time one goes, the fewer are the countries for which adequate data on both prices and employment are available.

I have selected the following countries, time periods, and statistical series as offering the best available tests of the relationships between prices and employment or unemployment at high employment levels:

1. *Great Britain, 1887-1913.* The Sauerbeck wholesale price index and the seasonally adjusted percentage of unemployment among trade unionists[38]

[36] This question was of great interest to Irving Fisher. For some pioneering investigation of this area, see his "Employment and the Price Level" in *Stabilization of Employment*, C. F. Roos, editor, Principia Press, 1933; and "A Statistical Relation between Unemployment and Price Changes," *International Labour Review*, June 1926, pp. 785-792.

[37] The literature on price stabilization as a guide to counter-cyclical policy contains several discussions of the characteristics of a desirable index to stabilize (see Irving Fisher, *Stabilizing the Dollar*, Macmillan, 1925, pp. 149ff.; Henry C. Simons, "Rules versus Authorities in Monetary Policy," *Journal of Political Economy*, February 1936, pp. 12-13; and Lloyd W. Mints, *Monetary Policy for a Competitive Society*, McGraw-Hill, 1950, p. 129). These writers all conclude that wholesale price indexes are the best available indexes to use as guides to stabilization policy.

[38] Both series have serious defects for this purpose. The Sauerbeck price index is overweighted with imported commodities, and the trade union unemployment rate covers only a small and cyclically unstable portion of the economy. Against

2. *United States, 1919-1929.* The BLS wholesale price index and the BLS index of factory employment, seasonally adjusted

3. *United States, 1946-1953.* The BLS wholesale price index, and unemployment as a percentage of the civilian labor force, seasonally adjusted

The last period is included despite its shortness because it is of the greatest current interest, and the data are the most adequate.

For periods 1 and 2 the dates of the peaks and troughs in prices and employment are shown in Table 2. The expected general correspondence is clearly present. There is a cycle in unemployment or employment for every cycle in prices. The converse is also true, except that there is nothing in the wholesale price series corresponding to the sharp but brief rise in unemployment in Great Britain from May to November of 1897. There is a generally close correspondence in timing between the peaks in wholesale prices and the peaks in employment or in unemployment inverted. At the troughs, the correspondence in timing is usually not close.

Before examining further the relevance of these data to Ohlin's definition of full employment, it is necessary to specify more precisely another term in the definition. The definition speaks of "existing prices" without any time referent. If prices are stabilized at a time of widespread unemployment the result will not be full employment in any meaningful sense. Widespread unemployment could probably not be eliminated without some increase in the price level. "Existing prices" should refer to those existing in a period of high employment. However, one cannot use the concept of high employment in the definition without making it completely circular. I have therefore substituted for "existing prices" the previous peak in the price index, relying on the correspondence in peaks between prices and employment to insure that this defines a price level compatible with high levels of employment.[39] The Ohlin rule as thus interpreted would not require a full-employ-

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these disadvantages must be set the great advantage of consistent series covering a long period unbroken by major extraneous disturbances. For a discussion of this unemployment series, see Beveridge, *Unemployment: A Problem of Industry*, pp. 16-23. For discussion of the price series, see the *Journal of the Royal Statistical Society*, March 1921, pp. 255-277.

[39] The rule is generally a reasonable one, but may produce undesirable results in two cases. The first is that in which wholesale prices at their last peak were temporarily abnormally high, as in 1920. The second is that in which wholesale prices at their peak are below a former well-established level, and unemployment is still high, as in 1937. In some such cases, the level of the next to the last peak would be used; this might have been appropriate in 1939 and 1940. In other such cases, a maximum permissible price level would have to be chosen arbitrarily; this would have been necessary in 1922.

TABLE 2

Peaks and Troughs in Prices and Employment, Great Britain, 1887-1913, and United States, 1919-1929

GREAT BRITAIN, 1887-1913				UNITED STATES, 1919-1929			
Wholesale Prices		*Trade Union Unemployment Rate, Inverted*		*Wholesale Prices*		*Index of Factory Employment*	
Peaks	*Troughs*	*Peaks*	*Troughs*	*Peaks*	*Troughs*	*Peaks*	*Troughs*
	June 1888				Feb. 1919		March 1919
Dec. 1889	July 1896	Jan. 1890	Dec. 1892	May 1920	Jan. 1922	Jan. 1920	July 1921
		May 1897	Nov. 1897	March 1923	June 1924	June 1923	July 1924
July 1900	Nov. 1902	Oct. 1899	May 1904	Nov. 1925	June 1927	Jan. 1926	Jan. 1928
May 1907	Feb. 1909	April 1907	Oct. 1908	Sept. 1928		Aug. 1929	
March 1913		Nov. 1912					

ment policy to undo past inflation but would require it to prevent future inflation, in the sense of prices that reach new high levels.

The paired price and unemployment series can now be used to form a rough notion of the amount of unemployment compatible with the definition. This is done by discovering the instances in which prices regained a former peak and observing the level and trend of unemployment when this price level was regained. Too much importance should not be attached to the exact point when this occurs, since if prices were stabilized at this level, employment might continue to rise for a time, though perhaps not as rapidly as it would have if prices had continued to rise.

The British series from 1887 to 1913 (Chart 6) afford three instances when peaks in wholesale prices were regained. The first of these occurred in January 1900, when prices regained their December 1889 level. The seasonally adjusted trade union unemployment rate for January 1900 was 1.9 per cent; its low of 1.8 per cent had been reached three months previously. Prices continued to rise until July 1900, and during this period the unemployment rate rose to 2.5 per cent. Monetary and fiscal policy that would have held down prices during this period might therefore have accelerated the rise in unemployment. The trade union unemployment rate was still relatively low at the end of the period. In three depressions between 1885 and 1913 it reached 9 per cent.

