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Volume Title: The Measurement and Interpretation of Job Vacancies

Volume Author/Editor:

Volume Publisher: Columbia University Press

Volume ISBN: 0-87014-471-5

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

Publication Date: 1966

Chapter Title: Job Vacancy Measures and Economic Analysis

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Chapter URL: <http://www.nber.org/chapters/c1597>

Chapter pages in book: (p. 27 - 48)

## *Job Vacancy Measures and Economic Analysis*

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The past generation has witnessed the perfection of several major families of concepts and measures to describe the structure and performance of the economic system. The most notable are those relating to the national accounts, input-output analysis, the flow of funds, and various indicators of economic activity. In the process of developing these systems of measurement, there has been continuous interaction between theoretical analysis and the grubbing with numbers and sources. These systems of measurement have increased our understanding of the operation of the economy and enhanced the relevance of economics—and economists—to the policy issues of the day. But they have also extended the frontiers of ignorance, as new knowledge always does, by raising many more questions than have been answered.

It will come as no great surprise that both the concepts and numbers relating to the labor market are a relatively underdeveloped field. There are detailed figures on the volume of coal output by grade of coal and region over many years, but the changing occupational structure of coal miners is unknown. The international trade in cocoa beans or coffee has been well documented for decades, while the imports and exports of engineers, physicians, and scientists has only recently attracted any attention. The present eleven-fold system of occupational groups (professional, technical and kindred workers, etc.) is an archaic scheme with which to describe or to analyze the changing occupational structure of a modern industrial economy; these socio-economic categories had their intellectual origins in a desire to show that the Marxian predication of the increasing miserization of the working class did not apply to the

United States. Further, there is a strange incongruity in the state of theory and measurement applicable to the labor market. The measurement of the labor force, with the advent of the monthly *Current Population Survey*, is now one of our best statistical reporting systems, but the theory of labor supply is in disarray. On the other hand, the theoretical base for the demand for labor, rooted in production theory, is relatively well-regarded despite many problems, but statistics on job content and job structure are nonexistent or primitive. On neither side of the labor market is there a well-established system embracing measurement and related theoretical analysis.

In these circumstances, a conference on job vacancies is most welcome, although it is narrower than our deficiencies; it is also more restricted than my mandate from your chairman ". . . to prepare a paper for the opening session relating to the types of data that might be useful for measuring the current demand for labor."

#### *THE INTEREST IN JOB VACANCY SERIES*

For at least a decade, the Bureau of Labor Statistics has been exploring systems for the measurement of job vacancies. In 1955 it was said that ". . . the Bureau has under active consideration experimental work looking toward reporting of job vacancies, possibly in connection with the new Department of Labor program for a Federal-State system of turnover reporting for manufacturing industries."<sup>1</sup> Dr. Raymond T. Bowman of the Bureau of the Budget reported six years later that "The experiment . . . showed so much variation from employer to employer in what was included in the term 'job vacancies' that it was decided not to start a continuing series."<sup>2</sup>

A number of university economists, although mindful of the difficulties, continued to advocate the development of job vacancy

<sup>1</sup> Bureau of Labor Statistics, Interim Report of the Review of Concepts Subcommittee to the Committee on Labor Supply, Employment, and Unemployment Statistics, Recommendation 9, 1955.

<sup>2</sup> *Hearings before the Subcommittee on Economic Statistics of the Joint Economic Committee*, 87th Cong., 1st Sess., Dec. 18, 19, 20, Washington, 1961, p. 268.

data. Thus, Paul A. Samuelson cautiously recommended in December 1961: "Experimentation in a tentative and unpretentious way might be done to determine whether other indicators of labor market tightness could be developed (as, e.g., some imperfect measure of job vacancies)." <sup>3</sup> The December 1961 meetings of the American Statistical Association included a session at which job vacancy series were advocated.<sup>4</sup> The President's Committee to Appraise Employment and Unemployment Statistics (Robert A. Gordon, Chairman) recommended with respect to job vacancies ". . . that the Department of Labor initiate the program of research which has been submitted to the Committee—a program which seems to represent a well-balanced and reasonable approach to the problem."<sup>5</sup>

The Committee representing the OECD which reviewed manpower policies in the United States stated that it ". . . attaches the highest importance to new efforts reported by the American authorities to initiate a current series on job vacancies in sufficient occupational and labor market detail to be useful for operational purposes, although this is admittedly difficult to achieve in such a large country."<sup>6</sup>

This persistent concern with job vacancy data is derived from a variety of theoretical, policy, and operating interests.

1. Job vacancy data are said to be the counterpart of unemployment series. The two sets of data, particularly with details as to region, industry, and occupation, reinforce each other in the understanding of the state of labor markets and their changes over time. In contrast to other countries, in the United States we have only a partial view of the operation of our labor markets.<sup>7</sup> Data on job

<sup>3</sup> *Ibid.*, p. 369. Also, see the testimony of Professor John W. Kendrick, pp. 337-338.

