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Working Paper 2004-19
August 2004

WORKING PAPER SERIES

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Abstract: This paper uses unique employer-employee matched administrative data files to determine that firm and industry employment dynamics play significant roles in the earnings gains of workers who change jobs and in different ways across the business cycle. Among the more notable results is the finding that job-changers who leave a firm that is shutting down experience a greater earnings loss than job-changers who leave a firm that is merely contracting. In addition, the earnings loss from changing industries where firm-specific human capital is likely to be important has the potential of creating a much greater barrier to labor mobility during recessionary times than during an expansion.

JEL classification: J23, E32, J21

Key words: labor mobility, industry dynamics, administrative data

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The authors gratefully acknowledge Sarah Dougherty. They also thank Mary Daly, Joshua Pinkston, and Madeline Zavodny for helpful comments. The views expressed here are the authors' and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. Any remaining errors are the authors' responsibility.

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Wage Gains Among Job Changers Across the Business Cycle: Insight from State Administrative Data

I. Introduction and Background

The mobility of workers is crucial for a flexible, functioning, competitive labor market to clear surpluses and shortages created by macroeconomic demand and supply fluctuations (e.g., see McLaughlin 1991). Ultimately, the impact of such market clearing activity on individual worker welfare has a lot to do with how such moves impact individual earnings. Whether earnings suffer or get a boost from job changes typically depends on the reason for such a move. Voluntary job changes (e.g., resulting from the presence of excess demand) typically lead to increases in earnings as an individual seeks to reap the returns to the cost of such a move (e.g., Topel and Ward 1992). Job changes resulting from worker displacement (i.e., involuntary job changes) typically result in earnings losses as workers scramble to find new employment; and these earnings losses have been found to persist over time (e.g., Ruhm 1991, Jacobson et al. 1993, Stevens 1995, and LeFranc 2003).

The purpose of this paper is to explore the role that individual, firm, and industry characteristics play in earnings gains and losses that result from workers changing employers during an expansion and a recession, and to determine whether the mechanisms that lead to earnings gains/losses differ across the business cycle. The results indicate that the dynamics of the firm and the industry play significant roles in the earnings gains experienced by workers, and often in different ways over an expansion and a recession. We learn that the experience of job changers across the business cycle can be affected by characteristics of the economic environment in ways that would not be apparent by merely controlling for macroeconomic indicators, such as the unemployment rate.

A. Impact of Job Changes on Earnings Growth

The bulk of the literature that examines the impact of job mobility on earnings focuses on the characteristics of the worker and how these characteristics affect the decision to change jobs and the impact the change has on earnings. Human capital theory has two main predictions regarding worker mobility and earnings gains. First, as a theory of individual investment, it predicts that an individual will not undertake a job change (an activity that entails a significant cost) unless the returns from that activity (in the form of higher earnings on the new job) exceed the costs. Topel and Ward (1992: 439) find that, "wage gains at job changes account for at least a third of early-career wage growth, and the wage is the key determinant of job changing decisions among young workers."[1] Second, both the employer's and worker's investments in firm-specific human capital explain why mobility among workers declines with job tenure. The longer a worker stays with a given employer, the more likely that worker will have accumulated a significant amount of *firm-specific* human capital. The net result is that the worker's productivity (thus earnings) with the current employer is greater than with any other employer, increasing the cost of a job change for both the worker and the employer. Topel (1991) finds a significant negative relationship between job turnover and job tenure.[2]

The productivity (thus earnings) gains from investments in firm-specific human capital can also result in more severe earnings losses when job changes are involuntary. Earnings of workers in industries with greater investments in firm-specific human capital will suffer more in the event of an involuntary job change (through plant closures or employment contractions, for example) than the earnings of workers in industries that do not require as much firm-specific

[1] Also see Antel (1991) and Blau and Kahn (1981). Neumark (2002) provides more recent evidence that job *stability* (not changing jobs often) among young workers has positive long-term implications for earnings later in life.
[2] Also see Mincer and Jovanovic (1981), Borjas and Rosen (1980), and Mincer (1986, 1988).

human capital investments (e.g., see Weinberg 2001 and Neal 1995). The earnings of workers in jobs/industries with greater amounts of firm-specific human capital investments are starting from a higher level from which to fall when the worker is forced to find new employment.

B. Differences Across the Business Cycle

The relative importance of the various theories in directing a worker's decision to change employers and the impact that change is expected to have on earnings likely depend on the relative strength of the labor market. During expansionary times, the labor market becomes tighter and the cost of making a voluntary change (e.g., as a human capital investment) becomes smaller as the probability of finding a new job is higher. We should, therefore, see more voluntary job changing, and thus greater wage gains, across an expansionary period than across a recessionary period. This will show up in the role that expected earnings gains plays in the decision to change jobs. During a recession, factors other than earnings enhancements (such as layoffs) are often more prominent determinants of whether someone changes employers. During an expansion, expected earnings gains likely play a more dominant role in that decision.

A tight labor market will also diminish potential negative influences of unattractive characteristics. For example, the amount of time a worker spends in unemployment might typically be interpreted as a signal of lower productivity. This would make it difficult for someone with more unemployment to find a higher paying job than the one he/she left. During a tight labor market, the potential negative impact of greater unemployment experience is likely diminished due to the high demand for labor.

For similar reasons, we might expect to see the impact of industry-specific human capital on earnings losses as workers change industry to be diminished during an expansion. Again, the strength in demand for workers means that a worker has more options for enhancing earnings

from a job change without being confined to searching for another job in the industry in which he/she was originally employed.

C. The Role of Firm and Industry Dynamics

One aspect of the job-changer's earnings experience that has not received much attention is the environment that describes the economic condition of the old and new employer and of the old and new industry. In other words, what can we predict about a job-changer's potential earnings gain or loss based on what we know about where the worker comes from and where the worker ends up? We know that a worker who originates in a secularly declining industry is more likely to change jobs involuntarily, and is thus more likely to suffer an earnings loss with the job change. However, it may make a difference whether a worker's firm is shutting down or merely contracting (laying off workers), as well as the rate at which firms in the worker's industry are shutting down, contracting, or expanding. It is also likely that the potential negative impact on earnings of more firms contracting in an industry will be muted during an expansionary period when a worker's options (even for an involuntary separator) are greater as the result of greater overall demand for labor.

Holzer et al. (2004) find that firm characteristics can play a significant role in workers' earnings determination, but how this role may vary across the business cycle or how it compares with the importance of industry characteristics have not been addressed in the literature. This paper makes use of longitudinal state administrative data to characterize firm and industry dynamics and merges those dynamics with longitudinal state administrative worker files from which one can trace earnings gains and losses from job changes over time. These unique data allow for the analysis of wage gains among job changers and for the identification of some specific macroeconomic, industry, firm, and individual determinants of those gains.

II. The Data

The two data sources used for the analysis come from state administrative data collected by the Georgia Department of Labor for the purposes of administering the state's Unemployment Insurance (UI) program. The Individual Wage file contains information on a worker's quarterly earnings. Regrettably, the file contains no additional information about the worker's demographics (e.g., education, gender, race) or about the worker's job (e.g., hours of work, weeks of work). However, the worker's earnings can be tracked over time and linked to an employer file through a worker ID number.[3] These data are highly confidential and strictly limited in their distribution.

The employer file contains records on all UI-covered firms and includes quarterly information on the firm's level of employment and wages (total payroll) for the quarter, as well as the firm's NAICS classification.[4] The firm can also be tracked over time with the use of a unique firm identifier. Changes in the firm's ownership (for single-establishment firms) can also be identified through time, as well as declines in the number of establishments that comprises a firm (for multi-establishment firms). The longitudinal nature of these firm records allows one to calculate some unique dynamics that are typically not available for analyses of worker mobility. Having a history of reporting activity for each firm allows us to determine whether a firm has

[3] See Haltiwanger et al. (1999) for a collection of studies using these and other employer-employee matched data sets.