The second instance of a regained peak in prices occurred in April 1906, when prices regained the peak of July 1900. The unemployment rate for April 1906 was 3.6 per cent; its trough was 3.1 per cent in April 1907. The same level was also reached in September 1906. A policy that held down prices during 1906 and the early months of 1907 would probably have prevented the unemployment rate from falling this low.

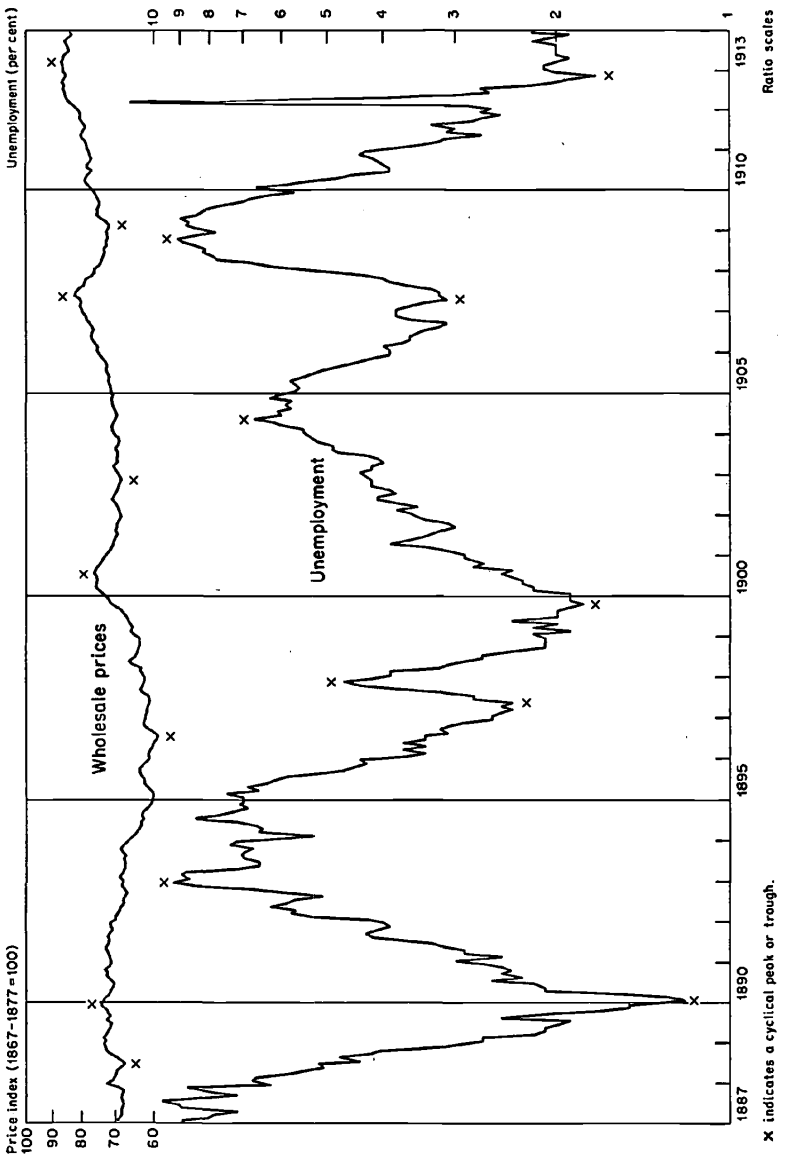
The third instance of a regained peak in prices occurred in February 1912, when prices regained the level of May 1907. The unemployment rate in February 1912 was 2.9 per cent. The trough of 1.7 per cent was reached in November, and a policy of holding down prices would again have prevented the trough from being so low.

It can be concluded that employment in Great Britain was overfull in three instances during this period, according to this definition, but that the levels of unemployment implied by the definition would nevertheless have been reasonably low. In the United States from 1919 to 1929 employment was never overfull, since wholesale prices never surpassed their previous peaks.

The last instance of a regained peak in wholesale prices occurred

CHART 6

Unemployment and Wholesale Prices, Great Britain, 1887-1913



in the United States in September 1950, when prices regained the level of August 1948. Unemployment in September 1950 was 4.2 per cent of the civilian labor force (both seasonally adjusted) and was falling rapidly as a result of the Korean War. A monetary and fiscal policy that held prices down to the August 1948 level would have retarded the further fall in unemployment but would probably not have prevented a considerable further fall. After March 1951, unemployment and wholesale prices fell together for more than two years, although consumer prices were rising. Since the levels of unemployment reached during this period of falling wholesale prices were much lower than those of the period from September 1950 to March 1951, it does not seem sensible to regard employment as overfull during that period. Rather, the period 1950-1953 must be considered one when wholesale prices and unemployment were governed by divergent forces. This suggests that Ohlin's definition, as I have interpreted it, is not always useful.

The paired series on prices and unemployment can be used to go one step beyond the Ohlin definition. The notion of full employment subject to a price constraint can be replaced by the simple notion of price stability as the guide to monetary and fiscal policy at all times. This is the policy advocated by Irving Fisher, Henry C. Simons, and Lloyd W. Mints.[40] Under such a rule, stable prices not only set a limit to inflationary monetary and fiscal policy in an expansion but also replace unemployment as the principal guide to policy during contractions. Would such a rule permit large-scale unemployment to develop before it called for countercyclical action or would it be substantially equivalent to a full-employment policy as defined by other methods?

