

**Long-term effect of job displacement in Japan: A conservative estimate using the Japanese
Longitudinal Survey on Employment and Fertility (LOSEF)**

by

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Abstract

Using data from Japanese Longitudinal Survey on Employment and Fertility (LOSEF), this study investigated the long-term effects of displacement on earnings in the Japanese labor market. Adopting a fixed-effect model, we found significant negative effects of displacement on monthly earnings, by 23.6%. Furthermore, the earnings penalty was persistent: the estimate of earnings losses four years after displacement remained at 16.9%. Since our sample included those who experienced displacement only once in their career and were reemployed as a regular worker within a year, the obtained estimates of the earnings reductions associated with displacement would presumably be conservative.

1. Introduction

There has been a growing trend toward displacements in Japan since the 1990s. While the average rate of displacements has been low, the rate grew from about 1.1% in 1989 to 2.6 % in 2001. This trend raises a concern about the costs of being displaced. The costs could be especially high in Japan, where internal labor markets play an essential role in its employment system, and employees who were hired immediately upon graduation and have been continuously employed at the same firm are provided much stronger job security than the others.

The consequences of displacement have been studied intensively in the context of the U.S. labor market. In particular, using panel data from the Panel Study of Income Dynamics (PSID) (Ruhm, 1991; Stevens, 1997) or administrative records (Jacobson, et al., 1993; Couch and Placzek, 2010), the previous literature shows that displaced workers suffer from significant earnings losses that persist at least four to six years after displacement.

Studies on the issues of displacement in the Japanese labor market have relied heavily on large cross-sectional data sets such as the Employment Trend Survey (ETS) or the Employment Status Survey (ESS) (Abe et al., 2002; Bognanno and Kambayashi, 2013). These studies find that there is a significant one-shot wage penalty associated with displacement. Moreover, by exploiting the large sample size of the data sets, they show that the wage penalty is larger for the aged and long tenured workers. Due to a lack of panel data, however, the long-term effects of displacement remain unknown.

The objective of this study is to supplement the findings in the previous studies by investigating whether displaced workers experience long-term earnings losses in the Japanese labor market. In particular, using panel data from a series of the Japanese Longitudinal Survey on Employment and Fertility (LOSEF) that have recently become available, we explore the magnitude and persistency of earnings losses associated with job displacements in Japan.

The remainder of this paper is organized as follows. Section 2 presents a statistical model of the relationship between earnings and displacement and explains our estimation method. Section 3 describes the data we use for our empirical analyses. The results are presented in Section 4, and Section 5 concludes.

2. Analytical framework

To examine the long-term effects of displacements on monthly wages, we apply the methods of Jacobson et al. (1993). More specifically, we first estimate the following wage equation:

$$y_{it} = \alpha_i + \gamma_t + X_{it}\beta_x + \sum_{k=-3}^4 \delta_k D_{it}^k + \varepsilon_{it} \quad (1)$$

where y_{it} represents the natural log of earnings, X_{it} , a set of time-variant variables that affects both monthly compensation and employment probabilities, such as age and age squared. D_{it}^k is a dummy variable that takes a value of one if individual i was displaced k years prior to time t . In this study, k takes values from -3 to 4: we assume that earnings reductions begin 3 years prior to the displacement and last 4 years after the displacement. γ_t is a set of year dummy variables that is used to control for the effects of nationwide economy.

α_i represents individual fixed-effects (FE); that is, a set of time-invariant unobserved individual characteristics that have an effect on monthly compensation. If α_i includes factors such as the worker's ability and motivation that would affect both monthly compensation and a displacement probability, then estimating Equation (1) without controlling for α_i would yield biased estimates of the effects of displacement. To deal with this issue, we employ an FE model in estimating Equation (1).

3. Data

3.1. Data source

The data used in this study come from four Internet surveys administered by the Project on Intergenerational

Equity at the Research Institute for Policies on Pension and Aging: (1) the Japanese Longitudinal Survey on Employment and Fertility (LOSEF): the 2011 Internet Version, (2) the LOSEF for the middle-aged and elderly, (3) the LOSEF for the youth, and (4) the LOSEF for displaced workers¹. Survey (1) was conducted in Sep.-Dec. 2011, Survey (2) in Nov.-Dec. 2012, and Surveys (3) and (4) in Nov.-Dec. 2013. Hereafter, Surveys (1)–(4) will be collectively called the LOSEF.

The LOSEF collected longitudinal data on individuals' public pension enrollment, employment, and other major life events (e.g., marriage, childbirth). The respondents for the surveys were selected from those who had registered as monitors with an Internet survey company. Survey (1) covered approximately 6,000 males and females aged 30 to 59. Surveys (2)–(4) supplemented Survey (1) with information on the middle-aged and elderly, youth, and displaced workers, respectively. In particular, Survey (2) covered approximately 2,000 males and females aged 50 to 69, and Survey (3) about 3,000 males and females aged 21 to 35. Survey (4) targeted individuals who had experienced displacement, where an individual was identified as having been displaced if he/she answered “yes” to both of the two screening questions: “Have you ever worked as a standard employee (*seishain*)?” and “Have you ever left employment due to bankruptcy, layoff, voluntary redundancy, or ordinal dismissal at least once in your career after March 31, 2011?” As many as 1,400 displaced workers participated in Survey (4), providing a valuable and useful data source for the study of displaced workers in Japan. We construct data by pooling information on the sample of the LOSEF, leading to a total sample of 11,962 individuals with 298,512 person-year observations.

