The Heterogeneous Effects of Training Incidence and Duration on Labor Market Transitions

Bernd Fitzenberger, Aderonke Osikominu, Marie Waller

IRP Seminar, September 2009

Motivation

- Training is an important tool of active labor market policy in many countries.
- Many recent papers on employment or wage effects of these programs (see Card, Kluwe, and Weber 2009).
- Assignment to training for the unemployed is often dynamic: assigned to training only if not found a job before.
- Most recent studies use matching approach (does not account for selection based on unobservables, restrictions when adjusting approach to dynamic setting).
- Some estimate hazard rates using the so called timing-of-events approach proposed for continuous duration models by Abbring and van den Berg (2003).

Motivation

- Obtain effect of training versus no training on employment probability (classical ATT) in setting with dynamic assignment.
- Little attention on effect heterogeneity across training duration so far. Realized training duration is an endogenous variable, often depends on success in job search. Most papers consider the start of a program as treatment.
- How does training affect the employment probability of trainees when accounting for these dynamics?
- Does the effect of training vary with the planned duration of the scheme when individual program duration is endogenous? (costs, lock-in effect)

Contribution

- Evaluation of training schemes that takes into account the dynamics of program assignment and duration.
- Joint estimation of transitions in and out of employment and training using a bivariate RE probit model.
- Highly flexible specification allows for state dependence, duration dependence, and various forms of effect heterogeneity.
- Correlated individual specific effects: selection into training based on unobservables.
- Estimated using Bayesian simulation technique (Markov Chain Monte Carlo, MCMC): numerically robust estimation, predictors of the individual specific effects.
- Develop simulation approach to obtain different treatment effects of interest.

Long-term Training

- Training important part of German ALMP: retraining, **long-term training** (focus here), short-term training.
- About 20 bn Euros; about 9% of stock of unemployed participates in training.
- Permanently reintegrate unemployed back into employment. Enhance human capital and adjust skills to changing requirements of labor market and possibly to changed individual conditions of employability.
- Train specific professional skills: in classroom, training firms, internship.
- Examples: computer assisted bookkeeping, sales strategies, operating construction machines.
- Planned duration on average 8 months, but large heterogeneity.

Dynamic Training Participation

- **Dynamic assignment of training:**
- Eligibility: registered unemployed and training considered necessary.
- During unemployment job-seeker and caseworker meet repeatedly for counseling interviews and case worker decides whether participation now or wait further.
- Job seeker: two competing risks, job or training.
- **Dynamic decision to continue or drop out while on program:** Encouraged to take job offer even during training. Not possible to be employed and take part in training at the same time!
- End of participation endogenous: 20% dropouts (see Waller 2009) and some cases with prolonged participation.

The Integrated Employment Biographies Sample

- Large and rich data set for evaluation of German ALMP.
- 2.2% random sample of individuals data drawn from four administrative data processes: **Employment spells** (social insurance register data, 1990-2004), **Benefit spells** (records of transfer payments of labor agency, 1990-2005), **Programm spells** and **Job search spells** (labor offices, 2000/1997-2005).
- Spell structure: personal identifier, day of begin, day of end, many variables.
- 17 m. spells, 1.4 m. individuals

Panel Data Set for the Analysis

- Inflow sample into unemployment between 7/1999 and 12/2000, age 25 to 53; after continuous employment of > 124 days.
- 42,251 individuals, 5,319 participants.
- Construct panel data set based on calendar quarters.
- Follow individuals from inflow quarter over 17 quarters or until end of 2004.
- Construct employment dummy, training dummy and covariates for each quarter.
- Covariates include: age, schooling, occupation, wage, health, children, local labor market condition, season, year, employment history before inflow...

Model (simplified)

- Employment equation:

$$E_{it}^{*} = [Qlag]_{it,E}\gamma_E + x_{it,E}\beta_E + \alpha_{i,E} + \epsilon_{it,E} \tag{1}$$

  where $E = \mathbf{1}[E^{*} > 0]$. "Qlag" is a vector of variables depicting past program information.

