SUMPPLEMENTARY APPENDIX

For

Structural Earnings Losses and Between-Industry Mobility of Displaced Workers, 2003-2008

Table S1. Regression coefficients for the effect of industrial mobility on displaced workers' earnings changes, with fitted interaction effects between datasets and all other variables in the models

	Model S1
Stayers:	
In manufacturing (the constant)	
In service	-0.135**
	(0.040)
In wholesale and retail	-0.116
	(0.071)
In transportation and utilities	0.060
	(0.051)
In construction	-0.144**
	(0.051)
In agriculture and mining	0.181
	(0.120)
In public administration	-0.214
	(0.490)
Movers:	
Manufacturing to service	-0.358**
	(0.065)
Manufacturing to wholesale and retail	-0.431**
	(0.125)
Manufacturing to transportation and utilities	-0.049
	(0.169)
Manufacturing to construction	-0.520
	(0.286)
Manufacturing to agriculture and mining	-0.089
	(0.188)
Manufacturing to public administration	-0.442**
	(0.117)
All other types of industry movers	-0.158**
	(0.038)
Survey year = 2008	0.032
	(0.032)
× Stay in service	0.002
	(0.040)
× Stay in wholesale and retail	0.018
	(0.070)

× Stay in transportation and utilities	-0.104*
	(0.051)
× Stay in construction	-0.059
	(0.051)
× Stay in agriculture and mining	-0.160
	(0.120)
× Stay in public administration	-0.600
	(0.509)
× Manufacturing to service	-0.105
	(0.067)
× Manufacturing to wholesale and retail	0.015
	(0.122)
× Manufacturing to transportation and utilities	0.191
	(0.174)
× Manufacturing to construction	-0.059
	(0.292)
× Manufacturing to agriculture and mining	0.171
	(0.189)
× Manufacturing to public administration	-0.137
	(0.120)
× All other types of industry movers	-0.039
	(0.039)
All other variables	✓
R-squared	0.04
N	3,281

Source: Current Population Surveys (Displaced Worker Supplement), January 2006 and 2008 combined.
Notes: Robust standard errors in parentheses. All variables except industrial mobility variables are centered at their means.
* $p<0.05$, ** $p<0.01$ (two-tailed).

Table S2. Regression coefficients for the effect of industrial mobility on displaced workers' earnings changes, with voluntary part-time workers excluded from the sample

	Model S1	Model S2
Stayers:		
In manufacturing (the constant)	0.041	-0.042
	(0.031)	(0.041)
In service	-0.100*	-0.021
	(0.040)	(0.051)
In wholesale and retail	-0.083	-0.050
	(0.074)	(0.134)
In transportation and utilities	0.065	0.166
	(0.054)	(0.109)
In construction	-0.112*	-0.035
	(0.044)	(0.055)
In agriculture and mining	0.145	0.374
	(0.127)	(0.212)
In public administration	-0.574	-1.059
	(0.812)	(1.639)
Movers:		
Manufacturing to service	-0.281**	-0.157
	(0.063)	(0.086)
Manufacturing to wholesale and retail	-0.394**	-0.112
	(0.139)	(0.130)
Manufacturing to transportation and utilities	-0.029	-0.106
	(0.197)	(0.139)
Manufacturing to construction	-0.305	0.174
	(0.265)	(0.106)
Manufacturing to agriculture and mining	-0.005	0.160
	(0.160)	(0.449)
Manufacturing to public administration	-0.439**	-0.669**
	(0.118)	(0.108)
All other types of industry movers	-0.117**	-0.031
	(0.038)	(0.061)
Long tenure	-0.114**	0.018
	(0.034)	(0.049)
× Stay in service		-0.123
		(0.077)
× Stay in wholesale and retail		-0.047
		(0.161)
× Stay in transportation and utilities		-0.160
		(0.121)
× Stay in construction		-0.117
		(0.095)
× Stay in agriculture and mining		-0.354
		(0.263)
× Stay in public administration		1.012
		(1.649)
× Manufacturing to service		-0.200
		(0.120)

