

## ESCAPING LOW EARNINGS: THE ROLE OF EMPLOYER CHARACTERISTICS AND CHANGES

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Using a unique dataset based on individual Unemployment Insurance wage records for Illinois in the 1990s that are matched to other Census data, the authors analyze the extent to which escape from or entry into low earnings among adult workers was associated with changes in their employers and firm characteristics. The results show considerable mobility into and out of low earnings status, even for adults. They indicate that job changes were an important part of the process by which workers escaped or entered low-wage status, and that changes in employer characteristics help to account for these job changes. Matches between personal and firm characteristics also contributed to observed earnings outcomes.

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As welfare reform was implemented throughout the United States in the late 1990s, millions of low-wage female workers entered the labor market. While their ability to find and retain employment has been higher than initially thought, con-

cern remains about their levels of wages and benefits and their potential for earnings growth over time (for example, Committee for Economic Development 2000; Strawn et al. 2001). Indeed, these factors will be critical determinants of the extent to which low-wage women will be able to escape poverty and achieve economic self-sufficiency for themselves and their families. And these issues are clearly just as relevant to low-wage male workers as to their female counterparts.

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Yet some very fundamental questions remain about workers in low-wage labor markets in the 1990s and beyond. Among the questions we investigate in this study are the following: To what extent do low-wage workers experience enough earnings growth over time to “escape” their low-wage or poverty status? Do the processes by which workers escape low-wage status differ across demographic groups—especially by gender and age? How important is wage growth *within* jobs, as opposed to mobility *across* jobs and employers, for those who escape low-wage status? What characteristics of *employers* contribute the most to success in the low-wage market, and which workers are matched to these employers? How important is the quality of that *match* for achieving success in the low-wage market, as opposed to individual skills and other attributes?

To obtain evidence on low-wage workers and their jobs and earnings, we tap an important new source of data: the Longitudinal Employer-Household Dynamics program (LEHD) currently being compiled at the U.S. Census Bureau. This program matches data from the universe of Unemployment Insurance wage records over the 1990s or earlier to data from the various household and economic surveys of the Census Bureau, as we describe below. The data have been transformed to allow us to analyze a wide range of issues regarding workers, their employers, the interactions between them, and their dynamics over time.

Using a subsample of LEHD data from the state of Illinois in the 1990s, we here try to establish some important basic facts about the relationships between low-wage workers and their employers and how these attachments change over time. We also explore a few of the implications of these dynamics for workers and their ability to escape low earnings.

### Results from Previous Research

Earnings growth among workers who initially have low wages can occur through at least two different mechanisms. Wages

can rise within a particular firm as the worker gains on-the-job training and accumulates tenure; or, alternatively, the worker can gain from turnover and mobility across firms while searching for (or “matching” to) a better job.<sup>1</sup> An individual’s choice between these alternative paths will depend not only on his or her own skills and preferences, but also on the attractiveness of the current employer (relative to other potential employers in the labor market) and the quality of the match between the two. Very weak skills or job performance, or an especially poor match with the employer, could result in an involuntary termination from the current job and the necessity to seek new employment, regardless of the attractiveness of the current job and other opportunities.

Either way, the quality of the firms to which individuals have access should be an important determinant of their ability to improve their earnings over time. The quality of any given firm in this regard will reflect the overall level of wages (and also benefits) that they pay, controlling for worker quality; and opportunities for earnings growth there over time. But access to high-quality firms may be limited for some low earners, independently of their skill levels, due to discrimination, poor information, weak employment networks, and the like. These issues have, of course, been noted in a long tradition of work that focuses on the “person” versus the “job,” and on the extent to which there are “good” versus “bad” jobs for the same less-skilled individuals.<sup>2</sup>

<sup>1</sup>Large literatures on both topics can be found within labor economics, though relatively few studies focus on the low-wage labor market per se. See Willis (1986) for an earlier review of the literature on human capital and on-the-job training; Farber (1999) provides a more recent review of literature on turnover and mobility across jobs.

<sup>2</sup>This tradition includes the “dual labor markets” literature of the 1970s (for example, Doeringer and Piore 1971) as well as the “efficiency wage” literature of the 1980s (for example, Katz 1986).

What is the empirical evidence on returns to experience versus turnover/mobility, particularly for low-wage workers? Several studies of turnover and its effects on wage growth have been done using data from the National Longitudinal Survey of Youth (NLSY79)—such as those by Royalty (1998) and Gladden and Taber (2000). Among other things, these studies clearly indicate the fairly positive effects of voluntary (or job-to-job) turnover on wage growth, and the more negative effects of involuntary (or job-to-nonemployment) turnover.<sup>3</sup> The returns to work experience for low-wage workers have also been documented in this work (particularly by Gladden and Taber, and also by Burtless 1995). But the NLSY79 contains very little information on the characteristics of the employers of these workers; and it is too small to permit an analysis of employment dynamics for detailed groups of low-wage workers, and particularly adults. Furthermore, many of the data are from the 1980s, and low-wage labor markets have likely evolved a good deal since that time.

Other studies have focused on the role of employers and their characteristics or hiring behaviors in determining which less-educated workers get hired into different kinds of jobs (for example, Bishop 1993; Holzer 1996), and on the role of employers in the wage-determination process (Katz 1986; Groshen 1991). These papers have often used data from particular surveys of employers or matched data on employers and some of their employees. But because the samples used in this body of work have generally been fairly small—often limited to particular firms or sectors of the work force—and mostly cross-sectional in nature, the extent to which these studies can illuminate the dynamics of employment and earnings growth for low-wage workers has been limited.

In recent years, a new body of literature has arisen that uses matched employer-employee data with large, often longitudinal samples.<sup>4</sup> These new datasets enable researchers to analyze both sides of the labor market—because information is now available on firms, workers, and the interaction between the two. This permits the construction of controls for both worker and firm heterogeneity, and promises considerable refinement of our understanding of the sources of earnings variation. While regressions using worker-based datasets typically explain less than 30% of earnings variation, the incorporation of such controls increases the proportion explained to as much as 90% (Abowd et al. 2003)—with firm-specific factors explaining about half of the variation. The new data also permit new insights into the earnings effects of key factors. For example, while a standard regression might suggest that the return to 10 years' experience is about 47% for men, this changes to 99% once the regression is estimated using longitudinal information on both workers and firms (Abowd et al. 2003).