<sup>4</sup> "Unemployment Statistics in a Changing Economy," *Proceedings, American Statistical Association*, December 27, 1961.

<sup>5</sup> *Measuring Employment and Unemployment*, Washington, D.C., September 27, 1962, p. 201.

<sup>6</sup> OECD, *Reviews of Manpower and Social Policies, Manpower Policy and Programmes in the United States*, Paris, 1964, p. 16.

<sup>7</sup> Compare, for example, the regular monthly data for Great Britain which show by region, industry, and occupations both total unemployment and job vacancies. Ministry of Labour, *Statistics on Incomes, Prices, Employment and Production* (Quarterly), Tables E-8 to E-12. For technical appendix, see No. 8, March 1964, p. 131.

vacancies are a missing element in the description of the level and the structure of labor demand.

2. Job vacancy data which meet the tests of statistical consistency and reliability would be of very considerable theoretical interest in the debates over the nature of recent unemployment between those who have emphasized the deficiency of effective demand and those who have stressed the role of changing structural factors in the economy.

3. Job vacancy data provide another significant measure of economic fluctuations as the economy moves from low levels to high and then retreats. They are of particular interest to those concerned with "turning points." These data are also decisive for examining the interrelations between product markets and labor markets, as the level and structure of final output changes over time.<sup>8</sup> How is tightness in particular product markets reflected in associated labor markets and vice versa? Any increase in our understanding of the complex processes of interaction between labor markets and product markets, at different levels of aggregate output, would be of considerable analytical interest to economists.

4. There are a variety of operating purposes for which job vacancy data could be useful. The most important of these are: (a) the more effective allocation of a given labor force by pointing out existing vacancies to which unemployed could be referred; (b) the more effective administration of unemployment compensation;<sup>9</sup> (c) the development of training and retraining programs, including apprenticeship programs, which are based upon more reliable indicators of employment opportunities.<sup>10</sup>

These purposes are not to be interpreted as solely governmental, since these data would afford additional information to manage-

<sup>8</sup> See, J. C. R. Dow and L. A. Dicks-Mireaux, "The Excess Demand for Labour, A Study of Conditions in Great Britain, 1946-56," *Oxford Economic Papers*, February 1958, pp. 1-33.

<sup>9</sup> The data could be used to provide more light on the extent to which unemployment is "optional or voluntary." See, Martin R. Gainsbrugh, "The Need for Job Vacancy Measures," *Voluntary and Involuntary Unemployment*, National Industrial Conference Board, Public Affairs Conference Report Number 1, New York, 1964, p. 20.

<sup>10</sup> Seymour L. Wolfbein, "The First Year of the Manpower Act" in *Unemployment and the American Economy*, Arthur M. Ross, ed., New York, 1964, p. 59.

ments, labor organizations, and households in their decision-making processes. These operating purposes appear to be the central interest of the paper by Louis Levine.

### *MAJOR PROBLEMS OF CONCEPT AND MEASUREMENT*

#### *Questionnaires and Operational Significance*

There is great diversity and variability in the procedures by which business enterprises and other employers recruit and maintain a work force and provide job opportunities. In some cases internal responsibility for employment decisions is formalized and centralized, while in other instances it is informal and widely diffused. In some situations, priorities are carefully established for each job opportunity among present employees, depending on whether they are at work or on layoff, and whether they are previous employees or new applicants; in other instances, jobs are filled by informal arrangements, caprice, or accidental encounters. The size of enterprise, the technology which influences the characteristics of job content, and the extent of formal organization of the labor market, as in hiring halls, are among the major factors shaping the procedures by which jobs are identified and filled. Compare the procedures for recruiting a second helper in the basic steel industry, a banquet waiter at the Waldorf, a part-time grocery clerk in a chain store, an assistant secretary of a government department, or a plant manager in a major corporation. A great deal of the difficulty in measuring job vacancies is derived from such inherent diversity and variability in the procedures by which job opportunities are made available, which in turn have their roots in the particular technologies and labor markets.

As a number of pilot studies of job vacancies in recent years have emphasized, many problems arise because of the diffusion in responsibility for making decisions on employment, the absence of coordinated and complete statistical records within enterprises or other employers of labor, and the lack of a uniform and explicit definition of a job vacancy. These are serious matters to any survey and reflect the fact that more meaningful data from an enterprise on job vacancies may have to await significant reorganization of

internal decisions, structure, and policies. In the same way, a series of projected capital plant and equipment budgets for a company are relatively meaningless until planning for plant and equipment outlays has become a part of the organizational life of the enterprise. Until job vacancy data have become a part of internal managerial reporting, planning, and decision making, there is genuine doubt as to the meaning of numbers which are simply provided for an exterior questionnaire. It is hoped, of course, that the willingness to provide some job vacancy data to an exterior survey may itself enhance the interest and use of job vacancy reporting in internal decisions of a management.

