The earnings effect of job displacement: Evidence from the GSOEP

by

Getinet A. Haile

Department of Economics

The Management School

University of Lancaster

German Socio-Economic Panel User Conference, 2004

Outline

1. Job Displacement
2. Theoretical Background
3. Existing empirical evidence
4. The GSOEP data & Sample Selection
5. Estimation Methodologies
6. Results

1. Job Displacement

➢ Involuntary job separation (broad definition)

➢ Very much studied in the context of the US labour market following the high levels of (manufacturing) job losses in the mid-1980s.

➢ Limited studies in Europe (and elsewhere) largely due to lack of appropriate data for the purpose of undertaking US type studies. Also, the problem of displacement has not been as much.

➢➢ There is a need for studying the nature and consequences of job displacement to be able to make appropriate interventions

➢ The focus of studies on job displacement is on the Incidence & Costs of job displacement.

➢ Questions generally asked are:

1/ Who are the displaced? And

2/ What are the costs of job displacement?

- Two types of economic costs

1/ Earnings loss &

2/ Spells of unemployment/non-employment

- The focus in this study is on identifying the displaced and the cost that they experience in terms of lost earnings.

2. Theoretical Basis

- Human capital theory: job displacement → loss of firm-specific human capital → low productivity → earnings loss.

- Search & matching theory: job displacement → loss of match specific capital → earnings loss (if good match!)

- Signalling & imperfect information: (initial) wage penalty due to imperfect information

➢ Further theoretical considerations: Efficiency wage theory, agency theory.

➢ In general theory allows us to predict the consequences of job displacment. For example, the nature of job displacement, the duration of interruption following displacement & time since re-employment do mater in explaining the costs of job displacement.

➢ Prediction of the theories is not substitute for empirical investigation however. It is only through empirical investigation that we can get an accurate account of the costs of job displacement.

3. Existing empirical evidence

➢ Hamermesh (1989); Farber (1993,1997, 2001), Fallick (1996), Kletzer (1998) give comprehensive review of the US literature.

➢In the US displaced workers lose between 10 – 25% vis-à-vis non-displaced workers.

➢ More recently, job displacement is being studied in Europe in general & Germany in particular.

Becker (2000), low-risk workers (-16%) and high-risk workers (0%)

Burda & Mertens (2001): combine GSOEP with administrative data. Lowest earnings quartile +2% while upper three quartiles –17%. Overall, -3.6% growth.

Couch (2001): GSOEP (1992-1996): annual earnings grow by –13.5% in the year of displacement & -6.5% two years later.

Bender *et al* (2002), no significant loss but interruption following displacement leads to higher penalty (up to 19%)

4. The GSOEP data & sample selection

- Longest panel data in Europe
- Self reported reasons for job loss
- Possible to construct control group of non-displaced workers
- Possible problems with type & number of interruptions
- The sample selection criteria includes:
    - West German Men,
    - Those that are successfully interviewed in 1984 (& then after),
    - Those without gaps in observations

- Those that were 16 – 51 years old in 1984,
- Those that are not in self-employment, not in agriculture & charity,
- Those without missing values on personal and relevant job characteristics

5. Estimation methodologies:

A/ Within-Group Estimator (Generalisation of the Difference-in-Differences (DID) technique)

$$y_{it} = \alpha_i + \beta' \mathbf{x}_{it} + \sum_{r=-3}^{3} \gamma_r D_{it}^r + \varepsilon_{it}$$

i and t index individuals and calendar time (years), respectively. y_{it} represents log of real monthly earning, $\mathbf{x}_{it}$ represents vector of covariates and D_{it} is displacement dummy.

For the displaced: D_{it}^r assumes a value of 1 if, in period t, worker i was displaced -r years later or, if, in period t, worker i had been displaced r years earlier.

The coefficient γ_r therefore represents the effect on a worker's earnings of job displacement r (-r) years following (preceding) the event of job displacement. ε_{it}, constant variance & uncorrelated across individuals and time periods.

B/ Matching & Within-Group Estimator

➢ Propensity score matching (Rosenbaum & Rubin, 1983) to construct appropriate comparison group.

