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## *Introduction and Summary*

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The nature and characteristics of the labor supply in the United States and many other countries have been studied extensively. As a result, a vast amount of information is available regarding the characteristics of the labor force, its different components, and particularly the unemployed. This information has helped to increase substantially our knowledge of trends and of changes in the labor supply and of problems associated with unemployment.

On the other hand, the demand for labor has been explored very little, especially in the United States, as is noted by Arthur Burns in his opening remarks at this conference. Until recently, little attention has been given to this question and efforts to collect data on the demand for labor have been sporadic. Yet, there has been a growing awareness of the value such data might have, ranging from their use as a basis for job training efforts to their use as a tool of economic analysis. Indications that data on job vacancies have proved useful for a variety of purposes in other highly industrialized countries have served to highlight the need for considering the collection of such data in this country.

It was to promote research that would improve understanding of job vacancies and to encourage the compilation of job vacancy statistics in this country that the conference which was the source for the papers in this volume was organized. The conference, arranged by the National Bureau of Economic Research with financial assistance from the Office of Manpower, Automation and Training of the U.S. Department of Labor, was designed to bring together people who had worked on the collection of job vacancy data in different countries with people who had been working on or consid-

ering the collection of similar data in this country. The conference included economists and others with widely different backgrounds, from government, from universities, from research institutions, from trade unions and from business enterprises. It served, in effect, as a means of enabling these people to exchange points of view, to share their experiences in the collection and interpretation of job vacancy data, and to discuss the feasibility and desirability of collecting such data in this country.

The plans and the arrangements for the conference were carried out with the very helpful assistance of a Planning Committee composed of the following people: Gary Becker of the National Bureau of Economic Research; Harold Goldstein, Assistant Commissioner of the U.S. Bureau of Labor Statistics; Martin Gainsbrugh of the National Industrial Conference Board; Norman Medvin of the U.S. Bureau of Employment Security; Albert Rees of the Department of Economics of the University of Chicago; Arthur M. Ross of the Institute of Industrial Relations of the University of California at Berkeley; Herbert Striner of the Upjohn Foundation; Nathaniel Goldfinger of the AFL-CIO; and Seymour Wolfbein, Director of the Office of Manpower, Automation and Training of the U.S. Department of Labor. In addition, Geoffrey H. Moore of the National Bureau performed the very useful function of serving as the liaison official for the National Bureau of Economic Research in the organization of the conference. James F. McRee and Joan Tron edited the manuscript and H. Irving Forman drew the charts.

The conference was organized along four major subject areas, which also serve as the basis for the organization of this volume. The first subject concerned the general problems surrounding the collection and use of job vacancy data. It was designed to highlight the limitations as well as the advantages of such data within the framework of the U.S. economy. It served to raise basic issues regarding the collection of such data, as will be discussed shortly. The conference turned next to a survey of the collection and uses of job vacancy data in a number of highly industrialized countries other than the United States. Pilot studies relating to the collection of similar data in this country were reviewed at the third session,

while the fourth session was devoted to alternative approaches to measuring the demand for labor.

This volume contains the papers presented at the conference plus comments of discussants and of other participants who attended. A brief summary of the contents of these papers is provided in the next section of this introduction. The concluding section considers some of the central issues raised in the conference, focusing primarily on the analytical uses to which job vacancy data might be put.

#### *HIGHLIGHTS OF THE CONFERENCE*

The papers presented at the first session of the conference supplement each other in an interesting manner. John Dunlop dealt with the conceptual problems relating to the collection and interpretation of job vacancy data. In contrast, Louis Levine, director of the U.S. Employment Service, focuses on the operational aspects of job vacancy data collection and the uses of these data in improving labor market operations. Still further contrast is provided by Charles Holt and Martin David, who take a highly theoretical approach, attempting to show how the concept of job vacancies might be incorporated in a theory of labor market functioning.

Dunlop raises four fundamental questions regarding the meaning and value of job vacancy data in the U.S. First, he notes that job vacancy data ordinarily are not part of management operations and, hence, are not likely to be easily available or, indeed, particularly meaningful. Second, he stresses the growing importance of internal labor markets in this country. This is the tendency of many corporations to hire people only in certain initial job classifications, or "ports of entry," and then to promote from within.