These results should have particular relevance to the analysis of the low-wage labor market—particularly given the new policy focus on jobs, employers, and how workers advance within (or out of) this market. However, there has been no U.S. research using such data.

### Data and Methods Used

In this study, we take advantage of a new database that enables us to match U.S. workers with past and present employers, and contains characteristics of both the workers and the firms. This database consists of quarterly establishment records of the employment and earnings of almost all indi-

<sup>3</sup>See also Topel and Ward (1992) for evidence on wage growth of young workers in the 1960s using the Longitudinal Employer-Employee Database (LEED).

<sup>4</sup>For a recent collection of these studies, see Haltiwanger et al. (1999). The literature on matched employer-employee data is reviewed by Abowd and Kramarz (1999).

viduals who worked in the state of Illinois from the first quarter of 1990 to the fourth quarter of 1995. Data of this kind have been extensively described elsewhere (Haltiwanger, Lane, and Spletzer 2000), but it is worth noting that they have several advantages over household-based survey data. In particular, the earnings are quite accurately reported: there are financial penalties for misreporting. The data are current, and the dataset is extremely large, with 57,101,724 observations on 11,207,031 workers. Since we have almost the full universe of employers and workers, we can track movements across earnings categories and across employers with great accuracy. The Unemployment Insurance records have also been matched to internal administrative records that have information on date of birth, place of birth, and race and sex for all workers, thus providing limited demographic information.

There are some clear disadvantages as well. These job-based data are different from the typical worker-based data with which many researchers are familiar. Earnings refer to quarterly earnings, and we have no information on either wage rates or hours and weeks worked. Furthermore, we have little explicit information on family characteristics or worker skills.

However, the latter drawback is substantially mitigated by our ability to estimate individual *worker fixed effects* and *firm fixed effects* for all individuals and employers in the data. Essentially, these effects are drawn from a regression of  $\ln(\text{quarterly earnings})$  on dummy variables for each worker and each firm in a sample that includes all person-quarters of UI-covered employment in the entire state of Illinois during the 1990s.<sup>5</sup> The coefficients on these respec-

tive dummy variables—in their original form and also “adjusted” for observable characteristics—are then appended to the data and used as independent variables in our analysis below on a subset of these data.<sup>6</sup>

The interpretation of the fixed effect for workers is that it is a permanent characteristic of the worker, capturing the worker’s average earnings potential when entering the labor market. Thus, workers with positive fixed effects are those with relatively high earnings, regardless of the job they hold or the firm in which they work—perhaps because of their unobserved ability, skills, or motivation. The firm fixed effect, on the other hand, is meant to capture unobserved heterogeneity such as capital stock and production practices, as well as management and organizational structure. Thus firms with positive fixed effects pay relatively high wages regardless of the workers who fill their jobs.<sup>7</sup> Of course, the estimation of these parameters must rely on certain assumptions that are frequently made in the empirical literature using panel data.<sup>8</sup>

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Due to the left-censoring of the UI data (our sample begins only in 1990), experience is measured as  $(\text{age} - (\text{imputed education}) - 6)$  until 1990 for each individual. All variables in the equation appeared as deviations from sample means, so that the means of estimated person and firm effects for the overall sample equal zero.

<sup>6</sup>For example, the person fixed effects are decomposed into linear components based on the equation  $b_i = f_{0i} + f_1 X_i$ , where the  $X$  are observable characteristics of the worker (such as gender and race). The  $f_{0i}$  can be interpreted as the fixed effect adjusted for these person characteristics, and also have zero means for the entire sample of workers.

<sup>7</sup>The question of why some firms would persistently pay higher wages over time has been heavily debated in the literature on “efficiency wages” or “insiders/outside” (Katz 1986). The fact that higher wages are not bid down over time by the attraction of larger supplies of workers requires either that firms choose to maintain these higher wages—perhaps to attract better workers, reduce turnover, and so on—or that the incumbent workers have the power to block the entry of potential workers into these firms.

<sup>8</sup>Specifically, the fixed person and firm effects are identified only from individuals who change firms over time. This assumes that such turnover is exog-

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<sup>5</sup>See Abowd et al. (2002, 2003) for a full description of the estimation technique. The regressions are of the form  $\ln(\text{earnings})_{ijt} = a + b_i + c_j + d_t + f\text{Exp}_{ijt} + e_{ijt}$ , where  $i$ ,  $j$ , and  $t$  denote the person, firm, and year, respectively;  $b$  and  $c$  are the person and firm dummies;  $d$  represents year dummies; and  $\text{Exp}$  represents an experience measure drawn from the UI data.

Results presented below are based on a 5% random sample of wage records for the state of Illinois between 1990 and 1995.<sup>9</sup> We limit our analysis to workers aged 25–64 in this period, and also to those who exhibit at least marginally consistent attachment to the work force—which we define as showing some employment in at least two quarters for each calendar year. Thus, students and other young people with low attachment to the work force are excluded here, and we focus instead on low-earning adults.

Since we are defining low-earning workers exclusively on the basis of administrative data, we need a definition that avoids (as much as possible) those whose earnings are low either for transitory reasons (such as a recent job displacement) or for voluntary reasons (such as in the case of married women who choose to work part-time). To deal with these issues, we define low-earning status as earning less than \$12,000 per year (in 1999 dollars), and we also stipulate that a worker must have had earnings below this level for three consecutive years. We also compute most results separately for men and women, to allow for the fact that the latter are more likely than the former to be homemakers voluntarily choosing part-time work.

Such a definition of persistently low earnings might seem somewhat arbitrary, but we have deliberately chosen a level of earnings at which a family of four with a single earner would remain under the poverty

line, even after receiving the Earned Income Tax Credit. Furthermore, our analysis of a limited sample of these data that were matched to CPS records indicates that higher cutoffs generate more college graduates with low levels of hours worked (rather than low hourly wages) among our low earners, whom we wanted to avoid.<sup>10</sup> Either way, robustness checks indicate that our qualitative findings below are not sensitive to the exact level at which we define low earnings.<sup>11</sup>

To define the extent to which these low earners “escape” this status in the labor market, we begin by categorizing workers by this status in the period 1990–92, and then consider their status again in 1993–95. Thus, we can calculate “transition matrices” into and out of low-earning status for workers across these periods.