To answer this question, a further definition of the meaning of stability is needed. The level at which prices are to be stabilized is, as before, that of the previous peak. A wholesale price index will be considered stabilized at that level if it does not depart from it in either direction by more than a specified allowance for random fluctuation. If random fluctuation were allowed to influence countercyclical policy, the policy might at times reinforce rather than offset cyclical movements in prices. This is a result of lags in the collection of data, in the formulation of policy, and in the influence of policy on prices. Thus if policy attempted to offset a random decline in prices, it might not become effective until the underlying expansion reasserted itself, and this expansion would then be reinforced.[41]

[40] See the works cited in note 37.

[41] For fuller discussion of this point, see Mints, *op.cit.*, p. 140, and Milton Friedman, "A Monetary and Fiscal Framework for Economic Stability," *American Economic Review*, June 1948, pp. 254-258.

I have determined the allowance for random movement for each series by examining such random movements[42] over the period for which it was used. For the Sauerbeck index for Great Britain, 1885-1913, an allowance of 4 per cent was necessary, because of the small coverage of the index and the high proportion of sensitive prices included. Two random rises and one random decline during the period exceeded this allowance. For the BLS wholesale price index for the United States, an allowance of 3 per cent was made for the period 1919-1929, and 2 per cent for 1946-1953. No random movements during these periods exceeded these allowances.

The effect of a stable price policy during contractions can be roughly estimated by determining the points at which declines in wholesale prices clearly become more than random, and observing the level and trend of unemployment of these points. The instances that will permit the most unemployment under such a policy are those when the peak in prices lags behind the trough in unemployment (the peak in unemployment inverted). Three lags of more than one month are shown in Table 2. In Great Britain, the peak in wholesale prices of July 1900 lagged 9 months behind the trough in unemployment. The decline in wholesale prices exceeded the allowance for random fluctuation in January 1901, when the unemployment rate had reached 2.9 per cent. A lag of 4 months in the peak of prices behind the trough in unemployment occurred in 1913. The decline in prices exceeded the allowance for random fluctuation in March 1914, when the unemployment rate was 2.2 per cent. The third substantial lag shown on the table occurs in the United States in 1920. The decline in prices exceeded the allowance for random fluctuation in August 1920. From January to August the seasonally adjusted index of factory employment declined from 116 to 106 (1923-1925 = 100) but in August it was still at a relatively high level.[43] The final instance of a lag is not shown in Table 2; in 1948 in the United States the peak in wholesale prices lagged nine months behind the trough in unemployment. By December 1948 the decline in wholesale prices exceeded the allowance for random fluctuation. Unemployment in December 1948 was 3.5 per cent of the civilian labor force, compared with 3.1 per cent at its trough in December 1947 (see Chart 7), and an average of 3.3 per cent for the 12 months ending October 1948 (then the lowest 12 month average since World War II).

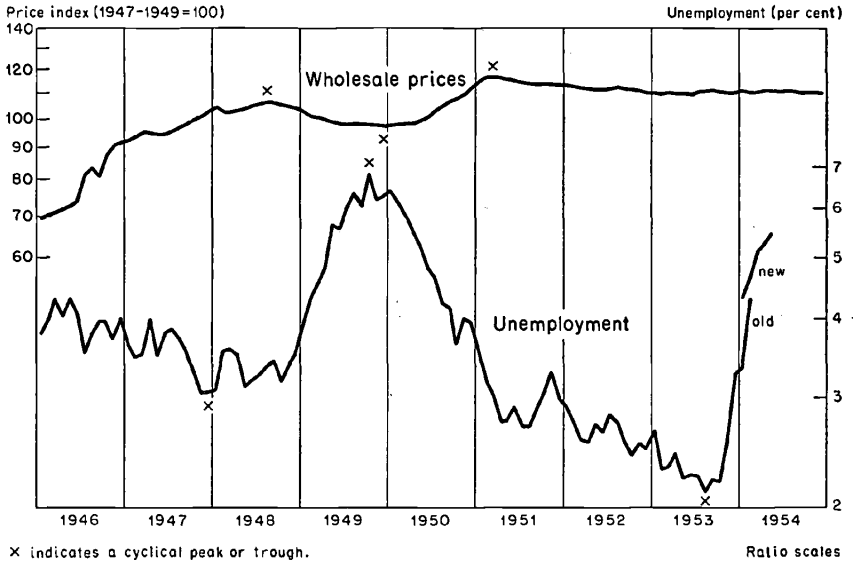
These four cases suggest that using wholesale prices as a principal guide to countercyclical policy would not delay action in contractions

[42] As used here, a random movement means a movement that does not constitute a specific cycle in the method of analyzing cycles used by the National Bureau of Economic Research.

[43] The rule was probably not appropriate during this contraction (see note 39).