This phenomenon has a number of implications with regard to the interpretation of job vacancy data. Thus, to the extent that ports of entry are relatively few, vacancies will be concentrated in a small number of the many job classifications that exist. Also, the policy of promotion from within means that employers will use hiring standards that rest in part on evaluation of future potential as well as on qualifications for the particular position that happens to be available. By the same token, information on the nature of

job vacancies cannot be used as a straightforward measure of the types of training programs that might be instituted by governments.

A third problem raised by Dunlop is self-employment, a source of employment opportunity excluded from job vacancy surveys. The interpretation of self-employment and the definition of a job vacancy with regard to self-employment raise some very knotty questions.

Dunlop goes on to point out that for job vacancy data to prove most useful the present system of job classification in this country needs drastic revision. This system, he notes, was evolved primarily for historical reasons, possesses little analytical value, and is not related to job content or to job scales. Referring to research by students at Harvard, he suggests an alternative system based on cross-classification of jobs according to job content and job families, the latter representing "jobs with similar orientation often with a common mobility problem, and with related types of qualifications and working environments." In the concluding section Dunlop illustrates briefly how this new classification might be used.

As an administrator responsible for the collection and use of job vacancy data, Levine takes a more pragmatic approach to the problem. In his view, the collection of job vacancy data is clearly feasible, even within the existing institutional and definitional frameworks. He summarizes the experiences of various state employment services in collecting such data, outlines future plans of the state employment services in this regard, and then proceeds to demonstrate how these data may be used as a basis for improving labor market operations.

The paper by Holt and David is not only highly theoretical, but also very much of an exploratory work. As they note in their introduction, no comprehensive theory of the labor market has yet been advanced which could serve as a basis for evaluating the effects of changing economic institutions or of the relationship between demand for and supply of labor in different markets and for different skills. Their contribution, therefore, lies in an attempt to provide the stimulus for a theory which would incorporate both the demand and the supply aspects of labor markets, with job vacancies as the indicator of the demand for labor.

Indeed, the basic strength of their approach lies in the attempt to base their theory on the interaction between the number and characteristics of unemployed workers on the one hand and the number and characteristics of available jobs on the other hand. The model consists essentially of the representation of interactions between these two variables and of changes in them until an equilibrium position is reached. The matching of job seekers with job vacancies is viewed as resulting from a random search process in which the matching occurs in such a way as to fulfill certain minimum requirements on both sides.

The applicability of this model to actual conditions is limited, as is brought out in the comments of the discussants. Thus, Richard Lester, referring to Dunlop's ports of entry, points out that the model fails to allow for such institutional factors. He goes on to note that because of the institutional framework within which American labor markets operate, wages are not necessarily moved up or down in proportion to excess demand or excess supply of labor. Rather, adjustments are made in other ways, such as temporary layoffs and reduced hours of work. Eleanor Gilpatrick goes on to question the validity of a cornerstone of the model, the Phillips Curve, and its relation to the problem. She raises further questions regarding the applicability of the model to labor market analysis. Jacob Mincer, however, notes that the model can have useful applications, though with some modifications. A central question raised in the discussion, one which arose repeatedly throughout the conference, related to the economic significance of the locus of the points at which the number of unemployed equals the number of job vacancies.

Marvin Friedman, of the AFL-CIO, agrees with Dunlop's criticisms of the inadequacies of the present occupational codes but questions the feasibility of the nationwide job evaluation plan proposed as an alternative, pointing to the difficulties the Dutch have had with this method. However, detail about employment, occupationally and otherwise, is vital, and Friedman wonders whether resources might not better be spent for obtaining more such detail in current reports of the Bureau of Labor Statistics than in collecting job vacancy data.

The other comments at this session focused primarily on the conceptual problems relating to job vacancy measurement raised by Dunlop. These views received strong support from Killingsworth and Lester, both of them stressing the need for exploration into new systems of job classification and the need for further investigation of the phenomenon of ports of entry and their significance with respect to job vacancy data.

