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The Time Dimension in the Collection of Job Vacancy Data

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Job vacancy data can be sought as of the time of the interview or for a longer period as well. The former case, which typifies the current trend in the collection of such data, provides a series of discontinuous observations over time, the size of the discontinuity increasing with the interviewing interval. Such collection of data is relatively simple and inexpensive. The question arises, however, whether such discontinuities may not result in a loss of valuable information. The dangers of outright bias also cannot be ignored, in view of the fact that with a fixed interviewing interval, which is virtually certain, the same interviewing periods would always be missed.

Collection of job vacancy data on an accrual basis, covering the period from one interview to another, can remedy these deficiencies. It could, in principle, provide a valuable set of data (*ex ante* or *ex post,* depending on how they are collected) relating to labor market analysis, as well as to general economic analysis. A reliable set of *ex ante* data would be particularly useful since, as noted in the Gordon report, the value of vacancy data deteriorates rapidly with time. Because of the time involved in data collection, even vacancy information for a week ahead would lose much of its value by the time it was received by placement officials. Clearly, what is needed is information relating to current vacancies and to future vacancies

NOTE: The authors would like to express their appreciation to Eleanor Gilpatrick for constructive advice and suggestions.

(beyond seven days) resulting from turnover and business expansion, and preferably data relating to the duration of vacancies as well.

A job vacancy series relating only to current vacancies may provide more narrow coverage than desired, and would be useful primarily for finding work for some of the unemployed, thus further fostering the "unemployment office" image of the state employment offices. Such data are not likely to be comprehensive enough for analysis of labor markets and economic conditions.

Obtaining "period data," however, presents certain obstacles aside from cost. If the data refer to the past, part of the information would probably have to come from memory, with all the potential biases that entails; also the data would be useful primarily for historical purposes. If the data refer to the period ahead, say from the current interview date until the next one, the data collection problem encompasses a forecasting problem as well. Moreover, the source for such *ex ante* data within the firm may pose an additional problem, for the person who can supply data on current vacancies (usually a personnel clerk or, at best, a personnel manager) is not likely to know enough about the firm's forward plans to supply informed data on anticipated vacancies. In such a case, more than one person in a firm may have to be contacted each time, with attendant higher costs and inconvenience.

Perhaps the basic issue in deciding whether to collect "period" rather than "point" vacancy data is the extent, if any, to which additional useful information is obtained in the former case. This is the question to which the present paper is addressed, with specific reference to the value of collecting job vacancy data currently and on an *ex ante* basis for a month ahead. The empirical analysis in this paper is based on a study in which both sets of data were collected, together with actual employment and new hires, so that comparisons are feasible. The comparisons are based on criteria designed to test whether such *ex ante* data are indeed superior to current vacancy data. Three such criteria are used—feasibility, amount of information, and accuracy of the *ex ante* data. First, a brief description of the study would seem to be in order.

THE STUDY

The data which serve as the basis for this analysis were collected during a pilot operation conducted in Champaign-Urbana, Illinois between October 1963 and May 1964. The purpose of that study was to investigate problems involved in the collection of job vacancy data on a continuous basis from the same firms. The study was conducted on a limited basis, without any outside financing, and was able to cover only seventeen firms. Because of the relatively small size of the area, no attempt was made to use probability methods in selecting these firms. Rather, the firms were selected on a judgment basis, with the objective of obtaining representation from firms of different sizes and producing different products or services. Roughly one-third of the firms had 100 workers or less while four had 300 or more. Of the seventeen firms, seven were manufacturers, five were retailers or wholesalers, and five sold services (including the city hospital and the University of Illinois). Nine of the firms were divisions of larger companies, while the others were locally owned.[1]

Each of the sample firms was contacted monthly during the period of the study, with the purpose of obtaining data on employment turnover anticipations. The data collection form used for these interviews follows. One such data sheet was used for each respondent in each firm. Respondents were interviewed around the middle of the month, with as many different respondents in each firm as were required to obtain complete coverage of that firm. On each interview the respondent was asked to report his turnover during the past month, the number of job openings existing as of the date of the interview, and additional anticipated openings arising during the coming thirty days. The anticipations were subdivided by departures and by addtions, and then subdivided within each of these categories, as shown on the data sheet. The categories used were designed partly to make the questions more meaningful

[1] More information on sample composition will be found in Robert Ferber and Neil Ford, "The Collection of Job Vacancy Data Within a Labor Turnover Framework," in *Employment Policy and the Labor Market,* Arthur M. Ross, ed., Berkeley, 1965, pp. 162–190.

