Volume Title: The Measurement and Interpretation of Job Vacancies

Volume Author/Editor: NBER

Volume Publisher: NBER

Volume ISBN: 0-87014-471-5

Volume URL: http://www.nber.org/books/unkn66-2

Publication Date: 1966

Chapter Title: Comments on "The Concept of Job Vacancies in a Dynamic Theory of the Labor Market"

Chapter Author: Charles C. Killingsworth, Richard Lester, Jacob Mincer, Eleanor Gilpatrick, Marvin Friedman

Chapter URL: http://www.nber.org/chapters/c1600

Chapter pages in book: (p. 111 - 141)

Comment

CHARLES C. KILLINGSWORTH, MICHIGAN STATE UNIVERSITY

The papers by Dunlop and Levine mention the relevancy of job vacancy data to the structural change vs. aggregate demand controversy. To some, this reference may seem anachronistic. N. J. Simler began a recent article in the *American Economic Review* with the announcement that he was administering the last blows to the "dead horse" known as the structural unemployment hypothesis. And Charles Silberman has assured us recently in *Fortune* magazine that everything that happened in the labor market in the past decade was simply the result of "a concatenation of fortuitous circumstances." Hence, there may be a feeling in some circles that Dunlop and Levine should be advised to delete such an obsolete reference from their papers.

That is a feeling which I do not share. My feeling is that the labor market developments of the past twelve months have substantially strengthened the so-called structural hypothesis. Therefore, the purpose of my comments is to offer some speculations concerning the possible uses and misuses of job vacancy data in evaluating this continuing controversy concerning the primary causes of our excessive unemployment rates.

It is essential to begin with a brief consideration of just what the essence of the aggregate demand–structural controversy really is. It is sometimes said that a "true" structuralist *must* argue that there are more job vacancies than unemployed workers. This is a misunderstanding. Perhaps there are some hitherto inarticulate structuralists who hold that view, but most of the so-called structuralists who have expressed themselves in print take a different view. This group generally accepts the position that part of our excessive unemployment must be attributed to inadequate demand and part of it to insufficient adaptation of the labor force to structural changes in the economy. On this much, the structuralists and the inadequate-demand school can agree. The real disagreement relates

to the extent to which expansion of aggregate demand will reduce the unemployment rate. In the discussions of 1963 before the Clark Committee and elsewhere concerning policies for reducing the unemployment rate, scarcely anyone took the position that no expansion of aggregate demand was necessary. I, for one, specifically endorsed the tax cut then under consideration. But I strongly disagreed with the position being taken then by the President's Council of Economic Advisors that the tax cut would create enough jobs of the right kinds to reduce the unemployment rate to 4 per cent.[1]

The crucial point of disagreement at that time was not what kinds of jobs were *then* vacant, but what kinds of jobs would be created within a year or eighteen months after the tax cut. I felt then, and still do, that some unrealistic assumptions were being made concerning growth patterns in employment in response to tax cuts. In late 1961, the Council had brought out a "full employment perspective" suggesting (among other things) what employment patterns would be if a 4 per cent unemployment rate were achieved in 1963. I was startled to find that in this exercise the Council had assumed a rather substantial *increase* in agricultural employment as a consequence of the assumed reduction in the unemployment rate. That assumption seemed to me to be seriously inconsistent with the well-established pattern of rapidly declining employment in agriculture. In 1963, I again believed that some important aspects of the Council's projections ignored the changes in growth patterns that have appeared in the past decade or so. But this is not the occasion to review the details of that disagreement. The point that is important for this conference is that a job vacancy survey in late 1963 probably would not have shed very much light on the precise point of disagreement.

Such a survey now—a year after the passage of the tax cut—might shed more light on this disagreement. But notice should be taken

[1] This was the position taken by Walter W. Heller, then chairman of the Council, in an address before an unemployment conference in Berkeley, California, on April 19, 1963, reproduced in A. M. Ross (ed.), *Unemployment and the American Economy,* New York, 1964, pp. 93–115, esp. p. 113. There was a similar prediction in the CEA presentation to the Clark Committee; this was reproduced in the *1964 Economic Report,* Appendix A. This statement appears on p. 172: "The tax cut would thus increase demand to levels consistent with a 4-percent rate of unemployment."

of a change in position. My position on the record as of September 1963 was that the tax cut would not get us much below a 5 per cent unemployment rate without hitting significant bottlenecks of labor supply. It is my present view that this is precisely the situation today, with a reported unemployment rate of 4.8 per cent. Gardner Ackley, the present chairman of the CEA, now concedes that the Council exaggerated the benefits to be expected from the tax cut; he agrees that it will not produce the 4 per cent unemployment rate that the Council foresaw eighteen months ago.[2] Nevertheless, Mr. Ackley still disputes the so-called bottleneck thesis and insists that further vigorous application of fiscal and monetary policy could reduce unemployment to the 4 per cent level. And I believe that we have now reached the point where further tax cutting cannot significantly reduce the unemployment rate.

Assume that we had a complete count of job vacancies, suitably defined, as of today. How much light would that shed on this disagreement? Obviously, a gross comparison of total vacancies and total unemployed would tell us next to nothing. It would be essential to do a great deal of grubbing with details to determine whether the vacancies that exist constitute present bottlenecks or are indications that we are approaching some bottlenecks. It is not always easy to make that determination. So if there is anyone who expects that a job vacancy series will give us quick and conclusive answers about the basic causes of unemployment, he runs a considerable risk of being disappointed.

This brings me to one of John Dunlop's basic points. He tells us that the present system of occupational classification, as used in presenting unemployment statistics, is an "archaic hodgepodge." I agree so wholeheartedly that I want to embellish the point. The classification identified as "professional, technical and kindred workers" is often equated with college graduates. But about 40 per cent of the members of this group lack college degrees. The classification includes not only nuclear physicists but also lion tamers, mathematicians and actors, college presidents and dancing girls, M.D.'s and faith healers, opera singers and prostitutes. Thus

[2] Gardner Ackley, address and discussion at Seminar on Manpower Policy and Program of U.S. Department of Labor, Washington, January 28, 1965.

it seems justifiable to say that there is considerable heterogeneity in the classification. Let us consider also the "operatives" classification. This is the largest of all the classifications, and it is often assumed to be composed almost entirely, if not exclusively, of semiskilled factory workers. But the fact of the matter is that, according to the 1960 Census, nearly half of the "operatives" were employed outside of manufacturing!

For some purposes the present system of occupational classification is worse than meaningless because it is seriously misleading. Probably never before in the history of economic analysis have so many able people been led to so many false conclusions by one set of published data. For example, many analysts have arbitrarily picked certain of these occupational classifications as "technologically vulnerable groups." Not a shred of proof has been offered to substantiate the identification. Apparently the validity of the choice is assumed to be self-evident. But when you consider the heterogeneity of the detailed occupations swept under the big tent called "operatives," the thing that becomes self-evident is the absurdity of designating this classification as "technologically vulnerable." Parenthetically, I should add that a similar problem of heterogeneity, plus shifting weights over time, is encountered in the classification of employment and unemployment by *industry*. In most industries, white-collar employment has grown enormously since World War II, so that the job mix by industry is quite different in 1965 from what it was in 1947.