Experiences of other countries in the collection and use of job vacancy data was the subject of the second major part of the conference. A summary of the practices in twenty-three countries is provided in the paper by William Shelton and Arthur Neef, based on a survey conducted by the U.S. Bureau of Labor Statistics. The results of that survey lead Shelton and Neef to conclude that job vacancy data in these other countries are not as complete as unemployment data, although four countries have developed the nucleus of an establishment reporting system for collecting such data. Most of the countries surveyed publish statistics on job vacancies, representing the number of jobs listed with the national employment offices. These statistics are, however, seriously incomplete as an estimate of the total number of job vacancies. Nevertheless, some of these countries make use of these data for economic analysis, their uses ranging from measuring the demand for labor to evaluating and forecasting business cycle developments.

A detailed exposition of the collection and use of job vacancy data in each of five countries is the subject of the other papers at this session. W. Thomson, the Director of the National Employment Service of Canada, provides a very thorough description of the collection of such data in his country and of their strengths and weaknesses. Although the National Employment Service participates only in about one-third of the hirings in the country, an extensive system for collecting and processing such data has been developed. As in most other countries, they are based on reports of job openings by employers to the employment service. Thomson is frank in stressing the imperfections of Canada's job vacancy statistics. These include the absence of any method of evaluating the meaning of changes in the number of vacancy notifications, the limited coverage of the data, the absence of any distinction between

part-time and full-time openings, and the lack of related information, such as duration of vacancies or difficulties of filling vacancies. Thomson also stresses the need for careful interpretation of job vacancy data, and cautions against the comparison of aggregate unemployment with aggregate vacancies as a measure of labor market conditions.

Japan presents a very different institutional framework for vacancy data collection, Gerald Somers and Masumi Tsuda report. They emphasize the dual structure of employment in large and small firms, particularly the traditional practice of hiring junior and senior high-school graduates on a permanent basis, to be trained and promoted within the firm the rest of their working lives. Wages, bonuses, and fringe benefits are tied to this system. Temporary workers may be hired as required, but these workers can be released on short notice. As a result of this system, there is much greater demand for young workers than for older people, and unemployment is much more likely to be concentrated among the latter group. From the point of view of job vacancy data collection, this system represents perhaps an extreme case of the "ports-of-entry" concept advanced by Dunlop, with corresponding implications for interpretation and analysis.

As in the other countries, job vacancy data in Japan are obtained from job openings listed by employers with the Public Employment Office. These statistics are, however, supplemented by periodic surveys of the demand for particular types of workers. The data have been used for a variety of purposes, according to the authors. These include the matching of labor supply and labor demand by local areas and as a basis for the analysis of structural changes in the labor market and in the Japanese economy. In particular, the vacancy series is noted to be of significant value in the analysis of national unemployment, underemployment, and inflation.

In France, according to the paper by Jacques Chazelle, Director General of Employment of the Ministry of Labor, job vacancy data are obtained on the basis of openings reported by employers to local employment offices. Legally, all such vacancies are supposed to be reported, though no attempt is made to enforce this obligation. In French experience, the data on job openings appear to fulfill vari-

ous purposes of economic analysis, some of them based on the comparison of job openings with job applications by occupation.

Chazelle points to the success of the Ministry of Labor in repatriating 70,000 job seekers from Algeria into the French labor force as evidence of the value of job vacancy statistics. The regularly available data on job openings were supplemented by intensive employer surveys, and as a result of this campaign to uncover vacant positions the number of such job seekers fell from 70,000 on November 1, 1962, to 14,000 by October 1964. Nevertheless, Chazelle points to the need for future refinement of this information. Thus, he stresses the need for compilation of such data on a more selective basis, for the classification of job openings by level of professional skill and by working conditions, and for greater exploitation of such data on a national and local level.