Since many individuals will have multiple employers over a three-year period, we must focus on their experience with their “dominant employer” in each period to identify employer characteristics and their effects on earnings over time. The dominant employer for any given quarter is defined as the one with whom an individual has the highest earnings in that quarter, while the dominant employer over a three-year period is the one that is dominant over the most quarters during that period.<sup>12</sup>

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enous with respect to earnings levels. Also, the estimation of both worker and firm fixed effects implies that the latter can be cleanly separated from the former, whereas there are circumstances under which this might not be so. For example, individuals might gain portable skills from training at a particular firm that then contribute to their estimated person effect or the firm effect observed for a subsequent employer. Finally, we note that the fixed effects are estimates based on large samples of individuals but quite limited numbers of quarters per person or firm, which limits the consistency of the estimates.

<sup>9</sup>The results described in this paper do not seem unique to the state of Illinois or the time period in question. Similar qualitative results from other states in the mid-to-late 1990s appear in Andersson et al. (2002, 2003).

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<sup>10</sup>For instance, even in this sample we find that roughly 40% of our low earners had at least some post-secondary education, and over 10% were college graduates. Educational attainment among low earners was relatively high for white women, consistent with the notion that some were in two-earner families and choosing part-time work for family reasons. But the fractions of low earners who had attained some higher education rise considerably with higher cutoff levels for such earnings.

<sup>11</sup>The results we present below on the effects of mobility across employers and employer characteristics on transitions out of low earnings are also found in the small samples of less-educated workers in low-income families that we can identify with matches to the March CPS of various years. More information on these results is available from the authors upon request.

<sup>12</sup>In our longer report (Andersson, Holzer, and Lane 2002), we pool all person-quarters of data and



Thus, each worker will have one dominant employer for each three-year period, and workers are considered to have changed employers if their dominant employer changes between these periods. Earnings associated with the dominant employer over a three-year period will be considered here, as well as the changes in these earnings that are associated with changes in the dominant employer. Employer characteristics that we consider here include 1-digit or 2-digit industry, firm size, and turnover rates. Employee characteristics include gender, age (as defined by two categories—"younger" adults who are 25–34, and those who are 35 and older), race, and an imputed education measure.<sup>13</sup>

Thus, we are able to calculate transition rates into and out of low-earning status for various demographic groups, the characteristics of low-earning workers versus other workers, how workers are matched with employers by the characteristics of each, and how employer characteristics vary with changes in jobs and earnings status for different groups of workers. The changes in employer characteristics associated with job changes not only shed light on the substantive dynamics of workers in labor markets, but also enable us to "difference away" the characteristics (observed or unobserved) of the workers themselves, helping us distinguish those characteristics from the features of the jobs workers hold as we seek to identify the determinants of employment outcomes.

## Empirical Results

### Transitions from Low-Earnings Status and Job Changes

We begin in Panel A of Table 1 by presenting the distribution of workers across

four categories: those who were never "low-earning" in either period; those who were low-earning in 1990–92 but not in 1993–95; those who were not low-earning in 1990–92 but were in 1993–95; and those who were low-earning in both periods. These four categories thus define the transition matrix for low-earning status over these two three-year periods. Results are presented for the overall sample, and then separately by gender and age group (that is, younger versus older adults).

The results show that, according to our definition, the vast majority of adult workers with at least minimal labor market attachment were not "low-earning" in either period. In fact, the overall percentages who were low-wage are just 5% and 3%, respectively, in the two time periods. But *transition rates out of low-earning status were fairly high*. Of those who were low-wage in the initial period, over half (that is, the 3% in the third row versus the 2% in the bottom row of the last column) managed to escape this status in the second period. On the other hand, a relatively small percentage (2%) of those who were not low-wage initially fell into this status in the latter period.

Of course, estimated transition rates might be lower if we defined a transition out of poverty-level earnings somewhat more stringently—for example, by requiring these workers to consistently earn over \$12,000, or to earn higher amounts at least some of the time. Tabulations that we have generated with other potential definitions of transitions, as well as the results of the next table, indicate that most of those escaping poverty status by our definition were indeed achieving substantial wage gains.<sup>14</sup>

analyze the effects of firm characteristics and mobility on earnings using all employers, rather than those that are "dominant" in any three-year period. The qualitative results presented here are found there as well.

<sup>13</sup>The imputation methodology follows that described in Abowd, Kramarz, and Margolis (1999). It is based heavily on worker observables such as gender, age, and previous work experience.

<sup>14</sup>In tabulations not presented here, a majority of those escaping the category of persistently low earnings made at least \$15,000 in at least one of the three years considered, though only a small fraction (that is, about one-eighth) earned above that level in all three years. Our longer report (Andersson, Holzer, and Lane 2002) considers mobility across a broader range of earnings categories, such as earnings above \$12,000 or \$15,000 for some but not all of the three years in question.

Table 1. Low-Earning Status and Job Mobility, 1990–1992 and 1993–1995.

<i>Earning Group</i>	<i>Male</i>	<i>Female</i>	<i>Young</i>	<i>Old</i>	<i>Total</i>
<b>A. Mobility into and out of Low-Earning Employment</b>					
Total	1.00	1.00	1.00	1.00	1.00
Not Low-Earning Either Period	0.976	0.888	0.935	0.926	0.944
Low-Earning Earlier, Not Later	0.012	0.054	0.027	0.038	0.036
Low-Earning Later, Not Earlier	0.007	0.031	0.015	0.017	0.021
Low-Earning Both Periods	0.004	0.033	0.023	0.018	0.019
<b>B. Job Changing by Low-Earning Employment</b>					
Not Low-Earning in Either Period	.261	.257	.332	.221	.260
Low-Earning Earlier, Not Later	.589	.439	.579	.413	.472
Low-Earning Later, Not Earlier	.521	.442	.527	.409	.463
Low-Earning Both Periods	.250	.251	.371	.211	.250
Total	.279	.273	.342	.230	.277

*Note:* All estimated results are based on a 5% sample of data from the state of Illinois in the period 1990–95. “Low earnings” are defined as less than \$12,000 per year (in 1999 dollars) for at least three consecutive years. Numbers in Panel A are distributions of workers in each demographic group across low-earning categories (and therefore add up to 100%), while those in Panel B are the percentages of those in each category who have changed their primary employers across the two three-year periods.