The unique characteristic of the LOSEF was that it asked respondents to utilize their Social Security Statement (*Nenkin Teikibin/Nenkin Net*) in answering questions in the survey. A Social Security Statement is an administrative document issued to enrollees of two public pension schemes: a scheme for workers regularly employed at private establishments (Employees' Pension, hereafter called EP; *Kosei Nenkin Hoken*) and a scheme for self-employed, farmers, non-standard workers, and other non-employed (National

¹ See Takayama et al. (2012) for a detailed explanation of the LOSEF: the 2011 Internet Version and Takayama et al. (2013) for the LOSEF for the middle-aged and elderly.

Pension, hereafter called NP; *Kokumin Nenkin*)². The aim of issuing the Social Security Statement is to inform the public pension enrollees of their enrollment history. As such, the document contains an individual's monthly records on the schemes enrolled, contributions made, etc. from age 15 (or age 20 for those enrolled in the NP) to present. Since an individual must enroll in/disenroll from the EP each time he/she obtains/separates from a standard job, the number of job acquisitions/separations can be identified from the enrollment record. In addition, information on the name of the firm where an individual was employed, the amount of standard monthly compensation (*Hyojun Hoshuu Getsugaku*), etc. is available for each period he/she had participated in the EP³.

The LOSEF asked respondents to accurately provide information in the Social Security Statement by transcribing the document. Furthermore, it requested respondents to answer retrospective questions about the characteristics of the EP-covered jobs they had had on the basis of the records in the Social Security Statement. The LOSEF also asked respondents who had experienced EP-covered job separation to recall and select the reason for each such experience from 7 alternatives: (i) Bankruptcy, layoff, voluntary redundancy, (ii) Mandatory retirement or transferred to an affiliated company (include being reemployed as an entrusted employee), (iii) Ordinary dismissal, (iv) Termination of contract period (includes seasonal work), (v) Marriage, childbirth, child-raising, (vi) Caregiving for elderly parents, and (vii) Others.

Given the information available in the LOSEF, we use, as a dependent variable, the natural log of the

² Although non-standard workers will be qualified for the scheme if they are considered as a regularly employed worker based on overall assessments of work arrangements and contents of the work (Japan Pension Service, retrieved from <http://www.nenkin.go.jp/n/www/english/detail.jsp?id=39>), we will call workers enrolling in the EP as “standard workers” for simplicity. The document cannot be issued to enrollees of the public pension schemes for civil servants (Mutual Aid Associations, *Kyosai Nenkin*); hence, surveys (1)–(4) do not include these individuals.

³ Standard monthly compensation represents monthly compensation, which is classified into 30 ranks according to the prescribed table and serves as the basis for calculating the benefits and contributions of the Employee's Pension scheme. Compensation covers salary, wage and any allowance employees receive from their employer but does not include extra allowance or bonus received at intervals of more than 3 months (Japan Pension Service, retrieved from <http://www.nenkin.go.jp/n/www/english/detail.jsp?id=39>).

standard monthly compensation as of April each year. The main independent variables are dummy variables that represent the timing of displacement. Here, displacement is defined as leaving employment due to bankruptcy, layoff, voluntary redundancy, or ordinal dismissal. The timing of displacement is identified from the dates the respondent disenrolled from the EP.

The constructed data have three major advantages over the ETS and ESS used in the previous literature. First, as described above, the LOSEF contains detailed longitudinal information on one's employment that is necessary to investigate the long-term effects of displacement on earnings. Second, the data are expected to have few recall bias and attrition problems because they are based on the respondents' Social Security Statement. Finally, due to Survey (4), the sample of the data contains a relatively large number of displaced workers, which is essential for the current study.

Despite the abovementioned advantages, the data have potential shortcomings as well. First, the sample of the LOSEF is not nationally representative (Takayama et al., 2012; Takayama et al., 2013). Second, the only available measure of earnings in the LOSEF, standard monthly compensation, does not include extra allowance or bonus received at intervals of more than 3 months; in addition, it is a categorical measure. Hence, a problem of measurement error may exist. Finally, in the LOSEF data, we cannot observe detailed characteristics of an individual's job (including standard monthly compensation) during the periods he/she had not enrolled in the EP. Hence, the sample used in our analysis is biased toward those who had been employed regularly at private establishments⁴. These shortcomings must be kept in mind when conducting an empirical analysis, and caution would be required in interpreting the results of the analysis.

3.2. Sample restrictions

We impose several restrictions on our sample (Table 1). First, our sample is limited to individuals who have

⁴ Note that non-standard workers will be qualified for the scheme if they are considered a standardly employed worker based on overall assessments of work arrangements and contents of the work (Japan Pension Service, retrieved from <http://www.nenkin.go.jp/n/www/english/detail.jsp?id=39>).

had an EP-covered job (i.e., had enrolled in the EP) at least once in their career. For each of these individuals, the sample period starts from the year he/she first obtained an EP-covered job and ends in the year of the survey they participated in⁵. This restriction reduces the number of individuals to 10,651 (89% of the original sample) and person-year observations to 239,284 (80.2% of the original sample). Hereafter, we call this sample the EP sample.

In imposing further sample restrictions, we divide the individuals in the EP sample into two groups: individuals who had separated from an EP-covered job and those who had never had such an experience. Among the individuals in the first group, our sample include only those who had separated from an EP-covered job just once by the survey date; whose reason for the job separation was displacement (i.e., bankruptcy, layoff, voluntary redundancy, or ordinal dismissal); who had at least 3 years of tenure when displaced; who found the next EP-covered job within a year after the displacement; who had accumulated at least 4 years of tenure on the next EP-covered job by the survey date; and who had worked as a standard worker (*seishain*)⁶. On the other hand, with regard to the individuals in the second group who had never separated from an EP-covered job, the sample restrictions are that he/she had continuously worked on the single EP-covered job for at least 7 years by the survey date as a standard worker⁷.