#### *The Internal Labor Market*<sup>11</sup>

It is possible to conceive a world in which workers are hired in from the exterior labor market at each job classification in an enterprise. This might be the case because each enterprise had only a few job classifications or because present incumbents in other classifications had no preferred status in filling a job classification. In such a world each job classification is also a "port of entry" to the enterprise.<sup>12</sup> The actual world is very far removed from this model, and all employers, whether or not subject to collective bargaining agreements, tend to develop an elaborate set of practices or rules relating to promotions, transfers, layoffs, and retirements for various groups of job classifications; they confine entry from outside the organization—temporary or more permanent entry—to a limited number of classifications. In the typical enterprise, hiring-in jobs are only a small fraction of the total number of job classifications;

<sup>11</sup> By internal labor market is meant the complex of rules which determines the movement of workers among job classifications within administrative units, such as enterprises, companies, or hiring halls. These movements may be transfers, promotions, demotions, or layoffs to the exterior labor market; they may be temporary or permanent, which may affect the operation of the rules. See, my testimony, *Hearings before the Subcommittee on Employment and Manpower of the Committee on Labor and Public Welfare*, U.S. Senate, 88th Cong., 1st Sess., May 20, 21, 23, Washington, 1963, pp. 302-303; also, "Manpower in Operating Classifications on the Railroads," *Transportation Economics*, Special Conference 17, New York, National Bureau of Economic Research, 1965 (distributed by Columbia U. Press).

<sup>12</sup> Clark Kerr, "The Balkanization of Labor Markets" in *Labor Mobility and Economic Opportunity*, 1954, pp. 101-103.

in many, such jobs are confined to common labor, maintenance, a beginning woman's job in the plant, a clerical position, a beginning managerial post, and a few professional occupations.

A good deal of industrial relations and personnel activity is concerned with the making and administration of rules relating to the internal movement of employees among job classifications and their relation to the exterior labor market. These rules specify the "seniority districts" or groups of job classifications which are treated as a single unit for purposes of promotions, layoffs, and transfers. Seniority districts need not be the same for each type of movement, and they may also vary according to the temporary or permanent nature of the move. The rules also specify the standards according to which promotions, layoffs, transfers, and retirements are to be made, typically indicating the weights to be attached to ability, as well as length of service with the company, the establishment, and in the seniority district or job classification. In the case of layoffs, the rules also usually specify the period for which rights of re-employment may be claimed, and the procedures by which notice of recall is to be given. The substance of these rules varies enormously among industries, companies, and according to labor organizations.<sup>13</sup>

If a job vacancy is interpreted, as it generally has been, to refer in some sense to the exterior labor market, and to exclude the resort to employees already in the establishment, then it is clear that these rules of the internal labor market have enormous significance for the meaning and interpretation of any job vacancy data. In one company employees on layoff may retain rights to recall up to two years; in another, only up to one year. After one year, an increase in demand in the latter company produces job vacancies, while the company with the two-year rule is simply recalling employees already on the payroll and has no vacancy. In one company the seniority districts may provide for promotion to a maintenance job from other classifications, or may even include an internal apprenticeship program, while another company may hire into the maintenance classifications from outside. An increase in demand for

<sup>13</sup> Sumner H. Slichter, James J. Healy, and E. Robert Livernash, *The Impact of Collective Bargaining on Management*, Washington, D.C., 1960, Ch. 5-10.



maintenance work may show up as a vacancy for common labor in the first case and a vacancy for maintenance classifications in the second case. The growth of interplant transfer rights, at least in the case of plant closings, in a number of collective bargaining agreements also affects the meaning of job vacancy.<sup>14</sup> These observations apply not merely to production and maintenance jobs, but to clerical and managerial as well. Indeed, logically any change in the rules of the work place which affects the relative rights or access to job classifications by insiders as compared with outsiders also affects, in some sense, the meaning of a reported job vacancy.

The internal labor market can be presented in diagrammatic form to illustrate several ideal types of arrangements. Figure 1(a) shows the extreme in which every job classification is a port of entry or exit to the exterior market; Figure 1(b) represents the case of a single hiring connection between the interior and exterior markets. In Figure 1(b), the president of the company must have entered at the bottom classification.

