Job mobility and hourly wages: is there a relationship?

There is a positive correlation between wages and tenure in Minnesota; specifically, workers earning high wages exhibit high tenure and change jobs less frequently compared with workers earning low wages

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Unemployment Insurance (UI) wage records allow a detailed look at the functioning of the labor market.[1] Researchers used this database to examine statistical and economic relationships between job and worker flows. For example, using UI wage records for the State of Maryland, S. Burgess and others found that new hires are not limited to expanding firms; separations are not limited to shrinking firms; and workers flow (sum of hires and separations) is substantial.[2] It is estimated that new hires and separations each account for about 20 percent of total jobs in an average quarter in Minnesota.[3]

These findings on the reallocation of jobs and workers are important, but they provide no information on the causes of these flows. In particular, what about the relationship between job mobility and wages? S.H. Farber, using data from the Current Population Survey to study job changes, observed that most new jobs are of a short duration and the probability of job change diminishes with tenure.[4] This suggests that there may be differences in wages offered by firms over the duration of a job—specifically, there is a positive correlation between wages and tenure. In other words, workers earning high wages exhibit high tenure and change jobs less frequently, compared with workers earning low wages.

How much does a new hire earn? What are the wages of jobs in which separations occur? This article provides some evidence to illuminate the relationship between job mobility and wages. The analysis is based on a linked employer-employee database involving UI wage records for Minnesota. Because the Minnesota UI wage records include, among other variables, hours worked, the data are appropriate for studying this relationship. This article presents estimates of entry jobs, exit jobs, and continuing jobs, as well as their hourly wage distributions in Minnesota, and addresses how these jobs and wage distributions differ across industries and establishment size classes.

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The methodology

The analytical approach used involves three steps. First, the employer-employee database was constructed using data from the Minnesota UI wage records and the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW), also known as the ES-202 program. Each quarterly UI wage records file was linked to its corresponding ES-202 file using the establishment UI account number.[5] Then, the quarterly files were linked by the establishment UI account number and the worker Social Security number to form a longitudinal database. For each job, or the pairing of an establishment with a worker, an employment pattern over time was constructed.

Second, jobs were assigned into different turnover categories, which were then used to define job types. A series of five consecutive quarters of UI wage records data were used to develop turnover estimates for a single quarter, or the "reference" quarter. The required quarters include the quarter of reference, two quarters preceding the quarter of reference, and two quarters succeeding it.[6] The data covered eight quarters, from third quarter 2000 to second quarter 2002. These eight quarters of UI wage records provide the

necessary data to compute turnover measures for the year 2001.

The last step in the analysis involved computing the hourly wage earned at a particular job. The individual hourly wages were then used to develop hourly wage distributions. Results in this article relate to jobs in the economy rather than to workers.

Labor turnover categories. For each establishment, the quarterly UI wage records provide a list of all employees who worked at that establishment during a particular quarter. Pulling together the employee lists from each of the five quarters produces a time series on the employment status of each employee at a given establishment. The analysis is based only on data for workers who are employed during the reference quarter.[7]

Using the employment pattern of workers over the five quarters, the turnover categories are defined below. Let q_t denote the reference quarter; then q_{t-1} and q_{t-2} represent the two quarters preceding the reference quarter, and q_{t+1} and q_{t+2} denote the two quarters succeeding the reference quarter.

1. ***Continuous*** is a worker who worked at the same establishment in q_{t-1}, q_t, and q_{t+1}. The employment status in q_{t-2} and q_{t+2} is irrelevant to this definition.

2. ***New hire*** is a worker who worked at the same establishment in q_t and q_{t+1}, but did not work for the establishment in the two previous quarters. The worker could either remain employed at or be separated from the establishment in q_{t+2}.

3. ***Rehire*** is a worker who was working at the same establishment in q_{t-2}, q_t, and q_{t+1}, but did not work at this establishment in q_{t-1}.

4. ***Exit*** is a worker who worked at the same establishment in q_{t-1} and q_t, but did not work for the establishment in the succeeding two quarters.

5. ***Temporary exit*** is a worker who worked at the establishment in q_{t-1} and q_t, did not work for this establishment in q_{t+1}, and returned to work in q_{t+2}.

6. ***New hire and exit*** is a worker who worked at the establishment only in the reference quarter, or q_t.

7. ***New hire and temporary exit*** is a worker who worked at the establishment only in q_t and q_{t+2}.