The final sample satisfying all the restrictions consists of 1,120 individuals (9.4% of the original sample) with 22,354 person-year observations (7.5% of the original sample). The average number of observations per individual is approximately 20.

3.3. Characteristics of the final sample

⁵ The average age these individuals first enrolled in the EP was 22.2.

⁶ Note that non-standard workers will be qualified for the scheme if they are considered a standardly employed worker based on overall assessments of work arrangements and contents of the work (Japan Pension Service, retrieved from <http://www.nenkin.go.jp/n/www/english/detail.jsp?id=39>).

⁷ The sample restriction of at least 7 years of tenure corresponds to the sample restrictions on displaced workers that require them to have accumulated at least 3 and 4 years of tenure on the pre- and post-displacement EP-covered jobs, respectively.

Table 2 presents summary statistics of the variables representing the characteristics of the final sample.

Compared to those in the EP sample or original sample, the individuals in the final sample were more likely to be in their 30s to 50s at the time of the survey, less likely to be female, and more likely to have high education.

The final sample is composed of 53 displaced workers and 1,067 non-displaced workers. Compared to the non-displaced workers in the final sample, the displaced workers were more likely to be aged 50 or older at the time of the survey and less likely to have higher education (Table 3). Furthermore, in terms of the initial EP-covered job, the displaced workers were more likely to work in the construction, wholesale and retail trade, or amusement and leisure industry; more likely to be managers or transportation and communication workers; and more likely to work at small firms.

Among the displaced workers in the final sample, the average age in the year of displacement was about 38, where the minimum and maximum ages were 22 and 55, respectively (Table 4). On average, they spent 0.26 years to find the next EP-covered job after being displaced and had accumulated 10.2 years of tenure on the job after being reemployed. 59% moved to smaller firms, 57% changed industry, and 40% changed occupation.

4. Results

4.1. Long-term earnings effects of displacement

The results of estimating Equation (1) are presented in Table 5. Column 1 in Table 5 shows OLS estimates of the equation when the effects of age are not controlled for. All of the coefficients on the displacement dummies are negative and significant except for those on the dummies indicating the years prior to displacement. When age and age squared variables are added as covariates, all the coefficients on the displacement dummies become negative and significant (Column 2).

Column 3 in Table 5 shows FE estimates of Equation (1) when age and age squared variables are not included as covariates. All of the coefficients on the displacement dummies are negative and significant except

for those on the dummies indicating the years prior to displacement. Controlling for the effects of age does not significantly change the results (Column 4). The FE estimates of the earnings losses of displaced workers are smaller than the OLS estimates, which suggests that displaced workers tend to have time-invariant unobservable characteristics that correlate negatively with earnings. Figure 1 presents the results in Table 5 graphically.

According to the FE estimates of Equation (1) with age and age squared variables, earnings are reduced by 23.6% in the year of displacement. While the magnitude of the earnings reduction tends to become smaller in post-displacement periods, it remains to be 16.9% in the fourth year after displacement. Thus, the results indicate that displacement has persistent negative effects on earnings.

4.2. Subsample analysis

To examine whether the earnings effects of displacement vary by worker characteristics, we interact each displacement dummy variable D_{it}^k with variables indicating workers' sex, education, firm size, and industry, and re-estimate Equation (1) that includes these interaction terms with a FE model. The results of the estimation are presented in Table 6.

The first set of the results shows how the earnings effects of displacement vary by sex. Some of the FE estimates of the coefficients on the interaction terms between displacement dummies and a female dummy are positive and significant, while the others are insignificant. These results seem to indicate that female workers are less affected by displacement than male workers. However, the caution would be required in interpreting the results given the extremely small sample size of displaced female workers (only 7 out of 53 displaced workers).

The second set of the results shows the earnings losses of displaced workers by the level of education. All of the FE estimates of the coefficients on the interaction terms between displacement dummies and a high education dummy are positive and significant. These results suggest that the earnings losses associated with displacement are smaller for high-educated workers compared to low-educated workers. Furthermore, the

difference between low- and high-educated workers persists over time. This would be the case if high-educated workers are more likely to accumulate general human capital that can be transferred to other jobs.

The third set of the results shows the difference in the earnings penalty of displacement by firm size. All of the FE estimates of the coefficients on the interaction terms between displacement dummies and a large firm dummy are negative, and some of them are significant. Hence, workers who are displaced from a large firm tend to experience larger earnings reductions compared to those who are displaced from a small firm. Moreover, they do not seem to catch up over time. This would be the case if workers in a large firm have more opportunities to receive trainings that produce specific human capital.

The final set of the results show how the earnings effects of displacement vary by industry. All of the FE estimates of the coefficients on the interaction terms between displacement dummies and a manufacturing sector dummy are negative, and some of them are significant. The results indicate that the earnings losses of workers who are displaced from a manufacturing sector are larger than those of workers displaced from the other sectors, although the difference seems to disappear over time.

4.4. Effects of tenure

To control for the effects of tenure, we add tenure and tenure squared variables to Equation (1) and re-estimate the equation. The results of the estimation are presented in Table 7. The FE estimates of the coefficients on the dummies representing the year of displacement and the years after displacement now become positive. Hence, if the length of tenure is the same, earnings in the post-displacement job are higher than those in the pre-displacement job. These results seem to indicate that a part of human capital accumulated on the pre-displacement job can be transferred to the post-displacement job.