[4] White et al. (1990) provide an extensive discussion about the use of these employment data, commonly referred to as the ES202 file. These are the UI data being used by the BLS to construct their Business Employment Dynamics data file introduced at a BLS briefing 30 September 2003 (NEWS 2003).

just been born (started business), expanded employment over the previous year, has contracted employment over the previous year, or is in the process of dying (i.e., shutting down).[5]

In addition to firm dynamics, the dynamics of the worker's industry are also calculated. For example, by aggregating the firm experience to the industry level, we can determine the percent of firms in the individual worker's industry that are being born, expanding, contracting, and dying. We can also determine whether the firm is large or small relative to other firm sizes in the industry, and whether the firm has high-paid or low-paid workers relative to the industry. Since all workers can be linked to their employer, we can also calculate whether the worker is a relatively high-paid or low-paid worker in that firm; this gives us a crude measure of the worker's relative human capital (both general and firm-specific combined).[6]

Because of the lower UI coverage in the agriculture industry, workers in agriculture are excluded from the analysis. In addition, since government workers have been found to be quite distinct from private workers in their rates of pay, turnover, and sensitivity to economic conditions (for example, see McConnell et al. 2003, Ch. 12), they are also excluded from the analysis. Sample statistics are discussed in the next section.

[5] While the nature of the present analysis requires a slightly different definition in timing, detailed information about how these firm dynamics are calculated can be found in Hotchkiss et al. (2003). Also see Spletzer (2000). The concepts of firm dynamics are defined in the next section.

[6] While each firm is required to report employment and wages paid at the establishment level, each worker can only be linked to the firm, so employment and payroll information at the establishment level is aggregated (for multi-establishment firms) to construct a firm-level record that is then linked to each of the firm's workers.

III. Empirical Specification

A. Timing and Other Data Restrictions

We examine three time periods: an early expansionary period (1996-1999), a later expansionary period (1997-2000), and a recessionary period (2000-2003). Since the focus of the analysis in this paper is on workers who change employers, individuals are only included in the sample if they are employed both at the beginning and at the end of each time period (they need not be employed during multiple time periods, however). It is also possible for workers to be employed at more than one job during any particular quarter. This employment could happen sequentially or simultaneously during the quarter. Since we have no way of distinguishing sequential from simultaneous multiple employment, we restrict workers to only one employer during a quarter and extract the information that pertains to the employer from whom the worker received his/her greatest amount of earnings during that quarter.

Also, since we have no indication of hours of work or even weeks of work during a particular quarter, it is important to compare "interior" quarters of earnings to calculate earnings growth. In other words, for a worker that is changing employers, we want to compare earnings with Employer A during a quarter sandwiched between two other quarters of employment by A to earnings with Employer B that falls between two other quarters of employment by B. Without taking this precaution, we could be comparing earnings during a quarter the worker changed jobs, so wasn't employed the full quarter by A, thus biasing the measured earnings from A downward.

In addition, we use the timing of the 2001 recession and availability of data to define the recessionary and expansionary time periods over which we compare earnings growth. Figure 1 illustrates how the time periods are defined for analysis. The recession includes quarters

2001Q1-2001Q4. We chose the beginning of the recessionary time period as four quarters before the recession (2000Q1) and the end as five quarters after the recession (2002Q1).[7] The employer identified in 2000Q1 is referred to as Employer A and the employer identified in 2003Q1 is referred to as Employer B. This resulted in comparing earnings for each worker 12 quarters apart. The expansionary period is defined as close to the recessionary period as possible, separating Employer A and Employer B by 12 quarters, and requiring the period to begin and end during the first quarter. The beginning of the early expansionary period is defined as 1996Q1 and the ending as 1999Q1. The later expansionary period begins in 1997Q1 and ends in 2000Q1.

[Figure 1 here]

This rigid sample construction has several implications. Firstly, the usual implications of requiring no missing data are more severe as the result of having to merge the administrative employment and wage data. If a firm doesn't report payroll one quarter, that firm has missing data and thus all the workers in that firm will be excluded from the analysis during that time period. Since smaller (and single-establishment) firms are more likely to not report in any quarter than larger (and multi-establishment) firms, there is a slight over-representation in this sample of larger and multi-establishment firms.[8] Secondly, the interior quarter comparisons essentially require that workers have spells of at least three months continuous employment at the beginning and at the end of the time periods. The implication of this restriction is that results

[7] To avoid having seasonality influence the earnings growth comparison from the beginning to the end of a time period, we compare earnings from the same quarter as equi-distant from the ends of the recession as possible. Quarter 1 in a year is typically identified as the most innocuous quarter for earnings or employment comparisons.

[8] Table A1 in the Appendix compares population and sample means for firms in 2000Q1. The means are reassuringly similar, differing the most on average employment and in the percent of single establishment firms that change owners.

are generalizable only to workers with fairly continuous attachment to the Georgia labor market.[9] The advantages of constructing the sample in this way include a well-defined period of comparability between the recessionary and expansionary time periods. In addition, by constructing a cross-section of workers with multiple observations, we are able to investigate the impact of activities (e.g., employment versus unemployment spells) between Employer A and Employer B on earnings growth.

For this time frame, 2000Q1, 1997Q1, and 1996Q1 will be the quarters from which we extract data corresponding to Employer A and 2003Q1, 2000Q1, and 1999Q1 will correspond to employment with Employer B. To be included in the analysis for each time period a worker must be employed both at the beginning and at the end of the time period. However, we do not require that a worker be present in more than one time period. The percentage change in earnings from the beginning to the end of each time period for person i, $\%\Delta E_i$, is calculated as follows:

$$\%\Delta E_i = \frac{(E_{iB} - E_{iA})}{0.5 * (E_{iB} + E_{iA})}, \quad (1)$$

where E_{iA} refers to the quarterly earnings of i at the beginning of the period (paid by Employer A) and E_{iB} refers to the quarterly earnings of i at the end of the period (paid by Employer B).

Table 1 reports sample averages for job-changers and non-changers by time period.[10] Consistent with job-matching theory, individuals that worked for a different employer at the end

[9] Roughly 80 percent of the workers with interior quarter earnings at the beginning of each time period are observed again with interior quarter earnings at the end of the time period. The restrictions placed on the sample construction affect the recessionary and expansionary samples similarly.

[10] All dollar values are deflated by the Atlanta MSA CPI and reflect 2003Q1 values. "Non-changers" means that a worker had the same employer at the beginning and ending of a time period. It is possible for these workers to have been laid off or to have changed jobs (and back again) some time during the period.

of each time period had lower quarterly earnings on average than those who do not change employers (i.e., workers with higher earnings are typically considered to have better employment matches and are thus less likely to separate from their employer – see row 2 of Table 1). Moreover, workers staying with the same employer had higher quarterly earnings relative to the firm average than did people who ended a sample period working for a different firm (see rows 4 and 5 of Table 1). Workers seem to move down in the earnings distributions of their firms even though, on average, they experienced an earnings gain. For instance, the average job-changer across the first sample period went from earning roughly 148 percent of the firm's average earnings to roughly 134 percent of the firm's average wage.[11]

[Table 1 here]

The higher relative earnings among workers staying with the same firm is also seen in the firm characteristics, where non-changers are found in higher-paying firms (within an industry) than job-changers, on average (i.e., the average relative earnings/worker is a higher percentage of the industry average earnings among non-changers at both the beginning and end of each sample period – see rows 13 and 18 of Table 1).

While job-changers overall experienced larger percentage wage gains than non-changers, workers changing jobs during the recessionary period experienced a smaller percentage wage gain than those who did so during the expansionary periods (see row 3 of Table 1). This likely reflects more involuntary job changing during the recessionary period. Surprisingly, job-changers in all time periods experienced about the same average amount of unemployment

[11] The averages of the relative measure of earnings across changers and non-changers does not equal to 100 percent because the denominators for those ratios are calculated using the full sample of observations rather than the selected sample used for the analysis. This will not affect interpretation of results as the relative positions of the observations are not affected by the denominator used as long as it is consistent within each firm or each industry.

between Employer A and Employer B, and the same number of different employers over the period (see rows 6 and 7 of Table 1).[12]

Job-changers were more likely to be found in smaller firms (firms that represented roughly 1.3 percent of the industry's total employment) than non-changers (found in firms that represented roughly 2.9 percent of their industry's employment). However, job-changers were more likely to come from (and go to) larger industries; roughly 6.5 percent of the state's total employment versus 6.0 percent of the state's employment represented by the industries of non-changers.

The employment dynamics of firms look remarkably similar across time periods, with more non-changers being employed in expanding firms (see row 11 of Table 1) and more job-changers ending up in expanding firms (see row 16 of Table 1). However, during the recessionary time period, there is a considerably smaller percentage of workers ending up in an expanding firm and a greater percentage that end up in a contracting firm. In addition, there is a greater incidence of firm births and deaths among job-changers than non-changers.[13]

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[12] "Unemployment" in this sample refers to a quarter in which a person does not show up as being paid by a Georgia firm. It is possible that during a quarter of "unemployment" the person was actually working outside the state of Georgia. In addition, these unemployment averages do not necessarily reflect the unemployment experience of all workers during the recession since individuals with longer than nine quarters of unemployment are excluded from the sample due to sample construction requirements. Nine quarters, however, would be an exceptionally long spell of unemployment, even across a recession. Unemployment spells among so-called "non-changers" also potentially reflect seasonal unemployment in jobs such as retail and construction and other factors such as re-tooling shut-downs at manufacturing plants. As a consequence, the term "non-changer" is not strictly accurate since the only requirement is that they end a sample period working for the same employer.