8. ***Rehire and exit*** is a worker who worked at the establishment only in q_{t-2} and q_t.

9. ***Rehire and temporary exit*** is a worker who worked at the establishment in the following quarters: q_{t-2}, q_t, and q_{t+2}.

Job categories. Turnover categories are used to distinguish five types of jobs: continuing, entry, exit, entry and exit, and recall jobs. (See table 1.) The turnover categories and job types are constructed from the UI wage records. The relationship between the turnover categories and the job categories are as follows:

1. ***Continuing jobs*** are jobs held by workers on a continuous basis.

2. ***Entry jobs*** represent jobs taken by new hires including jobs held by workers categorized in turnover classes "New hire" and "New hire and temporary exit."

3. ***Exit jobs*** represent jobs associated with worker exits. In these jobs, workers are classified in the turnover categories "Exit" and "Rehire and exit."

4. ***Entry and exit jobs:*** entry jobs that are held for no more than one quarter. These are the jobs of those workers defined in the turnover category "New hire and exit."

5. ***Recall jobs*** represent those jobs held by workers who return, or will return, to the same establishment after an absence from work of one quarter. They include the jobs of those workers defined in the turnover categories "Rehire," "Temporary exit," and "Rehire and temporary exit."

Hourly wages by job type

There were 3,003,800 jobs in an average quarter of 2001 in Minnesota. (See table 2.) Continuing jobs accounted for about 69.4 percent of total jobs. This means that 30.6 percent of total jobs experienced some type of turnover. Entry jobs and exit jobs each accounted for about 11 percent of total jobs, or 331,000 and 334,000 jobs, respectively. Jobs in which an entry and exit occurs in the same quarter accounted for 5.4 percent of total jobs, or 163,000 jobs. In total, jobs involving an entry, an exit, or both represented about 28 percent of jobs, or 829,000 jobs. This indicates that job mobility is significant in the Minnesota labor market. Finally, recall jobs were only 3.0 percent of total jobs, or 90,000 jobs in an average quarter of 2001.

The data clearly show that the hourly wage distributions exhibit some significant differences among the different job types. The hourly wage distributions of the five job types

Table 1. Computing turnover status and job type from Unemployment Insurance wage records

Employment status over a series of quarters					Turnover status in reference quarter (q_t)	Job type in reference quarter (q_t)
Preceding quarters		Reference quarter	Succeeding quarters			
q_{t-2}	q_{t-1}	q_t	q_{t+1}	q_{t+2}		
0 or 1	1	**1**	1	0 or 1	**Continuous**	**Continuing**
0	0	**1**	1	0 or 1	**New hire**	**Entry**
0	0	**1**	0	1	**New hire and temporary exit**	**Entry**
0	0	**1**	0	0	**New hire and exit**	**Entry and exit**
0 or 1	1	**1**	0	0	**Exit**	**Exit**
1	0	**1**	0	0	**Rehire and exit**	**Exit**
1	0	**1**	1	0 or 1	**Rehire**	**Recall**
0 or 1	1	**1**	0	1	**Temporary exit**	**Recall**
1	0	**1**	0	1	**Rehire and temporary exit**	**Recall**

follow a well-behaved ordering that holds at each of the three hourly wage percentiles. Continuing jobs show the highest hourly wages, while entry and exit jobs have the lowest. In between these two extremes, recall jobs have the second-highest hourly wages, followed by exit jobs, and then by entry jobs. In other words, jobs with an entry, an exit, or both have lower hourly wages than either continuing jobs or recall jobs.

While the individual hourly wage distributions can be stacked nicely, the difference between them seems to get larger as one moves from the 25th percentile to the 75th percentile. For example, comparing the hourly wages of continuing jobs with those of exit jobs shows a difference of $2.80 in the 25th percentile, $5.10 in the median, and $7.77 in the 75th percentile. Similarly, comparing the hourly wage distribution of continuing jobs to that of entry jobs reveals that hourly wages of entry jobs are lower than those of continuing jobs—by $2.99 at the 25th percentile, $5.39 at the median, and $8.74 at the 75th percentile.