First, identify the probability of displacement

$$P(D_{it} = 1) = F(X_{it-1}, Z_{it-1}, R_{it-1})$$

Then a non-displaced worker *j* is chosen as a control based on 'propensity score' & using the 'nearest-neighbour' matching method (Sianesi, 2001):

$$\left| P_{it} - P_{jt} \right| = \min_{n \in \{D_{nt}=0\}} \left\{ P_{it} - P_{jt} \right\}$$

6. Empirical Findings: Tables of results + figures

Table 1: Descriptive statistics of samples used in the earnings analysis (GSOEP: 1984 – 1997)

	Starting sample	Final sample	Matched sample
Age<=30	**0.239**	**0.191**	**0.170**
Age45	**0.410**	**0.460**	**0.454**
Age45+	**0.351**	**0.348**	**0.377**
Education (years)	**11.040**	**10.997**	**10.558**
Married	**0.733**	**0.790**	**0.817**
Single	**0.267**	**0.210**	**0.183**
German	**0.670**	**0.651**	**0.574**
Health problem	**0.280**	**0.264**	**0.295**
Tenant	**0.600**	**0.608**	**0.658**
Children under 16	**0.490**	**0.530**	**0.557**
Northern Germany	**0.180**	**0.164**	**0.168**
Western Germany	**0.461**	**0.463**	**0.426**
Southern Germany	**0.359**	**0.373**	**0.407**
Unemployed b4 1984	**0.218**	**0.209**	**0.323**
No. of displaced	**553**	**483**	**358**
No. of man-year	**28073**	**20009**	**6240**
No. of men	**3181**	**2190**	**647**

Table 2: Real gross monthly earnings before, during and after job displacement (DM 1995 price)

Relative time	Final sample		Matched sample	
	Non-dis. (freq.)	Displaced (freq.)	Non-dis. (freq.)	Displaced (freq.)
5 years before	4459.0 (2806)	4257.8 (780)	4123.3 (505)	4315.6 (713)
4 years before	4559.7 (772)	4375.6 (190)	4258.8 (134)	4462.1 (166)
3 years before	4529.4 (940)	4423.5 (225)	4264.8 (166)	4501.3 (197)
2 years before	4592.1 (1079)	4204.1 (263)	4305.7 (192)	4254.3 (231)
1 year before	4562.0 (1322)	4079.9 (323)	4246.6 (245)	4116.2 (284)
Year of displacement	4579.4 (1542)	3949.6 (389)	4227.3 (270)	4007.6 (338)
1 year after	4663.1 (1309)	4040.7 (227)	4369.1 (219)	4196.2 (169)
2 years after	4747.8 (1080)	4070.8 (271)	4476.9 (178)	4264.8 (191)
3 years after	4866.3 (921)	4180.0 (266)	4690.6 (151)	4410.3 (186)
4 years after	4935.2 (769)	4272.8 (265)	4731.2 (122)	4511.8 (182)
5 years after	5199.3 (2892)	4406.0 (1378)	4894.1 (451)	4456.5 (950)
Total	4722.8 (15432)	4248.1 (4577)	4411.6 (2633)	4327.6 (3607)