[13] An "expanding" firm is one whose employment in the quarter of interest is greater than its employment during the same quarter of the previous year. A "contracting" firm is one whose employment in the quarter of interest is less than its employment during the same quarter of the previous year. A firm is considered to be "dying" (to have shut down) if it has a quarter of positive employment followed by four consecutive quarters of zero employment. A firm is "just born" (newly opened) if it has a quarter of positive employment preceded by four consecutive

Fifty-nine percent of the job changers ended up in a new 1-digit SIC industry in all three time periods (see row 19 of Table 1). Job-changers from Manufacturing, Retail Trade, and Professional & Business Services were the most likely to end up in a new industry; these statistics are also almost identical across time periods. The general decline in Manufacturing employment and lack of specificity in training in Retail Trade and Other Services likely accounts for the larger number of industry switchers from these industries. Industry-level employment dynamics also look broadly similar across time periods for both job-changers and non-changers. We do observe some impact of the recessionary period with fewer firms expanding at the end of the recessionary period (see row 39 of Table 1).

B. The Model

The earnings growth a worker can expect to experience from changing jobs/employers ($\%\Delta E_i$) is a function of the worker's individual characteristics (X_i), characteristics of the current and new employer (Y_i), and characteristics of the current and new industry (Z_i). The wage growth is expressed as the following linear statistical relationship:[14]

$$\%\Delta E_i = \beta_0 + \beta_1 X_{iA} + \beta_2 X_{iB} + \beta_3 Y_{iA} + \beta_4 Y_{iB} + \beta_5 Z_{iA} + \beta_6 Z_{iB} + \varepsilon_i . \quad (2)$$

Of course finding one's self in the job-changer sample is not a random event, and is very likely a function of the growth in earnings one would expect from making such a change. In order for inferences from estimating equation (2) on a sub-sample of job-changers to be

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quarters of zero employment. Dummy variables for employment dynamic categories (expansion, contraction, dying, and just born) were used so as to capture the impact of the nature of a firm's employment change. a simple percentage change representation of employment could have been used, but would have been uninformative for newly born firms.

[14] An alternative strategy, given the range of the dependent variable, would be to perform a logistic transformation of the data and to estimate the relationships via nonlinear least squares. However, the parameter estimates from this linear specification were all reasonably scaled, suggesting out-of-sample predictions are not be a problem for reasonable values of the regressors.

generalizable to the employed population, the estimation must take into account a worker's propensity to be a job-changer. A person's unobserved inclination to change jobs can be expressed as a function of the expected wage gain and other regressors at the beginning of the time period that might affect the likelihood that a person changes employers (K_i):

$$I_i^* = \alpha_0 + \alpha_1 \%\Delta E_i + \alpha_2 K_i + \upsilon_i \,. \tag{3}$$

Since I_i^* is unobserved, an indicator function is defined as follows:

$$I_i = \begin{cases} 1 \text{ if } I_i^* > 0 \\ 0 \text{ otherwise} \end{cases}. \tag{4}$$

The strategy is to estimate a reduced-form version of equation (3) via a maximum-likelihood probit; calculate the inverse Mill's ratio that describes the probability of a worker changing jobs ($\hat{\lambda}_i = \phi(\hat{\alpha}'\Omega_i)/\Phi(\hat{\alpha}'\Omega_i)$), where ϕ is the standard normal density function, Φ is the standard normal cumulative distribution function, and Ω is the vector of regressors in both equation 2 and equation 3); include $\hat{\lambda}_i$ as an additional regressor in equation (2) which is then estimated on a sub-sample of job-changers only via Ordinary Least Squares (OLS). This is the standard Heckman correction for sample selection (see Greene 2000: 930).

The last stage of the analysis involves estimation of the structural rendition of equation (3). Using the parameter estimates obtained from estimating equation (2), an expected percentage change in earnings from changing jobs is calculated for every person in the data set (whether a job-changer or non-changer). (The average values of Employer B characteristics from the job-changers are used to calculate the wage change for non-changers.) Equation (3) is then estimated via a maximum-likelihood probit with particular attention being paid to the estimate of α_1. Human capital investment theory suggests that $\hat{\alpha}_1$ should be positive. We also

conjecture that the expected wage gain from changing jobs will play a larger role in that decision during expansionary times than during the recession.

IV. Estimation Results

A. The Percentage Change in Earnings

Table 2 presents the results from the second-stage estimation of equation (2) separately for the three time periods. Results from the first-stage, reduced-form estimation of equation (3) are contained in the Appendix.

Individual Characteristics. The larger one's earnings are at Employer A (relative to other workers at the same firm), the *smaller* will be the expected earnings gains, and the larger one's relative earnings are at Employer B, the *larger* will be the expected earnings gains. These effects would be anticipated if one considers the fact that coming from a job high in the earnings distribution increases the chances of ending up lower in the distribution in the new job (especially since some of the job changes are for involuntary reasons). In addition, ending up in the upper tail of the earnings distribution (with Employer B) means the worker is more likely to have come from a lower spot in the distribution and, thus, experience a larger earnings gain.

Across all time periods, spells of unemployment decreased earnings growth, but only by a slightly greater amount during the recession.[15] This provides only weak empirical support for the supposition that weak labor markets magnify the impact of potentially negative signals. The greater number of employers a job-changer had during the expansionary periods, however, did boost his/her earnings, whereas having multiple employers across the recession had no impact on earnings growth (although insignificantly different from zero, the coefficient on multiple

[15] This negative impact of unemployment is consistent with studies of post-displacement earnings (for example, see Neal 1995).

employers across the recession is even negative). These results provide evidence of greater voluntary changes during the expansionary periods, with workers being able to chase higher earnings from one employer to the next in a tight labor market.

[Table 2 here]

Firm Characteristics. The influence of Employer A and Employer B firm and industry characteristics on wage gains are remarkably similar in sign across all three time periods, although there are some notable differences in magnitude.[16] Leaving a firm within three years of its birth enhances earnings across all time periods (although insignificantly across the recession), which is consistent with new firms being less flush with resources to share with workers; new firms are typically particularly low-paying firms. It's also of interest to note that *going to* a contracting firm enhances earnings and *leaving* a contracting firm reduces earnings (during all periods). This is likely because leaving a contracting firm is more often for involuntary reasons and if a worker is being hired by a firm that is downsizing, it's more likely the worker brings a more highly valued set of skills than the workers being laid off. The greater earnings gain from joining a contracting firm could also be reflecting compensation to the worker for taking a job in a more risky economic environment. This effect is strongest across the recession where added economic uncertainty likely places additional pressure on the requirements of (or increases the risk for) a new hire joining a contracting firm.

The loss in earnings from leaving a contracting firm is magnified if the firm is shutting down (dying) as opposed to merely contracting. A firm that is shutting down affects workers across all earnings levels and may provide less notice or opportunity for workers to find alternative employment than workers leaving a contracting firm (where specific positions, rather

[16] The impact of firm characteristics found here are broadly consistent with Holzer et al. (2004) who find that changes in earnings are smaller for smaller firms and in firms with more turnover.

than all jobs, are being eliminated). The loss in earnings, therefore, will be greater when leaving a dying firm than leaving a contracting firm. This effect is consistent across all time periods.

Moving to (from) a relatively large firm increases (decreases) a worker's earnings, providing additional evidence of the already well-documented positive association between employer size and workers' pay (for example, see Groshen 1991, 2001; and Morissette 1993). The earnings loss experienced from leaving a larger firm (except during the early expansion where the effect is insignificantly different from zero) may also be indicative of the strength of internal labor markets within larger firms (Groshen and Levine 1998); the worker leaving a larger firm loses any seniority advantage and firm-specific human capital more likely to be accumulated by moving up the job ladder at the larger firm. This negative impact is much larger across the recession, which was a time period notorious for firms re-organizing by eliminating management positions.

Like the individual's relative earnings, leaving a high-paying firm (high-paying relative to the industry) reduces earnings gains and going to a relatively high-paying firm increases earnings gains. The magnitudes of the effects are similar across time periods.