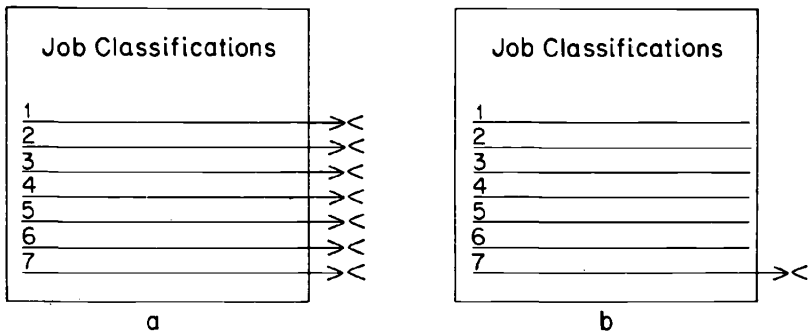


FIGURE 1

A variety of more realistic internal labor markets may be depicted. In the basic steel industry, for example, a schematic representation of typical arrangements until 1962 would have provided for separate ports of entry in the managerial, professional, and clerical categories; in the production job classifications these points were typically at

<sup>14</sup> Arnold R. Weber, "The Interplant Transfer of Displaced Employees" in *Adjustment to Technological Change*, Gerald G. Somers, et al., eds., 1963, pp. 95-143.

the bottom of departmental lines of seniority. The 1962 agreements were the first in basic steel to provide for minimum standards in local seniority agreements. They placed, in effect, a pan below the previous department ladders, so that the junior employee in a broad area would be the first to be laid off.<sup>15</sup> Figure 2(a) presents a schematic diagram before, and Figure 2(b) constitutes a diagram of production and maintenance after, the 1962 change. In Figure 2(a)

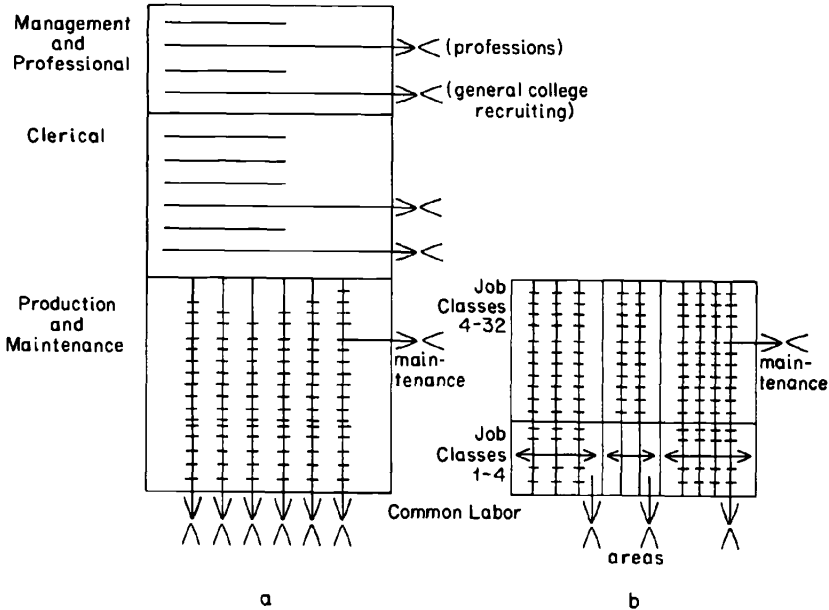


FIGURE 2

a vacancy could exist on one line of promotion, resulting in a hire from outside while employees were on layoff on another line. In

<sup>15</sup> "1. The local parties shall establish a seniority pool within an agreed upon area in each plant and such pool shall be regarded as being a single seniority pool for the purposes of layoff and recall. The pool shall be made up of all jobs in Job Classes 1, 2 and 3 and such jobs in Job Class 4 as shall be agreed upon by the local parties. . . .

2. The agreed upon area in each case shall be as broad as practicable and in no event shall be less than a major operating unit such as Blast Furnace, Coke Plant, Open Hearth, etc." *Agreement between United States Steel Corporation and the United Steel Workers of America, Production and Maintenance Employees, Central Operations-Steel, April 6, 1962, p. 84.*

Figure 2(b) a vacancy could exist only if all employees with rights in the "area" were employed.

All internal labor markets should not be presumed to be analogous to those in industrial plants. The scope of an internal labor market is defined by the limits of a single administrative set of rules governing the movement of employees. In this sense, an exclusive hiring hall servicing a number of enterprises is to be regarded as a single internal market. Hiring halls are significant in many casual-type occupations such as exist in the maritime and construction industries. The hiring hall should logically be treated as an entity, with ports of entry or exit from the pool of labor within the hiring hall. From this perspective, a vacancy is to be seen as arising from resort to workers outside the established lists, as when the hiring hall cannot temporarily furnish manpower or when the list is opened for new registrants.