The situation in the Netherlands and Sweden is particularly interesting in that job vacancy data appear to be put to considerable analytical use, and operational reports are not the only source of such data. In both countries, the data serve as the basis for estimates of labor shortages. Per Holmberg indicates that in Sweden such estimates have been made both with and without regard to the availability of housing facilities near the place of employment. Moreover, the Swedish job vacancy data are used as the basis for a system of periodic regional labor market forecasts, which appear to serve as an important guide to public policy. Sweden also possesses an additional source of job vacancy data in employer reports to the Business Tendency Survey of the Swedish Institute of Economic Research. This survey covers job vacancy trends in most of mining and manufacturing. According to Holmberg, expectations with regard to employment trends as reported in this survey agree closely with what later actually happens.

L. J. Niesten reports that in the Netherlands yearly estimates on labor shortages are prepared by the government employment bureaus. They supply a better understanding of the labor market situation and are used in the development of training programs.

In her discussion of the papers at this session, Sylvia Ostry contrasts the different approaches to vacancy data collection and analysis followed by these five countries, and notes the rather extensive

use of such data for economic analysis. Adolph Sturmthal points to the differences between labor market functioning in Western and Central Europe and in the United States, and notes the effect of such differences on the measurement and interpretation of vacancies. Margaret Martin, of the Bureau of the Budget, reviews the experience of these other countries to shed light on the optimum design of job vacancy data collection for the United States.

New experimental evidence on the measurement of job vacancies in the United States provides the connecting theme among the five papers presented at the third session of the conference. Four of the papers describe ongoing programs of job vacancy collection. Elizabeth Slotkin presents the findings of a pilot study undertaken by the Illinois Bureau of Employment Security to ascertain the feasibility of collecting vacancy data. Results of this study served as a partial basis for the job vacancy survey program undertaken by the U.S. Department of Labor, as reported by Irwin Wingard.

As is evident from Mrs. Slotkin's paper, the results of the pilot study were by no means completely favorable. Among other things, only one-fourth of the sixty-two employers interviewed possessed formal job vacancy records; forty-five of sixty-two firms returned job vacancy schedules, but only sixteen of these firms listed one or more job vacancies (the labor market situation in Chicago was very tight at the time); and some difficulty was encountered in classifying the sixty-five job openings according to the *Dictionary of Occupational Titles*.

As a result of these experiences, the current survey of job openings by the Illinois Bureau of Employment Security has been modified in a number of ways, including the elimination of the restriction of vacancies to those lasting more than three days, the use of the term "job opening" instead of "job vacancy," resort to a mail questionnaire, and the inclusion of a request for wage rates with each job vacancy listing. At the same time, difficulties in the pilot survey led Mrs. Slotkin to inquire whether data on job orders placed with the Employment Service may not provide similar, if not better, information than job vacancies. As she points out, the job order data are already coded by occupation and industry. The problem remains, nevertheless, of the restricted coverage of the job

order data, which means that supplementary survey techniques may be needed.

Wingard provides a detailed description of the experimental program for the collection of job vacancy information in fiscal 1965 conducted jointly by the Bureau of Employment Security and the Bureau of Labor Statistics. The actual data were collected by the state employment agencies in sixteen metropolitan areas, under the direction of the Bureau of Employment Security. The primary objectives of this program were to evaluate the feasibility of collecting useful job vacancy data by occupation and location and to ascertain the value of such data to the placement operations of the Public Employment Service. A subsidiary aim was to explore the feasibility of using such data for purposes of economic analysis and public policy.

The paper by Vladimir Chavrid and Harold Kuptzin, of the Bureau of Employment Security, presents detailed information on the extent to which data on job openings as collected by the U.S. Employment Service may reflect total job vacancies. Among other things, the paper brings out the fact that nonfarm job openings reported to the Employment Service represented almost one-fourth of all new hires in the United States in 1964. Most placements by the employment service were for skilled positions, although by far the largest proportion of the applicants registering with the public employment offices were semiskilled or unskilled.