Industry Characteristics. The impact of most of the industry characteristics on wage gains are quite similar in sign to the impact of those characteristics at the firm level. For instance, workers leaving an industry in which a greater percent of firms are being born at the beginning of the period increases wage gains; *going to* an industry in which a larger percentage of firms are new, however, decreases earnings gains. The fewer overall resources available for start-ups to share with workers is likely driving these results at both the firm and industry level. Also similar to the impact at the firm level, workers hired into industries with a large percentage of firms expanding (during all time periods) experience greater wage gains. This is presumably

because an expanding industry is putting upward pressure on wages as firms compete with workers. The wage gains are predictably larger during the expansionary periods than across the recession.

Leaving a contracting industry during the later expansion results in an earnings loss, while leaving a contracting industry across a recession results in an earnings gain (there is no impact in the early expansion). Leaving a firm (or industry with more firms) that is contracting may more likely happen as a result of involuntary action. Such an experience during an expansion may send a negative signal, whereas, across a recession such action may be viewed as a consequence of overall economic conditions rather than as a reflection of the individual worker's productivity, thus not negatively impact earnings. [17]

One notable deviation of the similarities in the impacts of firm and industry characteristics is found in the coefficients on the percent of firms that are contracting in the industry to where job-changers are going (Employer B). Whereas at the firm level being hired by a contracting firm increased a worker's wages, being hired by a firm in an industry where a greater percentage of firms overall are contracting results in an earnings decline. So, while individuals can fare well if they happen to be hired by a declining firm, broad industry contraction puts downward pressure on earnings.

Since the firm and industry dynamics are measured in different scales (firm dynamics by a dummy variable and industry dynamics by percent of firms in the industry), it is difficult to directly compare the relative magnitude of these regressors on earnings gains.[18] Table 3 presents information on the additional percent of firms in the worker's industry that would need to

[17] See Gibbons and Katz (1991) for evidence on how a firm's lay-off strategy signals information about a worker's productivity.

[18] Dummy variables (like those defined at the firm level) can not be used to reflect industry dynamics since there are not births or deaths of an entire industry during the sample period.

experience the dynamic in question in order to generate the equivalent earnings gain (or loss) produced by leaving or being hired by a firm experiencing the same dynamic.[19] Comparing the impact of leaving an expanding firm to leaving an industry with more firms expanding, it appears as though the industry dynamic (percent of firms expanding) is stronger than the firm dynamic (leaving a specific firm that was expanding), since the percent of firms expanding would only have to increase by 0.1 of a standard deviation or less in each time period to generate an earnings gain as large as that lost by leaving a firm that was expanding.

[Table 3 here]

The industry dynamic also appears to be stronger when comparing being hired by expanding or contracting firms versus expanding or contracting industries. The percent of firms expanding in the industry into which a worker is being hired would have to increase between 0.3 and 0.9 of a standard deviation to generate the same earnings gains experienced when hired by an expanding firm. Additionally, it appears that the ability to translate being hired by a contracting firm into actual earnings gains would be a rare event, since it is likely that a contracting firm is also in an industry where other firms are contracting. It only takes the percent of firms contracting in the worker's new industry to increase by 0.4 of a standard deviation or less to wipe out earnings gains experienced when hired by a contracting firm. The results suggest that the best strategy for a worker to boost expected earnings gains from changing jobs is to be hired by a contracting firm in an expanding industry.

Returning to the coefficient estimates in Table 2, another notable difference between the impact of firm and industry characteristics is that, across all time periods, while moving to a relatively large *firm* results in expected wage gains, moving to a relatively large *industry* results

[19] Only comparisons of the coefficients that were significantly different from zero in all three time periods and for both the firm and industry regressors are used for illustration.

in wage losses. Greater competition among workers in larger industries could be keeping the wages of new hires low, relative to wages of new hires in smaller industries, where competition wouldn't be as intense.[20]

Weinberg (2001), and others, suggests that industry-specific human capital investments can create barriers to inter-industry labor mobility through wage loses workers experience from changing industries. For the most part, changing industries does seem to decrease wage gains across all time periods.[21] The only industry from which workers seem to consistently experience earnings gains upon leaving is Leisure and Hospitality, although job-changers during the later expansion also experienced earnings gains when moving out of Wholesale Trade, Information, and Professional & Business Services. This suggests that overall greater demand for workers during a strong expansion can mitigate any losses that typically occur from losing industry-specific human capital. In addition, leaving Retail Trade only marginally decreases earnings.[22] The largest losses, particularly across the recession, were experienced by workers changing jobs out of Construction, Manufacturing, and Transportation & Utilities. These are industries in which workers likely develop skills that are least transferable to other industries.[23]

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[20] It's important to remember that this effect is found holding the relative earnings of workers in those large and small industries constant; in other words, it is not just that workers earn less in the larger industries (e.g., retail trade).

[21] Note that relative earnings within the industry have been controlled for. These results (and the negative coefficient on relative earnings/worker in the worker's initial industry) are consistent with Neal (1995) who finds that industry-specific human capital can be even more important in determining post-displacement wages than firm-specific human capital. Also see Carrington and Zaman (1994) who document the importance of industry characteristics in earnings losses among displaced workers.

[22] These industry classification refer to the broad 1-digit NAIC classifications. Details on these classifications can be found at <http://www.census.gov/epcd/www/naicstab.htm>.

[23] Significantly larger earnings losses for displaced manufacturing workers re-employed in other industries, relative to non-manufacturing workers, was also found by Jacobson et al. (1993).

The coefficient estimate on the selection term during each time period, $\hat{\lambda}_{it}$, tells us about the correlation between unobservable factors that influence a workers propensity to change employers and a worker's inclination to experience wage gains. Across the recession, this correlation is negative and highly significant, indicating that workers more likely to change jobs were also more likely to experience a wage *loss*. This would likely be the case if job changes during this time period were dominated by involuntary actions. The propensity to change jobs and eventual wage gains were not significantly related during either expansionary periods, suggesting that voluntary job changes played a more important role during these time periods.

B. Decomposing the Difference in Percentage Wage Changes Across Time Periods

Table 4 contains a decomposition of the four and one half percentage point difference in earnings growth between what job-changers during the recession experienced and what job-changers during the expansions experienced and decomposes it into its different contributing factors.

[Table 4 here]

Any difference in outcomes between two periods has two basic contributors: the difference in characteristics of the observations that make up the samples from the two time periods (i.e., differences in the sample means) and the difference in the environments in which these characteristics are translated into the outcomes (i.e., differences in the estimated coefficients). According to the calculations in the table, differences in the environment account for all (and then some) of the advantage workers had in changing jobs during either expansion, relative to the recession. Indeed, the characteristics of the samples were such that job-changers (along with their firms and industries) during the recession possessed characteristics that translated into higher earnings gains than job-changers during either expansion would have

experienced had *they* changed jobs across the recession. The only exception to this was the industry characteristics comparing the later expansion to the recession; industry characteristics (changing industry, industry dynamics, and relative industry characteristics) during the later expansion were more conducive to earnings gains than they were across the recession.

There are differences between the expansionary periods, however, in how each of the person, firm, and industry characteristics contributed to that environmental advantage job-changers in these periods had. Looking first at the later expansionary period comparison, the overwhelming bulk of the difference between the later expansion and the recession environments is unexplained; the estimate of the intercept term is the largest contributor by far to the advantage job-changers had in the later expansionary period.

In contrast with the later expansion, the unexplained difference between the early expansion and the recession contributed relatively little to the advantage of job-changers during the early expansion: the largest contributor was differences in how industry characteristics were translated into earnings gains. In both expansionary periods, the way in which person characteristics (e.g., spells of unemployment, number of employers, and relative earnings within a worker's firm) were translated into wage gains also contributed positively to the advantages job-changers had during these periods, relative to the recession.

From a policy perspective, identifying environmental differences (or differences in coefficients) as the primary determinants of the earnings growth differentials is not very encouraging. In other words, changing the characteristics of the person (e.g., reducing spells of unemployment), the firm (e.g., providing help to keep firms from shutting down), or the industry (e.g., reducing the incidence of contractions) will not be productive in reducing the relative

earnings loss of job-changers through a recession. Basically, efforts to change the environment, or, rather, reduce the severity and length of a recession, will be the most fruitful.