- Training equation (estimated if not employed and not yet left a program):

$$Q_{it}^{*} = x_{it,Q}\beta_Q + \alpha_{i,Q} + \epsilon_{it,Q} \tag{2}$$

  where $Q = \mathbf{1}[Q^{*} > 0]$.

- $\alpha_{(i,E)}$ and $\alpha_{(i,Q)}$ follow a joint normal distribution $N(0,\Sigma)$. $\epsilon_{it,E}$ and $\epsilon_{it,Q}$ are independently N(0,1).

Model

Employment equation is a flexible function of:

- incidence, duration and time since begin of lagged training
- lagged employment, elapsed duration in current state and time since inflow
- observed covariates
- interactions

Specification allows for effect heterogeneity w.r.t. to program length, time since begin, covariates and for state dependence, duration dependence, interdependence with covariates...

Training equation is a flexible function of:

- lagged training incidence, elapsed training duration, elapsed unempl. duration, time since inflow, covariates

About 160 parameters overall!

Identification

- Identified by the timing-of-events, discrete time version of the timing-of-events approach proposed by Abbring and van den Berg (2003).
- Selection effects driven by observables and unobservables affect the outcomes from the beginning, the treatment effect operates from the quarter of program start onwards.
- Identification of the causal effect relies on the conditional randomness of program starts and a no-anticipation condition as well as functional form assumptions.
- In Germany training at any point in time during unemployment. Short notice and partly supply driven.

MCMC: the Gibbs Sampler

- Estimation of likelihood function feasible with MCMC, a technique from Bayesian statistics. This gives information on all parameters, including the random effects.
- Goal: obtain a large sample from the posterior distribution of the parameters. Mean and SD can be interpreted like point estimates and SE from an ML estimation.
- **Gibbs Sampler:** Stack all parameters in one vector, form blocks, sample iteratively from the conditional distributions. Converges to a distribution that is the desired posterior distribution.
- After "burn-in period" each realization is a sample from the posterior distribution. Here: burn-in 5.000; results based on 45.000 iterations.

MCMC Estimation of Random Effects Probit Models

- Probit Model: Albert and Chib (1993): simulate latent dependent variables from truncated distributions (data augmentation).
- Random effects: data augmentation for the random effects (Zeger and Karim, 1991).
- Chib (2001, Handbook of Econometrics) reviews MCMC concepts. Related models estimated in economics for instance: Buchinsky et al. (2005) and Odejar (2002).
- We programmed algorithm in Stata. Diffuse priors used.

Simulation strategy

- Raw coefficient estimates are difficult to interpret because of complex dynamic structure of the model involving many interaction effects.
- Analyze directly the treatment parameters of interest.
- To get these, we simulate draws from the posterior distribution of these treatment effects based on the sequence of MCMC iterations.
- To account for selection based on unobservables, we use the draws of the individual random effects $\alpha_{i,E}$ and $\alpha_{i,Q}$ from the MCMC estimation of the model.

Parameters of interest

- *Classical ATT*: ATT of training versus non-participation
- *Training versus Waiting*: ATT of training versus non-participation in this quarter, but maybe later. Mimics treatment parameter suggested by Sianesi (2004) and estimated in several papers.
- *Effect of a Given Planned Program Duration*: ATT of 1, 3 or 4 quarters planned program durations versus 2 quarters planned program duration. Realized program length endogenous.

Simulation of the Classical ATT

For every 30th draw:

- Beginning with the quarter of program start, predict the individual quarterly employment status by going through the dynamic process based on the updated covariates, the coefficients, the predictor of the random effect and an idiosyncratic error term drawn from a standard normal.
- Analogously, simulate the counterfactual nontreatment outcome, with terms involving training set to zero.
- Calculate the average of the difference between the two predictions over all treated individuals.

Use the resulting 1,500 draws to describe the posterior distribution of the ATT (using mean and SD).

Simulation of further treatment parameters analogously:

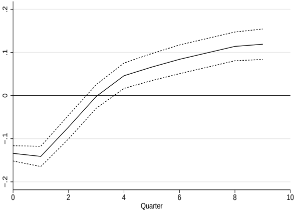
- *Training versus Waiting*: for the counterfactual set training dummy Q to zero for the start quarter and for the following quarters simulate E and Q in turn. Involves simulating a counterfactual participation rate.
- *Effect of a Given Planned Program Duration*: Set the planned length to the given number of quarters and then simulate E and Q in turn.