The analysis of the internal labor market has major implications for any study of job vacancies.

a. The number of job classifications at which vacancies occur is likely to be a small fraction of the total number of job classifications.

b. Job vacancies occur at job classifications which have been assigned the role of a port of entry in the internal labor market through collective bargaining procedures or by decision of management. The identification of these job classifications and their stability over time reflects the decisions of the internal labor market.

c. In a number of industries, there is a significant difference between temporary jobs of limited duration, which do not typically provide a basis for advancement, and jobs which represent a more permanent entry to the internal labor market. While probationary periods are common for many entry jobs, there are some jobs which are entirely temporary. E. Robert Livernash has stressed, in an exchange of views with me, that any list of job vacancies may be heavily weighted with such temporary situations.

d. Hiring standards are seldom concerned primarily with a single job, but with generalized capacities to move within the internal labor market and particularly up various promotion ladders. It is less possible than often thought to say much about qualifications for a particular job when the internal labor market emphasizes that

hiring standards are typically concerned with a range of job classifications. Within an industry, a comprehensive list of jobs with training requirements does not match the reality of the limited number of ports of entry. This concept also helps to explain high standards for employment that have been established increasingly in many industries, although, admittedly, high wage rates and the loose external labor market have played a role.

e. The analysis of internal labor markets tends to downgrade the use of job vacancy data for training purposes, at least by agencies exterior to the employer. It is not possible simply to compare job vacancies with the training of the unemployed and develop the major outlines of the training programs required. A great deal of additional training is required to match job requirements at other than ports of entry with the work force.

f. As technological change increases, and as plant closings in multiplant companies receive increased attention, the adaptation of seniority districts, promotion ladders, and relative layoff rights become problems of greater significance to management, labor organizations, and workers. The internal labor market deserves much greater analytical and practical attention.

g. There is need for the systematic study of internal labor markets and their interaction with external labor markets. Thus, we need to know much more about the number and characteristics of ports of entry to enterprises—production and maintenance jobs, clerical positions, and managerial and professional job classifications—how these have changed over recent years, and the way in which the operation of internal labor markets is shaped by size of enterprise, technology, and organization of the labor market. This sort of analytical orientation to labor markets is long overdue; it affords a way to relate industrial relations and personnel realities to categories of economic significance.

### *Self-employment*

Any study of job vacancies must recognize that self-employment is a significant source of employment opportunity excluded from surveys. The aspiration to be one's own boss has historically been a significant objective for many members of the labor force, and it

remains an important objective for many professionals, as well as those engaged in trade, agriculture, and construction. In 1963, there were 2.4 million self-employed in agriculture and 6.2 million self-employed in nonagricultural industries, almost 10 per cent of the total. This volume of gainful activity provides each year a significant number of job opportunities.

In a sense, self-employment is the limiting case of the problems presented by small enterprises, and particularly new ones, to all statistical series, including those relating to employment or job vacancies. There are over 200,000 establishments with less than twenty employees (1958 data) in manufacturing alone, with 1.2 million total employees. Enterprises with a few employees are also significant in trade, real estate, service industries, and construction. The definition of a job vacancy in these establishments, and the state of records on job vacancies, raise many serious questions well-known to those concerned with the design of statistical series. The occupational structure in the smallest enterprises often involves a different span of duties per job classification than in larger-scale operations.

#### *JOB CLASSIFICATION STRUCTURE*<sup>16</sup>

The case for job vacancy surveys is predicated substantially on the usefulness and significance of the measurement of vacancies by occupation or job classification, with regional and industrial breakdowns. Unless a continuing job vacancy survey can provide such detail, there is much less justification for the considerable expenditure required. Although a single series of job vacancies would provide another economic indicator,<sup>17</sup> the priority placed on measures of job vacancy relate in substantial degree to the concern with occupational detail by geographical area. The present occupational classification schemes, however, are among the least satisfactory of any economic data in the country. This derives partly from difficul-

<sup>16</sup> See, James Griffin Scoville, "The Job Content of the U. S. Economy, 1940-1970, An Attempt at Quantification," Unpublished Ph.D. Dissertation, Harvard University.

<sup>17</sup> See, *The Conference Board's New Index of Help-Wanted Advertising*, National Industrial Conference Board, Inc., Technical Paper 16, New York, 1964.

ties inherent in comparing job classifications across enterprises, in part from analytical neglect, and in part from disparate classifications. These last have emerged for different purposes and cannot be related to each other or to other significant dimensions in the labor market such as wage rates, employment, education, training, age, or measures of job content such as skill, responsibility, and working conditions.

The decennial Census developed a classification scheme (now with eleven major categories) based on a socio-economic view of the work force and its activities. In the language of Alba M. Edwards, who played a major role in the refinement of the present scheme: ". . . there is, and long has been, a real need for statistics showing in summary form an occupational distribution of the Nation's labor force—a need for statistics that cut across industry lines and bring together into one occupationally homogenous group all of the workers belonging to the same socio-economic class, with but minor regard to the particular occupations they pursue or to the particular part of the industrial field in which they work."<sup>18</sup> Whatever the validity of this viewpoint for an older generation, it is inappropriate for purposes of measuring the extent of technological change, job vacancies, educational and training requirements of economic activity, or other purposes of paramount interest in this decade.