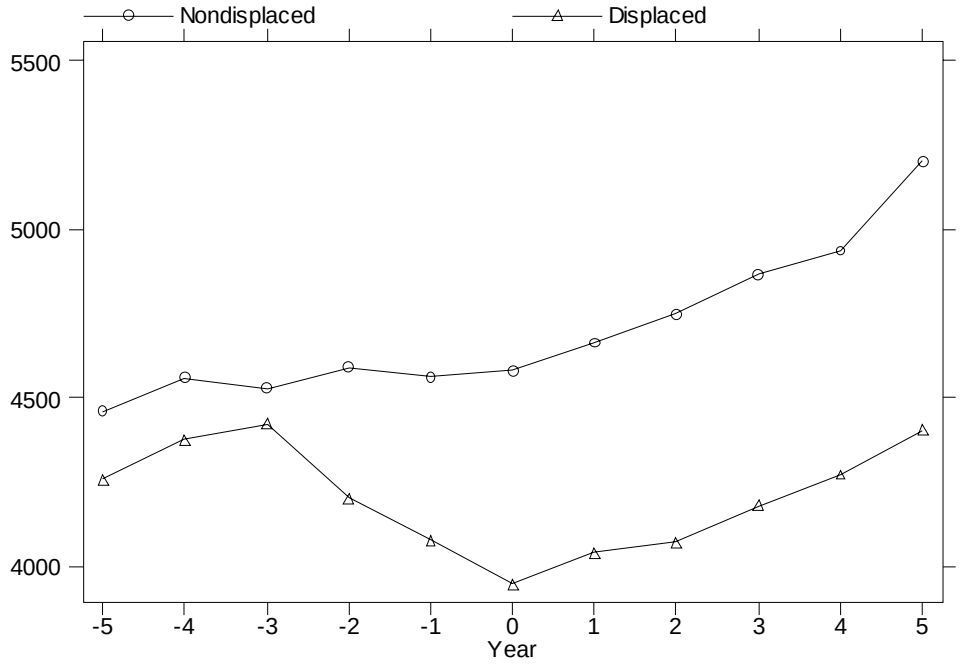

Figure 1: Real gross monthly earnings of displaced and non-displaced workers five years before and after job displacement (final sample).

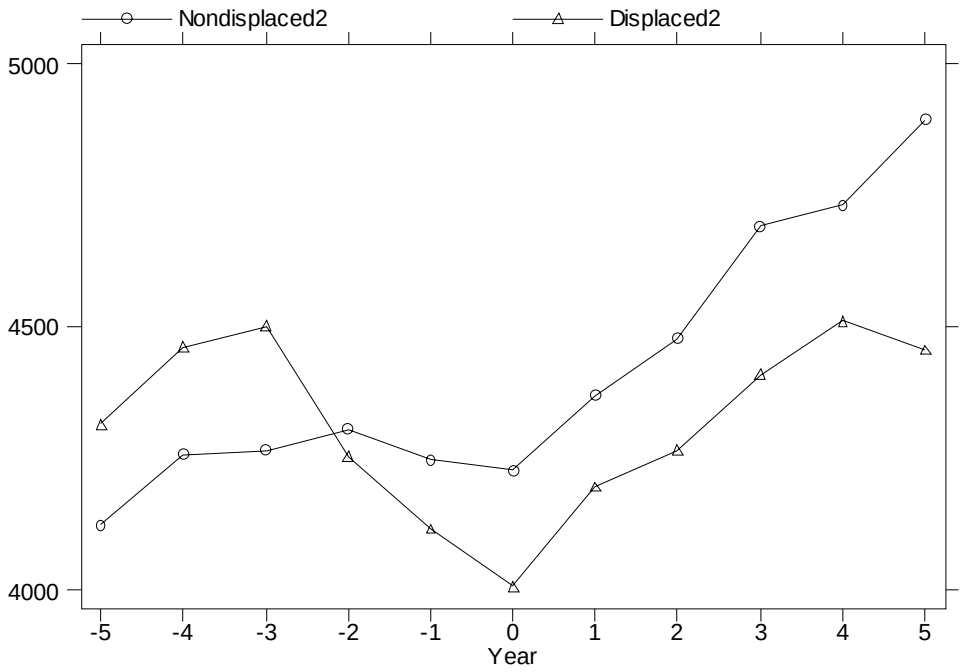

Figure 2: Real gross monthly earnings of displaced and non-displaced workers five years before and after job displacement (matched sample).

Table 3: Earnings effects of job displacement – all controls
(GSOEP: 1984 – 1996)