C. Structural Job Change Model

The estimation results from Table 2 can also be used to predict earnings growth among both job-changers and non-changers. This predicted value of $\%\Delta E_i$ for all workers is then used as a regressor in the estimation of equation (3). This exercise yields an informal test of the behavioral model underlying the empirical model. Human capital theory predicts that the coefficient on the expected earnings growth (α_1 in equation 3) be positive; workers who expect to experience a larger earnings growth from changing jobs will be more inclined to do so. The results of this structural estimation are found in Table 5.[24]

[Table 5 here]

The results in Table 5 indicate that the worker's initial firm changing owners (conditional on being a single-establishment firm) increases the worker's chances of being observed in a new job by 11 percentage points across the recession, by 17 percentage points during the later expansion period, and by 18 percentage points during the early recession period. There is a similar pattern of workers being more likely to change jobs if their firm shuts down one of its establishments (conditional on the firm having multiple establishments), with the impact being more pronounced during expansionary times. Further, the impact of the expected wage change is positive during all three time periods, and is also larger during expansionary times. The

[24] Some explanation of how the percentage change in expected earnings from changing employers is calculated for non-changers is warranted. Clearly, new-employer information is not observed for non-changers. Consequently, the average new-employer characteristics for the job-changers are used for the new-employer characteristics of the non-changers for the purposes of predicting what the average percentage change in earnings would be if a non-changer changed employers.

implication is that for the same amount of work place change or expected wage gain, workers are more wary of giving up their job across a recession than during an expansionary period.

V. Conclusions

The results in this paper have confirmed some things we already knew about worker mobility and determinants of job changing, and they have presented some new insights.

A. Confirmation of What We Know

The significant negative correlation between a worker's propensity to change jobs and expected earnings growth across a recession confirmed that job changing across a recession is more likely to be involuntary than job changing through an expansion. The wage gain equation estimates also confirmed that workers are able to chase higher wages by changing employers during an expansion, but not across a recession. Job-changers during an expansion are also in a better negotiating position when hired by an expanding firm or industry; that negotiating advantage is much reduced across a recession. Confirmatory evidence was also found for larger firms paying higher wages and for the possibility that industry-specific human capital inhibits job mobility, particularly across a recession.

The structural job-changing probit model confirmed the human capital prediction that workers take the expected earnings gain from a move into account when making the decision; the larger the expected earnings gain, the more likely a worker is to change jobs. In addition, the impact of such an expected gain on behavior is much greater during expansionary periods.

B. What We Learned

Generally, this paper provides evidence that the way in which job changes impact earnings growth differs across the business cycle. Specifically, a tight labor market appears to

slightly dampen the impact of potentially negative signals from the job search process. For example, while more unemployment decreases earnings gains over time for all workers, the impact is marginally greater through a recession than during expansionary times. In addition, the earnings loss from changing industries where firm-specific human capital is likely important appears to have the potential of creating a much greater barrier to labor mobility during recessionary times than during an expansion. We also learn from the analysis that industry dynamics are more potent than firm dynamics in generating wage gains or losses. In addition, the impact of each employment dynamic is magnified through a recession.

Separating from a contracting industry during an expansion appears to potentially send a negative signal about the worker, or may reflect that the worker was being paid beyond his/her productivity. On the other hand, separating from a contracting industry during a recession actually increases earnings. If one can manage to be hired by a contracting firm, earnings will receive a boost in all time periods.

C. Policy Implications

From a macroeconomic policy perspective, the environment in which person, firm, and industry characteristics are translated into earnings growth was more important in determining the advantage job-changers have during an expansion, relative to a recession, than differences in the characteristics themselves. The implication is that efforts to minimize or avoid a recession is the best strategy to protect earnings gains among job-changers; this is not a surprising revelation. The greater the potential earnings gains from changing jobs, the more mobile and flexible workers are likely to be, resulting in a more efficient functioning of the labor market. At a more micro level, it is clear that job-changers leaving a firm that is shutting down tend to fare much worse than job-changers leaving a firm that is merely contracting. This suggests that efforts to

help firms weather a temporary economic down-turn would benefit even the workers who separated from those firms. In addition, re-training efforts would also be in order to reduce the losses incurred from workers changing industries in order to find new employment.

From a broader perspective, the impact of firm and industry dynamics on earnings growth among job changers can vary dramatically across the business cycle, even among workers that are reasonably attached to the labor market. These dynamics reflect more subtle differences than can be captured merely by macroeconomic indicators, such as the unemployment rate. For example, the results here indicate that being hired by a contracting firm will yield a very different earnings growth outcome than being hired by a contracting industry (*ceteris paribus*). And the degree to which an industry is expanding or contracting has different implications for earnings growth across a recession than through an expansionary period.

In spite of the limited individual demographic information available from the state administrative wage files, this paper has demonstrated that these data can be useful in predicting earnings growth among job-changers in different economic environments. Not only do the individual characteristics that workers bring to the labor market influence the outcomes they experience, but the industry and firm environments in which those outcomes are determined are shown to be important, as well.

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Figure 1. Definition of time periods for analysis.

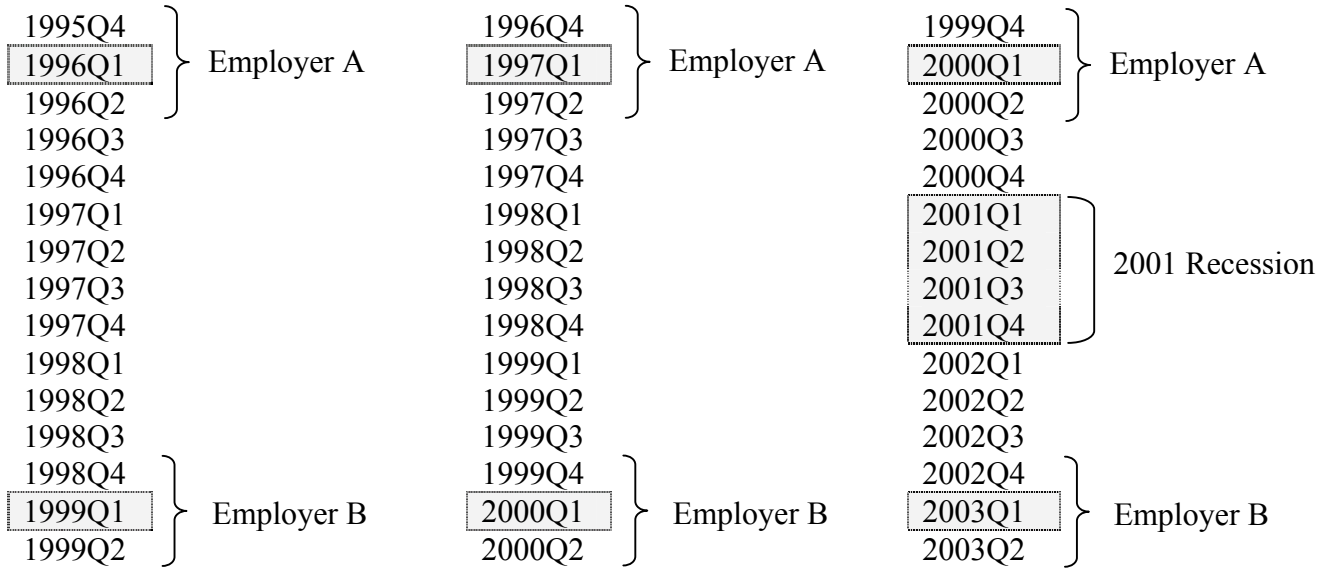

Table 1. Sample means of job-changers and non-changers.