No. _____
Period _____
Company _____
Departments _____

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EMPLOYMENT TURNOVER ANTICIPATIONS

Date _____ (_____)
Respondent _____ (_____)
Position _____ (_____)
Interviewer _____ (_____)

Category	Mgr., supervisory, and prof.	Sales	Office workers	Skilled	Service unskilled, and semi-skilled
Departures					
Individual initiative (retirements, quits, return to school, etc.)	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Company initiative					
Transfers	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Seasonal turnover	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Other layoffs	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Discharges	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Total departures	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
How many of these have been replaced and are working now?	_____	_____	_____	_____	_____
Additions					
Current job openings from previous departures*					
Open more than three days	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Open three days or less	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Openings arising from above departures	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Openings arising from anticipated or known departures	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
New positions to be set up	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Total additions	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Of total additions, how many callbacks?	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Net change	_____ (____)	_____ (____)	_____ (____)	_____ (____)	_____ (____)
Discrepancy between anticipated and actual	_____	_____	_____	_____	_____

*As of current date.

to the respondent and partly to add to the analytical value of the data.

Anticipations were recorded on each form outside of the parentheses the first time that the form was used. When the respondent was reinterviewed the following month, he was asked initially to report actual turnover by these categories during the preceding thirty days, and this information was recorded on the same sheet within the parentheses. A new sheet was then used to obtain anticipations for the following thirty days. In this way, each interview after the first obtained information both on past turnover and on anticipations for future turnover.

Breakdowns by occupation were used in an attempt to throw light on the possibility of obtaining job vacancy data by occupation. For labor market analysis, however, the breakdowns actually used are clearly not sufficiently detailed. Moreover, obtaining data by these broad breakdowns caused the respondents some difficulty; it would have been simpler to obtain such data by individual occupations. These breakdowns are not used in the present analysis.

Altogether seven monthly interviews were made with eleven of these firms, six with one firm, five with two firms, four with two other firms, and three with one firm. The general approach was to seek these data from the key people (or hiring points) within the firms each month, these hiring points having been established on the basis of a prior exploratory interview. Two or more hiring points were used in six of the seventeen firms. The people supplying the information ranged from top executive officers to personnel managers to secretarial staff. In most instances, however, the information was obtained from operating department managers or from personnel managers. With the exception of some experiments with telephone interviews toward the latter part of the study (beginning with February 1964), all of the data were obtained by personal interview, and cooperation was generally excellent throughout.

THE FEASIBILITY OF EX ANTE *DATA*

Judging by the experiences on the present study, little difficulty is likely to be encountered in obtaining *ex ante* data on job vacan-

cies, at least for a month ahead. Of the seventeen firms in the sample, sixteen were still cooperating when the operation was terminated, and the one drop-out might have remained had only current information on job vacancies been requested. To be sure, some additional contacts were needed to obtain this information since, as noted previously, six of the seventeen firms contained more than one hiring point. However, in four of the six cases, the additional contacts would have been needed in any event if complete data on current vacancies were to be obtained. Moreover, in at least one respect, the collection of the *ex ante* data may have contributed to the quality of all the data collected, since there was relatively little tendency for respondents to refer the interviewer to lower-ranking personnel as the study proceeded. In other words, the request for *ex ante* data made clear the necessity of obtaining this information from key executives in the firm.

On the other hand, whereas information on current vacancies was occasionally supplied from records, information on labor force anticipations was invariably supplied without recourse to records, for such records did not exist. Among the smaller firms, respondents indicated that they gave little prior thought to this subject; only the largest firms in the sample possessed any systematic procedure for anticipating future employment needs. Only for departures was any advance information available regularly, because of the customary two-week advance notice period.

It might also be noted that beginning with February 1964 some of these interviews were conducted by phone. Such interviews, however, were used only with respondents reporting little turnover and who had been previously fairly cooperative. Hence, no definitive inference can be made regarding the relative superiority of these telephone interviews. In general, however, the data obtained from them seemed to be of the same quality and of the same type as previously furnished by personal interview. At least, therefore, it would seem feasible to substitute telephone interviews for personal interviews in a number of instances after such an operation has been underway for three or four months, with attendant savings in time and costs.