Estimation Results, Variances

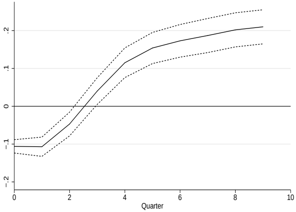
Variable	Male Mean	Male SD	Female Mean	Female SD
West				
$Var(\alpha_E)/(Var(\alpha_E)+1)$	0.381	0.011	0.468	0.013
$Var(\alpha_Q)/(Var(\alpha_Q)+1)$	0.221	0.039	0.308	0.042
$Corr(\alpha_E, \alpha_Q)$	-0.109	0.060	-0.004	0.067
East				
$Var(\alpha_E)/(Var(\alpha_E)+1)$	0.356	0.016	0.511	0.021
$Var(\alpha_Q)/(Var(\alpha_Q)+1)$	0.261	0.039	0.224	0.042
$Corr(\alpha_E, \alpha_Q)$	-0.120	0.069	-0.220	0.096

Classical ATT

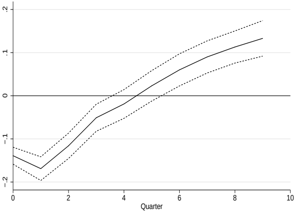
West German Men



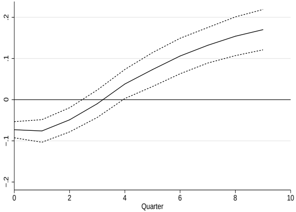
West German Women



East German Men

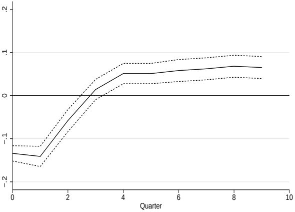


East German Women

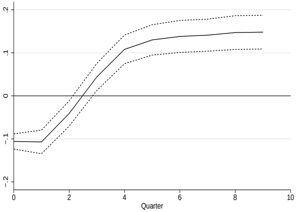


ATT of Training versus Waiting

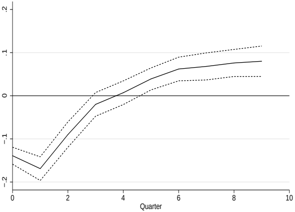
West German Men



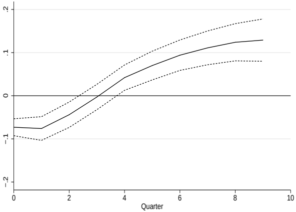
West German Women



East German Men

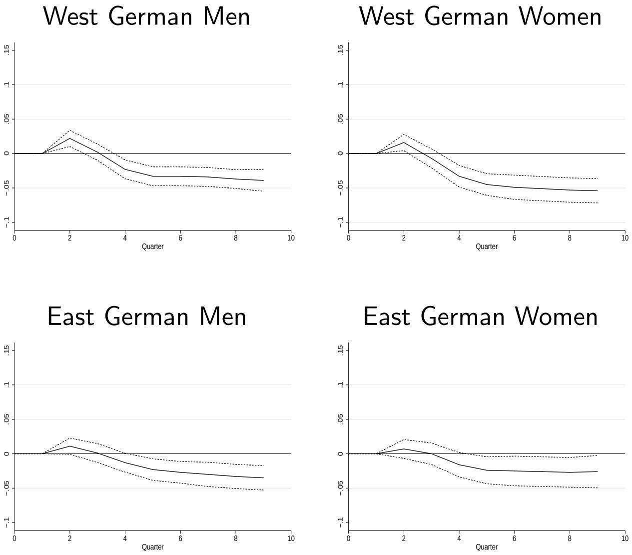


East German Women

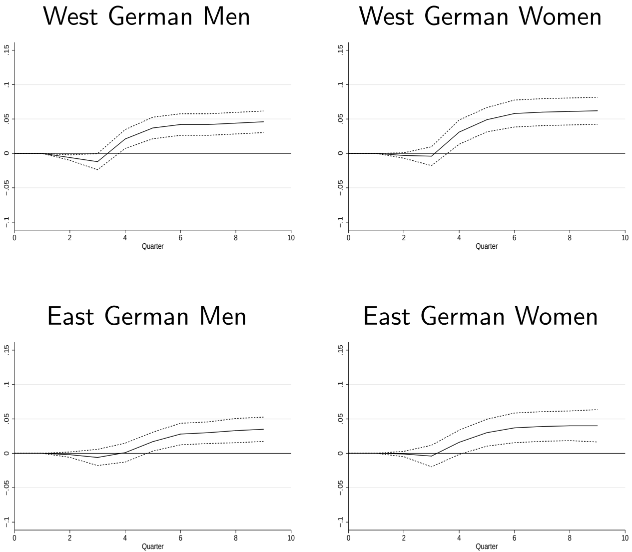


Introduction
Training in Germany
Data
Model
Estimation
Simulation of ATT
Results
Conclusion
Research Agenda
Appendix

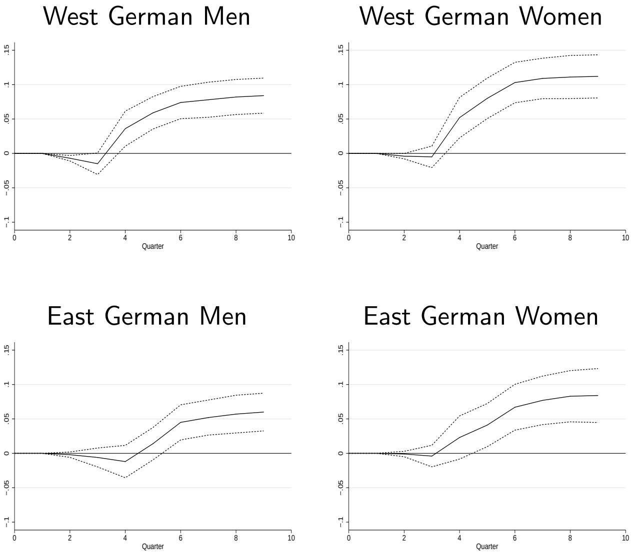
ATT of Attending a Program Scheduled for 1 vs 2 Quarters



ATT of Attending a Program Scheduled for 3 vs 2 Quarters



ATT of Attending a Program Scheduled for 4 vs 2 Quarters



Conclusion

- Evaluate the impact of training on employment using a bivariate dynamic RE probit model.
- Dynamic approach that accounts for dynamic assignment of training and dynamic decision to continue training.
- Estimation by MCMC.