		Early Expansion 1996Q1-1999Q1		Late Expansion 1997Q1-2000Q1		2001 Recession 2000Q1-2003Q1	
	Variables	Job-Changers	Non-Changers	Job-Changers	Non-Changers	Job-Changers	Non-Changers
1	Number of Observations	381,478	813,026	398,579	830,684	396,836	938,716
	Individual Characteristics:						
2	Quarterly Earnings (Employer A)	$8,404 (9,024)	$10,932 (11,795)	$8,520 (9,065)	11,075 (11,749)	$9,298 (10,279)	$11,186 (11,593)
3	Percentage Change in Earnings	14.8% (54.1)	6.19% (37.1)	14.7% (53.8)	6.3% (37.2)	9.5% (54.5)	7.7% (36.2)
4	Relative Erngs in Firm A (% of firm average)	147.6 (126.2)	159.3 (144.5)	142.7 (122.3)	153.1 (138.5)	128.3 (110.6)	136.9 (123.2)
5	Relative Erngs in Firm B (% of firm average)	134.3 (111.3)	155.4 (143.8)	126.3 (105.5)	144.7 (131.3)	117.0 (93.5)	131.7 (114.4)
6	# of Qtrs Unemployed	0.59 (1.29)	0.16 (0.56)	0.52 (1.25)	0.15 (0.55)	0.56 (1.29)	0.13 (0.53)
7	# of Employers	1.85 (1.12)	0.22 (0.60)	1.78 (1.09)	0.20 (0.57)	1.72 (1.04)	0.17 (0.56)
	Firm Characteristics:						
	Employer A:						
8	Just Born = 1	0.03	0.01	0.03	0.02	0.02	0.01
9	Firm Dying = 1	0.08	0.0004	0.09	0.0009	0.07	0.0008
10	Firm Contracting = 1	0.35	0.34	0.35	0.34	0.32	0.31
11	Firm Expanding = 1	0.49	0.56	0.48	0.57	0.55	0.59
12	Relative Size of Firm (% of ind. total empl.)	1.4 (4.8)	2.7 (7.3)	1.3 (3.9)	2.9 (8.3)	1.2 (3.8)	2.9 (7.6)
13	Relative Ernngs/Worker (% of ind. ave. ernngs)	76.7 (49.2)	85.0 (52.5)	77.9 (50.2)	97.0 (54.4)	82.8 (54.5)	89.3 (55.1)
	Employer B:						
14	Just Born = 1	0.04	0.0007	0.05	0.001	0.04	0.0008
15	Firm Contracting = 1	0.34	0.41	0.31	0.37	0.43	0.52
16	Firm Expanding = 1	0.56	0.51	0.59	0.55	0.47	0.39
17	Relative Size of Firm (% of ind. total empl.)	1.4 (4.2)	2.7 (7.4)	1.5 (4.4)	3.0 (7.7)	1.5 (5.3)	3.0 (7.9)
18	Relative Ernngs/Worker (% of ind. ave. ernngs)	86.2 (56.8)	87.5 (56.3)	86.7 (56.0)	89.1 (55.7)	95.4 (59.1)	99.2 (59.0)
	table continues...						

	Industry Characteristics:						
19	New Industry = 1	0.59	--	0.59	--	0.59	--
20	From Construction [b]	0.04	--	0.04	--	0.05	--
21	From Manufacturing [b]	0.20	--	0.21	--	0.18	--
22	From Transp. & Utilities[b]	0.04	--	0.03	--	0.03	--
23	From Wholesale Trade [b]	0.07	--	0.06	--	0.07	--
24	From Retail Trade [b]	0.16	--	0.15	--	0.15	--
25	From Financial Activities[b]	0.08	--	0.08	--	0.08	--
26	From Information [b]	0.06	--	0.06	--	0.07	--
27	From Professional & Business Services[b]	0.14	--	0.14	--	0.16	--
28	From Ed. & Health Srvs [b]	0.10	--	0.10	--	0.10	--
29	From Leisure & Hospitality[b]	0.09	--	0.10	--	0.10	--
30	From Other Services[b]	0.03	--	0.02	--	0.02	--
	Employer A:						
31	% Firms Being Born	11.9 (3.2)	12.7 (3.1)	11.9 (3.3)	11.5 (3.2)	11.1 (3.5)	10.6 (3.4)
32	% Firms Dying	10.7 (2.1)	10.4 (2.2)	11.1 (2.3)	10.7 (2.3)	10.0 (2.2)	9.8 (2.2)
33	% Firms Contracting	34.5 (5.1)	34.3 (5.0)	35.5 (4.8)	35.0 (4.4)	35.8 (4.3)	35.5 (4.3)
34	% Firms Expanding	30.5 (3.4)	30.7 (3.7)	31.1 (4.2)	31.5 (4.6)	30.8 (4.2)	31.1 (4.6)
35	Relative Size of Ind. (% of GA total empl.)	6.5 (2.5)	6.1 (2.5)	6.5 (2.5)	6.0 (2.5)	6.5 (2.5)	6.0 (2.5)
36	Relative Erngs/Worker (% of GA ave earnings)	102.9 (40.7)	110.7 (37.9)	103.4 (41.4)	111.1 (38.4)	105.2 (44.6)	109.6 (40.9)
	Employer B:						
37	% Firms Being Born	11.7 (3.5)	11.2 (3.5)	11.1 (3.5)	10.5 (3.5)	11.4 (2.9)	10.7 (3.1)
38	% Firms Contracting	47.1 (4.8)	47.1 (4.7)	45.4 (4.7)	45.5 (4.6)	41.1 (6.6)	41.7 (6.4)
39	% Firms Expanding	31.0 (4.2)	31.6 (4.4)	30.7 (4.3)	31.4 (4.6)	27.9 (3.6)	28.4 (3.8)
40	Relative Size of Ind. (% of GA total empl.)	6.3 (2.4)	6.0 (2.4)	6.3 (2.4)	5.9 (2.5)	6.5 (2.8)	6.0 (2.7)
41	Relative Erngs/Worker (% of GA ave earnings)	108.1 (43.4)	110.3 (40.1)	108.9 (43.8)	110.5 (40.4)	107.3 (43.7)	110.0 (41.1)
	table continues...						

	Identifying Characteristics:						
42	Worker's Initial Firm is a Single Establishment and Changes Owners = 1	0.0052 (0.07)	0.0025 (0.05)	0.0037 (0.06)	0.0019 (0.04)	0.0035 (0.06)	0.0021 (0.05)
43	Worker's Initial Firm is Multi-establishment and Closes an Estab. = 1	0.07 (0.25)	0.03 (0.18)	0.09 (0.28)	0.06 (0.23)	0.04 (0.20)	0.03 (0.17)

Notes: Standard errors are in parentheses. All dollar values are deflated by the Atlanta MSA CPI and reflect 2003Q1 values.

Table 2. Second-stage OLS estimation results.

	Early Expansion	Late Expansion	2001 Recession
Regressors:	Percentage Change in Earnings from 1996Q1 to 1999Q1	Percentage Change in Earnings from 1997Q1 to 2000Q1	Percentage Change in Earnings from 2000Q1 to 2003Q1
Individual Characteristics:			
Relative Earnings in Employer A	-0.2312* (0.0006)	-0.2387* (0.0006)	-0.2834* (0.0007)
Relative Earnings in Employer B	0.2338* (0.0007)	0.2488* (0.0007)	0.3034* (0.0009)
Number of Quarters spent Unemployed	-0.0107* (0.0005)	-0.0090* (0.0005)	-0.0159* (0.0005)
Number of Employers during Period	0.0113* (0.0010)	0.0154* (0.0010)	-0.0012 (0.0012)
Firm Characteristics:			
Employer A:			
Just Born = 1	0.0162* (0.0049)	0.0265* (0.0047)	0.0026 (0.0050)
Firm Dying = 1	-0.0333* (0.0041)	-0.0502* (0.0040)	-0.0311* (0.0043)
Firm Contracting = 1	-0.0192* (0.0031)	-0.0387* (0.0031)	-0.0117* (0.0032)
Firm Expanding = 1	-0.0175* (0.0030)	-0.0186* (0.0030)	-0.0182 (0.0031)
Relative Size of Firm (% of industry total employment)	0.0064 (0.0173)	-0.1101* (0.0186)	-0.3304* (0.0194)
Relative Earnings per Worker (% of industry average earnings)	-0.4612* (0.0016)	-0.4396* (0.0015)	-0.4408* (0.0014)
Employer B:			
Just Born = 1	0.00006 (0.0045)	0.0030 (0.0044)	-0.0092+ (0.0047)
Firm Contracting = 1 [c]	0.0297* (0.0031)	0.0291* (0.0030)	0.0413* (0.0028)
Firm Expanding = 1	0.0504* (0.0030)	0.0549* (0.0030)	0.0442* (0.0028)
Relative Size of Firm (% of industry total employment)	0.1430* (0.0173)	0.0883* (0.0159)	0.2678* (0.0131)
Relative Earnings per Worker (% of industry average earnings)	0.4055* (0.0014)	0.4000* (0.0013)	0.4019* (0.4019)
table continues...			