Comparing across demographic groups, we find that female workers were more likely to be low-earning than their male counterparts, while there appears to be little difference by age group among those over 25. Over half of those who were initially in low-earning status transitioned out of that status within each demographic group. The fraction of men who were low-earning in both periods is extremely small.

Panel B of Table 1 presents the percentage of workers in each of these four categories who changed their “dominant employer” between 1990–92 and 1993–95. Again, results are presented for the total sample and then separately by gender and group. The results indicate that about a fourth of all workers changed their dominant employer across the two periods. This implies a turnover rate of under 10% each year, which is a good deal lower than we find in the broader literature (for example, Anderson and Meyer 1994; Lane 2000), but likely reflects the particular sample of workers on whom we focus and the definition of employer change we use here.<sup>15</sup>

For those who were either escaping low-earning status or entering into it, however, the likelihood of a change in the dominant employer was roughly twice as large as for those who maintained either their poor or non-poor status. In other words, *changes in employers were associated with almost half of all transitions out of or into low-earning employment status*. Thus, employer changes were more likely to be associated with major changes in earnings status, both positive and negative, than was continuity with the same employer. In this case, using more stringent definitions of transitions out of poverty tends to strengthen this finding.<sup>16</sup>

Furthermore, while younger workers had higher rates of employer change than older workers, the same general pattern holds for all demographic groups considered here. The results are thus consistent with those of

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reduces the turnover rate substantially, as does our focus on permanent separations that exclude temporary layoffs.

<sup>16</sup>For instance, job changes were associated with about 70% of the cases in which consistently low earners in the early period earned above \$15,000 for one or more years in the later period.

<sup>15</sup>In particular, the omission of younger and marginally attached workers from our sample no doubt

Table 2. Quarterly Earnings Levels and Changes by Low Earning and Job Mobility Status: 1990–1992 and 1993–1995.

Group	Earnings 1990–92				Percent Changes between 1990–92 and 1993–95			
	Mean	Median	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	Mean	Median	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile
<i>Not Low-Earning Either Period</i>								
Jobs Changers	8,218	6,736	4,387	10,208	.09	.03	–.21	.26
Non-Changers	10,030	8,943	5,773	12,221	.06	.05	–.14	.15
<i>Low-Earning Earlier, Not Later</i>								
Job Changers	1,943	1,962	1,413	2,446	.68	.37	–.14	.33
Non-Changers	1,991	2,083	1,555	2,513	.19	.09	–.11	.11
<i>Low-Earning Later, Not Earlier</i>								
Job Changers	3,989	3,059	1,952	4,710	–.19	–.34	–.63	–.01
Non-Changers	2,538	2,209	1,533	2,907	–.03	–.06	–.22	.12
<i>Low-Earning Both Periods</i>								
Job Changers	1,792	1,780	1,186	2,257	.23	.06	–.20	.39
Non-Changers	1,768	1,864	1,333	2,261	.07	.03	–.08	.16

Note: Quarterly Earnings represent average earnings with the dominant employer in the relevant three-year period. Percent changes are defined as changes relative to the average earnings level in the initial three-year period. Low-earning status and job-changing are defined as in Table 1.

Topel and Ward (1992) and others who have emphasized the important potential wage gains associated with job mobility, as well as losses when such mobility is not voluntary.

To what extent were these employer changes associated with the levels or changes in earnings of these workers? In Table 2 we present data on average earnings per quarter and percentage changes in these earnings by the four transition categories regarding low-wage status and whether the worker had changed employers. We focus on averages per quarter rather than total earnings per year or period, since quarters of employment changed little across periods for most of these workers.<sup>17</sup> For each variable, we present mean

and median earnings, as well as earnings at the 25th and 75th percentiles.<sup>18</sup> Then, separately by gender and age group, we present median earnings and changes as well in Table 3.

The results indicate that earnings levels were generally lower among those workers who tended to change their dominant employer, even within the subsamples defined by low-earnings status. However, *gains in mean and median earnings for those escaping low-earning status and losses in earnings among those entering that status were much larger for job-changers than for non-job changers.*<sup>19</sup> The

<sup>17</sup>Median quarters of employment were 11 for job-changers and 12 for non-changers in the period 1990–92, and they were 12 for both groups in the period 1993–95. No doubt these high rates of employment reflect our focus on older and relatively attached workers, as well as the fact that a worker shows up as being “employed” if he or she appeared with any employer during that quarter.

<sup>18</sup>Means have been calculated for samples that omit both the top and bottom 1% of earnings levels and changes, to minimize the effects of outliers on our results. Of course, the medians are completely unaffected by these procedures, while the 25th and 75th percentiles are only slightly affected. Also, separate results have been calculated for “full-quarter” earnings, which omit those quarters in which someone left a job. These results are qualitatively and quantitatively similar to those presented here.

<sup>19</sup>Standard errors on mean earnings changes in the fifth column of Table 2 for those who were changing jobs are roughly .02 among those escaping low-



Table 3. Median Earnings Changes by Gender or Age in 1990–1992, and in 1993–1995 versus 1990–1992.

Group	Male	Female	Young	Older
<b>A. Median Earnings Levels by Gender or Age, 1990–1992</b>				
<i>Not Low-Earning Either Period</i>				
Job Changers	8,265	5,407	6,273	7,333
Non-Changers	10,485	6,607	7,688	9,112
<i>Low-Earning Earlier, Not Later</i>				
Job Changers	2,130	1,905	2,006	1,903
Non-Changers	2,024	2,086	2,122	2,059
<i>Low-Earning Later, Not Earlier</i>				
Job Changers	3,622	2,940	2,972	3,115
Non-Changers	2,593	2,130	2,252	2,185
<i>Low-Earning Both Periods</i>				
Job Changers	2,022	1,649	1,882	1,594
Non-Changers	1,866	1,834	1,841	1,835
<b>B. Median Earnings Changes by Gender or Age: 1993–1995 versus 1990–1992</b>				
<i>Not Low-Earning Either Period</i>				
Job Changers	.02	.03	.03	-.01
Non-Changers	.04	.06	.07	.04
<i>Low-Earning Earlier, Not Later</i>				
Job Changers	.42	.35	.36	.39
Non-Changers	.04	.10	.13	.03
<i>Low-Earning Later, Not Earlier</i>				
Job Changers	-.45	-.30	-.32	-.36
Non-Changers	-.10	-.03	-.08	-.04
<i>Low-Earning Both Periods</i>				
Job Changers	-.04	.03	.03	.06
Non-Changers	-.03	.04	.02	.03

differences here are rather dramatic—for example, median earnings rose by 37% among those who escaped low-wage status by changing employers, but only by 9% among those who did not change; and median earnings declined by 34% among those who fell into low-wage status by changing employers but only by 6% among those who did not. This pattern holds within each demographic group as well in Table 3.