These differences are largest and grow fastest when jobs with both entry and exit are compared with continuing jobs. In fact, these two types of jobs exhibit a difference in hourly wages of $3.51 at the 25th percentile, $6.68 at the median, and $11.90 at the 75th percentile. On the other hand, staying with continuing jobs as a reference point, recall jobs have the smallest spread in hourly wages. Specifically, hourly wages of recall jobs are lower than those of continuing jobs by $2.30 at the 25th percentile, $3.85 at the median, and $5.21 at the 75th percentile. Thus, entry jobs, exit jobs, and both entry and exit jobs all seem to offer much lower hourly wages than continuing jobs.

The majority of entry jobs, exit jobs, or both are low paying.[8] Half of all exit jobs paid an hourly wage of $10.29 or less. Similarly, half of all entry jobs paid an hourly wage of $10.00 or less. In addition, the median hourly wage of jobs with both an entry and exit was $8.71. In other words, more than half of the jobs involved in worker reallocation, or the total jobs held by new hires and exits, paid an hourly wage of $10.29 or less. This hourly wage not only is lower than the median hourly wage ($15.39), but also is lower than the 25th percentile hourly wage ($10.39) of continuing jobs.

The picture is much clearer when comparing median hourly wages of different job types. The median hourly wage of exit jobs and of entry jobs was only two-thirds of the median wage of continuing jobs. And jobs with both an entry and an exit occurring in the same quarter offered a median hourly wage of only about 57 percent of the median wage of continuing jobs. This indicates that there are significant differences in hourly wages of continuing jobs and jobs involved in worker reallocation. Moreover, there appears to be a strong relationship between low wages and the high levels of worker reallocation in the Minnesota labor market.

The hourly wages of entry jobs held for no more than one quarter (new hire and exit jobs) were much lower than the hourly wages of either entry jobs or of exit jobs. The median hourly wage for jobs with both entry and exit in one quarter was about 13 percent lower than the median hourly wage of entry jobs and 15 percent lower than the median hourly wage of exit jobs. These jobs are more likely to be temporary jobs or jobs held by multiple jobholders with lower levels of human capital. Thus, it is not surprising that the wage distribution of entry

Table 2. Hourly wage percentiles by job type, Minnesota, 2001

Job type	Quarterly jobs		Hourly wage percentiles		
	Number	Percent	25th	50th	75th
Total	3,003,805	100	$9.17	$13.59	$21.79
Continuing	2,084,689	69.4	10.51	15.39	23.90
Recall	90,412	3.0	8.21	11.54	18.69
Exit	334,185	11.1	7.71	10.29	16.13
Entry	331,213	11.0	7.52	10.00	15.16
Entry and exit	163,306	5.4	7.00	8.71	12.00

jobs held for no more than one quarter ranks the lowest among all five job types.

Exit jobs seemed to have slightly higher wages than entry jobs. However, the differences in hourly wage percentiles were very small. In fact, the highest difference in percentile wages between the two types of jobs was only about $1.00 at the 75th percentile, meaning that the overall hourly wage distributions of entry jobs and exit jobs were almost identical. This could be due, in part, to the fact that many of the entry jobs and exit jobs occur in industries characterized by high turnover and a high demand for low-skilled labor, such as retail trade and services.

One potential explanation for the dramatic contrasts in the wage distributions by job type may be the process of matching and sorting between employers and workers.[9] Employers usually have imperfect information on the characteristics, abilities, and skills of employees. On the other hand, employees have imperfect information on the characteristics of jobs and the working environment. The lack of perfect information on either the employee or the employer brings uncertainty to productivity. To minimize their risk, employers offer new hires starting wages that are lower than those they pay employees with similar observable characteristics, but whose productivity and effort are known and high. As time passes, the quality of the match between the employer and the employee is revealed, and employees with higher productivity are sorted out. Successful matches give employees an opportunity to acquire firm-specific human capital that raises their productivity. Wage increases follow. Wages in the unsuccessful matches most likely stagnate and ultimately the matches are terminated; and the process is repeated with different employers or employees.

Hourly wages by job type and industry

In addition to the overall distributions of jobs and of hourly wages, the employer-employee database also allows for the computation of these distributions by industry, establishment size, and geographical region or county. The following discusses how hourly wage distributions for job types differ across 10 industries in Minnesota. These industries represent the major divisions defined in the *Office of Management and Budget, Standard Industrial Classification (SIC) Manual*.