Industry Characteristics: [a]			
From Construction; New Industry = 1 [b]	-0.1043* (0.0100)	-0.0099 (0.0134)	-0.1332* (0.0089)
From Manufacturing; New Industry = 1 [b]	-0.1481* (0.0112)	-0.1623* (0.0145)	-0.2346* (0.0091)
From Transportation & Utilities; New Industry = 1 [b]	-0.0967* (0.0127)	-0.0141 (0.0144)	-0.1609* (0.0101)
From Wholesale Trade; New Industry = 1 [b]	-0.0253* (0.0081)	0.0257* (0.0081)	-0.0260* (0.0080)
From Retail Trade; New Industry = 1 [b]	-0.0013 (0.0084)	-0.0116 (0.0076)	-0.0048 (0.0069)
From Financial Activities; New Industry = 1 [b]	-0.0425* (0.0067)	-0.0358* (0.0094)	-0.0348* 0.0079)
From Information; New Industry = 1 [b]	-0.0228 (0.0175)	0.0477* (0.0160)	-0.0734* (0.0135)
From Professional & Business Services; New Industry = 1 [b]	-0.0189+ (0.0086)	0.0450* (0.0111)	-0.0364* (0.0083)
From Education & Health Services; New Industry = 1 [b]	-0.0686* (0.0095)	-0.1050* (0.0100)	-0.0634* (0.0080)
From Leisure & Hospitality; New Industry = 1 [b]	0.0665* (0.0112)	0.1081* (0.0130)	0.0384* (0.0095)
Employer A:			
% Firms Being Born	0.7673* (0.1630)	0.0202 (0.1222)	0.6738* (0.1126)
% Firms Dying	0.4783 (0.3907)	0.2238 (0.1557)	0.0161 (0.1961)
% Firms Contracting	0.1000 (0.0972)	-0.4920* (0.0647)	0.3253* (0.0589)
% Firms Expanding	0.5599* (0.0988)	0.6887* (0.0613)	0.6150* (0.0689)
Relative Size of Industry (% of GA total employment)	-0.1239* (0.0456)	-0.0421 (0.0586)	-0.3816* (0.0451)
Relative Earnings per Worker (% of GA average earnings)	-0.4770* (0.0116)	-0.5460* (0.0068)	-0.4705* (0.0049)
Employer B:			
% Firms Being Born	-0.7402* (0.0280)	-0.7998* (0.0275)	-1.3842* (0.0310)
% Firms Contracting [c]	-0.4930* (0.0191)	-0.3821* (0.0197)	-0.2814* (0.0136)
% Firms Expanding	0.5119* (0.0217)	0.5403* (0.0222)	0.1691* (0.0290)
Relative Size of Industry (% of GA total employment)	-0.5781* (0.0363)	-0.8291* (0.0351)	-0.4046* (0.0359)

Relative Earnings per Worker (% of GA average earnings)	0.4673* (0.0023)	0.4732* (0.0022)	0.4828* (0.0023)
Intercept	0.0340 (0.0479)	0.2950* (0.0330)	0.0274* (0.0274)
$\hat{\lambda}_{it} = \phi(\hat{\alpha}'\Omega_{it}) / \Phi(\hat{\alpha}'\Omega_{it})$	-0.0042	-0.0027	-0.0161*
Number of Observations	376,016	394,367	391,371

Notes: Sample includes all workers employed in both end-point quarters. Standard errors are in parentheses. *, ^, + indicate statistical significance of the estimated coefficient at the 99%, 95%, and 90% confidence levels, respectively.

[a]Unless otherwise indicated, industry averages are at the 2-digit NAIC level (see a detailed description at <http://www.census.gov/epcd/www/naicstab.htm>).

[b]New industry is defined based on a broad 1-digit NAIC level (see a detailed description at <http://www.census.gov/epcd/www/naicstab.htm>).

[c]Since the time series is not long enough to identify dying firms at the end of the recession, the number of contracting firms used to calculate the percent contracting in Employer B's industry includes some firms that will eventually be identified as having shut down. In addition, some Employer B firms that are classified as contracting will eventually be identified as having shut down.

Table 3. Comparing marginal impacts of firm and industry characteristics.

Expanding (Employer A)	Early Expansion	Late Expansion	Recession
Impact on earnings of leaving a firm that is expanding:	-1.8%	-1.9%	-1.8%
*Percent increase in number of firms expanding in worker's initial firm industry needed to generate equivalent earnings **gain**:*	3.1% (0.06 s.d.)	2.7% (0.06 s.d.)	3.0% (0.1 s.d.)
Expanding (Employer B)			
Impact on earnings of being hired by a firm that is expanding:	+5.0%	+5.5%	+4.4%
Percent increase in number of firms expanding in worker's new firm industry needed to generate equivalent earnings gain:	9.8% (0.3 s.d.)	10.2% (0.3 s.d.)	26.2% (0.9 s.d.)
Contracting (Employer B)			
Impact on earnings of being hired by a firm that is contracting:	+3.0%	+2.9%	+4.1%
*Percent increase in number of firms contracting in worker's new firm industry needed to generate equivalent earnings **loss**:*	6.0% (0.2 s.d.)	7.6% (0.2 s.d.)	14.7% (0.4 s.d.)

Table 4. Decomposing the selectivity-corrected percentage change in earnings for job-changers

Predicted Selectivity-Corrected Percentage Change in Earnings	Predicted Percentage Change in Earnings
(a) $E[\%\Delta E_R \mid X_R] = \sum \hat{\beta}_R \overline{X}_R =$	10.4%
(b) $E[\%\Delta E_{E2} \mid X_{E2}] = \sum \hat{\beta}_{E2} \overline{X}_{E2} =$	14.8%
(c) $E[\%\Delta E_{E1} \mid X_{E1}] = \sum \hat{\beta}_{E1} \overline{X}_{E1} =$	14.9%
(d) $E[\%\Delta E_R \mid X_{E2}] = \sum \hat{\beta}_R \overline{X}_{E2} =$	9.4%
(e) $E[\%\Delta E_R \mid X_{E1}] = \sum \hat{\beta}_R \overline{X}_{E1} =$	8.6%
Difference in Predicted Percentage Change in Earnings Between Later Expansion (E2) and Recession (R)	
Gross difference in earnings change (b)-(a)	4.4%
Difference in change accounted for by differences in sample characteristics (d)-(a)	-1.0
Portion contributed by differences in person factors	*-1.19*
Portion contributed by differences in firm factors	*-1.31*
Portion contributed by differences in industry factors	*1.44*
Difference in change accounted for by differences in environments (b)-(d)	5.4
Portion contributed by differences in the intercept terms (unexplained differences)	*26.76*
Portion contributed by differences in person factors	*2.79*
Portion contributed by differences in firm factors	*-0.83*
Portion contributed by differences in industry factors	*-23.28*
Difference in Predicted Percentage Change in Earnings Between Early Expansion (E1) and Recession (R)	
Gross difference in earnings change (c)-(a)	4.5%
Difference in change accounted for by differences in sample characteristics (e)-(a)	-1.8
Portion contributed by differences in person factors	*-0.27*
Portion contributed by differences in firm factors	*-1.06*
Portion contributed by differences in industry factors	*-0.49*
Difference in change accounted for by differences in environments (c)-(e)	6.3
Portion contributed by differences in the intercept terms (unexplained differences)	*0.66*
Portion contributed by differences in person factors	*0.97*
Portion contributed by differences in firm factors	*-1.18*
Portion contributed by differences in industry factors	*5.9*

Note: As an example to understand the mechanics of the decompositions performed in the table, the difference in earnings gains between later expansion (E2) and recession (R) accounted for by differences in characteristics of the sample of individuals from these time periods(d-a) is decomposed as follows:

$$E[\%\Delta E_R \mid X_{E2}] - E[\%\Delta E_R \mid X_R] = \sum \hat{\beta}_R \overline{X}_{E2} - \sum \hat{\beta}_R \overline{X}_R$$

$$= \left\{ \sum \hat{\beta}_R^P \overline{X}_{E2}^P - \sum \hat{\beta}_R^P \overline{X}_R^P \right\} \leftarrow \textit{portion contributed by differences in person factors}$$

$$+ \left\{ \sum \hat{\beta}_R^F \overline{X}_{E2}^F - \sum \hat{\beta}_R^F \overline{X}_R^F \right\} \leftarrow \textit{portion contributed by differences in firm factors}$$

$$+ \left\{ \sum \hat{\beta}_R^I \overline{X}_{E2}^I - \sum \hat{\beta}_R^I \overline{X}_R^I \right\} \leftarrow \textit{portion contributed by differences in industry factors}$$

Table 5. Structural estimate of the probability of changing jobs.