CHART 7

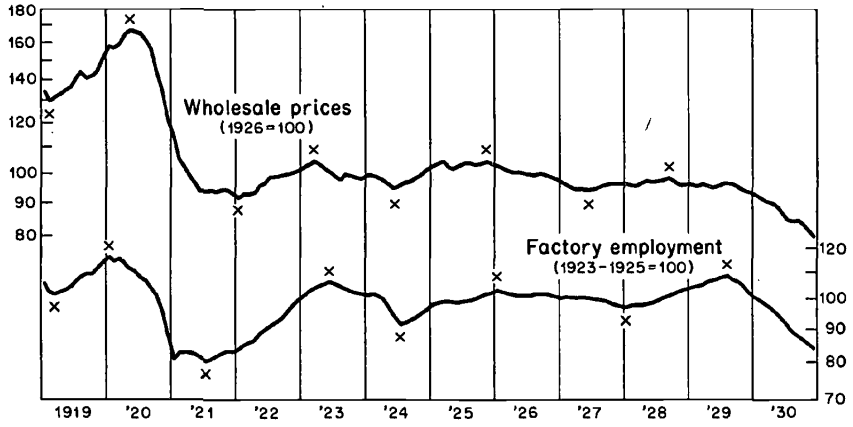
Wholesale Prices and Percentage of Civilian Labor Force Unemployed, United States, 1946-1954



to a point where large amounts of unemployment were tolerated. The real anomalies created by the price stability rule lie in the opposite direction, and occur when the peak in wholesale prices leads the trough in unemployment. Two instances of long leads have occurred in the United States since 1919. The first occurred when the peak in wholesale prices in September 1928 led the peak in factory employment by 11 months (see Chart 8). The decline in wholesale prices exceeded the allowance for random fluctuation in February 1929. In this month the index of factory employment stood at 105, its highest level since 1923, and it continued to rise to 108 in August. The second instance occurred when the peak in wholesale prices in March 1951 led the tentative trough in unemployment of August 1953 by 29 months. The decline in wholesale prices exceeded the allowance for random fluctuation in July 1951. In this month unemployment was 2.7 per cent of the civilian labor force, the lowest since World War II, and it continued to fall thereafter. In these two instances, a policy of preventing declines in the wholesale price level would have resulted in still tighter labor markets, and probably in unintended rises in consumer prices and in wages. This dilemma could perhaps be averted by selecting some lower level of prices as the goal of price stabilization, but only at the cost of permitting greater unemployment in other contractions.

CHART 8

Index of Factory Employment and Wholesale Price Index, United States, 1919-1930



This analysis has been designed more to suggest methods of further exploration than to provide any definitive statement of the relations between prices and unemployment. It has suggested that Ohlin's definition of full employment may be a reasonable one. However, the further departure from usual concepts of full employment implied in the Fisher-Simons-Mints rule leads to new difficulties. Some definitions of full employment raise problems by implying that monetary and fiscal policy should be guided by unemployment to the point of becoming useless as weapons against inflation; similarly the Fisher-Simons-Mints rule may mean concentration on wholesale prices to the point of ignoring important contraindications in employment and elsewhere. It appears that modern economies are too complex to be guided by any one simple rule; the alternatives are a set of rules more complicated than those that I have tried to test, some reliance on judgment and discretion in counter-cyclical policy, or complete reliance on "built in stabilizers."

3. *Factors Affecting the Level of Full Employment*

The third section of this paper will consider briefly the sources of differences that develop over time or exist between countries in the level of full employment as defined and measured in some one way. For purposes of illustrating these differences, comparisons will be made between the United States and Great Britain, and between the United States and Canada. The illustration of differences over time in full-

employment levels in the United States is not possible, because such differences develop slowly, and the relevant statistics for widely separated points in time cannot be made sufficiently comparable for the purpose.

To permit the necessary illustrations, full employment is defined as minimum total unemployment expressed as a percentage of the civilian labor force for a postwar calendar year. This concept can be readily applied to the statistics of all three countries. The concepts and methods used in measuring unemployment are virtually the same in the United States and Canada. In Britain, there are several major differences:

1. Unemployment statistics are taken from employment exchange and insurance records rather than estimated from labor-force surveys. Unemployment of former self-employed workers and unpaid family workers is included in the count only if they register at employment exchanges. Since these workers are not covered by unemployment insurance, some may be unemployed but not registered.

2. The minimum age of persons covered by the statistics is fifteen years rather than fourteen years.

3. The statistics include all persons registered as seeking work on a given *day*. Canadian and United States statistics cover persons who did not work as much as one hour for a full *week*.

Differences 1 and 2 would lead to a lower count of unemployment in Great Britain than in the other two countries. Difference 3 would lead to a higher count, and is by far the most important. On grounds of differences in concept alone, one would therefore expect minimum levels of unemployment to be higher in Great Britain than in the United States or Canada.

The postwar calendar year of lowest unemployment in the United States was 1953. Since all of the data for 1953 needed in making international comparisons are not yet available, I have used 1952, when unemployment was 2.7 per cent of the civilian labor force in the United States. For Great Britain, the postwar calendar year of lowest unemployment was 1951, when the wholly unemployed were 1.1 per cent of the civilian labor force (working population).[44] In Canada, 1947 and 1951 were the two years of lowest unemployment, with 2.0 and 2.1 per cent unemployed respectively. As this difference is too small to be of much significance, I have used 1951 to keep the comparisons closer together in time.

The year 1952 in the United States and the year 1951 in Canada and

[44] This estimate was obtained by dividing the mid-monthly figures for the wholly unemployed by simple averages of adjacent end-of-month figures for the civilian working population.

Great Britain were years of intense demand. There is no assurance, however, that this intensity of demand was exactly equal in the three cases. This may create differences in the minimum unemployment rates that cannot be taken into account in the discussion that follows.