Before presenting hourly wage distributions, it is important to investigate how the five job types are distributed in each industry. Four industries—agriculture (55 percent); retail trade (59 percent); construction (64 percent); and services (68 percent)—had below-average proportions of continuing jobs. (See table 3.) Job mobility—the sum of entry jobs, exit jobs, and jobs with both an entry and exit—accounted for 38 percent of total jobs, each in retail trade and agriculture; and about 30 percent of total jobs, each in construction and services. These results are expected, given the nature of these four industries; agriculture and construction are highly seasonal, while retail trade and services are naturally high-turnover industries.

The proportion of continuing jobs in the remaining six industries varied between a low of 74 percent in transportation, communications, and public utilities and a high of 80 percent in manufacturing. In addition, job mobility was lowest in public administration with 17 percent of total jobs followed by manufacturing at 18 percent of total jobs.

In addition to determining the distribution of jobs within each industry, it is beneficial to determine the role of industry differences in the overall distribution of job mobility. Of the 829,000 jobs that exhibited an entry, an exit, or both, about 80 percent were in four industries: services, retail trade, manufacturing, and construction. Two industries were particularly dominant in the incidence of job mobility: services, which accounted for 38 percent (or 317,000 jobs), and retail trade, which added another 26 percent (or 218,000 jobs). The shares of manufacturing and construction were 9 percent (or 78,000 jobs) and 6 percent (or 47,000 jobs), respectively.

Many conclusions can be drawn from the estimated hourly wage distributions presented in table 3. First, continuing jobs pay higher hourly wages than all the other job types in all 10 industries. This holds true at each of the three percentiles—that is, the 25th, the median, and the 75th percentile. The three highest median hourly wages of continuing jobs were in

Table 3. Hourly wage percentiles by major industry and job type, Minnesota 2001

Industry and job type	Quarterly jobs		Hourly wage percentiles		
	Number	Percent	25th	50th	75th
Agriculture, forestry, and fishing					
Continuing	18,782	54.8	$8.99	$11.40	$15.53
Recall	2,343	6.8	8.32	10.64	14.05
Exit	4,685	13.7	7.84	9.58	11.95
Entry	4,911	14.3	7.54	9.08	11.40
Entry and exit	3,550	10.4	6.95	8.47	10.31
Mining					
Continuing	5,560	78.0	19.68	22.34	25.30
Exit	888	12.4	18.01	21.64	24.82
Entry	272	3.8	11.45	16.17	23.84
Recall	299	4.2	12.16	15.92	22.85
Entry and exit	111	1.6	10.57	15.61	23.85
Construction					
Continuing	99,297	63.7	15.00	20.69	27.66
Recall	9,109	5.8	13.65	19.08	25.49
Exit	17,885	11.5	12.00	17.25	25.63
Entry and exit	10,746	6.9	10.89	16.62	25.66
Entry	18,860	12.1	11.30	15.91	24.59
Manufacturing					
Continuing	344,606	79.9	12.50	16.82	24.42
Recall	8,940	2.1	10.60	15.64	24.55
Exit	35,413	8.2	9.75	12.82	19.77
Entry	31,078	7.2	9.28	12.11	19.84
Entry and exit	11,033	2.6	8.02	10.00	16.43
Transportation, communications, and public utilities					
Continuing	106,836	73.7	12.72	18.72	27.58
Recall	5,010	3.5	10.38	15.00	23.57
Exit	13,276	9.2	9.96	13.86	23.05
Entry	13,072	9.0	9.86	13.01	20.83
Entry and exit	6,735	4.6	9.26	12.28	23.30
Wholesale trade					
Continuing	133,135	77.0	12.51	17.68	28.44
Exit	16,093	9.3	9.44	13.23	22.26
Entry	15,119	8.7	9.22	12.73	22.63
Recall	3,311	1.9	9.13	12.58	20.75
Entry and exit	5,295	3.1	7.52	9.90	14.01
Retail trade					
Continuing	334,381	58.6	7.37	9.78	14.25
Recall	17,792	3.1	6.74	8.21	11.03
Exit	87,233	15.3	6.46	7.88	10.29
Entry	86,794	15.2	6.25	7.51	9.55
Entry and exit	44,300	7.8	6.00	7.13	8.64
Finance, insurance, and real estate					
Continuing	137,673	76.8	12.39	17.70	28.46
Exit	16,423	9.2	10.00	14.83	24.29
Entry	17,632	9.8	9.85	13.73	22.36
Recall	2,428	1.4	9.02	12.93	22.49
Entry and exit	5,033	2.8	8.14	11.47	18.30
Services					
Continuing	744,133	67.9	10.50	15.23	24.42
Recall	34,371	3.1	8.22	11.00	17.32
Exit	123,640	11.3	8.00	10.40	15.83
Entry	125,866	11.5	8.00	10.23	15.05
Entry and exit	67,155	6.1	7.26	8.98	11.43
Public administration					
Continuing	87,365	79.2	13.60	18.27	24.11
Recall	4,068	3.7	8.00	10.75	15.90
Entry	7,817	7.1	7.45	10.04	14.77
Exit	7,754	7.0	7.38	10.00	16.58
Entry and exit	3,363	3.0	6.50	8.27	11.83

