Institute for Research on Poverty
Discussion Paper no. 1269-03

Escaping Low Earnings: The Role of Employer Characteristics and Changes

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July 2003

This document reports the results of research and analysis undertaken by the U.S. Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This document is released to inform interested parties of ongoing research and to encourage discussion of work in progress. This research is a part of the U.S. Census Bureau's Longitudinal Employer-Household Dynamics Program (LEHD), which is partially supported by the National Science Foundation Grant SES-9978093 to Cornell University (Cornell Institute for Social and Economic Research), the National Institute on Aging, and the Alfred P. Sloan Foundation. The views expressed herein are attributable only to the author(s) and do not represent the views of the U.S. Census Bureau, its program sponsors or data providers. Some or all of the data used in this paper are confidential data from the LEHD Program. The U.S. Census Bureau is preparing to support external researchers' use of these data; please contact U.S. Census Bureau, LEHD Program, Demographic Surveys Division, FOB 3, Room 2138, 4700 Silver Hill Rd., Suitland, MD 20233, USA. The research was also funded by grants from the Russell Sage and Rockefeller Foundations and the Employment and Training Administration. We are grateful to Henry Jackson and George Putnam of the Illinois Department of Employment Security, and also to the editor and two referees at the ILRR, for their helpful comments.

Abstract

In this paper, we analyze the extent to which escape from or entry into low earnings among adult workers is associated with changes in their employers and firm characteristics. We do so using a unique dataset based on individual Unemployment Insurance wage records that are matched to other Census data. Our results show considerable mobility into and out of low earnings status, even for adults. They indicate that job changes are an important part of the process by which workers escape or enter low-wage status, and that changes in employer characteristics help to account for these changes. Matches between personal and firm characteristics also contribute to observed earning outcomes.

Escaping Low Earnings: The Role of Employer Characteristics and Changes

As welfare reform has been implemented throughout the United States in the late 1990s, millions of low-wage female workers have entered the labor market. Although their ability to find and retain employment has been higher than initially thought, concern remains about the levels of wages and benefits that they earn and their potential for earnings growth over time (e.g., 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.

Yet some fundamental questions remain about workers in low-wage labor markets in the 1990s and beyond. Among these questions are:

- 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?

This paper presents evidence on low-wage workers and their jobs and earnings from an important new source: data from the Longitudinal Employer-Household Dynamics program (LEHD) currently being compiled at the U.S. Census Bureau. The data from this program match 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, how these attachments change over time, and a few of the implications of these dynamics for workers and their ability to escape low earnings. Definitive answers are deferred to future research. We hope that what we generate here will provide the basis for additional analyses of these issues in other places and much more specific groups, especially once the data have been more completely matched to survey data on employers and households.

RESULTS FROM PREVIOUS RESEARCH

Earnings growth among workers who initially have low wages can occur through at least two different mechanisms. They 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.[1] An individual's choice across these alternative paths will depend not only on his/her own skills and preferences, but also on the attractiveness of his/her current employer (relative to other potential employers in the labor market) and on the quality of the match between the two. When the worker's skills or job performance are particularly weak or the match with the employer is especially poor, (s)he may be involuntarily terminated from the current job and forced to seek new employment, regardless of the attractiveness of that job and other opportunities.

[1] Large literatures on both topics can be found within labor economics, though relatively little of these literatures focuses 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, while Farber (2000) provides a more recent review of literature on turnover and mobility across jobs.

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, independent 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.[2]

What has the empirical evidence shown 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). For instance, 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.[3] 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 analyze employment and dynamics for detailed groups of low-wage workers, particularly adults. Furthermore, many of the data are from the 1980s, though low-wage labor markets have likely evolved a good deal since that time.

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[2]This tradition includes the "dual labor markets" literature of the 1970s (e.g., Doeringer and Piore, 1971) as well as the "efficiency wage" literature of the 1980s (e.g., Katz, 1987).

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

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 (e.g., Bishop, 1993; Holzer, 1996) and on the role of employers in the wage-determination process (Katz, 1987; Groshen, 1991). These papers have often used data from particular surveys of employers and/or matched data on employers and some of their employees. But the samples used in this body of work have generally been fairly small, often limited to particular firms or sectors of the workforce, and they are mostly cross-sectional in nature—all of which has limited the extent to which we can learn about the dynamics of employment and earnings growth for low-wage workers from these studies.