This paper also presents preliminary results from the experimental job vacancy program of the U.S. Department of Labor. Based on reports from ten areas, the preliminary results suggest that the collection of job vacancy information by specific occupation from employers is clearly feasible, some areas reporting employer response rates of 90 per cent or more. Particularly interesting is the authors' use of these data to dramatize supply and demand imbalances for particular occupations among different areas. Thus, the authors report that vacancies for skilled welders in Milwaukee in October 1964 outnumbered applicants by 187 to 112. At the same time, Portland had only 12 openings for skilled welders and 100 applicants, while Birmingham had 89 vacancies and 53 applicants. Yet, as the authors note, if the data were not presented sepa-

rately by area, aggregative figures would indicate that the demand and supply for skilled welders at that time was nearly in balance, 288 vacancies versus 265 applicants.

A progress report on a privately financed study with roughly similar objectives to the government program is provided in the paper by John Myers of the National Industrial Conference Board. The NICB study is, however, much more intensive in nature, focusing on a single labor market area and attempting to explore in depth some of the problems in the collection of such data. The paper itself is based on the results of initial interviews with twenty-seven firms in the Rochester, New York, area during September-October, 1964. Problems explored include the definition of a job vacancy, the relationship of hiring practices to job vacancies, the ease of specifying hard-to-fill jobs, the feasibility of obtaining information on required years of experience and years of formal schooling with each job opening, and the means by which job vacancies might be classified.

In contrast to the Chicago pilot study, complete cooperation appears to have been obtained from the sample firms (though it is not clear if they were randomly selected). It is also of interest to note that very few vacancies reported were of less than one-week duration, although employers did experience difficulty in providing such information. Collection of information on experience and formal schooling requirements was feasible, although to a certain extent these two variables can substitute for each other. As in the Chicago pilot study, difficulty was encountered in the classification of jobs by the *Dictionary of Occupational Titles*. Thus, on the basis of checks with employers, about 25 per cent of the job vacancies in occupations other than professional and managerial turned out to be incorrectly classified by the researchers.

The final paper at this session, by Robert Ferber and Neil Ford, is based on an earlier and smaller study than any of the others. Since the basic study was reported elsewhere,<sup>1</sup> this paper sought to move one step further and to explore the analytical value of col-

<sup>1</sup> Robert Ferber and Neil Ford, "The Collection of Job Vacancy Data Within a Labor Turnover Framework," in *Employment Policy and the Labor Market*, Arthur Ross, ed., Berkeley, 1965, pp. 162-190.

lecting job vacancy data on an *ex ante* basis as well as on an *ex post* basis. Based on comparisons between job openings reported currently and openings expected in the coming month, strong evidence is advanced to support the feasibility of collecting data on prospective job openings, and their value for economic analysis. At the same time, the additional cost attached to the collection of such data would have to be weighed against the benefits that might accrue from the availability of this information.

In his comments on these papers, Albert Rees takes note of the progress that has recently been made toward the collection of job vacancy data in the United States, progress especially remarkable in view of the expert judgments rendered less than ten years earlier that such data could not be obtained. Rees notes that many problems remain to be solved and expects still more to arise, but points out that in this area of statistics, as in many others, we should not expect perfection. He stresses that it took many years for our current system of unemployment statistics to reach its present state, and that system is still by no means perfect.

The last session of the conference, reported in the final part of the volume, was concerned with alternative approaches to measuring the demand for labor. Charlotte Boschan investigates the behavior of three sets of available data that reflect the unfilled demand for labor, and traces their course during business cycles. The three series are newspaper display ads for executive positions, help-wanted advertising, and job openings pending as reported by the state employment offices of the U. S. Bureau of Employment Security. In all three, she finds that fluctuations tend to conform with the business cycle, with a tendency for the series to lead at the peaks and to be largely coincident at the troughs. Thus, to a limited extent all of these series could be considered as business cycle indicators, though it is not clear how well any of them reflects the over-all demand for labor.

In the other two papers, Eaton Conant and Mack Moore consider possibilities of developing new data from sources not previously studied. In the case of Conant, this source is private employment agencies, while Moore investigates the feasibility of obtaining and using job vacancy information from temporary help services. Co-

nant raises serious questions about the possibility of obtaining useful vacancy data from the private employment agencies, in view of the apparently poor records kept by these agencies, combined with their unwillingness to reveal information about their operations. Moore is more sanguine, expressing the view that although there would be difficulty in obtaining information on the operation of the temporary help services, such information could be obtained, and there does seem to be some correlation between the activities of these agencies and fluctuations in the level of job vacancies.