Furthermore, even among those who remained in low-earning or non-low-earning status across periods, the variance in

earnings changes associated with job changes appears to have been much higher than that associated with no employer change. Thus, the gap in earnings changes between those at the 25th and 75th percentiles was higher among job changers than among non-changers within each category defined by low-wage status and transitions into or out of it.

While voluntary job changes were the ones most likely to be associated with positive earnings changes, such turnover behavior was clearly endogenous with respect to alternative employment opportunities, which in turn depended on the employers to which workers had access. The changes in employer characteristics associated with these job changes, and how they were related to the characteristics of workers as well as to observed changes in

wage status and .05 for those falling into it. Differences in mean earnings changes across groups that are discussed here and below are statistically significant.

employment outcomes, are analyzed in some detail below.

### **Employers, Workers, and the “Matches” between Them**

We begin by considering some personal characteristics of workers, of employers, and of the “matches” we observe in the labor market between the two. Panel A of Table 4 presents data on worker gender, race, and education (imputed) across the four quartiles of the distribution of worker “fixed effects,” both overall and adjusted for these observable worker traits.<sup>20</sup> Similarly, Panel B of the table presents the size, turnover rate, and broad industry categories of firms by the quartiles of the distribution of firm fixed effects. Finally, in Panel C we present worker characteristics across the four quartiles of the firm fixed effects distribution, to illustrate something about the nature of the “matching” between workers and firms that occurs in the labor market.

The results shown in Panel A of Table 4 indicate that women, non-whites, and the less educated were more heavily concentrated among those with lower person fixed effects than were men, whites, and more-educated workers, respectively. Of course, it is no surprise that these groups persistently earned less in the labor market, due to differences in skills, discrimination across groups, or both. As expected, these differentials across quartiles of the fixed effects distribution mostly disappear when we consider effects that are adjusted for these personal observable characteristics.

In Panel B, we similarly note that certain characteristics of employers were associated with permanent tendencies to pay more to workers there. In particular, large firms, those with low turnover, and those in manu-

facturing paid higher earnings than smaller firms, those with high turnover, and those in retail trade or the services. Again, these overall relationships have all been noted before (for example, Brown, Medoff, and Hamilton 1990; Parsons 1986; Katz 1986). But since these characteristics are correlated with firm effects in equations that control for fixed person effects, it is clear here that these relationships denote the characteristics of the firms rather than those of workers who happen to be employed there.

Finally, the data in Panel C indicate that women, nonwhites, the less educated, and others with permanently low earnings were also matched to firms that permanently paid less than others—in other words, *workers with strong/weak fixed effects were matched to firms with strong/weak effects*. Thus, the characteristics of the workers themselves contributed to their low earnings, but so did those of the employers for whom they worked. This positive (albeit modest) correlation between worker and firm characteristics is consistent with earlier work using data from both France and the United States (Abowd et al. 1999), and reflects an outcome of the “matching” process in labor markets that merits further exploration.

While workers with low fixed effects tended to be matched in the labor market to firms with low effects, these workers sometimes changed employers in ways that improved the quality of the firms to which they were matched and thus their own employment outcomes. In Tables 5–7 we consider the characteristics of employers (and, to a much lesser extent, those of workers) that were associated with low-earnings status and transitions into and out of this status among workers. Thus, Table 5 presents the distributions of workers across industry groups, by low-earnings status in the two periods, and by whether or not the individual changed his or her dominant employer. For those who changed employers (Panel A), we present their industry both in 1990–92 and 1993–95; for those who did not change employers (Panel B), one listing of industries appears. Similarly,

<sup>20</sup>As noted above (footnote 6), the person fixed effects have been decomposed econometrically into those that are based on observable characteristics and those that are not. The latter are considered the “adjusted” fixed effects here.

Table 4. Person/Firm Characteristics and Matches between Them.

<b>A. Person Characteristics</b>						
<i>Quartile</i>	<i>Person Fixed Effects</i>			<i>Adjusted Fixed Effects</i>		
	<i>Percent Female</i>	<i>Percent White</i>	<i>Years of Education</i>	<i>Percent Female</i>	<i>Percent White</i>	<i>Years of Education</i>
Quartile 1	.51	.69	12.13	.48	.75	12.98
Quartile 2	.47	.74	12.77	.46	.75	13.05
Quartile 3	.45	.80	13.58	.46	.75	13.23
Quartile 4	.41	.86	14.66	.45	.82	13.57
<b>B. Firm Characteristics</b>						
<i>Firm Fixed Effects Quartile</i>	<i>Average Size</i>	<i>Turnover Rate</i>	<i>Industry</i>			
			<i>Manufacturing</i>	<i>Retail</i>	<i>Service</i>	
Quartile 1	143	.418	.06	.36	.40	
Quartile 2	179	.236	.18	.10	.4	
Quartile 3	267.5	.137	.26	.05	.3	
Quartile 4	663.4	.180	.32	.01	.11	
<b>C. Person-Firm Matches</b>						
<i>Firm Fixed Effects Quartile</i>	<i>Mean Person Fixed Effects</i>	<i>Mean Adjusted Fixed Effects</i>	<i>Percent Female</i>	<i>Percent White</i>	<i>Years of Education</i>	
Quartile 1	-.09	-.22	.58	.78	12.9	
Quartile 2	-.07	-.18	.51	.76	13.1	
Quartile 3	-.03	-.12	.43	.74	13.3	
Quartile 4	-.04	-.13	.33	.77	13.3	

*Note:* Panel A presents percent female, percent white, and average years of (imputed) education for each quartile of the distribution of person fixed effects, where the latter are defined as total effects or those adjusted for observable personal characteristics. Panel B presents average size, turnover rates, and major industry groupings for each quartile of the distribution of firm fixed effects. Panel C presents average person fixed effects (total and adjusted for observable characteristics) and demographic characteristics of workers for each quartile of the firm fixed effects distribution.