- Obtain treatment effects of interest directly by simulation.
- Results suggest positive treatment effects on the employment probability for all groups after the lock-in period.
- The effect of training versus waiting underestimates the effect of training versus no training by about one third.
- Participants benefit from being assigned to longer programs.

Current Research (Submitted Papers)

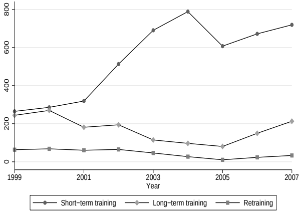
- *"Many Dropouts? Never Mind! - Employment Prospects of Dropouts from Training Programs"*: identify dropout and estimate employment effect of dropout from training
- *"Which program for whom? Evidence on the comparative effectiveness of public sponsored training programs in Germany", joint with M. Biewen, B. Fitzenberger and A. Osikominu*: comprehensive evaluation and comparison of different training programs, matching in a multiple and dynamic context, effect heterogeneity, importance of employment history etc. for matching
- *"Deja Vu? Short-Term Training in Germany 1970-1992", joint with B. Fitzenberger, O. Orlyanskaya and A. Osikominu*: employment effects of different short-term programs available at different times

Future Research

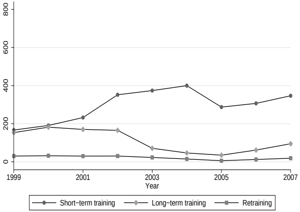
- Introduction of vouchers to training assignment: new project, waiting for the data ...
- While at IRP: start a new paper: again on ALMP? or use skills in microeconometric tools from dissertation for a completely different topic?
- While at IRP: Attend seminars, discuss research and maybe start a paper in cooperation with one of you, if you were interested...
- marie.waller@vwl.uni-freiburg.de