In his evaluation of these papers, Ben Seligman takes a rather pessimistic view. He points out that clear-cut relationships between total job vacancies and each of the indicators have yet to be established. Myron Joseph voices much the same skepticism of the feasibility of developing trustworthy job vacancy indicators from the sources covered by these papers. He stresses the need for learning more about the characteristics of job vacancies and their role in labor market operations.

### *SOME CENTRAL ISSUES*

As is evident from the foregoing, the conference covered many aspects of the collection and interpretation of job vacancy data, ranging from practical matters of data collection to theoretical questions relating to the use of such data in models of the labor market. In view of this wide range, it would seem useful to single out some of the principal questions that were discussed. This serves not only to indicate the major points of controversy, but also to suggest areas in which future work on this subject might well be directed.

1. How should job vacancy data be collected? Should such data be obtained as a by-product of the operations of employment services, or should such data be the focus of a separate activity designed specifically to deal with the associated statistical and conceptual problems? To some extent, this question is an oversimplification, for compromise approaches are also possible. Thus, as is the practice in some countries, the basic data on job vacancies can be obtained from job openings reported by employers to the employment services, but these data can be supplemented by separate surveys

designed to remedy the deficiencies and plug the gaps. In any event, consideration must be given to whether special attention should be paid to the preparation of comprehensive job vacancy data. It seems clear that this question must be answered in the affirmative if consistent and reliable job vacancy data are to be collected.

A related question is whether meaningful job vacancy data can be collected in view of the fact that such data do not currently constitute part of management operations. Few firms maintain records of job vacancies and, among larger firms, very few maintain comprehensive data of this sort in a central location. Does this necessarily imply that meaningful vacancy data cannot be collected under these circumstances? Doubts on this score do not appear to be prevalent among those who are already collecting such data.

In addition, various technical problems relating to the collection of such information have yet to be resolved. For example, how effectively can it be obtained by mail or by telephone? And, what allowance needs to be made for the possible existence of numerous hiring points within a firm or for possible bias in employer reporting of vacancy data?

2. How should job vacancies be defined? Should temporary as well as permanent openings be included? Should the data cover all vacancies open at the current time or should they be restricted to vacancies in existence for, say, three days or more? Should information be sought on *ex ante* vacancies and, if so, how far ahead?

3. To what extent should related information be sought with job vacancy data? Information on type of job and on location and duration of vacancy is virtually essential. However, should information also be sought on wage rates and conditions of employment as a basis for assessing the reality of the vacancy? Or should such information be regarded as of incidental interest because no comparable attempt is made in measuring unemployment to ascertain how many are seeking unrealistically high wages?

4. How are job vacancy data to be interpreted within the institutional framework of an economy? As noted previously, the hiring of employees by many corporations only at certain ports of entry means that the long-term nature of the position may be very different from the initial job description. How can such factors be

taken into account in the development of manpower policies? How can training and educational programs be set up under such circumstances?

5. To what extent should a data collection agency attempt to guard against the misuse of job vacancy data? A frequently cited misuse of these data in Canada is to take the difference between total vacancies reported to the employment service and total estimated unemployment as an indicator of inadequate or excess demand for labor. On the other hand, other countries report that even such a crude measure can be of some use. Under the circumstances, should the publication of such data be severely restricted or should the data be made generally available with appropriate caveats?

6. How well can the demand for labor be gauged by means other than the collection of job vacancy data? In the United States, job orders on file with the local offices of the state employment services provide a largely unexplored mine of information, particularly with respect to occupational detail. The extent to which such data may represent a proxy for a comprehensive job vacancy series is touched upon in some of the papers in this volume, but cannot be adequately determined until comprehensive data have been assembled. Further studies may be needed to determine the relationship between the amount of help-wanted advertising and fluctuations or trends in total job vacancies, as well as the feasibility of constructing indexes of labor demand from such other sources as temporary help services and private employment agencies.