COMPOSITION OF THE LABOR FORCE

The composition of the labor force by race, age, sex, industry, and class of worker influences the minimum rate of unemployment, because different categories of workers have different minimum unemployment rates. If the minimum unemployment rate for each category remained the same, that for the whole economy could change through shifts in the distribution of workers among the various categories. The structure of minimum unemployment rates for various types of workers is rooted in differences that for the most part seem persistent and present in many economies. Several examples can be given. Very young workers have high unemployment rates because they move in and out of the labor force frequently, and their lack of experience makes it harder for them to find work. Construction workers have high unemployment rates because their work is seasonal and turnover is frequent. Self-employed workers have very low unemployment rates, since lack of demand usually affects them through reduced earnings rather than loss of work. Thus in 1952 the unemployment rate in the United States was 2.4 per cent for all males, 3.1 per cent for all females, and 7.6 for males 14 to 19 years of age. In 1952 the unemployment rate for the experienced civilian labor force (which excludes work seekers who never held full-time civilian jobs) was 2.4 per cent; for construction workers it was 5.5 per cent, and for self-employed workers, 0.9 per cent.

The extent to which differences in the composition of the labor force are responsible for differences in the minimum unemployment levels of the three countries can be estimated by determining what the United States unemployment rate for 1952 would have been if its labor force composition had been like that of Canada or Great Britain in 1951. In other words, the United States unemployment rates for various categories are reweighted by the weights appropriate to the other countries.

For Great Britain, weights by age, sex, and major industry group can be obtained for 1951. Class of worker is not available, and race is not relevant. When the United States 1952 unemployment rate for the experienced labor force (2.4 per cent) is weighted by the 1951 industry distribution of British employment it rises to 2.5.[45] When the

[45] The categories used are mining; transportation, utilities, and communication; agriculture and fisheries; manufacturing; construction; distribution; finance and services; and government. The British data exclude the unemployed and include the self-employed.

United States unemployment rate for the civilian labor force in 1952 (2.7 per cent) is weighted by the age and sex composition of British wage and salary workers and unemployed, it rises to 2.8.[46] The principal cause of the difference is the larger proportion of young workers in the British labor force, despite the 15-year minimum age in British employment statistics.

Measurable differences in labor force composition between Great Britain and the United States thus fail to explain the differences in minimum unemployment rates. It is possible, though not likely, that unmeasurable differences in class of worker and detailed industry composition would work in the opposite direction.

For Canada, data for 1951 are available by major industry group, class of worker, and sex, but not by age. These data are averages of four quarterly labor force surveys, except that employment in nonagricultural industries was not available for the November survey. The averages of the other three surveys had to be used as estimates of the annual averages. When the unemployment rate of the United States experienced labor force for 1952 (2.4 per cent) is weighted by the Canadian distribution by industry and class of worker it drops to 2.2.[47] When the United States rate for the civilian labor force in 1952 (2.7 per cent) is weighted by the sex distribution of the Canadian labor force it drops to 2.6. These differences account for roughly half of the difference in minimum unemployment rates between the United States and Canada.

Trends in the composition of the United States labor force do not suggest any clear direction of future change in minimum unemployment rates. The secular increase in labor force participation by women and the secular decrease in the importance of agriculture may tend to raise minimum unemployment rates. This may be offset to some extent by the secular rise in the age at which workers enter the labor force.

LABOR TURNOVER

For any given composition of the labor force, changes in the minimum unemployment rate over time, or differences in it between coun-

[46] The rate for United States workers aged fourteen to nineteen was weighted by the number of British workers aged fifteen to nineteen.

[47] In making these estimates, assumptions had to be made about the distribution by class of worker of 32,000 Canadian workers in fishing and trapping, and 118,000 in forestry. It was assumed that all of the former were self-employed, and all of the latter were wage and salary workers. These assumptions both involve errors, although the errors are offsetting to some extent.

An unemployment rate for the United States for government and services combined was obtained by weighting the separate rates by employment of full- and part-time employees as estimated by the National Income Division of the Department of Commerce (*Survey of Current Business*, July 1953, p. 20).

tries will depend largely on labor turnover. In this is included both the number of accessions and the length of time needed to find a job. The first depends on the net rate of growth of the labor force, the rate of gross addition to the labor force, and the rate of mobility within the labor force. The second depends on the intensity of demand and the efficiency with which the labor market is organized. The extent of seasonal fluctuation in industry affects both gross additions to the labor force and mobility within the labor force, which in turn is influenced by the desire of workers to move, by changes in technology, and changes in the composition of demand.

Many of the factors just listed cannot be measured with available statistics for any one country, much less compared between countries. The net growth of the labor force, a relatively minor factor, is available for all three countries. For the United States from January 1952 to January 1953 the civilian labor force grew 1.0 per cent. In Great Britain, the civilian working population grew 0.4 per cent from December 31, 1950 to December 31, 1951. In Canada, the civilian labor force grew 1.3 per cent from March 3, 1951 to March 1, 1952. These data explain a very small part of the lower unemployment rate in Great Britain.

Data on the accession rate in all manufacturing are available for the United States and Great Britain. For 1952, the annual average monthly accession rate for United States manufacturing was 4.4 per hundred workers; for British manufacturing it was 3.2.[48] The real difference is probably larger than these figures indicate. There is a considerable understatement of accessions in manufacturing by the United States data, arising from sampling bias.[49] A corresponding understatement may be present in British data but must be very much smaller, since these data are based on reports from all employers in manufacturing with more than 10 employees. A second source of understatement is present in the British data but not in the American. The British data do not show accessions of workers who were separated later in the same reporting period (4 to 6 weeks). On the whole, the degree of understatement is probably less, perhaps much less, in the British data.

I can only speculate on the sources of lower turnover in Great Britain. They may include less seasonal fluctuation, since Britain has milder winters and cooler summers than much of the United States; less willingness to move on the part of British workers; smaller shifts in the

[48] This figure is based on data covering the 53 weeks starting December 31, 1950 and ending January 5, 1952. The 53 weeks are divided into twelve periods: one of 6 weeks, three of 5 weeks, and eight of 4 weeks. To obtain a monthly average, the accession rate for each period was multiplied by the number of weeks in the period, and the sum of the products was divided by 52.