× Manufacturing to wholesale and retail		-0.477
		(0.254)
× Manufacturing to transportation and utilities		0.181
		(0.373)
× Manufacturing to construction		-0.867
		(0.476)
× Manufacturing to agriculture and mining		-0.261
		(0.455)
× Manufacturing to public administration		0.254
		(0.149)
× All other types of industry movers		-0.139
		(0.074)
Education (Less than high school is omitted):		
High school graduates	0.047	0.031
	(0.045)	(0.048)
Some college	0.048	0.032
	(0.048)	(0.048)
College graduates	0.078	0.063
	(0.053)	(0.054)
Advanced degrees	0.104	0.089
	(0.088)	(0.088)
Union coverage of the lost job	-0.068	-0.078
	(0.051)	(0.049)
Other human capital and demographic variables	✓	✓
R-squared	0.04	0.04
N	3,281	3,281

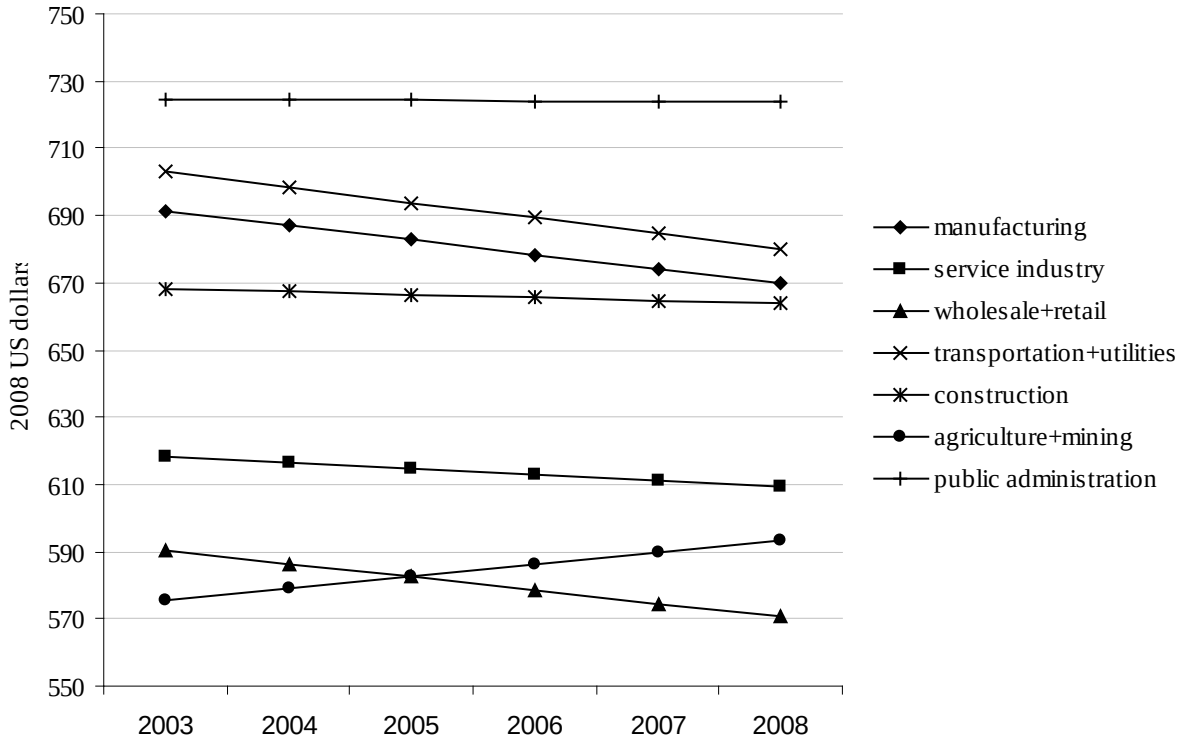
Source: Current Population Surveys (Displaced Worker Supplement), January 2006 and 2008 combined.
Notes: R obust standard errors in parentheses. All variables except industrial mobility and long tenure variables are centered at their means.
* $p<0.05$, ** $p<0.01$ (two-tailed).