NOTE: Industry is represented by the 10 major divisions defined in the *Standard Classification Industry (SIC) Manual.*

mining ($22.34); construction ($20.69); and transportation, communications, and public utilities ($18.72). And the three lowest median hourly wages of continuing jobs were in retail trade ($9.78), agriculture ($11.40), and services ($15.23). The median hourly wage of continuing jobs in manufacturing was $16.82. Thus, there is a significant industry effect on hourly wages of continuing jobs; the range of variation in median hourly wages was $12.56 among the 10 industries.Second, jobs with both an entry and an exit seemed to offer the lowest median hourly wage in all industries, except construction. In the construction industry, entry jobs had the lowest median hourly wages ($15.91), and jobs with both an entry and an exit had the second-lowest median hourly wages ($16.62). Among all industries, the lowest median hourly wage of jobs with both an entry and an exit was $7.13 in retail trade. Moreover, the median hourly wage of these jobs was less than or equal to $10 in six industries: agriculture, manufacturing, wholesale trade, retail trade, services, and public administration.

Third, entry jobs pay lower wages than continuing jobs in all industries. Specifically, each of the three hourly wage percentiles was lower for entry jobs than for continuing jobs. Comparing median hourly wages of entry jobs to those of continuing jobs reveals some striking results. For example, public administration exhibited the largest difference of all industries. In this low-wage industry, the difference between the median hourly wage of entry jobs and that of continuing jobs was only $2.27. However, this difference widens at the 75th percentile. In fact, 75 percent of entry jobs in retail trade had an hourly wage no larger than $9.55. Comparatively, the 75th percentile of continuing jobs was $14.25, a difference of $4.70.

In addition, the median hourly wage of entry jobs was lower than the 25th percentile hourly wage of continuing jobs in mining, manufacturing, services, and public administration. For example, in manufacturing, the median hourly wage of entry jobs was $12.11, which is lower than the 25th percentile hourly wage of $12.50 for continuing jobs. Similarly, in services, the median hourly wage of entry jobs was $10.23, and the 25th percentile hourly wage of continuing jobs was $10.50. These results indicate that in these four industries (particularly, manufacturing and services due to their role in job mobility), entry jobs command significantly lower wages than continuing jobs.

In the other six industries, the median hourly wage of entry jobs was only slightly higher than the 25th percentile hourly wage of continuing jobs. For instance, in retail trade the median hourly wage of entry jobs was $7.51, while the 25th percentile hourly wage of continuing jobs was $7.37. This relationship was also true in industries that showed high wages such as construction; transportation, communications, and public utilities; and wholesale trade. In construction, particularly, the median hourly wage of entry jobs was $15.91, and the 25th percentile hourly wage of continuing jobs was $15.00.

Fourth, like entry jobs, exit jobs were paid lower wages compared with continuing jobs in all industries. More precisely, the 25th percentile, median, and 75th percentile hourly wages of exit jobs were each smaller than their counterpart for continuing jobs. Considering services, retail trade, and manufacturing, which are the three industries with the largest numbers of exit jobs, the median hourly wage of exit jobs was $10.40, $7.88, and $12.82, respectively. On the other hand, the median hourly wage of continuing jobs was $15.23 in services, $9.78 in retail trade, and $16.82 in manufacturing.

Expressing these results in ratios, the median hourly wage of exit jobs was only 68 percent, 76 percent, and 81 percent of the median hourly wage of continuing jobs in services, manufacturing, and retail trade, respectively. Moreover, the median hourly wage of exit jobs in services was even lower than the 25th percentile hourly wage of continuing jobs. And in retail trade and manufacturing, the median hourly wage of exit jobs was only slightly higher than the 25th percentile hourly wage of continuing jobs. Thus, the majority of exit jobs were paying significantly lower hourly wages than continuing jobs.