This eleven-fold occupational scheme has no analytical base. It is not related to job content or any of its major components, such as skill, responsibility, or working conditions. The categories of "clerical and kindred workers" or "sales workers" run the full range of skills and responsibility. These categories are not fruitfully related to training, education, or to compensation levels. In a word, they are a hodgepodge.

The decennial Census has breakdowns within this eleven-fold general occupational classification of 296 occupations. These occupations are relatively heavily weighted among the professional, technical, and kindred worker group, which had only about 12 per cent of the work force in 1960, but 29 per cent of the occupations

<sup>18</sup> *Comparative Occupation Statistics for the United States, 1870-1940*, U.S. Bureau of the Census, 1943, p. 175.

listed. Table 1 compares the distribution of employment with the detailed occupations used in the 1960 Census.

TABLE 1  
*Distribution of Employment by Occupational Title,  
According to Census Classification*

Social-Economic Group	Number of Occupational Titles <sup>a</sup>			Percentage of	
	Major	Minor	Total	Titles	Employment
Professional, etc.	42	44	86	29.0	11.8
Farmers and farm mgrs.	2	0	2	.7	4.1
Managers, officials, props.	14	0	14	4.7	8.8
Clerical, etc.	28	0	28	9.4	15.1
Sales, etc.	9	0	9	3.0	7.6
Craftsmen, etc.	54	0	54	18.3	14.2
Operatives, etc.	42	12 <sup>b</sup>	54	18.3	19.4
Private household workers	4	0	4	1.4	2.8
Service, excl. private household	23	8	31	10.5	8.9
Farm laborers	4	0	4	1.4	2.3
Laborers, excl. farm and mine	10	0	10	3.3	5.0
Total	232	64	296	100.0	100.0

<sup>a</sup> Major titles are those which often submerge their component minor titles in various tables. Example: the major title, "Social scientists," includes economists, psychologists, etc. Minor titles, nonetheless, are meaningful from the standpoint of occupational classification.

<sup>b</sup> Mostly various types of apprentices. The percentage of occupational titles going to operatives when these are excluded is 14.2.

The monthly *Current Population Survey* uses the same eleven-fold occupational categories as the Census, but has no detailed occupational breakdown.

Another source of occupational data is the *Dictionary of Occupational Titles* with its description of 23,000 jobs.<sup>19</sup> This dictionary was designed to meet the needs of the United States Employment Service and its operating offices, and uses a code based upon major categories similar to those of the Census. The forthcoming edition of the dictionary is said to classify occupations not only by this code but also by "worker traits" according as individuals are oriented to things, data, and people in varying degrees.<sup>20</sup> But the system of

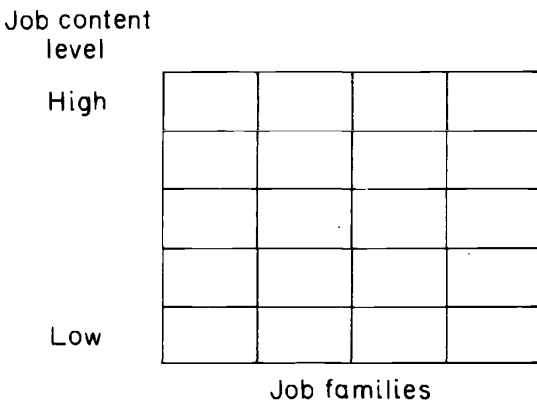
<sup>19</sup> The first edition was published by the Department of Labor in 1939; it was revised in 1949, and a third edition is expected to be issued in 1965.

<sup>20</sup> See, U.S. Department of Labor, Bureau of Employment Security, U.S. Employment Service, *Estimates of Worker Trait Requirements for 4000 Jobs*, Washington, D.C., 1956; Sidney A. Fine, "A Reexamination of 'Transferability' of Skills," *Monthly Labor Review*, August and September, 1957.

occupational classification developed by the Employment Service is not widely accepted; it is often most difficult to translate the job title or even job description of an enterprise into the classification. For larger economic and analytical purposes, it is impossible to relate the occupational structure of the Employment Service classification to the number of employees in each category, their compensation, age, or other characteristics, or to show changes in these dimensions over a period of years.

It has seemed to me that the present eleven-fold groupings of occupation should be replaced by a grid organized by reference to analytical criteria. Along one axis, job classifications should be ranked by job content as measured by the well-established techniques of job evaluation. Along the other axis, job classifications should be grouped by job families; i.e., jobs with similar orientation, often with a common mobility pattern, and with related types of qualifications and working environments. Examples of job families would be jobs related to operation of tools, or those related to machines, or to medical activity, or to education, including in each case all levels of job content. Just as in the internal labor market jobs are ranked, by administrative arrangements, according to job content levels and grouped into seniority districts, so on the macro-level, job classifications can be arranged according to job content levels and job families.

In schematic form, all job classifications at one date would be classified into a grid or table.