7. How can job vacancy data be used to analyze labor markets and economic conditions? The uses of these data for placement purposes and for manpower training programs are reasonably clear-cut. The possible analytical uses of such data, however, were not fully brought out at the conference. Consideration of these uses is basic to any decisions relating to their large-scale collection, particularly in the United States where key decisions on such matters are likely in the near future. Special attention to this question therefore seems warranted in this introduction.

The analytical uses for job vacancy data can be considered with reference to the use of such data in themselves, to their use in con-

junction with other labor market indicators, and to their use in relation to other measures of economic conditions. In the first instance, job vacancy data are clearly of considerable interest in themselves, for providing information on the number, location, and characteristics of existing job openings. For both analytical and operational purposes, such information is likely to be of most value if the data are subclassified by location and by occupation, so that they can be used to measure the extent to which vacancies are concentrated by area or by particular types of work. Information on other characteristics of job vacancies, such as wages, duration of vacancy, and working conditions, are also of analytical value, enabling us to determine the realism of the vacancies and the tightness of labor markets. Particularly important would be corresponding information on employment, to permit an evaluation of the seriousness of different levels of job vacancies.

From a longer-run point of view, trends in job vacancies over time, preferably classified by occupation, would be of considerable value in throwing light on the ability of the economic system to meet changes in the demand for labor. Time series of this sort should be invaluable for anticipating possible future dislocations in the labor market and for pinpointing subject areas in which education and retraining programs are most needed.

Job vacancy data in relation to unemployment statistics and other measures of labor supply are likely to be of particular value for cyclical analysis. Cyclical variations in job vacancies are of interest in themselves. Still more useful, however, would be comparison of vacancies with unemployment, assuming that the data are reasonably comparable and contain the proper stratifications, notably by location and by occupation. In such a case, comparison of vacancies with unemployment throws light on the extent of imbalance in labor markets. Comparisons could be made for particular occupations or for particular areas or for both. Various measures of imbalance in labor markets could be derived from such data at different levels of aggregation. To cite one example, if  $U_{ij}$  represents the number of unemployed in the  $j$ th occupation from the  $i$ th area, and  $V_{ij}$  represents the corresponding number of vacancies during

the same period, one aggregative measure of imbalance would be the following:

$$I = \frac{\sqrt{\sum \sum (U_{ij} - V_{ij})^2}}{\sqrt{\sum \sum U_{ij}^2} + \sqrt{\sum \sum V_{ij}^2}}$$

This measure varies between zero and 1. If labor markets are in complete balance, the value of  $I$  will be zero. On the other hand, if the labor market situation is such that none of the unemployed is in the same area-occupation stratum as any of the vacancies, complete imbalance is indicated and the value of  $I$  will be unity.<sup>2</sup>

The significance of different levels of  $I$  would have to be ascertained from experience, since the level depends, among other things, on the nature and degree of occupation and area detail. A measure of this type, however, could be of considerable value in indicating the extent of imbalance in labor markets, and of ascertaining the relationship between such imbalance and changes in business conditions. It would also be highly useful for policy purposes to ascertain whether imbalances in labor markets are decreasing or increasing over the long run.

The significance of structural unemployment in an economy depends to a large extent on comparisons of job vacancies, unemployment, and production trends. The studies that have been made to date investigating structural unemployment have been circumstantial in nature because job vacancy data have not been available. If job vacancy data were available, the dimensions of this problem could be appraised with far greater precision. Thus, the extent to which the unemployed in a particular area do not possess the skills called for by the available job openings in that area would reflect structural unemployment insofar as the industries from which the unemployed came are already operating at peak capacity rates. On the other hand, unemployment in an area where industries are op-

<sup>2</sup> A simpler, comparable measure for computational purposes is:

$$I' = \frac{\sum \sum (U_{ij} - V_{ij})}{U + V},$$

where  $U$  and  $V$  represent aggregate unemployment and vacancies, respectively. However, the above measure is more useful for analytical purposes.

erating below capacity rates would suggest that insufficient demand rather than structural unemployment is the primary reason for labor market imbalance. In this way, by comparing values of  $I$  for different labor markets (or perhaps simply  $U_{ij} - V_{ij}$ ) with measures of economic activity for those areas, much more definitive information could be obtained on the seriousness of structural unemployment.