5. Concluding remarks

Using panel data from the LOSEF, this study investigated the long-term earnings effects of displacement in

the Japanese labor market. Adopting a fixed-effect model to control for the effects of time-invariant unobserved individual characteristics, we found significant negative effects of displacement on monthly earnings. In particular, monthly earnings were reduced by approximately 23.6% upon displacement. Furthermore, the earnings penalty imposed on displaced workers was persistent: the estimate of earnings losses 4 years after displacement remained at around 16.9%. Since our sample included those who experienced displacement only once in their career and were reemployed as a regular worker within a year, the obtained estimates of the earnings reductions associated with displacement would presumably be conservative.

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Table 1: Sample restrictions

	Number of individuals (Number of person-year observations)
Enrolled in the EP	10,651 (239,284)
1. Separated just once	3,311 (70,366)
A. Involuntary (=bankruptcy, layoff, voluntary redundancy, or ordinal dismissal)	461 (11,834)
(a) At least 3 years of tenure when displaced	386 (10,928)
(b) Found the next EP-covered job within a year after the displacement	141 (3,195)
(c) At least 4 years of tenure on the next EP-covered job	377 (10,057)
(d) Worked as a standard worker	377 (9,979)
2. Never separated	1,586 (23,601)
(a) At least 7 years of tenure	1,099 (21,592)
(b) Worked as a standard worker	1,486 (22,872)

Note: The original sample consists of 11,962 individuals with 362,773 person-year observations

Table 2: Sample characteristics

	Final sample		EPI sample		Original sample	
	Mean	S.d.	Mean	S.d.	Mean	S.d.
<i>Demographic characteristics</i>						
Age	42.66	9.77	44.59	12.61	44.41	12.83
20s	0.034	0.181	0.106	0.307	0.124	0.330
30s	0.429	0.495	0.316	0.465	0.303	0.459
40s	0.261	0.439	0.215	0.411	0.196	0.397
50s	0.239	0.427	0.200	0.400	0.220	0.415
More than 60	0.037	0.188	0.163	0.369	0.156	0.363
Female	0.178	0.382	0.483	0.500	0.492	0.500
University education or higher	0.690	0.463	0.516	0.500	0.510	0.500
<i>Characteristics of the first EP-covered job</i>						
Age first obtained the EP-covered job	22.891	3.118	22.26	3.39		
Industry:						
Agriculture, forestry, and fishery	0.003	0.052	0.004	0.062		
Construction	0.068	0.252	0.059	0.235		
Manufacturing	0.382	0.486	0.263	0.440		
Information and communications	0.102	0.303	0.089	0.284		
Transportation or delivery activities	0.032	0.176	0.028	0.164		
Wholesale and retail trade	0.107	0.309	0.156	0.363		
Finance and insurance	0.113	0.317	0.101	0.301		
Real estate	0.009	0.094	0.011	0.102		
Scientific research	0.003	0.052	0.005	0.068		
Accommodation, food, and beverage services	0.004	0.067	0.023	0.151		
Amusement and leisure	0.003	0.052	0.010	0.102		
Education	0.008	0.089	0.019	0.137		
Healthcare and welfare	0.045	0.207	0.061	0.240		
Other	0.121	0.327	0.172	0.377		
Occupation:						
Professional/technical	0.402	0.490	0.317	0.465		
Management	0.090	0.287	0.050	0.218		
Office work	0.280	0.449	0.326	0.469		
Sales work	0.099	0.299	0.145	0.352		
Services work	0.044	0.205	0.083	0.276		
Security work	0.004	0.060	0.003	0.056		
Transport/communication	0.014	0.119	0.008	0.091		
Production/manufacturing/field work	0.060	0.237	0.055	0.228		
Unknown	0.007	0.084	0.013	0.112		
Firm size:						
Less than 100	0.190	0.393	0.278	0.448		
100 to 299	0.105	0.307	0.161	0.367		
300 to 499	0.059	0.236	0.075	0.264		
500 to 999	0.108	0.311	0.096	0.294		
1000 or more	0.538	0.499	0.390	0.488		
Number of obs.	1120		10651		11962	

Table 3: Sample characteristics by the experience of displacement

	Displaced		Non-displaced	
	Mean	S.d.	Mean	S.d.
<i>Demographic characteristics</i>				
Age	48.36	9.31	42.37	9.71
20s	0.019	0.137	0.035	0.183
30s	0.170	0.379	0.442	0.497
40s	0.321	0.471	0.258	0.438
50s	0.377	0.489	0.232	0.423
More than 60	0.113	0.320	0.033	0.178
Female	0.132	0.342	0.180	0.384
University education or higher	0.547	0.503	0.697	0.460
<i>Characteristics of the first EP-covered job</i>				
Age first obtained the EP-covered job	22.30	3.12	22.92	3.12
Years of tenure at the first EP-covered job	15.94	9.94	19.372	9.742
Industry:				
Agriculture, forestry, and fishery	0.000	0.000	0.003	0.053
Construction	0.132	0.342	0.065	0.246
Manufacturing	0.302	0.463	0.386	0.487
Information and communications	0.113	0.320	0.101	0.302
Transportation or delivery activities	0.019	0.137	0.033	0.178
Wholesale and retail trade	0.208	0.409	0.102	0.303
Finance and insurance	0.094	0.295	0.114	0.318
Real estate	0.000	0.000	0.009	0.096
Scientific research	0.000	0.000	0.003	0.053
Accommodation, food, and beverage services	0.000	0.000	0.005	0.068
Amusement and leisure	0.019	0.137	0.002	0.043
Education	0.000	0.000	0.008	0.091
Healthcare and welfare	0.000	0.000	0.047	0.211
Other	0.113	0.320	0.122	0.327
Occupation:				
Professional/technical	0.340	0.478	0.405	0.491
Management	0.189	0.395	0.085	0.279
Office work	0.208	0.409	0.284	0.451
Sales work	0.132	0.342	0.097	0.297
Services work	0.038	0.192	0.044	0.205
Security work	0.019	0.137	0.003	0.053
Transport/communication	0.019	0.137	0.014	0.118
Production/manufacturing/field work	0.057	0.233	0.060	0.238
Unknown	0.000	0.000	0.007	0.086
Firm size:				
Less than 100	0.283	0.455	0.186	0.389
100 to 299	0.226	0.423	0.099	0.299
300 to 499	0.000	0.000	0.057	0.232
500 to 999	0.094	0.295	0.112	0.315
1000 or more	0.038	0.192	0.546	0.498
Number of obs.	53		1067	