Table S3. Earnings Regressions for the Full Labor Market, with Industry-Specific Union Variables

	Model 1
Constant	6.539**
	(0.003)
Industry (manufacturing is omitted):	
Service	-0.110**
	(0.003)
Wholesale and retail	-0.149**
	(0.004)
Transportation and utilities	-0.022**
	(0.006)
Construction	-0.044**
	(0.005)
Agriculture and mining	-0.168**
	(0.011)
Public administration	0.019**
	(0.005)
Year	-0.006**
	(0.001)
× Service	0.003**
	(0.001)
× Wholesale and retail	-0.001
	(0.001)
× Transportation and utilities	-0.001
	(0.002)
× Construction	0.005**
	(0.002)
× Agriculture and mining	0.012**
	(0.003)
× Public administration	0.006**
Union Member	0.131**
	(0.004)
× Service	-0.045**
	(0.005)
× Wholesale and retail	-0.015*
	(0.007)
× Transportation and utilities	0.071**
	(0.007)
× Construction	0.158**
	(0.007)
× Agriculture and mining	0.093**
	(0.020)
× Public administration	0.022**
	(0.007)
Education (Less than high school is omitted):	
High school graduates	0.187**
	(0.002)
Some college	0.262**

	(0.002)
College graduates	0.485**
	(0.003)
Advanced degrees	0.577**
	(0.003)
Demographic and other human capital variables [a]	✓
R-squared	996,316
N	0.56

Source: Current Population Surveys (Merged Outgoing Rotation Groups), 2003-2008.
Notes: Robust standard errors in parentheses. All variables except industrial mobility variables are centered.
[a] age, age squared, gender, marital status, gender × marital status, have children, gender × have children, race, usual work hours, region, and occupations.
* $p<0.05$; ** $p<0.01$ (two-tailed).



Source: Current Population Surveys (Merged Outgoing Rotation Groups), 2003-2008.
Note: All other variables except for the union variable are set to their mean values. Industry-level average values are used for the union variable.

Figure S1. Predicted Earnings Trends by Industry for Model 1 in Table S3

The Construction of the Weight that Adjusts for Missing Data on Earnings and Industry

We used weighted regression to adjust the models reported in this article for non-random missingness of data on earnings and on the industry of both the lost job and the current job. The weight utilized is the inverse of the probability of inclusion in the full data subsample. The procedure for constructing the weight is:

(1) Estimate a model predicting inclusion in the full data subsample
(2) Construct an estimated weight
(3) Check the balance of the covariates when adjusted by the estimated weight
(4) If the covariates remain unbalanced, respecify the model in (1)

After repeating steps (1) through (4) many times, the final specification that was used to construct the weight is presented in Table S3. Below, we describe the procedure in more detail.

Table S4. Logit coefficients for a model predicting inclusion in the full data subsample

	Model S1
Age	0.057**
	(0.018)
Age squared	-0.001**
	(0.000)
Education (Less than high school is omitted):	
High school graduates	0.399**
	(0.127)
Some college	0.640**
	(0.132)
College graduates	0.576**
	(0.146)
Advanced degrees	1.030**
	(0.194)
Race (white is omitted)	
Black	-0.152
	(0.127)
Hispanic	0.014
	(0.113)
Other race	-0.404*
	(0.164)
Metropolitan residency	-0.016
	(0.076)
Married	0.326**
	(0.087)
Child	0.039
	(0.041)
Female	0.425*
	(0.209)
× High school graduates	-0.127
	(0.208)
× Some college	-0.242

	(0.211)
× College graduates	0.005
	(0.232)
× Advanced degrees	-0.485
	(0.299)
× Black	-0.305
	(0.179)
× Hispanic	-0.436*
	(0.173)
× Other race	-0.161
	(0.252)
× Married	-0.333**
	(0.120)
× Child	-0.104
	(0.056)
Constant	-1.362**
	(0.353)
Pseudo R-squared	0.02
Observations	7,132

Source: Current Population Surveys (Displaced Worker Supplement), January 2006 and 2008 combined.
Notes: Robust standard errors in parentheses. All variables except industrial mobility variables are centered at their means.
* $p<0.05$, ** $p<0.01$ (two-tailed).