AMOUNT OF INFORMATION

A summary of the extent to which *ex ante* information serves to supplement reports on current job vacancies is provided in Table 1. For each month in which interviews were conducted, this table compares the total number of current job openings reported by the firms with anticipated departures and with anticipated additions other than current job openings. The data are on a per firm basis, since different numbers of firms were interviewed each month.

TABLE 1

Total Anticipated Departures, Current Job Openings, and Additional Anticipated Vacancies per Firm, Monthly

Month in 1963-64	Anticipated Departures	Current Job Openings[a]	Anticipated Additional Openings	Anticipated Net Change
Oct.-Nov.	4.2	1.9	12.5	10.2
Nov.-Dec.	4.3	1.1	10.5	7.5
Dec.-Jan.	9.9	1.2	11.1	2.5
Jan.-Feb.	4.2	1.5	16.4	13.6
Feb.-March	6.8	1.7	16.4	11.2
March-April	7.1	2.6	18.0	13.2
April-May	9.1	1.9	25.4	18.3

[a] As of middle of first month cited.

As is evident from this table, the data on current job openings constituted a relatively small proportion of the anticipated openings in the sample firms during the month. In some months, these current job openings represent less than 10 per cent of the total anticipated turnover of the sample firms, and in no instance does it exceed 15 per cent.[2]

[2] To be sure, these openings represent only those arising from previous departures, and do not include openings resulting from anticipated future departures or from future new positions. The available data do not permit these latter two categories of current vacancies to be separated out from "anticipated additional openings," though such information as is available suggests that such a change would not alter appreciably the present results—most of the anticipated additions are future new positions. In a period of declining output, however, such positions would not exist.

Moreover, the trend over time in current job openings does not correspond closely with the trend of the anticipated departures, additional openings, or anticipated net turnover in these firms. Of the six comparisons which are possible from one month to another, the direction of change of current job openings corresponds only three times with the direction of change in anticipated departures, five times with the direction of change in anticipated additional openings, and three times with anticipated net change. As a result, these data suggest that current job openings do not provide a complete picture of the labor needs of the firm or of possible future labor market conditions. This is particularly true because data on current job openings are invariably sought from the personnel departments which, as a rule, do not have information on positions that may be opening up in the near future nor on anticipated departures.

ACCURACY OF THE DATA

The accuracy of information on current job openings is not comparable with information on anticipated departures or with openings arising from possible departures. In the former case, accuracy refers to ability to fill existing vacancies; in the latter, the ability to predict the occurrence of such vacancies. With current openings, accuracy involves a comparison of the number of job openings reported and which are expected to be filled within thirty days, with the number of such openings that are filled during this period. The current figure is the yardstick against which later reported hirings are evaluated. The measure of accuracy therefore depends on the ability (in some cases, perhaps the inclination) of the firm to fill these openings. For the other categories, however, the currently reported figure is an anticipation, with the later reported actual figure serving as the yardstick. For example, anticipated departures is not an exact figure like the current job openings. The accuracy with which this information is obtained depends primarily on the ability of the respondent to anticipate such turnover.

Similar statements apply to the other forms of additions to employment. In all such instances, accuracy relates to forecasting

ability, whereas in the case of current job openings, accuracy (predictive accuracy, as used here) depends on the respondent's ability to fill unfilled positions, which may or may not be within his control. Although these two sets of data are not comparable with regard to predictive accuracy, it is nevertheless of considerable interest to obtain some idea of the degree of confidence which can be placed in such data. This is especially so because "net change" represents a combination of these data.

It should be stressed that a low degree of predictive accuracy for current job openings does not necessarily mean that the data are of little value, for poor accuracy can result from the occurrence of events beyond the control of the respondents, particularly the possibility that labor market conditions may prevent the company from carrying out its plans. Also, wages or working conditions may not be sufficiently attractive to enable the firm to fill its openings on schedule.