Table 4: Characteristics of displacement in the final sample

	Mean	S.d.
Age when displaced	37.660	9.874
Years spent to find the next EP-covered job after the displacement	0.258	0.323
Years of tenure at the second EP-covered job	10.201	5.432
Change after displacement:		
Moved to a smaller firm	0.585	0.497
Moved to a larger firm	0.170	0.379
Changed industry	0.566	0.500
Changed occupation	0.396	0.494
No. of obs.	53	

Table 5: Earnings effects of displacement

sample dependent variable estimated model	LOSEF log of monthly earnings											
	OLS			OLS			FE			FE		
	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value
dn3	-0.061	0.049	0.213	-0.071	0.038	0.063	-0.002	0.025	0.950	0.014	0.023	0.531
dn2	-0.056	0.049	0.252	-0.084	0.038	0.028	-0.010	0.025	0.697	0.002	0.023	0.921
dn1	-0.082	0.049	0.096	-0.125	0.038	0.001	-0.047	0.025	0.060	-0.038	0.023	0.101
d0	-0.243	0.049	0.000	-0.300	0.038	0.000	-0.221	0.025	0.000	-0.212	0.023	0.000
dp1	-0.194	0.049	0.000	-0.265	0.038	0.000	-0.188	0.025	0.000	-0.178	0.023	0.000
dp2	-0.149	0.049	0.002	-0.239	0.038	0.000	-0.160	0.025	0.000	-0.152	0.023	0.000
dp3	-0.142	0.049	0.004	-0.252	0.038	0.000	-0.187	0.025	0.000	-0.165	0.023	0.000
dp4	-0.129	0.052	0.014	-0.246	0.041	0.000	-0.178	0.027	0.000	-0.156	0.024	0.000
age	no			yes			no			yes		
sample size	22354			22354			22354			22354		
Adj. R-sq	0.18			0.502			0.53			0.613		
F value	93.52			410.9			517.8			690		

Note: All the regressions control for a dummy variable indicating that the individual is female and year dummies.

Table 6: Earnings effects of displacement by worker characteristic

sample	LOSEF											
	male/female			educational level less than university/university or higher			displaced from firm with less/more than 1000 employees			displaced from job in non-manufacturing/manufacturing sector		
dependent variable	log of monthly salary											
estimated model	FE			FE			FE			FE		
base group	male			less than university			less than 1000 employees			non-manufacturing sector		
	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value
dn3	0.017	0.024	0.492	-0.041	0.034	0.230	0.033	0.029	0.254	0.040	0.027	0.144
dn2	-0.003	0.024	0.904	-0.050	0.034	0.143	0.014	0.029	0.616	0.031	0.027	0.261
dn1	-0.053	0.024	0.030	-0.119	0.034	0.000	-0.003	0.029	0.927	-0.023	0.027	0.399
d0	-0.230	0.024	0.000	-0.264	0.034	0.000	-0.175	0.029	0.000	-0.174	0.027	0.000
dp1	-0.191	0.024	0.000	-0.232	0.034	0.000	-0.143	0.029	0.000	-0.154	0.027	0.000
dp2	-0.162	0.024	0.000	-0.226	0.034	0.000	-0.118	0.029	0.000	-0.128	0.027	0.000
dp3	-0.159	0.024	0.000	-0.235	0.034	0.000	-0.130	0.029	0.000	-0.155	0.027	0.000
dp4	-0.150	0.026	0.000	-0.209	0.037	0.000	-0.116	0.031	0.000	-0.141	0.028	0.000
Interaction terms:	D = female dummy			D = more than university dummy			D = 1000 or more employees dummy			D = female dummy		
dn3×D	0.021	0.072	0.774	0.095	0.046	0.038	-0.042	0.048	0.373	-0.087	0.050	0.080
dn2×D	0.078	0.072	0.275	0.090	0.046	0.051	-0.025	0.048	0.599	-0.097	0.050	0.052
dn1×D	0.154	0.072	0.031	0.143	0.046	0.002	-0.088	0.047	0.063	-0.051	0.050	0.310
d0×D	0.174	0.072	0.015	0.088	0.046	0.055	-0.097	0.047	0.042	-0.130	0.050	0.009
dp1×D	0.137	0.072	0.055	0.091	0.046	0.048	-0.090	0.047	0.057	-0.082	0.050	0.099
dp2×D	0.113	0.072	0.113	0.129	0.046	0.005	-0.084	0.048	0.075	-0.083	0.050	0.096
dp3×D	-0.003	0.072	0.962	0.122	0.046	0.008	-0.088	0.048	0.064	-0.034	0.050	0.490
dp4×D	-0.017	0.076	0.822	0.090	0.049	0.065	-0.099	0.050	0.046	-0.060	0.056	0.282
sample size	22354			22354			22354			22354		
Adj. R-sq	0.613			0.613			0.613			0.613		
F value	599.5			600.3			599.7			599.6		

Note: All the regressions control for a dummy variable indicating that the individual is female, year dummies, and age and age squared variables.