The basic point that I want to emphasize is this: Excessive aggregation is probably the greatest impediment to understanding the operations of the labor market; the second greatest impediment is illogical disaggregation. I hope that a job vacancy series can avoid both of these shortcomings. It cannot do so if it relies on the traditional system of occupational classification which Dunlop has so trenchantly criticized. Whether the alternative approach which Dunlop proposes is the best one that is possible, I do not know; but I am sure that he has at least provided us with an excellent starting point.

I do not think that we should underestimate the mischief that could result from reliance on the old occupational classification

system in a job vacancy series. It will not really do much good to point out the shortcomings and limitations of the present system. Recent experience should have taught us that a published series of this kind gets to be like Mount Everest—you can be sure somebody is going to use it, no matter what the dangers and difficulties may be, just because it's there. A case in point is provided by the NICB help-wanted-advertising index. If that index were at all adequate as a job vacancies indicator, this conference would be pointless. Yet we find it cited again and again as a job vacancies indicator—in reports of the Council of Economic Advisors, in scholarly lectures abroad, in articles in professional journals, in congressional reports, and so on.

Apparently most of our quantitative enthusiasts today would rather smash their computers than admit that there are significant areas of the economy for which reliable data simply are not available. Apparently most of them have never learned the first lesson that used to be taught to practice teachers—which is, when you don't know something, the best policy is to admit your ignorance.

I hope no one will interpret these comments as an effort to belittle the importance of job vacancy research. Many of the papers prepared for this conference help to document the benefits that can result from this kind of research, especially in the practical operation of programs to prevent or alleviate unemployment. But I do want to suggest that we must temper our enthusiasm for job vacancy research with recognition of the validity of John Dunlop's observation that it will undoubtedly help to extend the frontiers of ignorance.

RICHARD A. LESTER, PRINCETON UNIVERSITY

John Dunlop's paper has implications, which he does not explore in depth, for both vacancy statistics and labor market theory. His "model" of an "internal labor market" with a few "ports of entry" contrasts sharply with the "theory" set forth in the Holt-David paper and has some similarities to the *Nenkoh* system in Japan.

Dunlop's internal market is likely to be a highly administered one. In the extreme cases, production workers enter only at the

lowest level of hiring-in jobs—unskilled or helper occupations—for a probationary period of, say, sixty days, after which they have seniority from date of employment. Subsequently, they rise up the occupational ladder according to opportunities for promotion, presented to one person at a time strictly in order of length of service in the seniority unit. On-the-job training facilitates an employee's ability to qualify for a vacancy, so that actual promotion may be exactly according to seniority. With a reduction in force, demotion and layoff are strictly in reverse order of seniority, with those on layoff having claims to any openings according to their place on the seniority roster. Thus, job vacancies that occur in the "internal market" normally are filled by promotion, except for those at the bottom rung of the promotion ladder. A study of eighty-two manufacturing firms in the Trenton metropolitan area in 1952 revealed that four-fifths of them filled all or most jobs above the bottom grade by in-plant promotion.[1]

The occupational wage structure is usually fixed in such companies by union agreements (two-thirds of them running for two or more years), by an established job evaluation program under nonunion conditions, or by some combination of negotiation and job evaluation. The structure of compensation tends to move up by uniform increases in cents per hour or percentages and by benefits that apply uniformly to all production workers in the plant or firm. Supply of labor for jobs up the ladder through seniority rationing has little quantitative meaning so long as persons wish to move up the promotion ladder and can only qualify for an opening one at a time. Workers are tied to the firm not only because of the layoff, transfer, and promotional rights governed by seniority but also because their benefit rights either vary with seniority (e.g., vacations, supplementary unemployment benefits, and pension rights) or are lost when a person severs his connection with the company (e.g., sickness, hospital, medical, educational, and other benefits). Thus, some four-fifths of the production employees in a plant may not consider themselves even potentially in the "external labor market," [2]

[1] Richard A. Lester, *Hiring Practices and Labor Competition,* Princeton, 1954, p. 32.

[2] See *ibid.,* pp. 60–62, and Lloyd G. Reynolds, *The Structure of Labor Markets,* New York, 1951, pp. 81–83.

and when they are forced into the external market by layoff or job termination, they suffer great losses and may become subject to a special type of behavior pattern.

The hiring standards of firms generally are not of the kind needed to perform the hiring-in jobs at the bottom (e.g., yard labor or helper), but are rather for jobs up the promotional ladder. At any one time, the firm may have, for a day or two, vacancies in jobs on the promotional ladder, while employees with seniority are bidding for those jobs or employees on layoff are being recalled, but, with such claims on them, these vacancies cannot be filled from the external market.

This sort of highly administered set of arrangements, or "internal market," has been covering a larger and larger proportion of the American economy since the 1930's, when elaborate seniority rules embodied in written agreements spread from the railroads to manufacturing, utilities, and transportation and became rather standard practice in well-established nonunionized as well as unionized firms. The extent to which a wage structure may, under such administered arrangements, get out of line is shown by what happens to the earnings of passenger firemen when they are "promoted" to yard engineer. Through such promotion, which must be taken, the average hourly earnings (in December 1959) of the promoted firemen would drop from $6.18 for passenger fireman to $3.26 for yard engineer, and his annual earnings would fall from $9,154 to $8,376.[3] Then, with reduced traffic, the new engineers "bump" back into their old passenger-firemen positions, thereby almost doubling their average hourly earnings while business is slack.

Perhaps the extreme in administered internal markets is illustrated by the *Nenkoh,* or "lifetime commitment system," of the larger firms in Japan, set forth in the Somers-Tsuda paper. The wages and benefits of persons under this system, covering 30–40 per cent of the nonagricultural employees in private enterprise, are determined, not by occupation or productivity, but "almost exclusively by age and length of service in one company." One result is that the earnings of employees 40–49 years of age under lifetime

[3] These figures were made available in the 1960 wage arbitration case of the Locomotive Engineers.

commitment are approximately six times those of the youngest employees in the firm—in contrast to a wage structure in small firms without lifetime commitment, where the same age differential is only three times and the level of wages is only 60 per cent that of the large-firm level (see Table 2 of the Somers-Tsuda paper). Such interfirm wage differences have persisted during a long period of marked labor stringency. Despite the wide wage-benefit differentials between large and small firms, actual movement of labor between them is practically nonexistent, and the marginal productivity theory of wages would seem to have limited applicability to the interfirm differentials and the interage wage differentials in Japan.