Logically, it would be possible to provide a very large number of job content levels and job families. Working with the 1940, 1950, and 1960 Census occupations, Dr. Scoville, in one application of these ideas, reclassified the Census occupations into a table with four levels of job content by an informal job evaluation process and into sixteen job families, providing a table for each year of sixty-four different cells. The data for three Census years permits a more adequate description of the changes in job content in the economy over the period 1940 to 1960. Tables 2 and 3 below present some of the results of Scoville's research. Table 2 abstracts from job families and shows changes in job content by region as a percentage of the total volume of employment. The table shows the growing importance of employment in the highest job content occupations in the country as a whole and the decline in the lowest

TABLE 2  
*Percentage Employed, by Job Content Level  
and Region, 1940-60*

Region	1940	1950	1960
<b>United States</b>			
Higher	15.2	16.9	20.4
Moderate	37.0	42.7	44.8
Lower	18.5	15.4	12.1
Unskilled	29.3	25.0	22.7
<b>Northeast</b>			
Higher	17.4	18.7	21.7
Moderate	42.7	46.0	46.3
Lower	10.7	9.6	9.1
Unskilled	29.2	25.7	22.3
<b>North central</b>			
Higher	16.1	17.3	20.2
Moderate	37.5	41.5	43.6
Lower	19.7	16.6	13.9
Unskilled	26.7	24.6	22.3
<b>South</b>			
Higher	11.4	14.2	18.3
Moderate	29.4	39.0	43.4
Lower	24.8	19.7	13.3
Unskilled	34.4	27.1	25.0
<b>West</b>			
Higher	17.1	18.6	22.7
Moderate	43.0	46.8	47.0
Lower	17.7	14.7	11.6
Unskilled	22.2	19.9	18.7

job content occupations. It also reflects regional economic development, e.g., the greater relative changes in the south.<sup>21</sup>

Table 3 summarizes the changes in employment by job classifications, arranged by sixteen job families, for the period 1940-60, without regard to job content level.

TABLE 3  
*Employment by Job Families, 1940-60*  
(millions)

Job Family	1940	1950	1960
Tools	8.14	11.30	11.63
Machines	5.80	7.91	8.35
Inspection	.74	1.14	1.73
Vehicle operation	2.13	2.66	3.10
Farm	8.23	6.70	3.95
Sales (with considerable knowledge of product)	.76	1.02	1.27
Sales (with little knowledge of product)	2.54	3.44	4.02
Clerical	4.46	3.04	9.55
Personal services	4.44	4.39	5.42
Entertainment	.29	.39	.44
Protection	.46	.60	.72
Education	1.12	1.29	1.93
Health	.98	1.42	2.00
Welfare	.24	.30	.39
Administrative and organizational	3.82	5.04	5.61
Research and design	.42	.86	1.38

Manpower planning is facilitated by data on the occupational distributions of employment by job families at the various levels of job content.

The present interest is neither to present a summary of Scoville's work nor to defend the particular categories or numbers he has developed to implement his tables. Rather, the objective is to sketch the central concepts and the contribution they can make to a more analytically significant measurement of occupational structure and the changing demand for various categories of labor services.

<sup>21</sup> An occupational table organized by job content and job family is a useful tool for the analysis of economic development, and can be used in international comparisons.

The use of job evaluation as a measure of job content perhaps deserves brief comment. These methods are widely used throughout industry over a wide range of job classifications, and, in my view, have been neglected by those concerned with classifications of occupations. Skill, responsibility, training, or working conditions alone are an inadequate measure of job content. These factors need to be weighted in some combination.<sup>22</sup> Perhaps the same weighting system need not be used for every job family; the ranking of job classifications could be compared on several weighting systems. If only a limited number of job content grades or levels are desired, the differences in weighting arrangements may not be expected to matter greatly. If such a program sounds ambitious, it may be appropriate to remind ourselves that the Dutch have established a detailed nationwide job evaluation plan<sup>23</sup> and have applied it widely throughout the country in the actual processes of wage setting. The socialist countries have classified occupations into a limited number of labor grades for many years, although the labor grades across industry have not always been standardized.<sup>24</sup>

An occupational matrix (such as outlined above) at periodic intervals is indispensable to any comprehensive measurement of the operation of the labor market.

a. The matrix should facilitate for each individual cell, regardless of how grossly or finely defined, the assembly of data on compensation, vocational training, general education, and the characteristics of the incumbents by age, sex, race, and other features. The isolation of our present occupational information, in the Census or the *Dictionary of Occupational Titles*, is a major deficiency. The labor force side of our labor market information has the virtue of being interrelated in a systematic and analytic way. The occupa-

<sup>22</sup> See Jack Stieber, *The Steel Industry Wage Structure, A Study of the Joint Union-Management Job Evaluation Program in the Basic Steel Industry*, 1959, pp. 36-40.