Table 7: Earnings effects of displacement (with tenure variables)

sample dependent variable estimated model	LOSEF											
	log of monthly earnings											
	OLS			FE			OLS			FE		
	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value	coeff.	s.e.	p-value
dn3	-0.076	0.038	0.047	-0.022	0.022	0.326	-0.071	0.038	0.063	0.014	0.023	0.531
dn2	-0.090	0.038	0.019	-0.035	0.022	0.119	-0.084	0.038	0.028	0.002	0.023	0.921
dn1	-0.072	0.042	0.091	-0.040	0.025	0.106	-0.125	0.038	0.001	-0.038	0.023	0.101
d0	-0.159	0.039	0.000	0.122	0.025	0.000	-0.300	0.038	0.000	-0.212	0.023	0.000
dp1	-0.127	0.039	0.001	0.137	0.024	0.000	-0.265	0.038	0.000	-0.178	0.023	0.000
dp2	-0.103	0.039	0.008	0.144	0.024	0.000	-0.239	0.038	0.000	-0.152	0.023	0.000
dp3	-0.119	0.039	0.002	0.112	0.024	0.000	-0.252	0.038	0.000	-0.165	0.023	0.000
dp4	-0.116	0.041	0.005	0.096	0.025	0.000	-0.246	0.041	0.000	-0.156	0.024	0.000
tenure	yes			yes			no			no		
sample size	22344			22344			22354			22354		
Adj. R-sq	0.508			0.632			0.502			0.613		
F value	405.9			718			410.9			689.6		

Note: All the regressions control for a dummy variable indicating that the individual is female, year dummies, and age and age squared variables.

Figure 1: Earnings effects of displacement

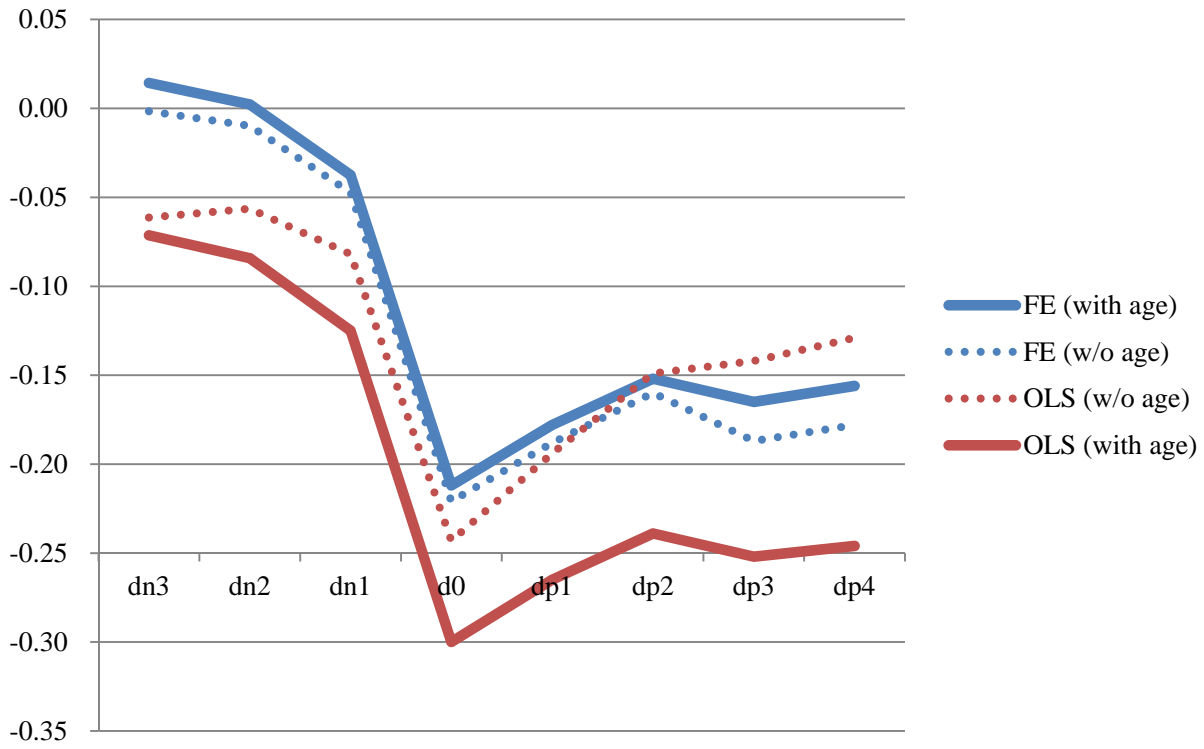


Figure 2: Earnings effects of displacement (Female/Male)