Based on the model S1 in table S3, we construct the weight variable (w_i):

$$\text{For } d_i = 1: \quad w_i = w_{dws,\,i} \times \frac{1}{\hat{p}_i}$$

where w_{dws} is the sampling weight provided by the BLS, d_i is the variable that indicates inclusion in the full data subsample for individual i, and $\hat{p}_i$ is the predicted probability from a logistic regression model such as the one reported in Table S3.

After specifying a logit model, we next assessed whether the weight constructed successfully minimizes the differences in covariates between the group with missing data and the group without missing data. This assessment is made by the standardized difference of the mean for each variable in x, calculated as:

$$\frac{\left| \bar{x}_{i,\,d_i = 1} - \bar{x}_{i,\,d_i = 0} \right|}{\sqrt{\frac{1}{2} Var\left(x_{i,\,d_i = 1}\right) + \frac{1}{2} Var\left(x_{i,\,d_i = 0}\right)}},$$

where $\bar{x}_{i,\,d_i = 1}$ is the mean for those who are in the full data subsample, $\bar{x}_{i,\,d_i = 0}$ is the mean for those who are not in the full data subsample, $Var(x_{i,\,d_i = 1})$ is the variance for those who are in the full data subsample, and $Var(x_{i,\,d_i = 0})$ is the variance for those who are not in the full data subsample.

In addition, we considered the standardized difference of the standard deviation for each variable in x, written as:

$$\frac{\left| Var\left(x_{i,d_i=1}\right) - Var\left(x_{i,d_i=0}\right) \right|}{\sqrt{\frac{1}{2}Var\left(x_{i,d_i=1}\right) + \frac{1}{2}Var\left(x_{i,d_i=0}\right)}}.$$

The results of the diagnostics are presented in Tables S4 and S5. Each table presents the mean of the standardized mean differences and the mean of standardized standard deviation differences, which are 0.0008 and 0.0019, respectively. The selection of the specification of the logit model in Table S3 was made with the goal of minimizing these two numbers. The current specification offers the smallest values on these two metrics, among the many specifications that we estimated.

Table S5. Mean differences between cases with and without missing data with the weight applied

Variable names	Cases with missing on earnings and industry data (1)	Cases with no missing on earnings and industry data (2)	Mean differences (1)-(2)	Standardized mean differences
Age	40.0490	40.0320	0.0172	0.0015
Age squared	1746.5000	1745.5000	1.0284	0.0011
Education:				
High school graduates	0.3462	0.3448	0.0014	0.0030
Some college	0.3121	0.3123	-0.0002	0.0005
College graduates	0.1748	0.1749	-0.0001	0.0003
Advanced degrees	0.0596	0.0596	0.0000	0.0000
Race:				
Black	0.1384	0.1390	-0.0006	0.0018
Hispanic	0.1515	0.1516	0.0000	0.0001
Other race	0.0542	0.0539	0.0002	0.0010
Metropolitan Residency	0.8671	0.8671	0.0000	0.0001
Married	0.5310	0.5315	-0.0005	0.0010
Child	0.6893	0.6886	0.0007	0.0006
Female	0.4222	0.4218	0.0004	0.0009
× High school graduates	0.1334	0.1335	-0.0001	0.0003
× Some college	0.1501	0.1497	0.0004	0.0012
× College graduates	0.0783	0.0785	-0.0001	0.0005
× Advanced degrees	0.0227	0.0227	-0.0001	0.0004
× Black	0.0656	0.0659	-0.0003	0.0012
× Hispanic	0.0572	0.0572	0.0000	0.0001
× Other race	0.0220	0.0218	0.0001	0.0011
× Married	0.2044	0.2048	-0.0004	0.0009

× Child	0.3036	0.3045	-0.0008	0.0011
Mean				0.0008

Table S6. Standard deviation differences between cases with and without missing data with the weight applied