Among the countries discussed at the conference, perhaps Sweden is the best example of an economy that is largely "external market" in character, and therefore best fitted for the Holt-David model. Although its industry is highly unionized, Sweden is a country predominantly of small firms. Swedish wages have considerable flexibility and there are few restraints on interfirm labor mobility. Typically, wage scales each year are negotiated nationally (largely by industry), but those negotiations establish only minimum rates or minimum increases. Since World War II, half the increased earnings of production workers has come, not through such national negotiations, but by "wage drift"—employer payment of rates increasingly above the minimum, the creep in piece-rate earnings with failure to revise production standards, and so on. In Sweden, two-thirds of all production hours are on piece rate, which makes promotion ladders of much less significance. Although the centrally and nationally negotiated agreements in Sweden cover a variety of subjects, they are silent on both seniority and employee benefits. Uniform four-week paid vacations are stipulated by national statute, and stress is placed on employee benefits under national and union programs of social insurance, which in no way restrict interfirm mobility. Thus Swedish workers are not so tied to individual firms by practices based on seniority. There is not a well-developed internal market sharply separated from the external market.

Prior to the late 1930's, it was also valid to talk of *the* "labor market" in the United States because hiring and labor mobility then were similar to the present Swedish "market." Subsequently, how-

ever, our concepts of employment in most unionized firms and many of the larger nonunionized firms with promotion ladders have radically altered, as I explain at length in *Economics of Labor* (2nd ed., 1964). This country now is, so to speak, part way between Sweden and Japan. Negotiated wage scales generally are not minimums but are actual rates. Thus wage drift is precluded except for earnings on piece rate and incentive work rising by means of looser and looser production standards. In two-thirds of all collective agreements, wage scales are predetermined for two or more years at a time. Rationing by seniority fixes who can qualify, in what order, for vacancies up the promotion ladder, and who is transferred and laid off when the work force has to be reduced. The Holt-David paper, as presented, contains many remarks about employers "lowering money wages" when labor supply becomes plentiful, about firms paying "the lowest acceptable wage," about high unemployment and low vacancies causing "wage rates [to] fall steadily," and about firms being "likely to terminate employment of their less productive workers during periods of low production." Such wage flexibility and such employment termination are precluded under union agreements and seniority clauses in the agreements, and in practice they would not occur in established nonunion firms, for a variety of reasons including the threat of labor organization. Thus, the Holt-David paper applies rather widely to the pre-1940 situation and to some industries still, such as agriculture, domestic service, and other types of small-scale enterprise, where seniority, promotion ladders, and unions are absent. Otherwise its theory lacks relevance.

For both operating and statistical purposes, it is desirable to know whether particular vacancies are part of the internal market or of the external market, whether they are subject to promotion or recall rights under seniority, and where they are on a ladder of promotion. Also, a vacancy filled by a person with seniority may be different from a vacancy filled by a person who lacks seniority until a probationary period is completed. Dismissed employees with seniority are subject to reinstatement under a grievance procedure ending in arbitration. Transfers are also subject to bumping rights according to seniority and subject to the grievance procedure.

Many firms do not want to report vacancies to the Employment

Service because they wish to keep most of the internal market separate from the external market, and because their hiring standards are not really for the port-of-entry jobs but for those up the promotional ladder. In hiring new employees, managements tend to think in terms of a work career of forty or forty-five years with the company. Therefore, managements often reject applicants who are fully qualified for the bottom-rung vacancy on such grounds as lack of personal qualities for higher-level jobs, discrimination against persons with accumulated seniority elsewhere,[4] discrimination against workers trained for the occupation in another firm,[5] and discrimination on grounds of race, sex, or nationality. A management may not want to put a female, a Negro, or a member of another minority group in the line of promotion, where opportunity to advance is in order of seniority. For such reasons, one cannot just compare the number of vacancies by occupation or industry with the number of apparently qualified applicants at the Employment Service, which, incidentally, cannot legally honor such discriminations in referring registrants.

Hopefully, these remarks indicate why vacancy figures cannot be properly interpreted without a thorough understanding of the operations of both the internal market and the external market in different types of industry and under the various practices prevalent in the United States in 1965.

JACOB MINCER, COLUMBIA UNIVERSITY AND
NATIONAL BUREAU OF ECONOMIC RESEARCH

The Holt-David paper admirably illustrates the relevance of the job vacancy concept to an economic analysis of labor market phenomena. The building blocks of this analysis are: optimization aspects of employers' and workers' job search and wage decisions, the stochastic nature of the equilibrating processes, and the interactions of stocks and flows in the labor market.

It is difficult to disagree with the approach at this level of gen-

[4] Lester, *Hiring Practices,* pp. 56–57.
[5] *Ibid.,* p. 36.

erality. What is more, the authors convincingly show that their approach is potentially fruitful, that it is productive of many empirical implications and applications. That the fulfillment of the promise would be facilitated by the existence of job vacancy data is an important conclusion for this conference.

While it is highly suggestive, the paper only modestly engages in behavioral hypotheses. It is, however, quite rigorous in exhibiting accounting and definitional relationships. I find this emphasis on the accounting integration of unemployment, job vacancies, and labor turnover flows to be highly illuminating. In my view, the paper points to a need for a parallel integration in our statistical programs. If the interest in job vacancy data leads to an extension of labor turnover statistics from manufacturing and mining to the whole economy, this in itself will be a major gain.

The Ferber and Ford pilot study suggests that such an integration and extension is feasible and useful. Their example of collecting information on job vacancy flows as a part of the total job vacancy and turnover count is very much in the spirit of the Holt-David framework. I should like to point out the particular usefulness of distinguishing, as Ferber and Ford do, "current job openings due to previous departures" from "new positions to be set up." Combined with data on separations and accessions, such information could greatly facilitate an understanding of employment effects of technological and other changes in the economy and in its various sectors.

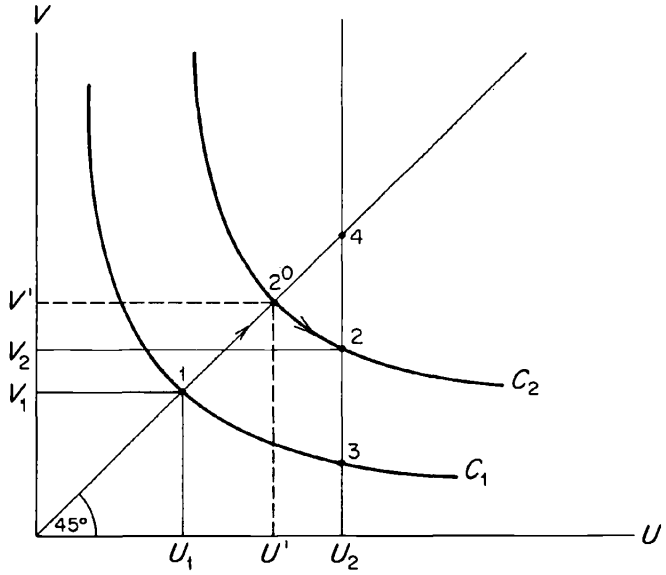
While the Holt-David paper constitutes a resounding positive answer to the question of potential analytical relevance of job vacancy data, it does not clearly focus on the more exacting question, which is: what are the *additional* insights we can gain from job vacancy data, given that we already have unemployment data? Some answers to this question can be found in their equations (12–15), in which they relate duration of unemployment to the number of vacancies and conversely. However, their emphasis on a strict inverse relationship between unemployment and job vacancies leads to an apparent conclusion, that once the relation is known, the information on job vacancies adds nothing to the information on unemployment. Of course, this conclusion is unintended, since the relation may shift from time to time, and differ from sector to sector.