Table 6 presents data on the sizes and turnover rates of their employers by similar breakdowns, and Table 7 presents person and firm fixed effects. As the person effects do not vary when individuals change jobs, these are presented just once in all cases, while separate firm effects are presented twice for the job changers only.

The results in Table 5 show considerable differences in industries of employment for workers according to their low-earnings status. For instance, we find that low-earning workers were much more likely to be found in retail trade (particularly eating

and drinking establishments) and in the services (especially education, personal services, and recreation) than were other workers, while they were less likely to be found in construction, manufacturing, utilities, and wholesale trade. Indeed, the strongest differences appear between those who were never low-wage versus those who were low-wage in at least one period, even if they subsequently escaped this status; this suggests that the personal characteristics of these workers may have had strong effects on the industries in which they gained employment.

*Table 5.* Distribution of Workers across Industries by Low-Earning Status and Job Mobility, 1990–1992 and 1993–1995.

<b>A. Job Changers</b>								
<i>Industry</i>	<i>Not Low-Earning Either Period</i>		<i>Low-Earning Earlier, Not Later</i>		<i>Low-Earning Later, Not Earlier</i>		<i>Low-Earning Both Periods</i>	
	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>
Agriculture, Mining	.01	.01	.01	.01	.01	.01	.01	.01
Construction	.08	.08	.01	.02	.02	.02	.01	.01
Manufacturing	.20	.19	.08	.11	.13	.06	.05	.06
TCU	.06	.06	.04	.04	.04	.03	.03	.03
Wholesale Trade	.10	.09	.04	.05	.07	.03	.03	.03
Retail Trade	.13	.12	.34	.26	.27	.34	.36	.33
Eating/Drinking	.04	.03	.16	.11	.13	.13	.18	.18
FIRE	.09	.09	.03	.04	.05	.05	.03	.04
Services	.31	.33	.43	.44	.38	.48	.46	.47
Hotel	.01	.01	.02	.02	.02	.02	.02	.02
Personal	.01	.01	.03	.02	.02	.03	.06	.06
Business	.07	.08	.07	.09	.08	.10	.05	.06
Health	.08	.09	.10	.13	.09	.10	.13	.11
Education	.04	.04	.09	.08	.06	.10	.10	.11
Movies/Recreation	.01	.01	.03	.02	.02	.03	.03	.04
Public	.02	.03	.02	.03	.03	.02	.02	.02
<b>B. Non-Changers</b>								
<i>Industry</i>	<i>Not Low-Earning Either Period</i>		<i>Low-Earning Earlier, Not Later</i>		<i>Low-Earning Later, Not Earlier</i>		<i>Low-Earning Both Periods</i>	
Agriculture, Mining	.01		.01		.01		.01	
Construction	.04		.01		.02		.01	
Manufacturing	.24		.06		.07		.03	
TCU	.08		.03		.04		.03	
Wholesale Trade	.09		.04		.03		.03	
Retail Trade	.09		.40		.30		.30	
Eating/Drinking	.02		.11		.14		.13	
FIRE	.07		.04		.04		.03	
Services	.31		.40		.46		.42	
Hotel	.01		.01		.02		.03	
Personal	.01		.02		.02		.03	
Business	.03		.04		.04		.03	
Health	.09		.11		.11		.09	
Education	.11		.19		.15		.23	
Movies/Recreation	.01		.02		.02		.03	
Public	.07		.03		.03		.04	

*Note:* Industry refers to a worker's dominant employer in each three-year period. Columns add up to 100% for one-digit industry categories (Agriculture, Construction, Manufacturing, Transportation/Communications/Utilities, Wholesale Trade, Retail Trade, Finance/Insurance/Real Estate, Services, and Public Sector). Since the non-job changers in Panel B have the same dominant employers in each of the two periods, only one set of results is presented for them.

On the other hand, comparisons of industries of workers who changed their dominant employers in Panel A of the table show some striking differences in industries for the same people, particularly if they es-

caped or entered low-earning status. For instance, workers who were low-earning in the earlier period but not in the later one clearly gained employment in manufacturing and some of the services (notably health

Table 6. Average Size and Turnover Rates of Dominant Employers  
by Low-Earning Status and Job Mobility of Workers, 1990–1992 and 1993–1995.

	<i>Not Low-Earning Either Period</i>		<i>Low-Earning Earlier, Not Later</i>		<i>Low-Earning Later, Not Earlier</i>		<i>Low-Earning Both Periods</i>	
	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95
<b>A. Job Changers</b>								
Average Firm Size	173	170	153	159	172	138	124	107
Average Turnover Rate	.297	.283	.391	.353	.363	.380	.408	.394
<b>B. Non-Changers</b>								
Average Firm Size	463		170		131		116	
Average Turnover Rate	.214		.318		.325		.295	

care and business services), and to a lesser extent in construction and wholesale trade, while losing employment in retail trade (especially eating and drinking) and other services (like education, personal services, and recreation). For the most part, the opposite is true for those who entered low-wage status in the later period. Thus, industry changes appear to have been strongly related to changes in earnings status, even for the same individuals, consistent with some earlier evidence on industry differences in earnings (for example, Krueger and Summers 1987).

Similar findings appear in Tables 6 and 7. For instance, Table 6 clearly indicates that firm sizes were lower and turnover rates higher among workers with lower earnings, even for those who managed to escape this status eventually and those who entered it. But those workers who escaped this status by changing employers ended up in larger firms with less turnover, while the opposite was true for those who entered low-wage status by changing employers.

In Table 7, we find large differences in person fixed effects between those who were never low-earning and those who were low-earning in one or more periods; this clearly indicates the important role of personal skills and other attributes in determining earnings status among workers. We also find large differences in firm effects across these groups, even for those who did not change jobs, which seems to confirm the tendency of workers with strong per-

sonal characteristics to be matched to better jobs and employers in the labor market. On the other hand, firm effects clearly improved for those individuals who managed to escape low-earnings status by changing jobs, while they deteriorated for those who entered this status because of a job change.

Clearly, then, the characteristics of the firms to which workers were matched had some independent effects on their ability to escape low-earnings status, in addition to their own personal attributes. An improved understanding of how this “matching” process works, and exactly what the most successful pathways are for workers to improve their earnings status, would clearly be useful for the development of successful policies to help low-wage workers.