Entries into Training in Germany (in 1000)

West Germany

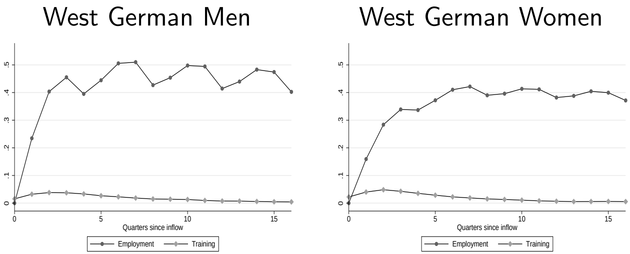


East Germany



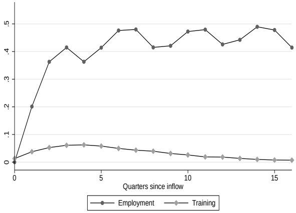
Source: BA (2001, 2006, 2007, 2008); own calculations.

Employment and Participation Rates over Time

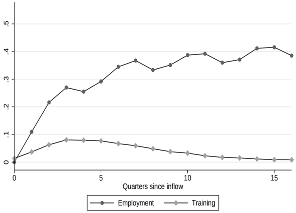


Employment and Participation Rates over Time

East German Men



East German Women



Dynamic Training Participation

- Static approach assumes that (1) distinction between participants and controls fixed over time (2) time of enrollment decided in the beginning and not adapted endogenously
- Static approach implicitly conditions on future outcomes if program assignment and program duration are actually dynamic decisions

Bayesian Methods and MCMC

- Frequentists: θ fixed but unknown and sample based $\hat{\theta}$ random. Focus on point estimates and standard errors.
- Bayesians: $\hat{\theta}$ fixed given data y and θ random. Get samples from posterior density of θ.
- Bayes Theorem:

$$f(\theta|y) = \frac{f(y|\theta) * \pi(\theta)}{f(y)}$$

- $p(\theta|y) \propto L(y|\theta)\pi(\theta)$ Posterior combines prior and likelihood.
- Because:

$$Pr(A|B) = \frac{Pr(B|A) * Pr(A)}{Pr(B)}$$

- Frequentists: Likelihood, Bayesians: Posterior distribution. Equivalent results with diffuse priors.

Algorithm (Slight I)

- Set starting values for the coefficient vectors η_E and η_Q, the individual specific effects $(\alpha_{i,E}, \alpha_{i,Q})$ and the variance covariance matrix of the individual specific effects Σ.
- Step 1a: Sample E^*_{it} from $\mathcal{N}(z_{it,E}\eta_E + \alpha_{i,E}, 1)$ with support $[0, \infty]$ if $E_{it} = 1$ and with support $[-\infty, 0]$ if $E_{it} = 0$. $\mathcal{N}(\bullet)$ denotes the normal distribution.
- Step 1b: Sample Q^*_{it} from $\mathcal{N}(z_{it,Q}\eta_Q + \alpha_{i,Q}, 1)$ with support $[0, \infty]$ if $Q_{it} = 1$ and with support $[-\infty, 0]$ if $Q_{it} = 0$ (if the training equation is to be estimated).

Algorithm (Slight II)