[49] See Jeanette G. Siegel, "Measurement of Labor Turnover," *Monthly Labor Review*, Dept. of Labor, May 1953, pp. 519-522.

composition of British demand; and perhaps less shifting in and out of the labor force by British workers, especially women and younger workers.

In addition to having less turnover than the United States, Britain handles a larger proportion of its turnover through public employment exchanges, and this would seem on the whole to mean that it is handled more efficiently. In the absence of data on the total amount of turnover, no demonstration of this point is possible.

Neither is it possible to say anything about secular trends in turnover in the United States. The series on turnover in manufacturing are available back to 1919, but both concepts and coverage have changed too much to permit trustworthy comparisons of present levels with those of the 1920's. Reductions in the minimum level of unemployment could take place either through a reduction over time in the amount of turnover, or through more efficient handling of it. The former would be desirable if it resulted from a decrease in the seasonal fluctuations in the demand for labor. However, reduction in turnover from other causes is not necessarily desirable, except where such turnover arises from lack of knowledge. Consumers are usually the best judges of the necessity for shifts in the pattern of demand, and workers are usually the best judges of the necessity for voluntarily quitting a job to seek another. It is not for the economist to say whether consumers and workers should want more or less mobility in the future.

On the other hand, an increase in the efficiency with which a given volume of turnover is handled is always to be desired. Perhaps this can be achieved by further improvement of public employment services. If so, the level of unemployment corresponding to any concept of full employment may be lower in the future than it is now.

4. *Summary*

The selection of a definition of full employment depends both on the nature of policy goals and the availability of statistical tools. This paper does not attempt to state what relative importance should be attached to competing goals of policy. It has, however, attempted to classify definitions of full employment to reveal their policy implications.

Some definitions clearly imply the priority of avoiding unemployment over other goals. This is true of the minimum unemployment and maximum employment approaches. To a slightly lesser extent it is true of the turnover approach as defined here. Within the general framework of these approaches the degree of priority given to avoiding unemployment can be increased by broadening the definition of unemployment.

Other definitions of full employment clearly imply that at times the cost of further reductions in unemployment is too high in terms of competing policy objectives. This is true of the price approach, and other approaches having the same implication could be devised.

Finally, some approaches are flexible enough so that they can be used to give either a very high or a rather low priority to the avoidance of unemployment. This is true of the unfilled vacancies approach.

The approaches discussed can also be summarized in terms of their statistical practicability. Since the United States and many other countries have reasonably good statistics on unemployment, employment, and prices, the minimum unemployment, maximum employment, and price approaches do not present serious statistical difficulties. The unfilled vacancy approach is practicable for Great Britain and for some other countries, but not for the United States or Canada. Its use depends on the existence of good statistics of unfilled vacancies. The turnover approach requires information of a kind that is nowhere available at present.

By means of some international comparisons it has been pointed out that the same approach will produce different numerical results in different economies, because of underlying dissimilarities in their labor forces and labor markets.

Appendix

NOTE 1. PROOF OF A PROPOSITION CONCERNING PARTIAL UNEMPLOYMENT

Let:

N = total labor force
F = number fully employed
I = number of involuntary part-time workers
P = number of other part-time workers
U = number of wholly unemployed

Let N remain constant over time, and for the other variables let the subscripts 0 and 1 refer to two points in time between which unemployment is rising. Net movement over time is assumed to take place between F and U, between F and I, and between P and U. To simplify the problem, no net change is assumed to take place between P and F or between P and I.

Time worked is expressed in full workweeks. For F it is 1, for U it is 0, and for I and P it is a and b respectively, where a and b are constant fractions.

First, find an expression for the increase in involuntary time lost. Involuntary time lost can increase in three ways:

1. By movement from F to U. Each such move involves the loss of

one workweek. The increase in time lost arising here is expressed as the increase in U, minus that part of the increase in U resulting from movement from P to U, or the decrease in P. This expression is $(U_1 - U_0) - (P_0 - P_1)$.

2. By movement from P to U. Each such move involves a loss of time equal to the time worked by P, or b. The increase in time lost arising here is b times the decrease in P, or $b\ (P_0 - P_1)$.

3. By movement from F to I. Each such move involves a loss of time equal to the time not worked by I, or $(1-a)$. The increase in time lost arising here is $(1-a)$ times the increase in I, or $(1-a)\ (I_1 - I_0)$.

The total increase in involuntary time lost is therefore $(U_1 - U_0) - (P_0 - P_1) + b(P_0 - P_1) + (1-a)\ (I_1 - I_0)$.

To see when the increase in U considered as representing full weeks of time lost is just equal to the actual increase in involuntary time lost, set the expression for the increase in involuntary time lost equal to the increase in U:

(1)

$$(U_1 - U_0) - (P_0 - P_1) + b(P_0 - P_1) + (1-a)\ (I_1 - I_0) = (U_1 - U_0)$$

This equation is satisfied when total time not worked by all part-time workers (I and P) does not change. This condition can be expressed in two ways:

(2) $$(1-a)\ (I_1 - I_0) + (1-b)\ (P_1 - P_0) = 0$$

(2a) $$(1-a)\ (I_1 - I_0) = (1-b)\ (P_0 - P_1)$$

Substituting (2a) in (1) we get:

(3)

$$(U_1 - U_0) - (P_0 - P_1) + b(P_0 - P_1) + (1-b)\ (P_0 - P_1) = (U_1 - U_0)$$
$$0 = 0$$

In exactly similar fashion it can be shown that when time not worked by all part-time workers increases, the increase in U is less than the total increase in involuntary time lost, and when time not worked by all part-time workers decreases, the increase in U is greater than the total increase in involuntary time lost.