With this prefatory note as a guide, two sets of comparisons relating to the accuracy of the data are presented in this section—time series comparisons and cross-section comparisons. Evidence relating to the predictive accuracy of the data over time is shown in Table 2 for ten firms for which such data were obtained during the entire

TABLE 2

Product-Moment Correlation Coefficients for Sample Firms Between Anticipated and Actual Turnover Over Time, by Type of Turnover

Correlation Coefficient	Departures	Current Vacancies	Additional Vacancies	Net Change
Negative	2	0	2	1
0-.49	0	3	2	2
.50-.89	4	3	3	5
.90 or more	4	2	3	2
Total	10	8[a]	10	10
Number of coefficients significant at .05 level	7	3	4	4
Correlation coefficient for all firms combined	.96[b]	-.24	.97[b]	.96[b]
Rank correlation coefficient for all firms combined	.67	.04	.74	.69

[a] No vacancies reported by two firms.

[b] Statistically significant at the .01 probability level.

period of the study.[3] This table presents product-moment and rank correlation coefficients between anticipated and actual labor turnover for departures, for current job openings, for anticipated job openings, and the net change in turnover. Separate breakdowns are not presented for departures or for other job openings because the small size of most of the sample firms provides little basis for presenting such results with much reliability.

The data in the top part of this table indicate reasonably good correlations between anticipated and actual turnover for most of the firms in each category. Only a small number of the correlation coefficients for the individual firms are significant, however, which may be partly due to the very small sample size (seven observations in each case). When the data for all firms are combined, three high product-moment correlations are obtained; namely, for departures, for additional vacancies, and for net change. These correlations are statistically significant at the .01 probability level. A very low correlation is obtained between current vacancies and those filled, the only low correlation of this group. Subsequent investigation reveals that this low correlation resulted from the inability of the sample firms to fill vacant positions, primarily because of skill shortages and partly because of low wages being offered for those occupations (e.g., nurses).

To some extent, however, the very high correlations obtained for all firms combined represents the fact that some of the firms are much larger than others, and were engaged much more actively in the labor market. Although this phenomenon cannot be ignored when aggregative data are used, it is nevertheless of interest to remove the effect of size by computing rank correlations among the various sets of data. Such correlations are shown in the last line of the table. The correlation coefficients are now much lower. Once more, the correlation for current vacancies is virtually zero. The other three correlations are reasonably high, though no longer statistically significant at the usual .05 probability level (though the correlation for additional vacancies is almost significant at that level). Over-all, however, the data suggest that on a time series basis

[3] One other firm is omitted because it did not segregate jobs filled between current openings and additional anticipated openings.

the three categories of anticipations for one month ahead provide useful *ex ante* information.

Some tendency was apparent for firms with high correlations between actual and anticipated values for one of the three categories (excluding current vacancies) to have high correlations on the other categories as well. This is not unexpected because the three categories are interrelated. Also, a tendency was observed for firms which were highly cooperative to have higher correlations between the anticipated and actual values.

Anticipated and actual totals for each of the four turnover categories are shown in Table 3 for all of the sample firms. The table indicates that, on balance, a consistent tendency existed for departures to be underestimated. Partly for this reason, additional vacancies also tended to be underestimated. These phenomena were fairly widespread, being true of seven of the ten firms.

Cross-section correlations between the anticipated and actual figures are presented in Table 4 for three months during the period studied—the beginning and ending months and one of the middle months. Rank order correlations are shown, as well as product-moment correlations, to allow for any effects on the correlations that may be present as a result of differing firm sizes.

As can be seen from this table, five of the twelve product-moment correlations are significant at the .05 probability level, as is true of eight of the twelve rank order correlations. Thus, in this case the use of ranks appears to have improved substantially the degree of correlation. The significant correlations are well distributed throughout the four categories, with perhaps the uniformly highest correlations being characteristic of additional vacancies and the lowest correlations obtained for net change. The correlations for current vacancies appear to be neither much higher nor much lower than the correlations for the other categories.

The results of this table would therefore seem to suggest that useful *ex ante* information on the extent to which departures, vacancies, and net change are likely to be distributed among firms can be obtained. Indeed, conceivably the replies may have been influenced by a learning process on the part of the respondents, since the degree of correlation for these categories increases sharply

TABLE 3

Anticipated and Actual Labor Turnover, October–May, for Ten Firms

Month in 1963-64	Departures		Current Vacancies		Additional Vacancies		Net Change	
	Anticipated	Actual	Existing	Later Filled[a]	Anticipated	Actual	Anticipated	Actual
Oct.-Nov.	31	36	6	5	26	32	+1	+1
Nov.-Dec.	31	58	5	2	33	50	+7	-6
Dec.-Jan.	102	110	4	1	18	35	-80	-74
Jan.-Feb.	20	43	8	2	21	25	+9	-16
Feb.-March	24	29	5	2	26	29	+7	+2
March-April	15	41	9	0	39	48	+33	+7
April-May	76	91	6	2	97	97	+27	+8

[a] Positions filled in the following month.