In recent years, a new body of literature has arisen that uses matched employer-employee data with large samples, many of which are longitudinal in nature.[4] 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 provides considerably more understanding of the sources of earnings variation. Regressions using worker based datasets typically explain less than 30 percent of earnings variation, but the incorporation of such controls increases the proportion explained to as much as 90 percent (Abowd et al., 2003)—with firm-specific factors explaining about half of the variation. The new data also permit new insights into our understanding of the effects of key measures on earnings. For example, while a standard regression might suggest that the return to 10 years experience is about 47 percent for men, this changes to 99 percent 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.

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[4]For a recent collection of these studies see Haltiwanger et al. (2000). The literature on matched employer-employee data is reviewed by Abowd and Kramarz (1999).

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, together with employer and worker characteristics. This database consists of quarterly establishment records of the employment and earnings of almost all individuals who worked in the state of Illinois from the first quarter of 1990 to the third quarter of 1998. These types of data 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: 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 a great deal of accuracy. The Unemployment Insurance records have also been matched to internal administrative records that have information on date of birth, place of birth, 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 data on family characteristics and/or worker skills.

However, the latter drawback is substantially mitigated by our ability to estimate individual *worker* and *firm fixed effects* for all individuals and employers in the data. Essentially, these effects are drawn from a regression of ln(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.[5] The coefficients on these respective dummy variables are then appended to the data and used as independent variables in our analysis below on a subset of these data.

The interpretation of the fixed effects 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.[6] Of course, the estimation of these parameters must rely on certain assumptions that are frequently made in the empirical literature using panel data.[7]

Results presented below are based on a 5 percent random sample of wage records for the state of Illinois between 1990 and 1995.[8] 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 workforce—which we define as showing some employment in at least two quarters for each calendar year. Thus, students and other young

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[5]See Abowd, Lengermann, and McKinney (2003) and Abowd, Creecy, and Kramarz (2002) for a full description of the estimation technique. The regressions included controls for year and for each individual's previous work experience. The person fixed effects are also decomposed into linear components that are based on observable characteristics (such as age, gender, and race) plus a constant term; the latter can be interpreted as the fixed effect adjusted for these person characteristics.

[6]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/outsiders" (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, etc.—or that the incumbent workers have the power to block the entry of potential workers into these firms.

[7]Specifically, the fixed person and firm effects are identified only from individuals who change firms over time. This assumes that such turnover is exogenous with respect to earnings levels. See Wooldridge (2002) for a discussion of these issues. Also, the estimation of both worker and firm fixed effects implies that the latter can be cleanly separated from the former, though 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 contributes to their estimated person effect or the firm effect observed for a subsequent employer.

[8]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).

people with low attachment to the workforce 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 at this point, 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 voluntarily (such as 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 3 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.[9] Either way, robustness checks that we have done indicate that our qualitative findings below are not sensitive to the exact level at which we define low earnings.[10]

To define the extent to which these low-wage workers "escape" their poverty status in the labor market, we begin by categorizing workers by low-earning status in the period 1990–92, and then consider their status again in the period 1993–95 (though we do not present any analysis of the last period in this

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[9]For instance, even with this sample we find that roughly 40 percent of our low earners have had at least some postsecondary education, and over 10 percent are college graduates. Educational attainment among low earners is relatively high for white women, consistent with the notion that some are in two-earner families and choosing part-time work for family reasons. But the fractions of low earners who have attained some higher education rise considerably with higher cutoff levels for such earnings.

[10]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.

paper). 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 3-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 3-year period is the one that is dominant over the most quarters during that period.[11]

Thus, each worker will have one dominant employer for each 3-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 3-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 (i.e., "younger" adults who are 25–34 versus those who are 35 and above), race, and an imputed education measure.[12]

Thus, we are able to calculate transition rates into and out of low-earning status for various demographic groups, the characteristics of low-earning 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 as

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[11]In our longer report (Andersson, Holzer, and Lane, 2002), we pool all person-quarters of data and analyze the effects of firm characteristics and mobility on earnings using all employers, rather than those who are "dominant" in any 3-year period. The qualitative results presented here are found there as well.

[12]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.

we attempt to disentangle the effects of people and their characteristics from those of the jobs that they hold on their employment outcomes.