	Early Expansion	Late Expansion	2001 Recession
Regressors:	Probability of Changing Employers 1996Q1 to 1999Q1	Probability of Changing Employers 1997Q1 to 2000Q1	Probability of Changing Employers 2000Q1 to 2003Q1
Predicted Value of $\%\Delta E_i$	0.5125* (0.0036) [0.1822]	0.5246* (0.0035) [0.1877]	0.3483* (0.0032) [0.1202]
Worker's Initial Firm is a Single Establishment and Changes Owners	0.4581* (0.0198) [0.1755]	0.4390* (0.0230) [0.1686]	0.3083* (0.0220) [0.1138]
Worker's Initial Firm is Multi-establishment and Closes an Establishment	0.4346* (0.0056) [0.1654]	0.3226* (0.0046) [0.1215]	0.1948* (0.0062) [0.0702]
Intercept	-0.5415* (0.0013)	-0.5289* (0.0013)	-0.5612* (0.0012)
Number of Observations	1,194,504	1,229,233	1,335,552

Note: Sample includes all workers employed in both end-point quarters. * indicates statistical significance of the estimated coefficient at the 99% confidence level. Standard errors are in parentheses and marginal effects of a one-unit change of variable are in brackets. All marginal effects are significantly different from zero at the 99% confidence level.

Appendix: Supplemental Tables.

Table A1. Comparison of population and sample means for firms, 2000Q1.

Variable	Population Means: Georgia	Sample Means
Average employment (firm size)	21.58	30.90
Firm is multi-establishment = 1	0.0164	0.0174
Firm is single establishment and changes owners = 1	0.0154	0.0236
Firm is multi-establishment and closes an establishment = 1	0.0012	0.0013
Firm is dying = 1	0.1081	0.0855
Firm is just born = 1	0.1266	0.1075
Firm is contracting = 1	0.2041	0.2292
Firm is expanding = 1	0.2831	0.2876
Industry of Firm:		
Construction = 1	0.1213	0.1232
Manufacturing = 1	0.0554	0.0579
Transportation & Uilities = 1	0.0305	0.0312
Wholesale Trade = 1	0.1110	0.1100
Retail Trade = 1	0.1276	0.1301
Financial Activities = 1	0.0874	0.0847
Information = 1	0.0178	0.0178
Professional & Business Services = 1	0.1860	0.1807
Education & Health Servcies = 1	0.0900	0.0925
Leisure & Hospitality = 1	0.0678	0.0713
Other Services = 1	0.1053	0.1006

Table A2. First-stage probit estimation results.

	Early Expansion	Late Expansion	2001 Recession
Regressors:	Percentage Change in Earnings from 1996Q1 to 1999Q1	Percentage Change in Earnings from 1997Q1 to 2000Q1	Percentage Change in Earnings from 2000Q1 to 2003Q1
Individual Characteristics:			
Relative Earnings in Employer A	-0.0191* (0.0017)	-0.0143* (-0.0317)	-6.28×10^{-6} (0.0019)
Relative Earnings in Employer B	-0.0327* (0.0018)	-0.0317* (0.0019)	-0.0518* (0.0021)
Number of Quarters spent Unemployed	-0.0545* (0.0016)	-0.0648* (0.0016)	-0.0358* (0.0016)
Number of Employers during Period	1.2075* (0.0020)	1.2648- (0.0021)	1.2456* (0.0019)
Firm Characteristics:			
Employer A:			
Just Born = 1	0.3141* (0.0132)	0.2632* (0.0128)	0.2926* (0.0126
Firm Dying = 1	2.3094* (0.0215)	2.1092* (0.0164)	1.9694* (0.0173)
Firm Contracting = 1	0.2402* (0.0069)	0.5264* (0.0070)	0.2441* (0.0069)
Firm Expanding = 1	0.1281* (0.0067)	0.1624* (0.0069)	0.1976* (0.0067)
Relative Size of Firm (% of industry average employment)	0.2093* (0.0460)	-2.0624* (0.0485)	-2.3511* (0.0454)
Relative Earnings per Worker (% of industry average earnings)	-0.2060* (0.0043)	-0.2044* (0.0041)	-0.0448* (0.0039)
Employer B:			
Just Born = 1	1.8347* (0.0203)	1.7652* (0.0177)	1.6787* (0.0191)
Firm Contracting = 1 [c]	0.0760* (0.0069)	0.1123* (0.0069)	0.0917* (0.0062)
Firm Expanding = 1	0.2532* (0.0067)	0.2678* (0.0068)	0.2890* (0.0062)
Relative Size of Firm (% of industry average employment)	0.2264* (0.0039)	-0.0338 (0.0456)	0.2008* (0.0381)
Relative Earnings per Worker (% of industry average earnings)	0.2264* (0.0039)	0.1824* (0.0039)	0.1220* (0.0036)
table continues...			

Industry Characteristics: [a]			
From Construction; New Industry = 1 [b]	0.0109* (0.0229)	-0.0680^ (0.0300)	0.0174 (0.0202)
From Manufacturing; New Industry = 1 [b]	0.0405 (0.0257)	0.2358* (0.0331)	0.5116* (0.0204)
From Transportation & Utilities; New Industry = 1 [b]	0.3607* (0.0300)	0.2947* (0.0321)	0.2430* (0.0218)
From Wholesale Trade; New Industry = 1 [b]	0.4826* (0.0185)	0.4744* (0.0189)	0.3134* (0.0181)
From Retail Trade; New Industry = 1 [b]	0.0542* (0.0201)	0.2530* (0.0187)	0.2196* (0.0159)
From Financial Activities; New Industry = 1 [b]	0.4770* (0.0157)	0.5788* (0.0215)	0.3643* (0.0186)
From Information; New Industry = 1 [b]	0.9756* (0.0410)	0.6340* (0.0360)	0.7999* (0.0295)
From Professional & Business Services; New Industry = 1 [b]	0.5564* (0.0196)	0.5054* (0.0250)	0.3836* (0.0188)
From Education & Health Services; New Industry = 1 [b]	-0.1308* (0.0222)	0.1050* (0.0242)	0.0693* (0.0184)
From Leisure & Hospitality; New Industry = 1 [b]	0.2022* (0.0263)	0.1078* (0.0299)	0.2144* (0.0224)
Employer A:			
% Firms Being Born	-8.1962* (0.3525)	-2.4535* (0.2686)	-0.4283+ (0.2564)
% Firms Dying	1.3871 (0.9227)	-1.7528* (0.3519)	-1.3949* (0.4242)
% Firms Contracting	0.4042+ (0.2223)	2.4752* (0.1512)	1.4209* (0.1342)
% Firms Expanding	0.3681 (0.2354)	-0.4412* (0.1501)	-1.8178* (0.1459)
Relative Size of Industry (% of GA average employment)	0.1034 (0.1314)	-1.2932* (0.1463)	0.2496^ (0.1201)
Relative Earnings per Worker (% of GA average earnings)	-0.6859* (0.0285)	-0.5055* (0.0180)	-0.2216* (0.0126)
Employer B:			
% Firms Being Born	3.5635* (0.0883)	3.0489* (0.0866)	3.5910* (0.0918)
% Firms Contracting [c]	-1.9734* (0.0595)	-1.9085* (0.0599)	-1.5719* (0.0429)
% Firms Expanding	0.3228* (0.0677)	0.0698)	0.5200* (0.0845)
Relative Size of Industry (% of GA average employment)	0.2288^ (0.1134)	0.5009* (0.1096)	1.0130* (0.1081)

Relative Earnings per Worker (% of GA average earnings)	0.2150* (0.0075)	0.1959* (0.0072)	0.1546* (0.0071)
Intercept	-0.5490* (0.1122)	-1.2072* (0.0732)	-1.8433* (0.0503)
Identifying Regressors:			
Worker's Initial Firm is a Single-Establishment and Changes Owners	0.1278* (0.0262)	0.0485 (0.0324)	0.2207* (0.0288)
Worker's Initial Firm is Multi-establishment and Closes an Establishment	0.2140* (0.0080)	0.2226* (0.0067)	0.2050* (0.0083)
Number of Observations	1,194,504	1,229,233	1,335,552

Notes: Sample includes all workers employed in both end-point quarters. Standard errors are in parentheses. *, ^, + indicate statistical significance of the estimated coefficient at the 99%, 95%, and 90% confidence levels, respectively.

[a]Unless otherwise indicated, industry averages are at the 2-digit NAIC level (see a detailed description at <http://www.census.gov/epcd/www/naicstab.htm>).

[b]New industry is defined based on a broad 1-digit NAIC level (see a detailed description at <http://www.census.gov/epcd/www/naicstab.htm>).

[c]Since the time series is not long enough to identify dying firms at the end of the recession, the number of contracting firms used to calculate the percent contracting in Employer B's industry includes some firms that will eventually be identified as having shut down. In addition, some Employer B firms that are classified as contracting will eventually be identified as having shut down.