NOTE 2. DERIVATION OF TIME NOT WORKED BY PART-TIME WORKERS

Data on the time not worked by all part-time workers for March 1947 and thereafter are derived from the number of workers who worked 1 to 14 hours, 15 to 21 hours, 22 to 29 hours, and 30 to 34 hours. The time not worked for each class is taken as 40 hours minus the

midpoint of the interval. For the period from January 1946 through February 1947, the published data are divided into only three hours classes (1 to 14, 15 to 29, and 30 to 34). These classes were handled in the same way. The effect of this break could be measured by combining data for the months following February 1947 into three classes. It proved to be slight, and the totals for the whole period 1946-1953 were therefore treated as a continuous series.

This series is very much affected by holidays which sometimes fall in the survey week in July, September, or November. In adjusting the series for seasonal variation, a ratio to a modified 12-month moving total was used. This modified total included interpolated values for months containing holidays; the interpolations were based on relationships to adjacent months in years when no holiday fell in the survey week. Separate seasonal adjustments were then made for these months for years when the survey week contained a holiday and years when it did not. These adjustments were based on separate averages of ratios of original data to the modified moving total. The result is generally satisfactory, except that July 1950 is substantially undercorrected. November 1950, when Armistice Day fell on Saturday of the survey week was not considered a month containing a holiday in the survey week.

The series on time lost by involuntary and other part-time workers were derived from numbers in the four hours classes listed above. However, prior to May 1949, no breakdowns by hours were published in the special surveys of part-time workers. The number of involuntary part-time workers usually working full time and usually working part time were therefore distributed into hours classes for the special surveys of September 1947, March 1948, and September 1948. This distribution was based on the average percentage distribution of the same classes of workers for the next six special surveys (not counting November surveys, in which the distribution was somewhat disturbed by Armistice Day holidays).

The special survey of September 1947 did not divide usual part-time workers preferring full-time work into those who could and who could not accept full-time work. This division was estimated from the average of the next two special surveys, the only two containing data suitable for this purpose.

NOTE 3. METHOD OF ANALYZING PARTIAL UNEMPLOYMENT USED BY T. K. HITCH

Hitch analyzed data on partial unemployment for 1947, 1948, and 1949, using the same source used in this paper. He concluded tentatively that "the volume of [involuntary] part-time work increases some-

what faster than unemployment, at least in the early stages of a depression."[50]

The logic of Hitch's method takes into account in part the offsetting nature of increases in involuntary part-time work and decreases in other part-time work. This is done by not assuming that each additional wholly unemployed person represents an additional full week of involuntary time lost. Instead, he uses data from the special surveys of part-time work to estimate the average hours of work sought by the wholly unemployed. This estimate is based on (1) the number of wholly unemployed persons seeking full-time and part-time work, and (2) the average hours worked by all part-time workers.[51]

This method allows for the fact that some wholly unemployed workers are former voluntary part-time workers and assumes that when such workers become unemployed, they seek part-time work. No allowance is made for the fact that of the unemployed who formerly had full-time jobs, some would have been "other part-time workers" in any given week while they were employed. When such a worker moves from "other part-time work" to "unemployed" he is counted as losing a full week of work involuntarily. The workers in question are those who lose time while employed because of illness, vacation, industrial disputes, bad weather, and personal reasons. This treatment of these workers may involve a slight overestimate of increases in involuntary time lost, although the point is debatable. It is clear that full-time jobs are being lost, and only the use of man-hours as a unit of measurement creates a problem.

Another problem is created by Hitch's unit of measurement. Stated fully, this unit is man-hours lost in total and partial unemployment as a percentage of man-hours constituting total labor force time. The base of this percentage varies with average hours worked. A reduction in overtime that caused average hours to fall from 43 to 41 would cause this measure of unemployment to rise, even though the time lost in total and partial unemployment was unchanged. To use the historical minimum of this percentage as a definition of optimum employment implies that overtime work is always desirable. This contradicts the

[50] Hitch, *op.cit.*, p. 8. The quotation refers to only one group of involuntary part-time workers. However, Hitch finds that the other large group maintains a stable relationship to the volume of unemployment, and hence the conclusion quoted must apply also to the total.

[51] The average hours of actual part-time workers must be used, since those seeking part-time work are not asked how many hours of work they are seeking. It would seem more logical to use the average hours of those who usually work part time by preference instead of the average hours of all part-time workers. This would reduce somewhat Hitch's estimates of time lost by the wholly unemployed.

views that underlie the Fair Labor Standards Act and most collective agreements.

So far, we have examined the concepts involved in Hitch's method. Perhaps these are less important than the practical problems involved. Hitch's estimates rely very heavily on the infrequent and irregular surveys of part-time work. This is a weakness in itself and, in addition, precludes any seasonal adjustments. Hitch appears to use the data on all part-time workers only as a means of interpolating in the series on involuntary part-time workers between special survey dates. This paper has attempted to use the data on all part-time workers as an independent check on the special survey data.