Fifth, the wages of exit jobs were very similar to those of entry jobs in all industries. In addition, the median hourly wages of exit jobs were slightly higher than the median hourly wage of entry jobs. However, it is important to note that these jobs offered significantly different wages depending on the industry. The hourly wages of entry and exit jobs were very low in retail trade and agriculture, while they were very high in mining and construction.

Hourly wages by job type, establishment size

The distribution of jobs and their hourly wage distributions were also developed by establishment size. In this article, establishment size was computed by taking the average quarterly employment over the number of quarters in which the establishment had employment records during the eight quarters of UI wage records used in the analysis. This definition reduces the effect of classifying establishments in the wrong size class due to transitory employment change.[10] Establishments were divided into five size classes: (1) establishments having 20 or fewer employees; (2) establishments having 21 to 50 employees; (3) establishments having 51 to 150 employees; (4) establishments having 151 to 250 employees; and (5) establishments having more than 250 employees.

The proportion of continuing jobs was about two-thirds of total jobs in all establishments with 250 or fewer employees. (See table 4.) In contrast, establishments with more than 250 employees were characterized by a larger proportion of continuing jobs; about three-fourths of jobs in these establishments were continuing jobs. This means that among all five

Table 4. Hourly wage percentiles by establishment size and job type, Minnesota 2001

Establishment size and job type	Quarterly jobs		Hourly wage percentiles		
	Number	Percent	25th	50th	75th
1– 20 employees					
Continuing	449,002	66.4	$9.02	$13.57	$21.30
Recall	25,723	3.8	8.00	11.54	18.83
Exit	81,795	12.1	7.01	9.71	14.94
Entry	81,537	12.1	7.00	9.49	14.36
Entry and exit	38,193	5.6	6.55	8.50	12.30
21– 50 employees					
Continuing	315,048	66.7	9.50	14.14	21.75
Recall	14,562	3.1	7.74	10.48	16.59
Exit	58,088	12.3	7.09	9.50	14.51
Entry	55,994	11.8	7.00	9.02	13.33
Entry and exit	28,850	6.1	6.60	8.15	11.40
51–150 employees					
Continuing	18,431	67.2	10.30	14.83	23.01
Recall	19,970	3.2	8.58	11.72	18.94
Exit	75,912	12.2	8.00	10.46	15.95
Entry	72,417	11.6	7.61	9.90	14.26
Entry and exit	36,360	5.8	7.08	8.96	11.74
151–250 employees					
Continuing	176,209	68.7	10.65	15.12	22.88
Recall	8,646	3.4	8.38	11.56	18.73
Exit	29,708	11.6	8.09	10.64	16.63
Entry	28,588	11.2	7.84	10.06	15.10
Entry and exit	13,231	5.2	7.27	8.94	11.75
251 employees or more					
Continuing	636,013	75.7	12.46	17.96	26.90
Recall	18,273	2.2	8.57	12.11	19.69
Exit	73,176	8.7	8.63	11.77	19.87
Entry	77,483	9.2	8.59	11.63	19.75
Entry and exit	35,102	4.2	7.25	9.00	12.25

establishment size classes, job mobility was lowest at establishments with more than 250 employees effecting only 22 percent of total jobs.

Establishments with more than 250 employees contributed about 186,000 jobs to total job mobility of 829,000, or 22 percent. This was the second-highest of all five size classes. The highest share was 24 percent from establishments with 20 employees or less, which had about 202,000 jobs with an entry, exit, or both. Thus, these two establishment size classes accounted for almost half of the jobs that were held by new hires or worker exits.

A close scrutiny of the hourly wage distributions in table 4 shows some important results. First, continuing jobs enjoy high wages across all establishment size classes. In addition, hourly wages, especially the 25th percentile and median, of continuing jobs increase as establishment size increases. This means that there is a positive monotonic relationship between establishment size and hourly wages of continuing jobs. For example, the 25th percentile hourly wage increased from a low of $9.02 at establishments with 20 employees or less to a high of $12.46 at establishments with more than 250 employees. Similarly, the median hourly wage varied from $13.57 at establishments with 20 employees or less to $17.96 at establishments with more than 250 employees. Thus, continuing jobs command higher wages at establishments with more than 250 employees.