But little is said about such possibilities in the paper. Yet, consideration of these possibilities is crucial for assessing the value of job vacancy data.

In what follows I shall describe some of the analytical insights which the joint availability of job vacancy and unemployment data may be expected to provide. The discussion will be facilitated by the diagrammatic illustration in Figure 1. Job vacancy counts (V)

FIGURE 1

The Unemployment-Job Vacancies Map



for the whole economy are measured on the vertical axis, and unemployment (U) on the horizontal. The relationship between job vacancies and unemployment is shown as a curve (C). The curve represents levels of vacancies and unemployment inverse to one another in the course of a business cycle.[1] The movements along a fixed C-curve are *cyclical* movements, but C itself may shift, due to a change in the amount of "friction" in the labor market (Figure 1).

[1] This is the relation stressed by Holt and David. See also, J. C. R. Dow and L. A. Dicks-Mireaux, "The Excess Demand for Labour: A Study of Conditions in Great Britain, 1946–1956," *Oxford Economic Papers,* February 1958.

The major promise of job vacancy data is that, with sufficient experience, maps like Figure 1 can be empirically reproduced. In any period the economy is described by a point (U, V) the location of which tells us something about the cyclical and frictional position of the labor market. Specifically, a change in unemployment from U_1 to U_2, which is due to a movement from point 1 to point 2, can be decomposed into a *frictional change* U_1U^1 and a *cyclical change* U^1U_2. Clearly, the same change in unemployment is consistent with movements from point 1 to any point on the vertical line erected at U_2. The change in unemployment alone does not provide a diagnosis. The change could be largely cyclical or largely frictional, as can be seen in moves 1–3 and 1–4 in Figure 1. Joint information on changes in unemployment and in job vacancies provides an answer about the extent to which the change is cyclical (movement along C) and frictional (movement from C_1 to C_2).

The promise of such an empirical resolution of disputes between "structuralists" and others concerning the interpretation of unemployment changes is attractive indeed.

Can we use the joint information on vacancies and unemployment for an analysis of levels as well as of changes? That is to say, given an observed unemployment level U_1, can we say how much of it is of a cyclical nature, and how much of it is a frictional or structural phenomenon? An affirmative answer can be given only if we can identify points on the C-curves which represent a "zero" level of cyclical unemployment.

One such locus, elsewhere suggested by Arthur F. Burns,[2] is a 45-degree ray from the origin in Figure 1. Here, the equality of unemployment and job vacancies defines zero-cyclical unemployment levels. The definition is derived from policy considerations. An excess of aggregate unemployment over aggregate job vacancies can be interpreted as indicating the desirability of an increase in aggregate demand. Equality of the two counts suggests that a reduction in unemployment could be achieved by facilitating or speeding up the proper matching of jobs and workers.

Objections to this definition, I believe, originate from the mis-

[2] A. F. Burns, "Economics and Our Public Policy of Full Employment," in *The Nation's Economic Objectives,* Edgar O. Edwards, ed., Chicago, 1964.

taken notion that the 45-degree line can, in some way, be thought of as a set of desirable alternative "full employment" positions of the economy. Not only is this notion incorrect, it is not even clear whether the equality of unemployment and job vacancies represents an aggregative equilibrium in any sense other than that of its own definition. For example, an aggregative equilibrium of labor markets can be said to exist when the pressures on wages emanating from excess supplies and excess demands in particular markets cancel out to zero. Abstraction from monetary policy, productivity trends, union pressures, minimum wages, and unemployment compensation could perhaps yield a rough equivalence between the two criteria. Taking the world as it is, however, it is not clear what locus of points in the (U, V) map of Figure 1 corresponds to an aggregative zero-inflation equilibrium. This is an empirical question, and it is not, a priori, obvious whether this locus would be below or above the 45-degree line.

Put differently, the intersection of the 45-degree line with a C-curve in Figure 1 does not necessarily correspond to the zero level on the Phillips curve.[3] It is clear, however, that a fixed C-curve is equivalent to a Phillips curve; upward movements on each are inflationary, downward deflationary. In this connection, the (U, V) map is more instructive because it indicates possible movements across C-curves as well as along them. These shifts must generate, and hence "explain," corresponding shifts in the Phillips curve. This consideration should not be neglected in the statistical estimation of Phillips curves, particularly when long time series are involved.

The more general advantage of the (U, V) map is the clear inference from it that in search of a policy optimum, we are not restricted to the grim "trade-off" between unemployment and inflation, a notion which the Phillips curve fosters. From any point on the map we can not only move up and down the particular C-curve, but also toward (or away from) the origin. Movements toward the origin can be accomplished by means of labor market policies which increase

[3] The Phillips curve relates unemployment and money wage changes. The concept was introduced by A. W. Phillips in "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom," *Economica,* November 1958.

information, mobility (geographic and otherwise), skill adjustments, and the like. Theoretically, unemployment may be reduced without inflation in the course of such policies. But policy is seldom, if ever, without costs. What are the "trade-offs," the social costs and returns in movements across rather than along C-curves, are important questions for empirical study.

How does a concept of full employment fit into this analysis? While it would be ill-advised to call "full employment" all conditions in which $U = V$, or any alternative locus of points in Figure 1 corresponding, say, to zero points on Phillips curves, I believe that the (U, V) map, together with data on price (wage) movements, can be helpful in defining movements toward full employment. From any given position on the map, all moves to the left will reduce unemployment. Choose the specific direction of movement, i.e., that mix of policies which yields the greatest excess of social returns over costs. Then, a conceptually meaningful definition of full employment is, I submit, a level of unemployment from which any further moves [4] on the (U, V) map result in greater additions to costs than to returns. So long as returns exceed costs, a movement is indicated. It is analytically appealing to think of this movement as proceeding along a line which corresponds to one of the previously suggested notions of aggregative equilibrium. But this need not be the case. Of course, the contents of social returns and social costs will not necessarily be agreed upon by all, nor will they be the same in different social climates. But "full employment" is a concept of social optimum with elements of subjectivity which cannot be abstracted from in any case.