EMPIRICAL RESULTS

Transitions from Low-Earnings Status and Job Changes

We begin in part 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 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 3-year periods. Results are presented for the overall sample and then separately by gender and age group (i.e., 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 are not low-earning in either period. In fact, the overall percentages of low earners are just 5 percent in 1990-92 and 3 percent in 1993-95. But *transition rates out of low-earning status are fairly high*. Of those who were low-wage in the initial period, over half (i.e., the 3 percent in the third row versus the 2 percent in the bottom row of the last column) manage to escape this status in the second period. On the other hand, a relatively small percentage (2 percent) of those who were not low-wage initially fall 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—e.g., 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

TABLE 1
Low-Earning Status and Job Mobility 1990–1992 and 1993–1995

	Male	Female	Young	Old	Total
A. Mobility Into and Out of Low-Earning Employment					
Total	1.00	1.00	1.00	1.00	1.00
Not low-earning in either period	.98	.89	.94	.93	.94
Low-earning earlier not later	.01	.05	.03	.03	.03
Low-earning later not earlier	.01	.03	.02	.02	.02
Low-earning both periods	.00	.03	.01	.02	.02
B. Job Changing by Low-Earning Employment					
Not low-earning in either period	.26	.26	.33	.22	.26
Low-earning earlier not later	.59	.44	.58	.41	.47
Low-earning later not earlier	.52	.44	.53	.41	.46
Low-earning both periods	.25	.25	.37	.21	.25
Total	.28	.27	.34	.23	.27

Note: All estimated results are based on a 5 percent sample of data from the state of Illinois in the period 1990–95. "Low earnings" are defined as earning less than $12,000 per year (in 1999 dollars) for at least three consecutive years. The columns in part A are distributions of workers in each demographic group across low-earning categories (and therefore add up to 100 percent), while those in part B indicate the percentages of those in each category that have changed their primary employers across the two 3-year periods.

potential definitions of transitions, as well as the results of the next table, indicate that most of those escaping poverty status by our definition are indeed achieving substantial wage gains.[13]

Comparing across demographic groups, we find that women 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. Furthermore, over half of those who are initially in low-earning status make a transition out of that status within each demographic group. Furthermore, the fraction of men who are low-earning in both periods is extremely small.

Part 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 or age group. The results indicate that about a fourth of all workers changed their dominant employer across this 3-year period. This implies a transition rate of under 10 percent each year, which is a good deal lower than what we find in the broader literature (e.g., Anderson and Meyer, 1994; Lane, 2000), but which likely reflects the particular sample of workers on whom we focus and the definition of employer change that we use here.[14]

But, for those who are either escaping low-earning status or entering into it, the likelihood of changing dominant employer is roughly twice as large as for those who maintain either their poor or nonpoor status. In other words, *changes in employers are associated with almost half of all transitions out of or into low-earning employment status*. Thus, employer changes are more likely to be associated with major positive and major negative changes in earnings status than is continuity with the same employer.

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[13]In tabulations not presented here, a majority of those escaping the category of persistently low earnings make at least $15,000 in at least one of the three years considered, though only a small fraction (about one-eighth) earn 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.

[14]In particular, the omission of younger and marginally attached workers from our sample no doubt reduces the turnover rate substantially, as does our focus on permanent separations that exclude temporary layoffs, etc.

In this case, using more stringent definitions of transitions out of poverty tends to strengthen this finding.[15]

And, while younger workers have higher rates of employer change than older workers both overall and within these categories, the same general pattern holds for all demographic groups considered here. The results are thus consistent with those of 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 are 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 has changed employer. We focus on averages per quarter rather than total earnings per year or period, since quarters of employment change little across periods for most of these workers.[16] For each variable, we present mean and median earnings, as well as earnings at the 25th and 75th percentiles.[17] Then, separately by gender and age group, we present median earnings and changes as well in Table 3.

The results indicate that earnings levels are generally lower among those workers that tend 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*

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[15]For instance, job changes are associated with about 70 percent of the cases where consistently low-wage workers in the early period earn above $15,000 for one or more years in the later period.

[16]Median quarters of employment are 11 for job-changers and 12 for nonchangers in the period 1990–92, and they are 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 they appear with any employer during that quarter.

[17]Means have been calculated for samples that omit both the top and bottom 1 percent 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.