### Regression Results

Tables 8 and 9 present some preliminary estimates from regression equations of the determinants of movements out of low earnings status and of earnings growth more generally.

The estimated equations in Table 8 are based on

$$(1) \quad \Delta \ln(\text{EARN})_{ij} = f(\Delta X_j; Z_i) + \Delta u_{ij},$$

where  $i$  denotes the individual worker and  $j$  denotes the firm, respectively; EARN refers to average quarterly earnings with the dominant employer; and  $X$  and  $Z$  refer to labor market characteristics of workers and firms,



Table 7. Average Person and Firm Fixed Effects,  
by Low-Earning Status and Job Mobility of Workers.

	<i>Not Low-Earning Either Period</i>		<i>Low-Earning Earlier, Not Later</i>		<i>Low-Earning Later, Not Earlier</i>		<i>Low-Earning Both Periods</i>	
	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>	<i>1990–92</i>	<i>1993–95</i>
<b>A. Job Changers</b>								
Person Fixed Effect								
Total	-.05	—	-.19	—	-.16	—	-.22	—
Adjusted	-.11	—	-.68	—	-.73	—	-.89	—
Firm Fixed Effects	.06	.04	-.36	-.24	-.15	-.37	-.43	—
<b>B. Non-Changers</b>								
Person Fixed Effect								
Total	-.02		-.16		-.18		-.19	
Adjusted	-.03		-.84		-.90		-1.05	
Firm Fixed Effects	.09		-.35		-.36		-.41	

Note: Since person effects are fixed, their averages do not change between 1990–92 and 1993–95.

respectively. Changes are measured across the periods 1990–92 and 1993–95. The sample is limited to those with low earnings in the earlier period.

Generally, the equations reflect “first differences” models of how changes in employers and their characteristics affect the earnings of workers with given (fixed) characteristics. The *X*’s include changes in the firm fixed effect and also in various observable characteristics of the firm, such as its size, turnover rate, and industry.<sup>21</sup> We include specifications in which only the former is included, as well as some in which the others are included as well.<sup>22</sup> Then, in

the final specification, we add to the model a person-specific effect (unadjusted for observable characteristics of the worker) as an additional independent variable. Though such fixed effects are usually “differenced away” in a pure first-differences model, we include them here to allow for the possibility that *changes* in earnings over time vary with the *levels* of personal characteristics, even when the latter are fixed in nature.<sup>23</sup>

The results in Table 8 provide general support for the notion that changes in firm characteristics are important explanations of changes in earnings. Changes in firm size, turnover rate, and the fixed firm effect all have statistically significant effects of the anticipated sign on earnings changes. Controlling for these, changes in industry effects are also quite important, with work-

<sup>21</sup>A set of dummy variables captures the range of transition possibilities across three very broad industry groupings: manufacturing, retail trade/service, and all other industries. The omitted category covers those who worked in “other” industries in both periods.

<sup>22</sup>The firm fixed effect should capture the effects of size, turnover, and industry on earnings, to the extent that the latter are fixed over time for any firm. Since size and turnover can vary over time for any given firm, they might have effects on wages that are independent of the firm’s fixed effect. But even industry might have effects on the earnings of relatively low-wage workers controlling for the firm effect, since our estimated firm effects are based on all workers in firms and not just the low earners there.

<sup>23</sup>The standard “first difference” model assumes that levels of the outcome variable depend only on levels of the determinants, and therefore that changes in the former depend only on changes in the latter. We note that both the firm and person fixed effects included here as regressors are themselves estimated, and thus the standard errors presented are somewhat downward-biased.

Table 8. Regression Estimates: Determinants of Changes  
in Ln(Earnings) per Quarter with Dominant Firms, 1993–95 versus 1990–92.

Description	(1)	(2)	(3)	(4)
<i>Change in:</i>				
Firm Fixed Effect	0.717 (25.61)**	0.685 (23.45)**	0.647 (21.88)**	0.610 (20.98)**
Firm Size			0.044 (2.47)*	0.049 (2.80)**
Firm Turnover			-0.185 (7.30)**	-0.178 (7.13)**
<i>Industry Status</i>				
Retail Trade/Services in Both Periods		-0.035 (1.25)	-0.036 (1.28)	-0.092 (3.31)**
Retail Trade/Services to Manufacturing		0.102 (1.58)	0.074 (1.15)	-0.027 (0.42)
Retail Trade/Services to Other		0.075 (1.53)	0.062 (1.26)	-0.023 (0.47)
Other to Retail Trade/Services		-0.104 (2.03)*	-0.102 (2.00)*	-0.197 (3.93)**
Manufacturing to Retail Trade/Services		-0.087 (1.29)	-0.060 (0.88)	-0.154 (2.32)*
Manufacturing to Other		0.165 (1.53)	0.174 (1.63)	0.049 (0.46)
Other to Manufacturing		0.256 (2.48)*	0.227 (2.19)*	0.130 (1.28)
Manufacturing in Both Periods		-0.009 (0.20)	-0.009 (0.19)	-0.041 (0.86)
Person Fixed Effects				0.305 (22.61)**
R-Squared	0.05	0.05	0.05	.09

Note: Samples include only those who are low earners in the period 1990–92. Only the constant term is not presented above.

\*Statistically significant at the .10 level; \*\*at the .05 level.

ers moving to the retail trade/service sector experiencing the most negative (or least positive) earnings changes and those moving out of those sectors enjoying the most positive changes.

In Table 9, we consider estimated versions of

$$(2) \quad \Pr(\text{EARN}_{ij,t} > 12000) = g(\Delta X_j; \text{EARN}_{ij,t-1}; Z_i) + v_{ijt},$$

where the variables are defined as before. The equation is estimated as a binomial probit. The sample is again limited to

those with low earnings in the initial period.

While similar to the “first difference” model for the log of earnings, this model estimates the likelihood that an individual whose earnings are initially low ends up in the category of low earnings versus non-low earnings (defined as in our summary tables above) in the subsequent period. It recognizes that this probability depends on changes in the individual’s earnings, and thus in his or her firm characteristics, between the current period and the previous one, as well as the level of earnings achieved

Table 9. Regression Estimates: Determinants of Low Earnings Status in Later Period (Probit Model).