Data on job vacancies used in conjunction with unemployment estimates would also be invaluable for analyzing the operation of labor markets, particularly for deriving more precise measures of the determinants of wages. Studies of this subject so far have had to concentrate on the effect of unemployment on wages, and have not been able to take a more balanced approach to the question. This could be one reason for their inconclusive results. Incorporation of demand elements as well as supply factors should provide a more realistic basis for evaluating the determinants of wages and of wage movements.

Job vacancy information in sufficient detail, combined with comparable data on unemployment, could also provide an operational basis for reducing target unemployment rates at full employment. The reason for this is that at full employment much of the remaining unemployment is due to frictional causes, such as plants closing down in some areas while other plants are opening or expanding elsewhere. Information on job vacancies could pinpoint these movements quickly, and hence could serve as a basis for reducing the extent and the duration of these frictional vacancies.

More generally, job vacancy data would provide a powerful tool for studying the interrelation between demand for products and the demand for labor, and of the manner in which these interrelations change over time. Thus, we have as yet virtually no information on the extent to which tightness of labor markets produces tightness of product markets. Knowledge of such interactions could be of value not only for over-all economic analysis but could assist policy makers in pinpointing and relieving bottlenecks in production.

Measures of job vacancies are also needed for inclusion in the various econometric models currently being prepared to describe the operations of the economic system. Clearly, the demand for labor

is a key variable in explaining fluctuations in economic conditions. Yet, such a measure cannot be included as long as the information is not available. Comprehensive analytical models of the economic system have necessarily had to be deficient in this respect, with the result that no estimates are currently obtainable of the effect on economic activity of changes in the demand for labor. Such information would be invaluable.

A virtually unexplored use of job vacancy data is that by business firms. Except for using internal information on the difficulty of filling particular positions, few corporations appear to have realized the possible value of job vacancy data for their own operations. This is perhaps understandable, since the unavailability of such data has made this question largely academic in the past. Yet, if such data were generally available, they might well prove of considerable use to business, although, as with government, this can only be speculated upon because each firm would undoubtedly develop uses of its own after experimentation. However, some uses of these data seem highly probable and worth mentioning here.

One use is similar to that mentioned already in regard to the study of occupational trends. The availability of detailed information on job vacancies over time would provide a better basis for anticipating labor shortages in a particular occupation, and for the firm's taking appropriate steps to cope with this shortage. Second, to the extent that job vacancy data are of value for cyclical analysis, they are likely to be of equal value to the many large corporations that prepare regular forecasts of their sales and profits. Moreover, the controversy between the structuralists and those who cite insufficient demand as the cause of continuing high unemployment is of more than academic interest to corporations concerned with the prospects for inflation and with the proper formulation of price policy.

A highly practical use of job vacancy data relates to the additional information that they would provide on the adequacy of labor supply in individual localities. Such information is vital when a corporation is considering locations for new plants. Information on job vacancies over time, by area, and by occupation, would be of

considerable benefit to a firm in evaluating the likelihood that it may experience labor shortages in different areas.

This outline of possible analytical uses for job vacancy data is undoubtedly incomplete, because experience with similar information suggests that unanticipated applications are bound to occur once the data are available. However, the outline should serve to suggest the richness and wide variety of applications that could be made. Once the data are collected on a regular basis and in sufficient detail, it is not at all unlikely that a future conference could be devoted wholly to their analytical uses.

In closing, it should be stressed that this survey of the possible analytical uses of vacancy data is not intended to overlook the many practical problems of data collection and data processing which remain to be solved. As many of the authors in this volume point out, not only do unsolved problems exist as yet with regard to the collection of such data, but the extent to which current data on the subject, such as job orders, can be integrated into more comprehensive job vacancy estimates remains to be determined. In the process, there is little doubt that the scope for the analytical uses of these data will be widened.