<sup>23</sup> Ad. Vermeulen, *Job Evaluation in the Netherlands*, OECD, 1956; Netherlands Normalisatie Instituut, Committee for Experts for Job Evaluation, *Standardized Method of Describing and Grading Activities for Job Evaluation and Other Papers*, The Hague, March 1960.

<sup>24</sup> See Walter Galenson, "Wage Structure and Administration in Soviet Industry" in *Internal Wage Structure*, J. L. Meij, ed., Amsterdam, 1963, pp. 300-334.

tional matrix of the type illustrated would provide systematic and interrelated data on the demand side, and indicate changes over time in response to technological change, regional influences, and market factors.

b. Job vacancy data can refer essentially only to "entry" job classifications, but analytical and operational uses of job vacancy data need to be appraised in terms of a matrix reflecting the full range of occupations.

c. An analytical occupational matrix is necessary to improve the quality of the collection of occupational data. The table is not designed merely to present in a more meaningful way the inadequate data already collected by the Census, but to improve the categories and the coverage of occupational data.

d. The framework encourages research into the factors affecting the demand for labor and its utilization in particular job families, as in the medical, education, or inspection job families.

#### CONCLUDING OBSERVATIONS

1. The basic difficulty which confronts the development of meaningful series of job vacancy data by occupations is not so much detailed questions of definitions, sampling, and reporting, which have been confronted with varying degrees of operational success in pilot studies, but rather the fact that job vacancy concepts and data today have so small a role in the operations of business enterprises, governments, and other employers of labor. Until these data are perfected and enter into internal organizational processes, the regular completion of questionnaires for outsiders will have limited meaning.

The development of job vacancy data inside an enterprise or other organization is to be seen as one step in a larger process of manpower planning. There are a limited number of enterprises in the United States which now seek to project their demands for labor forward, a few months, a year, and, in a few cases, for longer periods. In some cases these projections are for only a few occupational categories; in others, a larger range of occupations is considered. These techniques of projection need to be perfected and more widely

understood. More enterprises need to adopt these techniques so that we can develop estimates of forward needs for manpower by major occupational groups, just as we have perfected, since the end of World War II, estimates of plant and equipment outlays as a significant indicator and tool of analysis.

2. The concept of an internal labor market and its relations to the exterior labor market is essential to provide meaning to job vacancies. A job vacancy, by definition, can only be claimed or filled by a person exterior to the administrative unit (bargaining unit, plant, multiplant, or hiring hall unit). The attachments to a job within an administrative unit by a person on layoff or on leave, temporary or permanent, vary widely among business enterprises and other employers of labor. Job vacancies arise normally only at ports of entry to the internal labor market. A vast complex of rules and practices govern the allocation of labor within the internal labor market and relations to exterior markets. While these rules may be more formalized under collective bargaining agreements, they are extensive even in nonunion establishments, and particularly so, the larger the enterprise. The differences between the internal operations of union and nonunion plants have narrowed markedly in the postwar years. The managerial, professional, and clerical sectors of employment within enterprises, no less than production and maintenance, reflect internal labor markets.

The operations of internal labor markets deserve very considerable attention from an economic perspective rather than from the perspective of industrial relations and personnel from which they are usually considered. The occupational points of inflow and outflow between the internal and external markets are decisive to job vacancy studies, to the appraisal of hiring standards, and the formulation of training programs in the community. Internal labor markets, and their connection to the exterior, are significantly shaped by technology and the scale of operations. They need to be studied industry by industry.

3. Job vacancy data need to be presented by occupational (and regional) categories if they are to make a significant contribution. But the occupational categories for the employed (or the unemployed) are most inadequate. The job titles from one employer to

the next, particularly across industry lines, do not have a high degree of comparability. Despite conscientious work, the classifications of the *Dictionary of Occupational Titles* do not inspire wide confidence. Moreover, there are no analytically significant definitions to order or compare occupations and job classifications. A matrix of job content grades and job families is proposed for this purpose. In an economy with rapid technological change it is essential to develop a scheme for measuring the changes in job content that arise. Indeed, it may be expected that technology will continue to create an increasing number of new job classifications. This increasing diversity of occupations requires a framework to indicate these changes and to relate them to other significant attributes of jobs, such as numbers of occupants, compensation, specific training required, general education requirements, and the like. Job vacancy data need to be related to the larger perspective of the changing job content and job families of the economy; the present socioeconomic categories are grossly inadequate.<sup>25</sup>

This paper is not pessimistic as to the possibilities of developing worthwhile job vacancy series. It emphasizes, rather, that manpower projections by the enterprise, internal labor markets, and occupational tables arranged by job content and job families constitute areas in which significant work is vital in order to enhance the meaning and measurement of job vacancies.

<sup>25</sup> A major committee of experts should be established to make recommendations regarding the improvement of our occupational data and the coordination of these data with other statistical series.