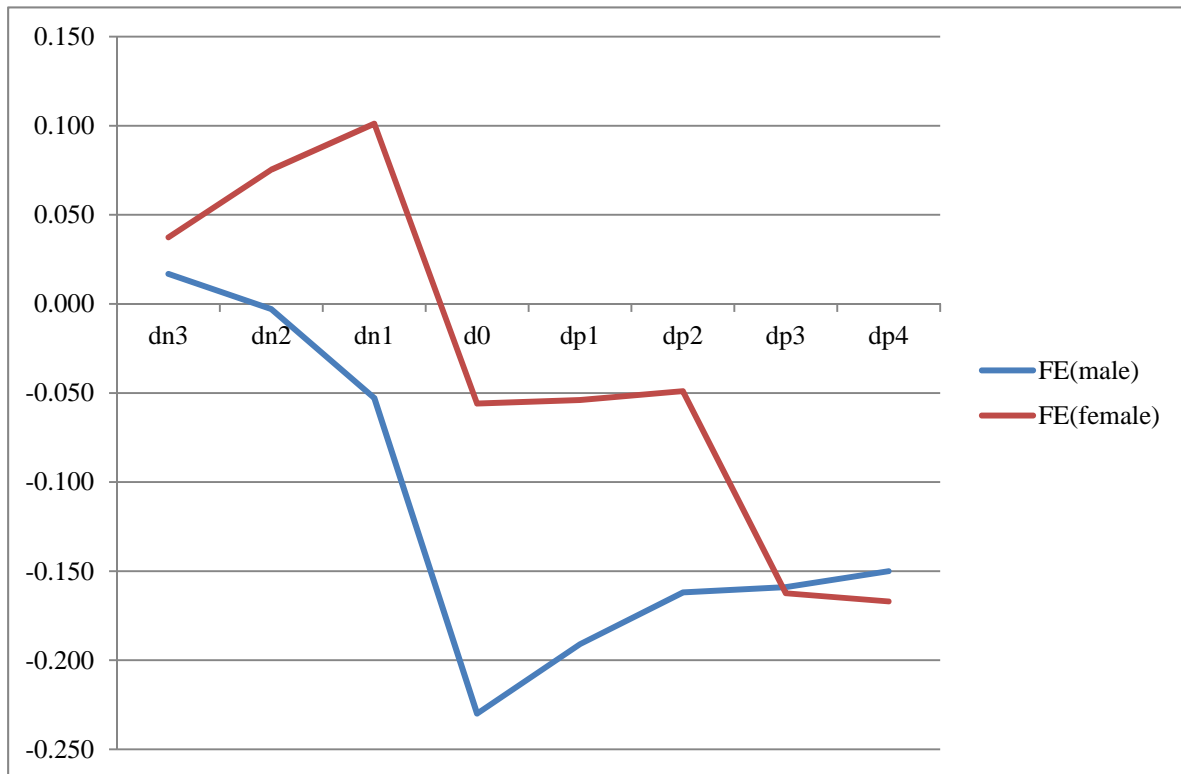


Figure 3: Earnings effects of displacement (High education/Low education)

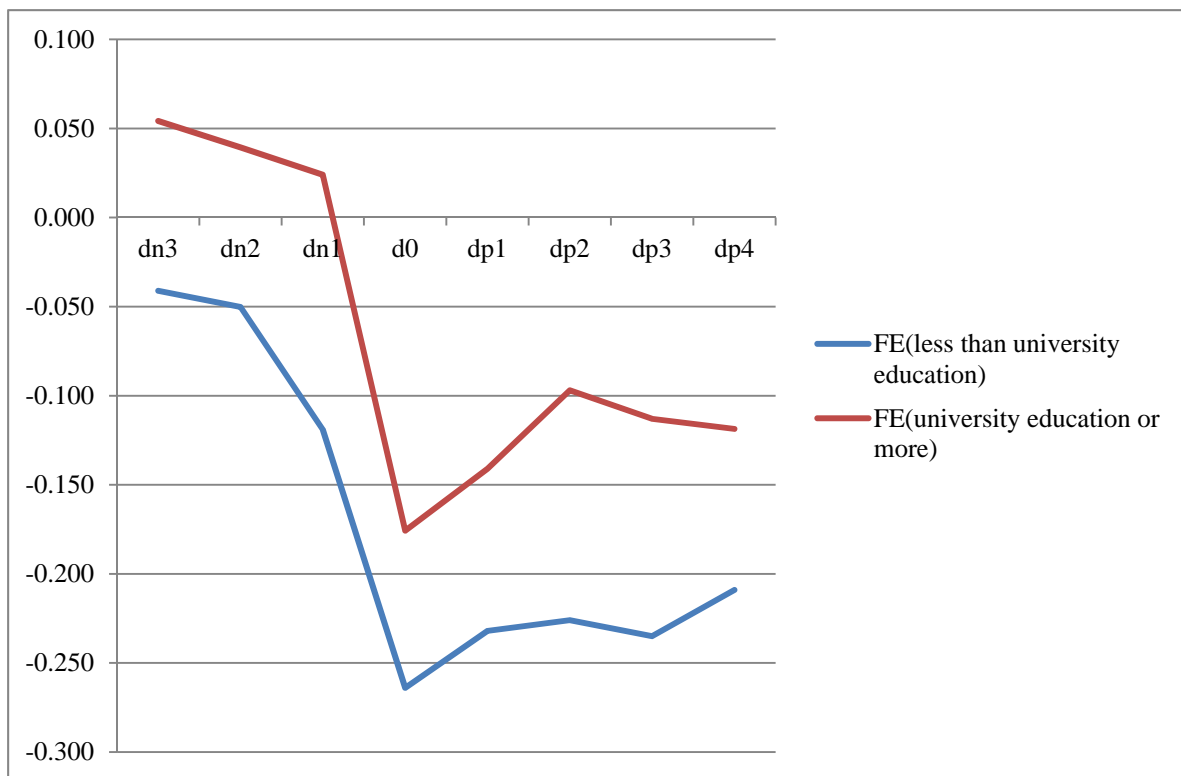


Figure 4: Earnings effects of displacement (Large firm/Small firm)