	(1)		(2)		(3)		(4)	
	Coeff.	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
Displacement dummy variables								
Displaced after two years	**-0.009**	**0.505**	**-0.015**	**0.228**	**-0.014**	**0.252**	**-0.015**	**0.235**
Displaced after a year	**-0.026**	**0.037**	**-0.027**	**0.021**	**-0.025**	**0.037**	**-0.021**	**0.071**
Displaced current year	**-0.034**	**0.005**	**-0.044**	**0.000**	**-0.041**	**0.000**	**-0.037**	**0.001**
Displaced a year ago	**-0.046**	**0.002**	**-0.049**	**0.001**	**-0.046**	**0.001**	**-0.045**	**0.002**
Displaced two years ago	**-0.023**	**0.107**	**-0.030**	**0.036**	**-0.029**	**0.040**	**-0.031**	**0.030**
Displaced three years ago	**0.019**	**0.077**	**-0.007**	**0.546**	**-0.007**	**0.549**	**-0.013**	**0.250**
Personal & job characteristics								
Age			**0.068**	**0.000**	**0.068**	**0.000**	**0.067**	**0.000**
Age sq./100			**-0.059**	**0.000**	**-0.059**	**0.000**	**-0.057**	**0.000**
Multiple displacements			**-0.063**	**0.000**	**-0.060**	**0.000**	**-0.056**	**0.000**
> 3 years tenure in the old job			**-0.062**	**0.000**	**-0.062**	**0.000**	**-0.062**	**0.000**
Re-employed part-time			**-0.214**	**0.000**	**-0.214**	**0.000**	**-0.213**	**0.000**
Firm size <20					**-0.061**	**0.000**	**-0.057**	**0.000**
Firm size 20-200					**-0.017**	**0.006**	**-0.014**	**0.024**
Firm size 200-2000					**-0.010**	**0.075**	**-0.007**	**0.169**
Constant	**8.272**	**0.000**	**6.640**	**0.000**	**6.668**	**0.000**	**6.687**	**0.000**
No. of observations	**20009**		**20009**		**20009**		**20009**	
No. of groups (men)	**2190**		**2190**		**2190**		**2190**	
R-sq: Within	**0.1214**		**0.2201**		**0.223**		**0.234**	

F-stat.	**205.09**	**295.5**	**255.93**	**169.92**
Prob. > F = 0.0000	**0.000**	**0.000**	**0.000**	**0.000**
Rho	**0.793**	**0.805**	**0.805**	**0.806**

Note: All specifications include relative time dummies while specification (4) includes calendar time dummies as well.

Table 4: Earnings effects of job displacement - matched controls
(GSOEP: 1984 – 1996)

	(1)		(2)		(3)		(4)	
	Coeff.	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**	**Coeff.**	**P-value**
Displacement dummy variables								
Displaced after two years	**-0.012**	**0.516**	**-0.018**	**0.311**	**-0.013**	**0.481**	**-0.013**	**0.472**
Displaced after a year	**-0.030**	**0.094**	**-0.034**	**0.045**	**-0.029**	**0.090**	**-0.027**	**0.108**
Displaced current year	**-0.032**	**0.070**	**-0.034**	**0.040**	**-0.027**	**0.103**	**-0.025**	**0.139**
Displaced a year ago	**-0.059**	**0.005**	**-0.054**	**0.007**	**-0.045**	**0.027**	**-0.046**	**0.022**
Displaced two years ago	**-0.030**	**0.159**	**-0.027**	**0.192**	**-0.021**	**0.300**	**-0.025**	**0.228**
Displaced three years ago	**-0.021**	**0.183**	**-0.021**	**0.198**	**-0.017**	**0.292**	**-0.026**	**0.098**
Personal & job characteristics								
Age			**0.063**	**0.000**	**0.062**	**0.000**	**0.060**	**0.000**
Age sq./100			**-0.055**	**0.000**	**-0.054**	**0.000**	**-0.052**	**0.000**
Multiple displacements			**-0.079**	**0.000**	**-0.073**	**0.000**	**-0.070**	**0.000**
> 3 years tenure in the old job			**-0.042**	**0.005**	**-0.042**	**0.005**	**-0.037**	**0.011**
Re-employed part-time			**-0.132**	**0.000**	**-0.136**	**0.000**	**-0.141**	**0.000**
Firm size <20					**-0.078**	**0.000**	**-0.074**	**0.000**
Firm size 20-200					**-0.009**	**0.375**	**-0.006**	**0.563**
Firm size 200-2000					**-0.020**	**0.039**	**-0.019**	**0.049**
Constant	**8.232**	**0.000**	**6.721**	**0.000**	**6.757**	**0.000**	**6.810**	**0.000**
No. of observations	**6240**		**6240**		**6240**		**6240**	
No. of groups (men)	**647**		**647**		**647**		**647**	

R-sq: Within	**0.113**	**0.198**	**0.207**	**0.219**
F-stat.	**59.2**	**81.01**	**72.81**	**48.8**
Prob. > F = 0.0000	**0.000**	**0.000**	**0.000**	**0.000**
Rho	**0.741**	**0.757**	**0.757**	**0.755**

Note: All specifications include relative time dummies while specification (4) includes calendar time dummies as well.

7. Conclusion: Neither large nor persistent effect of job displacement in Germany, contrary to the finding in the extensive US literature.