NOTE 4. DERIVATION OF THE NUMBER OF WHOLLY UNEMPLOYED PER 100 UNFILLED VACANCIES FOR GREAT BRITAIN

The derivation of this series involves a number of practical problems. Data on the number of unfilled vacancies refer to every fourth Wednesday, while those for unemployment refer to the Monday nearest the middle of each month. These two dates can be separated by 2, 5, 9, or 12 days. I have computed the ratio of corresponding observations as they stand when they are separated by 2 or 5 days. When they are separated by 9 or 12 days, I have taken the ratio of unemployment to the average of the preceding and the following observation for unfilled vacancies. The unemployment data then refer to a day separated by 2 or 5 days from the midpoint of the averaged period. The 5-day periods in both cases always include a weekend. A more elegant interpolation based on an actual count of days would be possible, but would involve assumptions about the extent to which changes in the state of the labor market can take place on Saturdays and Sundays. I do not know what assumptions would be appropriate.

The two series were seasonally adjusted separately before the ratio was computed. Because the unfilled vacancies series is broken into three segments by administrative change, the usual method of seasonal adjustment by ratios to 12-month moving totals could not be used. The link relative method was used instead to minimize the loss of observations at the breaks. The seasonal adjustment of unemployment is by the method of ratios to moving totals. Since the amplitude of the seasonal movement in this series was not constant, a correction for amplitude was made by the method used by Kuznets.[52]

The series on the number of persons wholly unemployed includes all registered unemployed, whether or not insured. Prior to June 1948, the

[52] Simon Kuznets, *Seasonal Variations in Industry and Trade*, National Bureau of Economic Research, 1933, p. 324.

unemployed registered but not insured were not divided into "wholly unemployed" and "temporarily stopped." After June 1948, the figures for insured and uninsured unemployed were combined, and the total was so divided. For June 1948, it can be computed that 99 per cent of the uninsured unemployed were wholly unemployed. This percentage was used in calculating the total number of wholly unemployed prior to June 1948.

In January 1948, 8,000 persons formerly considered disqualified for employment were added to the number of unemployed, and such persons were counted as unemployed thereafter. I have added 8,000 to the number of unemployed for the last three months of 1947 to produce a continuous series.

NOTE 5. SOURCES OF DATA

Except as otherwise noted, all United States data used in this paper are from the *Current Population Reports: Labor Force*, Bureau of the Census, Series P-57, P-59, and P-50, various dates; and *Labor Force Bulletin*, No. 7, April 1947. The data on wholesale prices and accession rates in manufacturing appear in the monthly issues of the *Monthly Labor Review*, Dept. of Labor.

For Great Britain, except as otherwise noted, all data are from the monthly issues of the *Ministry of Labour Gazette*, and for Canada all data are from the monthly issues of the *Labour Gazette*.

The Sauerbeck wholesale price index for Great Britain, 1887-1913, was published annually in the *Journal of the Royal Statistical Society*. The seasonally adjusted series on trade union unemployment in Great Britain was taken from the business cycle files of the National Bureau of Economic Research. The original data appeared in the (British) *Labour Gazette*, predecessor of the present *Ministry of Labour Gazette*.

The seasonally adjusted Bureau of Labor Statistics index of factory employment for the United States for 1919-1929 was adjusted by the Board of Governors of the Federal Reserve System and appeared in various issues of the *Federal Reserve Bulletin*.

COMMENT

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Albert Rees has brought us much closer to an understanding of the full-employment concept. Although he has not elaborated on it, I believe that he implicitly accepts a full-employment goal founded on broad social considerations and on elimination of the waste involved in unlimited departure from effective output rates.

Rees concludes that at present no single way of defining or measur-

ing full employment is sufficient. However, he points to two promising possibilities related to business-cycle policy: minimum unemployment and maximum duration of work-seeking. I wish to point to certain problems connected with the use of either measure.

With regard to minimum unemployment, it appears dangerous to minimize partial employment as much as Rees appears to minimize it. The recessions in the period checked were so mild that the possible burden of partial unemployment is not highlighted. His Chart 2 shows the great relative increase in involuntary part-time workers in 1949, even though their absolute increase appears unimportant. In a more serious depression the increase in the number of part-time workers might well be substantial.

Rees has performed an important service in developing the maximum duration of work-seeking as a concept of full employment, but a simple mean duration figure would appear to represent deviation from full employment less effectively than a distribution. Those out of work no more than a week do not significantly detract from full employment and perhaps should be considered separately from figures representing more serious dislocations. Further, those lying in the upper ranges of the distribution may represent special situations rather than characteristic cyclical changes in the aggregate situation. Possibly a positional mean would best characterize the problem.

The particular advantage of the maximum-duration-of-work-seeking concept is that it relates to seeking work and finding a job rather than to the number who admit unemployment. It represents a measure of the effectiveness of the process of finding work. From the point of view of social considerations, interest is centered on how effective this process is. This is a positive concept, in contrast to the negative connotations connected with the number of unemployed. Also, it is founded on actual activity (length of unemployment and number of accessions), while the number of unemployed is founded on judgments of interviewees. It seems to me that the problem of defining and measuring full employment is so important that the lack of the actual data required for measuring duration of work-seeking should not keep us from seeking the most effective method of measurement. When actual data become available, experience may, of course, force us to revise our ideas regarding the usefulness of the concept.

The danger of inflation makes it impossible to ignore the movement of prices as a constraint on any concept of full employment adopted. This applies to duration of work-seeking as well as to proportionate unemployment. Lack of faith in the price mechanism and the anomalies found in price history militate against the use of stable prices to repre-

sent full-employment levels. Sensitivity in the movement of the number of unemployed per vacancy indicates that such a figure may be useful as another constraint. Extremes may be found critically indicative. But this figure scarcely provides the basis for a definition or a direct measure of full employment. Neither the unemployed nor the number of vacancies represents actual activity measures. The latter is unimportant unless the vacancies lead to placements; thus we can argue that accessions are more important as an indicator.