We have seen that joint data on vacancies and unemployment permit a conceptual separation of cyclical and noncyclical components of unemployment. I called the noncyclical component "frictional," but further distinctions concerning the presence and degree of "structural" unemployment could also be obtained with such data, provided a particular interpretation is given to that term. "Structural" unemployment may be thought of as "frictional" un-

[4] While we tend to think of moves to the left only, optimization may also involve moves to the right. Financing of a longer and more thorough job search may increase the unemployment count, but at the same time contribute to a better allocation of resources.

employment where the "friction" is particularly pronounced. The amount of "friction" is given in the (U, V) map by the distance of given C-curves from the origin. But with the same amount of friction, unemployment may or may not be "structural." The term is applied to situations in which the potential costs of matching jobs and workers are particularly high. Clearly, the "structural" dimension of a given amount of maladjustment is a continuous variable. In this sense, the popular dichotomy between structural and nonstructural conditions of frictional unemployment is inaccurate and arbitrary. Nevertheless, even with this imprecise language, the two cases are often easily distinguished. For example, if vacancies and unemployment coexist in roughly equal magnitudes in similar occupations in the same local areas, the costs of matching jobs and workers are relatively small, hence the frictional unemployment is nonstructural. But if unemployment is high in some regions, and vacancies abundant in other, distant regions, sizable costs of movement would have to be incurred. And if unemployment is large in some skills and jobs go begging in others, high costs of training or retraining may be implicit. The second and third case may be called structural by this definition.

To detect the existence, degree, and changes in structural unemployment, (U, V) maps may be constructed for disaggregations of the economy in the cross-section, by various categories, such as industry, location, occupation, and any other classification of interest. For example, each location is represented by a point in the (U, V) map, and a scatter diagram showing such information for all labor markets may show a clear positive correlation. This would indicate that unemployment is largely nonstructural with respect to location, that is to say, that adjustments require movements *within* local areas rather than the more difficult movements *between* areas. In contrast, a negative relation in the scatter would indicate the presence of a structural problem. The scatters may, of course, show identifiable combinations of patterns. Observations of changes in these cross-sectional patterns over time will show rotations and shifts, providing highly suggestive leads for diagnoses of the changing structure of labor supplies and demands.

Needless to say, confidence in the diagnoses will require an analyt-

ical corroboration of related variables along the many lines suggested by Holt and David. And, unless the problem of data reliability is a source of great confusion, the data-collection enterprises now in their exploratory stages are eminently worthwhile.

ELEANOR GILPATRICK, UNIVERSITY OF ILLINOIS

The papers and discussants make little mention of technology in their discussion of job vacancies. Yet technological change is precisely one of the changes we are talking about when we refer to structural change. This, in turn, has been involved in the structural-demand controversy (still in evidence here) which gave impetus to the efforts to obtain job vacancy data by occupation and place.

Technology is embodied in physical means of production, and these call for special kinds of labor skills. Occupational titles are a reflection of the technology and involve, as well, a concept of minimum training levels. For example, the invention and use of the typewriter called for persons who could at least read and who had some finger dexterity. The computer calls for people who can handle mathematics and reason abstractly. Digging ditches with a shovel requires no previous education, but driving a piece of modern digging equipment presumably presupposes the ability to handle dial and gauge readings. Thus, when technology changes, it involves changes in occupations and therefore skill requirements; and this leads us back again to the structural-demand controversy and the importance of job vacancy data for diagnosis of unemployment.

Frictional unemployment supposes that the unfilled jobs can be filled by the unemployed. But structural unemployment exists where the skills of the unemployed are mismatched with respect to the jobs currently available or available with increases in demand. This is why our job vacancy data must not be allowed to be merely a single index or total to be compared with a single index or total of unemployment. We must have the information by occupation, location, and industry, and we must have similar information about the unemployed. Otherwise the use of job vacancy data for the purpose of analysis of the state of the labor market will be distorted.

In line with this approach, I think that Dunlop's paper is apt. I think we can read him to mean that the port-of-entry job is the first step in a family of similar skill-requiring occupations. It is the job which the firm cannot fill from its present work force. This is not just the lowest-level job, but appears at different stages in the skill hierarchy. Within a skill family the same initial training can be added to within the firm by experience or other means, and the individual can move along the continuum until there is a sharp break in the quality of training required. At this point there is another port of entry. Thus, we can conceive of the sweeper moving up to being a punch-press operator, but he cannot move up to being a programmer.

Technology sets the range within which skills are transferable one with another, and the degree to which they are substitutable in production. Technological change affects the identity of the skill families and influences the location of ports of entry. Thus job vacancy data will highlight the effects of technological change by reflecting changes in the ports of entry. I agree, however, that the eleven-title occupational system now in use says little about the operations or technology underlying titles such as professional or operative. A better system will give us a better insight into the working of the economy.

We require a system of labor force data which will classify the employed, the unemployed, and job vacancies by occupation, by location, and perhaps by industry. Having detailed occupational data by industry for the employed might well be even more important for manpower planning than having such categories for job vacancies. The employment proportions reflect the technological requirements, and these can be observed as they change over time. Incremental changes can also show the direction of manpower needs.

With respect to the data collected by the employment services, I suggest that they may be valuable but have limitations to their use both in economic analysis and for manpower planning. This is because the level and fluctuations of the data can be a function of the quality and quantity of staffing in the various agencies and can fluctuate with administrative policy. Particularly is this true by regions.

The USES data may be limited in their value when we talk about blowing them up to represent the universe of vacancies. On the other hand, these data could be useful in assessing labor demand and supply situations using the time dimension, or duration, of vacancies by occupation and place. Duration has proved to be a meaningful indicator in the unemployment series once we had enough data to establish regular cyclical patterns. Rather than having the arbitrary and subjective category of "hard to fill," I would prefer a measure of duration of openings by occupations. With establishment of a picture of "normal" vacancy periods for different occupations, fluctuations from the "normal" might be a sensitive indicator and might be less dependent on strict sampling requirements as is the case with a universal head count blown up from a sample.

I recall that Louis Levine comments on the existence of vacancies in the lower-skill occupations. He mentions as possible explanations below-standard wages and working conditions, or seasonality. I wish to suggest another possibility. Perhaps persistent low-skill vacancies are a function of employer refusal to employ Negro workers. The differential in the Negro-white unemployment rate is only cut in half when we adjust for occupational distribution.[1] The remainder must in good part be due to outright discrimination. The reluctance of employers to use USES facilities, which places the operational data in question, may well be related to their refusal to interview all those referred by USES. We can look to an improvement in the use of USES as the discrimination problem is tackled. Ignoring this part of the unemployment problem ignores a part which is not frictional but, in a sense, structural-institutional.