- Step 2: Sample $(\alpha_{i,E}, \alpha_{i,Q})'$ from its bivariate normal conditional posterior distribution $\mathcal{N}(\mu, V_{\alpha_i})$, where $\mu = V_{\alpha_i} \cdot \begin{pmatrix} T_{i,E} & 0 \\ 0 & T_{i,Q} \end{pmatrix} \cdot \begin{pmatrix} (\bar{E}_i^* - \bar{z_{i,E}}\eta_E) \\ (\bar{Q}_i^* - \bar{z_{i,Q}}\eta_Q) \end{pmatrix}$ and $V_{\alpha_i} = \left(\Sigma^{-1} + \begin{pmatrix} T_{i,E} & 0 \\ 0 & T_{i,Q} \end{pmatrix}\right)^{-1}$, a bar over a variable denotes its mean across time, $T_{i,E}$ the number of observations for person i, and $T_{i,Q}$ the number of observations for person i for which the training equation is to be estimated. The prior distribution of the random effects is given by $\mathcal{N}(0, \Sigma)$.
- Step 3a: Sample the η_E vector from its multivariate normal conditional posterior distribution $\mathcal{N}(M_E, V_E)$, where $M_E = V_E(B_{E,0}^{-1} b_{E,0} + \sum_{i=1}^{N} \sum_{t=1}^{T_{i,E}} z'_{it,E}(E_{it,E}^* - \alpha_{i,E}))$ and $V_E = (B_{E,0}^{-1} + \sum_{i=1}^{N} \sum_{t=1}^{T_{i,E}} z'_{it,E} z_{it,E})^{-1}$. N is the number of persons in the data. The prior distribution of the η_E vector is given by $\mathcal{N}(b_{E,0}, B_{E,0})$.

Algorithm (Slight III)

- Step 3b: If the training equation is to be estimated, sample the η_Q vector from its multivariate normal conditional posterior distribution $\mathcal{N}(M_Q, V_Q)$, where $M_Q = V_Q(B_{Q,0}^{-1} b_{Q,0} + \sum_{i=1}^{N} \sum_{t=1}^{T_{i,Q}} x'_{Q,it}(Q^*_{Q,it} - \alpha_{i,Q}))$ and $V_Q = (B_{Q,0}^{-1} + \sum_{i=1}^{N} \sum_{t=1}^{T_{i,Q}} z'_{it,Q} z_{it,Q})^{-1}$. The prior distribution of the η_Q vector is given by $\mathcal{N}(b_{Q,0}, B_{Q,0})$.
- Sample Σ^{-1} from its conditional posterior distribution
$$\mathcal{W}^{-1}\left(\begin{pmatrix} \sum_{i=1}^{N} \alpha_{i,E}^2 & \sum_{i=1}^{N} \alpha_{i,E}\alpha_{i,Q} \\ \sum_{i=1}^{N} \alpha_{i,E}\alpha_{i,Q} & \sum_{i=1}^{N} \alpha_{i,Q}^2 \end{pmatrix} + H_0,\ N + h_0\right).$$
$\mathcal{W}^{-1}$ denotes the inverse Wishart distribution. The prior distribution of Σ^{-1} is given by $\mathcal{W}^{-1}(H_0, h_0)$.
- Go to Step 1. Always use current values.

Employment Rate and Number of Participants

q	Male West $\bar{E}_t$	Male West $\hat{E}_t$	Male West N_t	Female West $\bar{E}_t$	Female West $\hat{E}_t$	Female West N_t
0	0.000	0.000*	1740	0.000	0.000*	1431
1	0.079	0.079*	1740	0.070	0.070*	1431
2	0.179	0.177	1721	0.162	0.165	1411
3	0.239	0.244	1696	0.264	0.267	1385
4	0.302	0.301	1664	0.354	0.355	1366
5	0.334	0.346	1623	0.415	0.412	1338
6	0.371	0.370	1577	0.442	0.440	1316
7	0.371	0.377	1526	0.450	0.454	1291
8	0.364	0.387	1465	0.464	0.468	1253
9	0.396	0.405	1393	0.478	0.481	1213

Notes: q denotes the quarter of program start, and $\bar{E}_t$ the sample mean of the employment dummy in quarter t. $\hat{E}_t$ is the mean of the employment dummy as predicted

Employment Rate and Number of Participants

	Male East			Female East		
	$\bar{E}_t$	$\hat{E}_t$	N_t	$\bar{E}_t$	$\hat{E}_t$	N_t
0	0.000	0.000*	1300	0.000	0.000*	848
1	0.048	0.048*	1300	0.039	0.039*	848
2	0.120	0.123	1290	0.081	0.078	840
3	0.178	0.177	1282	0.118	0.121	834
4	0.226	0.218	1265	0.172	0.185	825
5	0.278	0.284	1229	0.240	0.239	816
6	0.311	0.320	1201	0.279	0.274	795
7	0.318	0.335	1159	0.320	0.300	765
8	0.345	0.355	1106	0.329	0.330	741
9	0.378	0.391	1039	0.356	0.355	710