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

	Earnings 1990–92				Percent Changes between 1990–92 and 1993–95			
	Mean	Median	25th Percentile	75th Percentile	Mean	Median	25th Percentile	75th Percentile
Not low-earning either period								
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
Low-earning earlier not later								
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
Low-earning later not earlier								
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
Low-earning both periods								
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 3-year period. Percentage changes are defined as changes relative to the average earnings level in the initial 3-year period. Low-earning status and job-changing are defined as in the previous table.

Table 3
Median Earnings Levels by Gender or Age: 1990–1992

	Male	Female	Young	Older
Not low-earning in either period				
Job changers	8,265	5,407	6,273	7,333
Non-changers	10,485	6,607	7,688	9,112
Low-earning earlier not later				
Job changers	2,130	1,905	2,006	1,903
Non-changers	2,024	2,086	2,122	2,059
Low-earning later not earlier				
Job changers	3,622	2,940	2,972	3,115
Non-changers	2,593	2,130	2,252	2,185
Low-earning both periods				
Job changers	2,022	1,649	1,882	1,594
Non-changers	1,866	1,834	1,841	1,835
Median Earnings Changes by Gender or Age: 1993–1995 vs. 1990–1992				
Not low-earning in either period				
Job changers	.02	.03	.03	-.01
Non-changers	.04	.06	.07	.04
Low-earning earlier not later				
Job changers	.42	.35	.36	.39
Non-changers	.04	.10	.13	.03
Low-earning later not earlier				
Job changers	-.45	-.30	-.32	-.36
Non-changers	-.10	-.03	-.08	-.04
Low-earning both periods				
Job changers	-.04	.03	.03	.06
Non-changers	-.03	.04	.02	.03

those entering that status are much larger for job changers than for non-job changers.[18] The differences here are rather dramatic—e.g., median earnings rise by 37 percent among those who escape low-wage status by changing employers but only by 9 percent among those who do not change, while median earnings fall by 34 percent among those who fall into low-wage status by changing employers but only by 6 percent among those who do not. This pattern holds within each demographic group as well in Table 3.

Furthermore, even among those who remain in low earning or non-low earning status across periods, the variance in earnings changes associated with job changes appears to be much higher than that associated with no employer change. Thus, the gap in earnings changes between those at the 25th and 75th percentiles is higher among job changers than among nonchangers within each category defined by low-wage status and transitions into or out of it.

While voluntary job changes are the ones most likely to be associated with positive earnings changes, such turnover behavior is clearly endogenous with respect to alternative employment opportunities, which in turn depend on the employers to which workers have access. The changes in employer characteristics associated with these job changes, and how they are related to the characteristics of workers as well as to observed changes in employment outcomes, are analyzed 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. Part A of Table 4 presents data on worker gender, race, and education (imputed) across the four quartiles of the distribution of worker "fixed

[18]Standard errors on mean earnings changes in the fifth column of Table 2 for those who are changing jobs are roughly .02 among those escaping low-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.

TABLE 4
Person/Firm Characteristics and Matches between Them

A. Person Characteristics

Person Fixed Effects	Percent Female	Percent White	Years of Education
Quartile 1	.51	.69	12.13
Quartile 2	.47	.74	12.77
Quartile 3	.45	.80	13.58
Quartile 4	.41	.86	14.66
Adjusted Fixed Effects			
Quartile 1	.48	.75	12.98
Quartile 2	.46	.75	13.05
Quartile 3	.46	.75	13.23
Quartile 4	.45	.82	13.57

B. Firm Characteristics

Firm Fixed Effects	Average Size	Turnover Rate	Industry: Manufacturing	Retail	Service
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

C. Person-Firm Matches

Firm Fixed Effects	Average Person Fixed Effects	Average Adjusted Fixed Effects	Percent Female	Percent White	Years of Education
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: Part 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. Part B presents average size, turnover rates, and major industry groupings for each quartile of the distribution of firm fixed effects. Part 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.

effects," both overall and adjusted for these observable worker traits.[19] Similarly, Part 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 Part C we present worker characteristics across the four quartiles of the firm fixed effects distribution, to illustrate something about the nature of the "matching" that occurs in the labor market between workers and firms.