TABLE 4

Cross-Section Correlation Coefficients Between Anticipated and Actual Labor Turnover, by Category, Selected Months

Category	Correlation Coefficient	Oct.-Nov.		Jan.-Feb.		April-May	
Departures	Product-moment	.54		.45		1.00[a]	
	Rank order		.77[a]		.58		.93[a]
Current vacancies	Product-moment	.40		.91[a]		.25	
	Rank order		.66[b]		.81[a]		.61
Additional vacancies	Product-moment	.53		.92[a]		1.00[a]	
	Rank order		.50		.93[a]		.97[a]
Net change	Product-moment	.59		-.23		.90[a]	
	Rank order		.71[b]		.50		.72[b]

[a] Significant at .01 probability level.
[b] Significant at .05 probability level.

from the first period to the last period, though for a limited study such as this, seasonal and other influences cannot be discounted.

CONCLUSIONS

This paper has explored the feasibility of collecting job vacancy data on an *ex ante* basis as well as on an *ex post* basis. The study is based on a small sample and covers a relatively short period of time. However, the results do suggest that the collection of such *ex ante* data for at least one month ahead is feasible, provides considerably more information than just data relating to the current time, and that such information possesses a degree of accuracy high enough to be useful for labor market and economic analysis. The predictive accuracy of this information appears to be at least as good as that of current vacancies, though strict comparison is not possible because of the fact that a different type of accuracy measurement is involved in evaluating current vacancies.

To be sure, the collection of such *ex ante* data on job vacancies would involve contacting more people in many of the sample firms, with consequent expenditures of more time and more funds. The cost of these additional resources would have to be weighed against the benefits obtained from the extra information, something that

has not been attempted in the present paper. It might be noted, however, that one result of this broadened coverage of job vacancies might well be more complete information on current vacancies. Thus, in the present study, it was found that complete information on current vacancies could not be obtained from a single source in three of the sample firms. In a large scale study, such instances might also exist with some frequency, a point which would seem to merit further investigation.

It should be stressed that the findings of this study are not meant to cast doubt on the value of collecting data on current job vacancies. Such data are of great value in themselves, in providing some indication of the extent and nature of the demand for labor. The low correlation between current vacancies and the number of such positions filled does not reflect on the value of these data, but rather primarily on labor market conditions at the time the study was conducted. At the same time, the generally good correlations between the *ex ante* data on vacancies and later fulfillments suggest that such data could serve as a very useful supplement to current job vacancies, and raises the question whether the concept of a job vacancy should not be broadened for purposes of measurement.

Indeed, the results of this study suggest additional research on a number of different questions. First and foremost, the small-scale pilot nature of the study raises the question of the validity of the results for different areas and for different labor market conditions. Further studies might well investigate the additional cost of the *ex ante* information, as well as the value of the data. The question of the interviewing interval might also be considered, with a view toward determining whether data of more or less equal reliability could be obtained if the forward period were extended beyond one month. In addition, the classifications used to obtain the job vacancy information might well be reviewed and alternatives considered. One possibility in this connection might be to segregate vacancies by replacement needs and new positions. More systematic attention would also seem desirable to means of collecting the data, particularly to the feasibility of using telephone methods in connection with personal interviews.

Further work might well seek to include information on the dura-

tion of vacancies. In this study, such data were not collected specifically, but evidence indicates that some of the vacancies extended beyond the thirty-day period.

Another area that seems worthy of exploration is the prevalence of the tendency of employers to underestimate departures. In the present study, this tendency was uncovered at all levels of management, but the small scale of the study makes it impossible to draw any generalizations regarding this phenomenon. If it is indeed widespread, however, it would point to an additional source of instability in the labor market.

Finally, the extent to which complete information on vacancies can be obtained from a single source merits special study. The specification of so-called hiring points would seem to be crucial to the collection of reliable data on the extent and nature of the demand for labor.