Variable names	Cases with missing on earnings and industry data (1)	Cases with no missing on earnings and industry data (2)	Mean differences (1)-(2)	Standardized mean differences [a]
Age	11.9400	11.9550	-0.0147	0.0013
Age squared	978.0200	980.2600	-2.2395	0.0023
Education:				
High school graduates	0.4758	0.4753	0.0005	0.0010
Some college	0.4634	0.4634	-0.0001	0.0002
College graduates	0.3798	0.3799	-0.0001	0.0003
Advanced degrees	0.2367	0.2367	0.0000	0.0001
Race:				
Black	0.3453	0.3459	-0.0006	0.0018
Hispanic	0.3586	0.3586	0.0000	0.0001
Other race	0.2263	0.2259	0.0004	0.0019
Metropolitan Residency	0.3384	0.3385	-0.0001	0.0002
Married	0.4990	0.4990	0.0000	0.0001
Child	1.0594	1.0541	0.0054	0.0050
Female	0.4939	0.4938	0.0001	0.0001
× High school graduates	0.3400	0.3401	-0.0001	0.0003
× Some college	0.3572	0.3568	0.0004	0.0012
× College graduates	0.2687	0.2689	-0.0002	0.0008
× Advanced degrees	0.1489	0.1491	-0.0002	0.0012
× Black	0.2477	0.2481	-0.0005	0.0020
× Hispanic	0.2322	0.2322	0.0000	0.0001
× Other race	0.1466	0.1461	0.0005	0.0034
× Married	0.4033	0.4036	-0.0003	0.0007
× Child	0.7909	0.7766	0.0143	0.0186
Mean				0.0019

Finally, we estimate weighted regressions using the weight variable constructed above.

For more details of this methodology, see:

Morgan, Stephen L. and Jennifer J. Todd. 2008. “A Diagnostic Routine for the Detection of Consequential Heterogeneity of Causal Effects.” *Sociological Methodology* 38:231-81.

The Construction of the Occupational Measures from the O*NET Dataset

We used the O*NET 12.0 Database to construct the occupational skill measures. Among comprehensive dimensions of occupational characteristics, we use the dataset that includes occupational skill measures, education, training, experience requirements, and the specific vocational preparation (SVP) range. For more detailed methodology on the creation of these measures, see the technical document provided by Employment Security Commission:

National Center for O*NET Development. 2007. Data Dictionary: O*NET 12.0 Database

(1) Educational requirements[1]: average years of education in the occupation
(2) Experience requirements: average months of related work experience in the occupation
(3) On-site training: average months of on-site or in-plant training in the occupation
(4) On-the-job training: average months of on-the-job training in the occupation
(5) Job zone: modified SVP score

Job Zone	Name
1	Job Zone One: Little or No Preparation Needed
2	Job Zone Two: Some Preparation Needed
3	Job Zone Three: Medium Preparation Needed
4	Job Zone Four: Considerable Preparation Needed
5	Job Zone Five: Extensive Preparation Needed

Merging the O*NET dataset to the CPS dataset

The O*NET 12.0 and the CPS use different occupational classification schemes. O*NET 12.0 uses its own occupational scheme (O*NET-SOC 2000), which is based on the Standard Occupational Classification (SOC), and CPS uses Census Occupational Codes (COC). Although there are no crosswalks that directly match these two occupational schemes, both datasets can be matched to the SOC scheme. This entails several data matching processes: (1) Convert O*NET-SOC to SOC; (2) Match SOC to COC 2000. First, we matched O*NET-SOC 2000 to SOC. Although there are some differences between SOC and O*NET-SOC 2000, O*NET-SOC is roughly consistent with SOC. The differences are that O*NET-SOC 2000 applies more detailed classifications, which result in 49 SOC occupations matched to more than one SOC occupation. For these occupations, we use the occupational skill measures averaged for multiple O*NET occupations that are matched to the same SOC occupations. Next, we matched this dataset to the CPS dataset after the SOC and COC 2000 were matched using a crosswalk provided by the National Crosswalk Service Center (NCSC). The SOC also tends to be more detailed than COC 2000. As a result, when the datasets were matched, several COC were matched to multiple SOC. For those occupations, we again used their average scores. Also, because O*NET-2000 does not

[1] For the education, experience, and training measures, the original scales from the O*NET are percent of workers in several categories (e.g., % of workers whose educational attainment are less than high school), and we converted them to scale measures.

cover all SOC occupations, the score variables were missing for 69 COC occupations after the matching was completed.