The results of Part A of Table 4 indicate that females, nonwhites and the less-educated are more heavily concentrated among those with lower personal fixed effects than are males, whites, and more-educated workers. Of course, it is no surprise that these groups persistently earn less in the labor market, due to differences in skills and/or discrimination across groups. 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 Part B, we similarly note that certain characteristics of employers are associated with permanent tendencies to pay more to workers there. In particular, large firms, those with low turnover, and those in manufacturing pay 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 (e.g., Brown, Medoff, and Hamilton, 1990; Parsons, 1986; Katz, 1987). But, since these characteristics are correlated with firm effects in equations that controlled 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 Part C indicate that females, nonwhites, the less-educated, and others with permanently low earnings are also matched to firms that permanently pay less than others—in other words, *workers with strong/weak fixed effects are matched to firms with similarly strong/weak effects*.

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[19]As noted above (footnote 5), the person fixed effects have been decomposed econometrically into those that are based on observable characteristics and those that are not. The latter is considered the "adjusted" fixed effect here.

Thus, the characteristics of the workers themselves contribute to their low earnings, but so do those of the employers for whom they work. This positive correlation between worker and firm characteristics reflects an outcome of the "matching" process in labor markets that certainly needs further exploration.

Although workers with low fixed effects tend to be matched in the labor market to firms with low effects, these workers sometimes change employers in ways that improve the quality of the firms to which they are matched and thus their own employment outcomes. In Tables 5 through 7 we consider the characteristics of employers (and, to a much lesser extent, those of workers) that are 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 the individual changed his/her dominant employer. For those who have not changed employers (Part A of the table), one listing of industries appears; for those who have changed (Part B of the table), we present their industry both in 1990–92 and 1993–95. Similarly, Table 6 presents data on the sizes and turnover rates of their employers by similar breakdowns, and Table 7 presents personal and firm fixed effects. As the personal 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 of 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 are 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 other workers, while they are less likely to be found in construction, manufacturing, utilities, and wholesale trade. Indeed, the strongest differences appear between those who are never low-wage and those who are low-wage in at least one period, even if they subsequently escape this status; this suggests that the personal characteristics of these workers might have strong effects on the industries in which they gain employment.

On the other hand, comparisons of industries of workers who change their dominant employers in Part B of the table show some striking differences in industries for the same people, particularly if they

TABLE 5
Distribution of Workers Across Industries By Low-Earning Status and Job Mobility: 1990–1992 and 1993–1995

A. Job Changers

	Not Low-Earning in Either Period		Low-Earning Earlier Not Later		Low-Earning Later Not Earlier		Low-Earning Both Periods	
Industry	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95
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

(table continues)

TABLE 5, continued

B. Non-Changers

Industry	Not Low-Earning in Either Period	Low-Earning Earlier Not Later	Low-Earning Later Not Earlier	Low-Earning Both Periods
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 3-year period. Columns add up to 100 percent 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 Part B have the same dominant employers in each of the two periods, only one set of results is presented.

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

A. Job Changers

	Not Low-Earning in Either Period		Low-Earning Earlier Not Later		Low-Earning Later Not Earlier		Low-Earning Both Periods	
	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95
Average firm size	173	170	153	159	172	138	124	107
Average turnover rate	.297	.283	.391	.353	.363	.380	.408	.394

B. Non-Changers

	Not Low-Earning in Either Period	Low-Earning Earlier Not Later	Low-Earning Later Not Earlier	Low-Earning Both Periods
Average firm size	463	170	131	116
Average turnover rate	.214	.318	.325	.295

TABLE 7
Average Person and Firm Fixed Effects: By Low-Earning Status and Job Mobility of Workers

A. Job Changers

	Not Low-Earning in Either Period		Low-Earning Earlier Not Later		Low-Earning Later Not Earlier		Low-Earning Both Periods	
	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95	1990–92	1993–95
Person fixed effects								
Total	-.05	-	-.19	-	-.16	-	-.22	-
Adjusted	-.11	-	-.68	-	-.73	-	-.89	-
Firm fixed effects	.06	.04	-.36	-.24	-.15	-.37	-.43	-

B. Non-Changers

	Not Low-Earning in Either Period	Low-Earning Earlier Not Later	Low-Earning Later Not Earlier	Low-Earning Both Periods
Person fixed effects				
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.

escape or enter low-earning status. For instance, workers who were low-earning in the earlier period but not in the later period clearly gain employment in manufacturing and some of the services (notably health 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, and recreation). For the most part, the opposite is true for those who enter low-wage status in the later period. Thus, industry changes appear to be strongly related to changes in earnings status, even for the same individuals, consistent with some earlier evidence on industry differences in earnings (e.g., Krueger and Summers, 1987).