Second, hourly wages of entry jobs are higher in establishments with more than 250 employees than in all other establishment sizes. While the median hourly wage of an entry job at an establishment with 250 employees or less was between $9.02 and $10.06, it was $11.63 at an establishment with more than 250 employees. This discrepancy in wages gets larger at the 75th percentile. Specifically, 75 percent of the entry jobs at establishments with more than 250 employees paid an hourly wage of $19.75 or less. In the other four size classes, the 75th percentile hourly wage varied between $13.33 and $15.10. This result may indicate that establishments with more than 250 employees attempt to hire employees who possess more human capital than average.

Third, like entry jobs, exit jobs at establishments with more than 250 employees had higher hourly wages than at all other establishments. Furthermore, there seems to be a positive

relationship between establishment size and hourly wages of exit jobs, in particular at the 25th percentile and median. The median hourly wage of exit jobs increased from $9.49 at establishments with 20 employees or less to $11.77 at establishments with more than 250 employees.

Fourth, the hourly wages of jobs with both an entry and exit were not significantly different among the establishment size classes. In fact, the median hourly wage varied only between $8.15 and $9.00, and this small range of variation also characterized the 25th and the 75th percentiles. This may be an indication that these jobs require low skills and therefore are low-paying.

Fifth, using the median hourly wage, the same ordering of jobs prevails in all establishment size classes. In other words, going from highest to lowest, the five types of jobs are ranked by their median hourly wage as follows: continuing jobs, recall jobs, exit jobs, entry jobs, and entry and exit jobs. Although this ranking holds true in each size class, the difference in the median hourly wage between continuing jobs and jobs with both an entry and an exit in the same quarter varies widely among the five establishment size classes. This difference was $8.92 at establishments with more than 250 employees compared with $5.07 in establishments with 20 employees or less. Therefore, the results summarized in table 4 suggest that there are some significant wage differentials among establishment size classes that are prevalent in all job types.

THE MINNESOTA LABOR MARKET witnessed a substantial amount of job mobility as measured by jobs where an entry, exit, or both occurred. These jobs accounted for 28 percent of total jobs, or 829,000 jobs, in an average quarter of 2001. The majority of these jobs were low-paying jobs. Moreover, their hourly wages were significantly lower than those of continuing jobs. This indicates a strong relationship between low wages and high levels of worker reallocation. This relationship is significantly affected by the industry where the establishment operates and by its size of employment. □

Notes

[1] For a review on linked employer-employee data sets, see J. M. Abowd and F. Kramarz, "The Analysis of Labor Markets Using Matched Employer-Employee Data," *Handbook of Labor Economics*, 1999, vol. 3, pp. 2629–710.

[2] S. Burgess, J. Lane, and D. Stevens, "Job flows, worker flows and churning," *Journal of Labor Economics*, 2000, Vol. 18, No. 3, pp. 473–502.

[3] Hammida, M., "Worker, job, and churning flows by type of firm," *Minnesota Employment Review*, November 2001, on the Internet at **http://www.mnwfc.com/lmi/review/1101supp.htm** (visited December 2003).

[4] S.H. Farber, "Mobility and stability: the dynamics of job change in labor market," in O. Ashenfler and D. Card, eds., *Handbook of Labor Economics*, (Elsevier Science, 1999), Vol. 3, pp. 2439–83.

[5] An establishment is the statistical unit commonly used for reporting wage and employment data to the ES–202 and UI wage records programs in Minnesota. It represents a single physical location where goods and services are produced. While many employers operate only one location, some employers operate more than one location. In Minnesota, most multi-establishment employers report data separately for each establishment to both programs.

[6] Other definitions of turnover exist in the literature that use different numbers of quarters and span between the specific quarters. One such definition uses a period of six quarters that includes the reference quarter, four quarters preceding it, and one quarter succeeding it.

[7] Using the UI wage records, a worker is considered employed when reported quarterly wages are greater than zero.

[8] There is no consensus in the literature on wages that constitute a low wage. Some studies have used percentiles such as the 20th or the 25th percentiles, while others have used wage rates such as $10 per hour.

[9] An additional explanation may be skill-biased technological change that shifts the demand for labor in favor of employees with high skills and high educational attainments. As the preferences of consumers change toward higher quality goods, firms shift their relative demand for labor toward highly skilled workers, who in turn experience increasing returns to skill.

[10] For a detailed discussion on possible biases that result in inappropriate definitions of establishment size classes, see S. J. Davis, C. J. Haltiwanger, and S. Schuh, "Job Creation and Job Destruction," (The MIT Press, 1996).