I should like to comment now on the David and Holt paper, which I feel ignores technology, technological change, and the reflection of these in the proposed use of job vacancy data in their model. For example, the definition of an unemployed person includes a man who would take back his old job, if offered, if "the man still qualifies for holding the old job. . . ." But what about the man whose old job has been abolished by technological change, like the railroad fireman? Isn't he unemployed too? "Job vacancy"

[1] Mathew A. Kessler, "Economic Status of Nonwhite Workers, 1955–62," *Special Labor Force Report No. 33* (BLS), July 1963.

includes the numbers "who would be hired today . . . if they had the same skills and wage requirements as the men that the company has recently hired to fill corresponding positions." But what about the new opening that has never before been filled?

Lack of recognition of changing skill requirements leads to other difficulties. The authors suggest that when a vacancy is filled, unemployment is reduced. However, this would only be assured if those not in the labor force were classed as unemployed, a meaningless use of the term. It also ignores the effects of shifts within the employed group. In recent years there are numerous instances of women entering the labor force to take job openings for which unemployed men were unqualified. In these cases vacancies declined, but unemployment did not. If a vacancy is filled by an employed person, it may be replaced by another vacancy. No aggregate effect is observable, but the occupational identity of vacancies is of importance in the analysis of the unemployment situation.

An important by-product of technological change is the impact on initial requirements for entry jobs. Upgrading of these is a phenomenon attributed by Holt and David to unrealistic employer demands, but the skill continuum may be such that inside training is not adequate to move the individual along. He must be prepared to move before he enters. A sweeper can expect to learn assembly work on the job, but the lab assistant may have to be able to program before he is hired. The employer may be better equipped to train a lathe operator than a programmer.

I am suggesting that the concept of noncompeting skill families within labor markets, the old Taussig concept, is a valid and necessary one without which the diagnosis of unemployment and the model of the labor market will take on bizarre qualities. The difference between frictional and structural unemployment is that with structural unemployment the unemployed are not equipped to take the open jobs, or shortages of complementary skills prevent appropriate vacancies from developing for them.

The David-Holt model links unemployment and job vacancies to wage determination via the Phillips curve. Duration of unemployment and of vacancies is the mechanism whereby the two stocks are brought into equilibirum. Figure 5 of their paper is an illustration

of the process. But note that there is a minimum-skill endowment required by the employer, and a maximum-skill attainment of the worker. Figure 5 is a micro market. Yet the model somehow aggregates the adjustment in specific skill markets and presents the macro Phillips relationship of wage changes with unemployment rate changes.

But if there is technological change or a shift in demand, skill requirements and availabilities are affected, and the macro relationship is affected by changes in the weights and elasticities of skill supplies in all the micro markets. These are not necessarily interrelated, and the Phillips curve must be redrawn for each adjustment. It has no predictive validity or regularity. This is why other writers, contrary to what David and Holt suggest, indicate that full employment is compatible with various levels of wages.[2] Given nonsubstitutability of some skills, the wage rate for unemployed ditch-diggers can go to zero in the unskilled market without vacancies for economists declining in the academic market.

In the oral discussion, the Phillips curve has been superimposed on a 45-degree line rising positively from the origin, equating job vacancies and unemployment. This line is said to be the locus of points of labor market equilibirum, while the intersection with the Phillips curve is said to be the point of stable price equilibrium. But the equality along the 45-degree line is a sign of equilibrium only if those unemployed are equipped to take the vacant jobs. That is the meaning of frictional unemployment.

Even if we assume that we are talking about a cross-section view, one for each labor skill market, we cannot diagnose departures from the 45-degree line as due to excess labor demand or excess labor

[2] Empirical findings which contradict David and Holt's basis for validating the Phillips relationship appear in W. G. Bowen, *Wage Behavior in the Postwar Period,* Princeton, 1960; Otto Eckstein and Thomas A. Wilson, "The Determination of Money Wages in American Industry," *Quarterly Journal of Economics,* August 1962; Keith B. Griffin, "A Note on Wages, Price and Unemployment," *Bulletin of the Oxford University Institute of Statistics,* August 1962; Philip Ross, "Labor Market Behavior and the Relationship Between Unemployment and Wages," *Proceedings of the Fourteenth Annual Meeting,* Industrial Relations Research Association, New York, 1961; and Charles L. Schultze, *Recent Inflation in the United States,* Study Paper No. 1, Employment, Growth and Price Levels, Joint Economic Committee, 86th Congress, 1st Session, September 1959, Washington, 1959.

supply, and so on. This is because we do not know enough about labor skill complementarities and transferabilities.[3] For example, a shortage in a key skill will result in the skill complements not being filled, but the vacancies listed will reflect only the skill in short supply and not the complements if these are available among the unemployed. The numbers of unemployed can thus be greater than the numbers of vacancies, but the unemployment can still be due to structural rather than demand causes.

Finally, just as technological change is absent from the model, so are macro feedback mechanisms. For example, how long can high levels of unfilled vacancies be maintained without an effect on the level of demand? How elastic is employment with respect to wage changes when modern firms are limited by the extent of the product market?

MARVIN FRIEDMAN, AFL-CIO DEPARTMENT OF RESEARCH

John Dunlop's paper should be required reading for anyone who is truly interested in exploring the uncharted waters of job vacancy data. He has very clearly outlined the dimensions of the problem of measurement and interpretation of job vacancies in terms of the real world.

Understanding that real world, and understanding just what it is we hope to achieve in the field of job vacancy information, is vital unless we are content to spend millions of dollars without any really meaningful results.

Neither Holt and David nor Levine mentions the impact of

[3] There is another technical point to be made. If the 45-degree line equates numbers of job vacancies on the horizontal axis with numbers of unemployed on the vertical, then the same scales cannot be used for the Phillips curve. Using wage rates and vacancy rates we can use the Phillips curve, provided the scales are for percentage wage changes and the unemployment rate but not changes in the unemployment rate. There is still a difficulty, however. The denominator for the unemployment rate is employed plus unemployed. The denominator for the vacancy rate should be filled jobs plus unfilled jobs. But filled jobs may not equal employment because of multiple jobholding. Unless the vacancy rate uses a figure of employed, rather than filled jobs, the denominators are not comparable, and the 45-degree line will not express the unity of persons and openings.

employer upgrading practices to fill openings. Their "vacancies" are what Dunlop refers to as being at the ports of entry. In terms of relative importance, however, these vacancies are analogous to the visible portion of an iceberg. As Dunlop points out, "The actual world is very far removed from [a] model" in which each job classification is a port of entry. All employers, Dunlop correctly says, have "an elaborate set of practices or rules relating to promotions, transfers, layoffs and retirements for various groups of job classifications, and they confine entry from outside the organization . . . to a limited number of job classifications."

The consequence of this, of course, is that we are not likely to get a very good picture of the changing nature of work and of the changing skill requirements simply by examining vacancies at ports of entry. This being the case, one wonders how effective the type of program we are embarking on, and the one Levine describes, will be in helping us to determine the types of training and education programs that are needed in order to prepare people for the world of work. Or, for that matter, how much we would gain from the model Holt and David are constructing and into which they seem to be prepared to inject whatever vacancy data are forthcoming, seemingly without reference to Dunlop's real world.