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

In Table 7, we find large differences in personal fixed effects between those who are never low-earning and those who are 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 do not change jobs, which seems to confirm the tendency of workers with strong personal characteristics to be matched to better jobs and employers in the labor market. On the other hand, firm effects clearly improve for those individuals who manage to escape low-earnings status by changing jobs, while they deteriorate for those who enter this status because of a job change.

Clearly, then, the characteristics of the firms to which workers are matched have some independent effects on their ability to escape low-earnings status, in addition to their own personal attributes. A greater 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 the following:

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

where i denotes the individual worker and j denotes the firm; EARN refers to average quarterly earnings with the dominant employer; and X and Z refer to labor market characteristics of workers and firms 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.[20] We include specifications where only the former is included as well as some where the others are included as well.[21] Then, in the final specification, we add a person-specific effect to the model 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

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[20]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.

[21]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.

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

	(1)	(2)	(3)	(4)
Change in:				
Firm fixed effects	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)**
Industry Status				
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^2	0.05	0.05	0.05	.09

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

earnings over time vary with the *levels* of personal characteristics, even when the latter are fixed in nature.[22]

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 significant effects of the anticipated sign on earnings changes. Controlling for these, changes in industry effects are also quite important, with those 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 the following equation:

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

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.

Though similar to the "first differences" model for the log of earnings, this one estimates the likelihood that an individual whose earnings are initially low ends up in the categories 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/her firm characteristics, between the current period and the previous one, and the level of earnings achieved in the earlier period.[23] As before, firm changes are captured in fixed effects and sometimes in other observable firm characteristics as well, and one specification also allows for the level of person fixed effects to influence this outcome.

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[22]The standard "first differences" 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.

[23]This specification is based on the notion that Pr(EARNt>12) = Pr(EARNt–EARNt-1 >12-EARNt-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.

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

	(1)	(2)	(3)	(4)
Change in:				
Firm fixed effects	-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)
Industry Status				
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^2	.01	.03	.03	.07

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

The results of Table 9 are generally consistent with those of Table 8—particularly the strong impact of the firm fixed effect on moving out of low-wage status. The firm size and turnover effects are counterintuitive in this specification but not significant. Industry changes remain important—in general, changing industries results in a lower probability of remaining in low-wage status (recall that most low-wage workers are concentrated in low-wage industries). The two exceptions to this are noteworthy because they highlight the different paths to success in different industries. If the low-wage worker starts off in retail trade/services and stays, (s)he is more likely to remain low-wage. Conversely, if the low-wage worker starts in manufacturing and stays there, (s)he is likely to be able to exit—suggesting that career ladders are prevalent in the manufacturing sector, but not in retail trade/services.

Finally, the inclusion of personal fixed effects has strong positive effects on earnings growth and negative effects on the probabilities of having low earnings, regardless of initial status. 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 use a unique longitudinal dataset based on all workers in the state of Illinois in the 1990s, and we 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:

- *There is considerable mobility into and out of low-earning employment status*. A large fraction of adults who have very low earnings over lengthy periods of time (at least 3 years) manage to escape this status. This is true among men as well as women and among those who are older or younger than 35. However, a small group of workers who are not low-earning initially will enter this status as well, regardless of their demographics.

- *About half of those workers who either escape or enter into low-earning status across 3-year periods change their primary employers*. This rate of employer change is twice as high as occurs among those with no change in their low-earning status. Thus, mobility across employers is an important source of earnings changes for workers, in either the positive or negative directions.
- *Personal characteristics are strongly associated with the tendency of workers to ever have low-earnings status, but changes in employer characteristics are 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—are important determinants of the ability of 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 (such as transportation costs, limited information and "contacts," employer discrimination, etc.) that limit their access to the better jobs (Holzer, 1996).[24] 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 considerably enhance his/her 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. Do some employers, such as "temp" agencies, result in transitions to higher-wage employment more frequently than do others? What are the detailed industries to which

[24]In other words, low-wage workers may not be optimally self-selecting into the right employer matches, or they may be optimizing under fairly serious constraints in the "matching" process.

many workers switch when they leave retail trade and other low-wage establishments? 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 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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