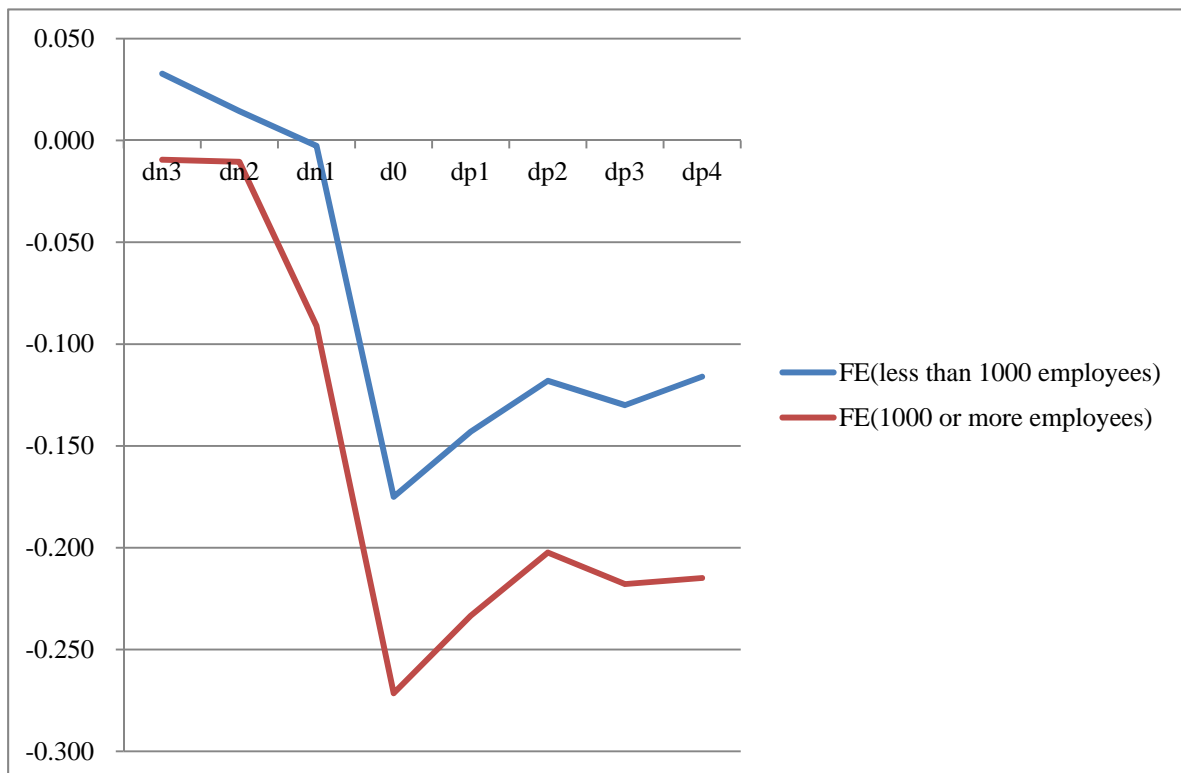


Figure 5: Earnings effects of displacement (Manufacturing/Non-manufacturing)

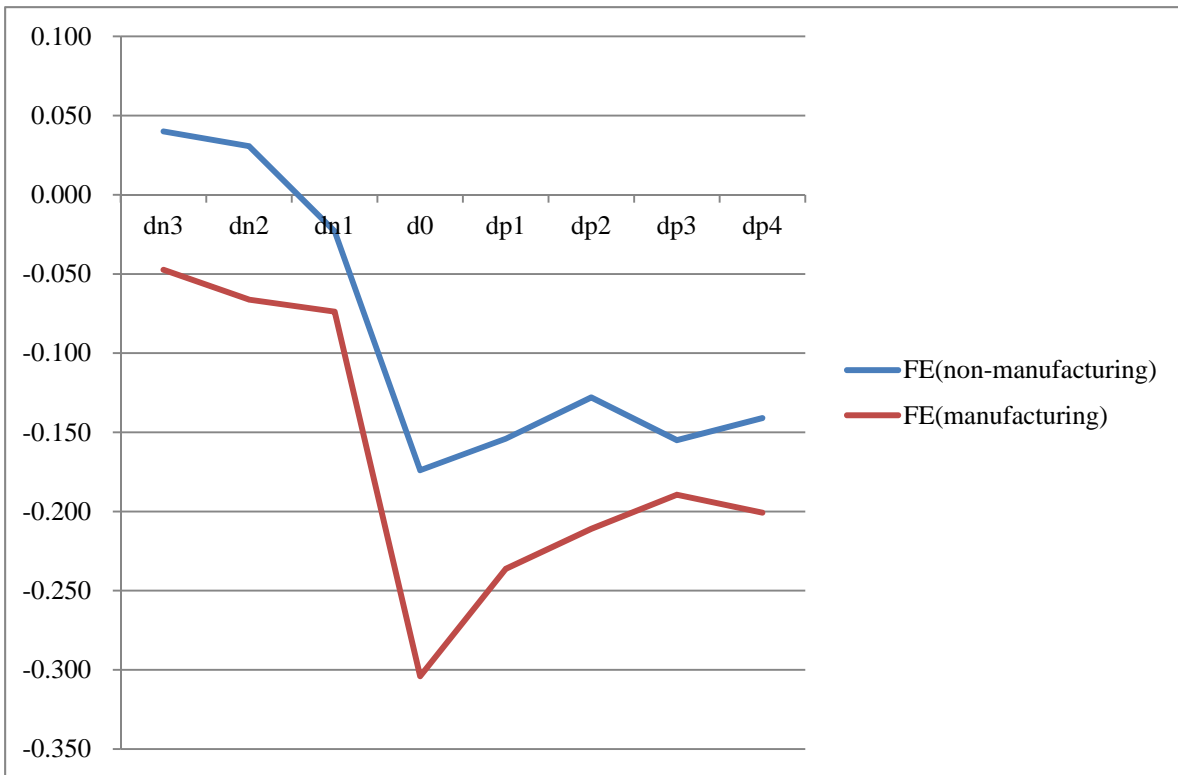


Figure 6: Earnings effects of displacement (With tenure)