Certainly, for those who are engaged in counseling youngsters, the information we are going to get will be of questionable value, for we are—or we ought to be—concerned with what the youngsters will need to equip them to move up that internal, upgrading ladder, as well as to be able to shift occupationally during their working lives.

One lives in hope, however, and one thing to hope for is that we will, at some point, be able to get a reasonable measure of these internal job developments. The inadequacies of the present occupational breaks which Dunlop mentions are widely agreed upon; I suspect even by the BLS. Dunlop's solution, after he disposes of the *Dictionary of Occupational Titles* as not very useful for his purposes (he and Levine are obviously not of one mind on this subject), is a major overhaul of our occupational classification system. I show my bias, I suppose, when I admit that I cringed at his support for a nationwide job evaluation plan. This is easier said than done, and I would point out to Dunlop that problems have developed with

regard to the nationwide job evaluation plan in the Netherlands, which Dunlop obviously had in mind in making this suggestion. One writer has recently observed that "The problems created by the normalized method of job evaluation in so small a geographic area as the Netherlands do not augur well for using a similar method in so large and diversified an economic system as the United States." [1]

Obviously, for purposes of manpower planning, counseling, and training, we need something better than we now have in the way of occupational information. There is simply not enough detail—occupationally and certainly geographically—in the BLS reports. It may well be that in the long run we would get much more value out of money spent to improve our occupational information than may be the case with regard to comparable expenditures on job vacancy statistics.

This is not to say we should not seek to improve our information on job vacancies. We should, but it should be as an operational tool for the employment service. And I underscore those words "operational tool."

One of the reasons for the proposed program of collecting job vacancy information is to strengthen the public employment service, and by so doing to facilitate the matching of workers and jobs. And this is not too much to expect of a program on which millions of dollars will be spent—especially not when one considers that it will have at best limited value in the area of manpower planning, counseling, and training.

From Levine's paper, however, one has reason to doubt that we can look forward to this tangible result unless matters improve considerably. Out of four of the pilot areas, according to Levine, job orders were obtained by the public employment service for only 6 per cent of the vacancies reported by the employers for purposes of the survey. And this, I take it, was after a specific inquiry to the employers as to whether or not they were interested in having the assistance of the employment service in filling the reported vacancies.

[1] Martin Oettinger, "Nation-wide Job Evaluation in the Netherlands," *Industrial Relations,* October 1964.

It is to be hoped that in time this will change. Inadequate as the information may be in terms of our broader needs in manpower planning, even the information on the "port of entry" jobs can be useful as an operational tool *if*—if they help us to place workers and if they help us to train workers even for these so-called entry jobs. It seems obvious, however, that even this limited use will take a long time to develop if we are forced to rely upon this statistical collection program as the vehicle.

All of this, then, seems to leave us with one bit of information—rather expensively arrived at—which we can look forward to in the near future if we go ahead with the proposed program. We will have some statistics on job vacancies. If they cannot be used effectively for manpower planning, counseling, and training, or for increasing the placement activity of the public employment service, surely—at least some would think—they can be used for economic analysis. But can they? Can they really be used to establish with any reliability —given the difference in the concepts and samples through which these data and through which the basic household data are derived —what part of our over-all unemployment is structural?

And if we should be able to bridge the gap and wash away all of the problems in the differences of measurement between the two samples, and arrive at an answer—that x per cent of our unemployment is structural—we really are not much ahead of where we are right now.

Knowing that we have a structural problem—whether one believes it is entirely or only partially structural makes little difference at this point—and even knowing the exact size of the structural problem is of little help unless we know *where* the problem is, that is, in what occupations, in what industries, and in what areas. For unless we know where the structural problem is, we are handcuffed in any attempt to analyze it, let alone deal with it.

Dunlop makes the case persuasively. In his paper which is concerned with the use of job vacancy measures for economic analysis, he questions the value of any large expenditure which does not produce data by occupational classification, with regional and industry breaks.

While Levine also recognizes the need for detail, he apparently

believes that, for his operational purposes at least, the proposed program will be useful. It might be, in time, and to the limited extent previously mentioned. But Levine's expression of hope that these surveys will result in what he calls a "statistical spin-off" which will permit the vacancy data to be used as an economic indicator leads me to another problem.

It is for use as an indicator that many of the more aggressive advocates support the idea of the collection of job vacancy statistics. This is tied to a political motivation that needs to be placed squarely on the table.

The interest of such individuals in a job vacancy index—no matter how inadequate the data are and no matter what qualifications are attached to the figures by the Department of Labor—is part of an effort to minimize the seriousness of our unemployment situation and the need for government action to achieve and sustain full employment by a variety of fiscal measures. Make no mistake about it, there are politics and politicians at work here. Thus, the opportunity to use such an index to advance the views of economic and political conservatives could easily prompt employers to "over report" job openings. This may well be one of the reasons, by the way, why so few job orders actually were forthcoming from the employers in the four cities mentioned in Levine's paper.

We are walking on very thin ice in any attempt to convert these vacancy data into an indicator. Remember, if you will, that the employment-unemployment data derived from the monthly household surveys are based on the specific actions of individuals. Thus, unemployment is not only a state of mind: the individual must actively be seeking work.

Any attempt to develop a job vacancy series into an economic indicator, which will be used as the obverse to the unemployment rate—or subtracted from it—therefore involves an effort to substitute employers' attitudes and actions for those of the workers. However, the fact that an employer believes he has a vacant job may be meaningless if, for example, the vacancy exists because he pays substandard wages. And I don't think it's appropriate to equate this problem with that of the unemployed worker whose wage aspirations may be initially too high. He is quickly forced to face reality but the employer will often be under no comparable pressure and is, in addi-

tion, not inclined to disrupt his existing wage structure by raising his wage offer.

It is difficult to create a set of standards which would exclude such vacancies from the job vacancy reports. But to include them, and then combine the local area reports into a single national figure, would surely distort the picture.

Differences of opinion over what constitutes a legitimate job vacancy are, of course, also a problem in developing a "running inventory" for operational purposes—that is, for use in manpower training and placement activities. However, this shortcoming is much less significant than that which is involved in use of the data as a national index. If the information is designed for use as a working tool—to provide the public employment service with reports on specific vacancies, in specific areas, so that it can perform more effectively for workers, employers, and communities—the local employment service people would be aware of those reported vacancies which offer substandard wages and, it is hoped, act accordingly.

For the purposes of the public employment service, additional information on specific job vacancies, by occupation and area, would no doubt be helpful in upgrading the service. The issue of concepts —such as the question of what is, or what is not, a true vacancy—is not as crucial in developing job vacancy information on an occupational and area basis, for operating purposes, as it would be in developing a national index where it is quite crucial if the end result is to have any validity.