Description	(1)	(2)	(3)	(4)
<i>Change in:</i>				
Firm Fixed Effect	-0.167 (12.02)**	-0.164 (11.17)**	-0.168 (11.31)**	-0.153 (10.11)**
Firm Size			0.136 (1.55)	0.114 (1.27)
Firm Turnover			-0.012 (0.99)	-0.017 (1.39)
<i>Industry Status</i>				
Retail Trade/Services in Both Periods		0.011 (0.85)	0.011 (0.85)	0.045 (3.27)**
Retail Trade/Services to Manufacturing		-0.208 (6.76)**	-0.208 (6.74)**	-0.164 (5.08)**
Retail Trade/Services to Other		-0.164 (7.13)**	-0.164 (7.11)**	-0.128 (5.33)**
Other to Retail Trade/Services		-0.172 (7.32)**	-0.172 (7.32)**	-0.130 (5.31)**
Manufacturing to Retail Trade/Services		-0.167 (5.43)**	-0.167 (5.43)**	-0.125 (3.89)**
Manufacturing to Other		-0.284 (5.69)**	-0.285 (5.70)**	-0.246 (4.58)**
Other to Manufacturing		-0.204 (4.18)**	-0.205 (4.21)**	-0.167 (3.26)**
Manufacturing in Both Periods		-0.134 (5.96)**	-0.133 (5.95)**	-0.120 (5.23)**
Average Earnings in 1990-92	-0.017 (2.53)*	-0.025 (3.73)**	-0.025 (3.74)**	0.023 (3.23)**
Person Fixed Effects				-0.178 (25.80)**
R-Squared	.01	.03	.03	.07

Note: Samples include only those who are low earners in the period 1990-92. Only the constant term is not presented above.

\*Statistically significant at the .10 level; \*\*at the .05 level.

in the earlier period.<sup>24</sup> As before, firm changes are captured in fixed effects and

<sup>24</sup>This specification is based on the notion that  $\Pr(\text{EARN}_i > 12) = \Pr(\text{EARN}_i - \text{EARN}_{i-1} > 12 - \text{EARN}_{i-1})$ ; in other words, the likelihood of having earnings above a certain level in the later period equals the likelihood that the change in earnings across periods is greater than the gap between the cutoff level and earnings in the initial period. Controlling for the worker's level of earnings in the earlier period enables us to estimate this probability as a function of changing firm characteristics across the two periods.

sometimes in other observable firm characteristics as well; and one specification also allows for the level of person fixed effects to influence this outcome.

The results in Table 9 are generally consistent with those in Table 8—particularly the strong impact of the firm fixed effect on moving out of low-earning status. The estimated firm size and turnover effects in this specification are counterintuitive but are not statistically significant. Industry changes remain important—in general, changing industries results in a lower prob-

ability of remaining in low-earning status (recall that most low-earners are concentrated in low-wage industries). Specific examples of these changes are noteworthy because they highlight the different paths to success in different industries. For example, low earners who started off in retail trade/services and stayed there were more likely to remain low earners; but exits out of retail trade generally reduced the likelihood of remaining a low earner. Conversely, a low earner who started in manufacturing and stayed there was likely to be able to exit—suggesting that career ladders are prevalent in the manufacturing sector, but not in retail trade/services. But exits from manufacturing to other sectors were also sometimes associated with an improved likelihood of exiting low earnings status, perhaps because of training obtained there.

Finally, the person fixed effects have strong positive effects on earnings growth and negative effects on the probabilities of having low earnings, even though we also control for initial earnings levels. Inclusion of these person effects generally reduces in magnitude but does not eliminate the effects of changes in firm characteristics. However, these results raise the important possibility that firm and person effects interact in generating movements in earnings over time, which we will explore further in our subsequent work.

### Conclusion

In this paper, we have used a unique longitudinal dataset based on all workers in the state of Illinois in the 1990s to analyze the extent to which escape from or entry into low-earning status among adult workers is associated with changes in employers and their characteristics. The results show the following:

(1) *There was considerable mobility into and out of low-earning employment status.* A large fraction of adults who had very low earnings over lengthy periods of time (that is, for at least three years) managed to escape this status. This was true among men as well as women and among those who were both older and younger than age 35. However,

a small group of workers who were not initially low-earning entered this status as well, regardless of their demographics.

(2) *About half of those workers who either escaped from or entered into low-earning status across three-year periods changed their primary employers.* This rate of employer change was twice as high as occurred among those with no change in their low-earning status. Thus, mobility across employers was an important source of earnings changes for workers, in both the positive and negative directions.

(3) *While personal characteristics were strongly associated with the tendency of workers to ever have low-earnings status, changes in employer characteristics were also important determinants of changes in earnings status for initially low earners.* Specifically, changes in the firm fixed effect for any worker—as well as changes in more easily observable characteristics such as size, turnover, and industry—were important determinants of the ability of workers who were initially low earners to escape this status in the labor market.

Taken together, these results suggest that the process by which low-wage workers are matched to employers could have large effects on their relative success in the labor market. Likewise, our ability to help match these workers to particular employers could have important effects on the success of our employment and training policies for these groups, especially if we assume that some workers may face high costs or various barriers (transportation costs, limited information and “contacts,” employer discrimination, and so on) that limit their access to the better jobs (Holzer 1996).<sup>25</sup> A worker who initially works for a low-wage employer might ultimately succeed by staying with this employer and accumulating tenure there, but a job change that entails a move to a higher-wage employer might

<sup>25</sup>In other words, low-wage workers may not be optimally self-selecting into the right “matches” with employers, or they may be optimizing under fairly serious constraints in the “matching” process.

considerably enhance that worker's prospects for success.

Of course, this analysis remains fairly exploratory. A good deal more work needs to be done, defining the exact characteristics of employers more carefully and the "pathways" by which workers escape low-earning status more clearly. Are some employers, such as "temp" agencies, associated more frequently than others with transitions to higher-wage employment? What are the detailed industries to which many workers switch when they leave low-wage

jobs in retail trade and other sectors? Which workers are most likely to make these changes? Our multivariate analysis must also more carefully distinguish between the returns to tenure within a firm and mobility across firms, as well as between the returns to a variety of personal characteristics.

At least for now, the descriptive data strongly suggest that employer characteristics and their changes, and the "matching" process more broadly, are important determinants of success for initially low-earning workers.

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