The proposed program, if it is undertaken, must be viewed as an operational tool to strengthen the public employment service. However, the conclusion I reach is that, even with this limited objective, we will need to exhibit a good deal of patience—and the willingness to spend a considerable amount of money—for relatively little return at the outset and a product of questionable value in the long run.

REPLY BY HOLT AND DAVID

The emphasis that John Dunlop and Richard Lester put on our need to learn more about the "internal labor market" is certainly sound. However, the organizational, institutional, and contractual

determinants of labor force decisions inside the firm tend to be both complex and highly specific to particular firms and industries. This makes research in this area difficult and generally applicable theories hard to attain. Our paper makes little effort to contribute to this area, but this should not be interpreted as minimizing its importance.

Our theory of the "external labor market" is concerned with those vacancies that the firm is attempting to fill from the outside. That these vacancies are created at ports of entry may affect the character of the vacancy, but this does not necessarily have a strong effect on the operation of the external market in filling such vacancies. Indeed many of Lester's points should be viewed as complementary to, rather than contradictory of, the model that we have offered.

It is true that union-company contracts aim to govern *wage rates* in great detail for extended periods of time, but their influence is less marked, if we consider tight labor markets rather than loose ones, or if we consider unit labor costs and the wage rates of individual workers. It is relevant to note that union contracts usually attach wage rates to jobs, but do not specify *all* the detailed qualifications required of employees in terms of skill, education, experience, and so on. Where changed market conditions require it, both workers and firms usually can find ways to make substantial adjustments, contracts notwithstanding. The necessity continually to seek replacements for quits and retirements maintains an interaction between the wage quality of labor available in the external market and that currently employed by the firm.

This is not to suggest that bargaining and contracts have no influence, but rather that we need an analysis of institutional and organizational factors to complement our analysis of the market forces that operate on a more atomistic basis. If we had to make a choice of exclusive emphasis—and we do not—it probably would be more relevant to stress the average job duration in the United States of three to five years rather than to picture as typical a forty- or forty-five-year work career with a company largely isolated from the external labor market.

To the extent that hiring does take place through ports of entry,

our theory suggests that one effect may be to require a rather large adjustment of the worker who loses his job after he is halfway up a promotion ladder. The prospect is that he will only be taken in by another employer at the bottom of a new ladder, given a low wage, and assigned work without any recognition for his experience. To accept a new job on these terms would require a considerable decline in his aspiration level which might take a considerable period of unemployment to accomplish. Thus the port-of-entry system may contribute to rigidities and increase unemployment.

One can readily agree with many of Miss Gilpatrick's points except that she sometimes overstates her case. She is certainly correct in stressing the importance of collecting data on unemployment and vacancies with breakdowns on occupation and region. The industrial classification is much more relevant for vacancies than it is for the unemployed, but it might be useful for both. We need to learn a great deal more about the factors that influence the transitions from one occupation and region to another. The estimation of the determinants of the transition probabilities in a stochastic model would seem the most promising approach to studying these structural questions.

To suggest that the availability of a ditchdigger cannot lead to the filling of a vacancy for an economist is to misunderstand the adjustment process that is at work. For example, the following worker shifts might accomplish the trick. The ditchdigger frees a floor sweeper, who frees a timekeeper, who frees a clerk, who frees a bookkeeper, who frees an accountant, who frees a market researcher, who finally turns economist and fills the vacancy. This process, even though it might be offensive to the egos involved, if it were clearly labeled, occurs all the time. It is facilitated by a wide variety of formal and informal training programs and by a tight labor market. In this way, big adjustments can be made by a large number of small adjustments unless barriers which have been erected to protect jobs in an underemployed economy interfere with the process.

This important upgrading process takes place partly in the external labor market, where the unemployed worker initially sets his aspiration levels high both in terms of wage and job quality, and

gradually lowers them as his search progresses. If this view is correct, the unemployed worker undergoes a significant process of dynamic change. If possible, our data should pick this up perhaps by asking about former employment (location, wage, and occupation) and minimum standards that prospective employment currently would need to satisfy. A corresponding argument leads to viewing vacancies as undergoing changes in terms of the range of the recruiting effort, skill requirements, and so forth. For example, an employer may conclude that in order to fill a vacancy at a set wage rate, he will need to hire inexperienced workers and train them. An understanding of these dynamic adjustment processes clearly is of great importance in evaluating the problem posed by rapid technological change, shifts in the composition of demand, and other structural stresses. With the passage of time and the accumulation of information, the need for occupational or geographic movement or the need for investment in training may become apparent to both the unemployed worker and the employer with vacancies. Since time, information, geographic movement, and training all are costly ingredients of the adjustment process, for policy purposes we need to learn the relative efficacy of each.

The theory that we have presented is not fully developed in taking account of technology and structural change, but this is hardly the same as ignoring "technology." Labor productivity is crucial in determining the desired work force and the production process crucial in establishing the skill requirements for job vacancies.

The point of asking a man whether he would like his old job back is to determine whether or not he is unemployed. For this it is immaterial whether the old job has been abolished or not. The contention is that if a worker is ready, willing, and able to do his old job but has become so discouraged that he is no longer looking, he should be considered unemployed. The question whether he still qualifies for his old job excludes from the unemployed category those retired workers who would *like* to have their old jobs back but are no longer *able* to perform them. Again, reference to the old job is for the purpose of getting information about the worker.

The labor market may or may not be in some kind of equilibrium when the number of vacancies equals the number of unemployed

workers. Rather, mechanical application of traditional supply-and-demand analysis might lead to the interpretation of such a "balance" between vacancies and unemployment as an equilibrium condition,[1] but we strongly dissent. The concepts of vacancies and unemployed workers are *not* sufficiently parallel to assume that such a condition would lead either to stable wages or to stable prices which are associated with a traditional market equilibrium. Also note that it is possible for vacancies to be redundant, if several competing companies all try to expand to meet an increase in demand.

We said that the market was in stochastic equilibrium when the number of vacancies and the number of unemployed workers were constant; i.e., the steady flows of workers and vacancies into the labor market were exactly matched by corresponding outflows of new hires and recalls from the market. In such a situation, we would expect that the percentage rate of change of money wages would be constantly either rising or falling depending on the relative number of vacancies and unemployed workers.

The final verdict on the theoretical approach advanced in this paper and its support of the Phillips relation must await its further development followed by careful empirical testing.[2] Unhappily, many of the statistical estimates of the Phillips relation have suffered from a severe structural misspecification. The relation is highly nonlinear, so linear approximations will tend to be unstable and will depend critically on the region of the curve that is observed.

[1] The 45-degree line referred to has a positive slope through the origin in a plot of unemployed workers vs. vacancies.

[2] For important current work, see the five articles by Hines, Behman, Eckstein, Perry, and Reder in the *Review of Economic Studies,* October 1964.