Notes: q denotes the quarter of program start, and $\bar{E}_t$ the sample mean of the employment dummy in quarter t. $\hat{E}_t$ is the mean of the employment dummy as predicted

Classical ATT

	Male West		Female West		Male East		Female East	
q	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	-0.134	0.009	-0.106	0.009	-0.139	0.010	-0.073	0.010
1	-0.141	0.012	-0.107	0.013	-0.169	0.014	-0.076	0.014
2	-0.073	0.014	-0.047	0.016	-0.116	0.015	-0.049	0.015
3	-0.002	0.014	0.040	0.018	-0.051	0.016	-0.010	0.017
4	0.046	0.015	0.115	0.020	-0.019	0.017	0.038	0.018
5	0.066	0.016	0.154	0.021	0.023	0.018	0.073	0.021
6	0.084	0.017	0.173	0.022	0.060	0.019	0.106	0.022
7	0.099	0.017	0.187	0.023	0.090	0.019	0.132	0.022
8	0.114	0.017	0.202	0.023	0.113	0.019	0.154	0.024
9	0.119	0.018	0.210	0.023	0.133	0.021	0.170	0.025

q denotes the quarter since program start

Predicted Participation Rate of Participants if Postponing Participation

q	Male West $\hat{Q}_t$	Male West $\bar{Q}_t$	Female West $\hat{Q}_t$	Female West $\bar{Q}_t$	Male East $\hat{Q}_t$	Male East $\bar{Q}_t$	Female East $\hat{Q}_t$	Female East $\bar{Q}_t$
0	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
1	0.270	0.650	0.175	0.708	0.337	0.729	0.220	0.742
2	0.317	0.413	0.192	0.464	0.374	0.533	0.221	0.619
3	0.292	0.226	0.165	0.229	0.333	0.349	0.189	0.432
4	0.241	0.074	0.132	0.064	0.269	0.142	0.151	0.195
5	0.177	0.020	0.095	0.025	0.197	0.024	0.107	0.029
6	0.132	0.020	0.072	0.021	0.141	0.014	0.073	0.021
7	0.099	0.019	0.053	0.018	0.097	0.010	0.052	0.018
8	0.078	0.006	0.043	0.011	0.071	0.006	0.039	0.012
9	0.060	0.001	0.035	0.008	0.050	0.000	0.028	0.002
Total	0.687	1	0.523	1	0.767	1	0.626	1

q denotes the quarter since program start.

ATT of Training versus Waiting

	Male West		Female West		Male East		Female East	
q	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	-0.134	0.009	-0.106	0.009	-0.139	0.010	-0.073	0.010
1	-0.141	0.012	-0.107	0.014	-0.169	0.014	-0.076	0.014
2	-0.058	0.013	-0.041	0.015	-0.090	0.015	-0.044	0.015
3	0.014	0.012	0.044	0.016	-0.020	0.014	-0.003	0.015
4	0.051	0.012	0.108	0.017	0.007	0.014	0.042	0.015
5	0.051	0.012	0.130	0.018	0.039	0.013	0.070	0.017
6	0.058	0.013	0.138	0.019	0.062	0.014	0.094	0.018
7	0.062	0.013	0.141	0.019	0.068	0.016	0.111	0.020
8	0.068	0.013	0.147	0.020	0.076	0.016	0.124	0.022
9	0.065	0.013	0.148	0.020	0.080	0.018	0.129	0.025

q denotes the quarter since program start

Predicted Participation and Employment Rates Male, West

	One quarter		Two quarters		Three quarters		Four quarters	
q	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$
0	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000
1	0.399	0.079	0.793	0.079	0.904	0.079	0.918	0.079
2	0.086	0.187	0.286	0.165	0.706	0.159	0.812	0.158
3	0.024	0.246	0.061	0.244	0.246	0.232	0.617	0.229
4	0.007	0.267	0.017	0.290	0.050	0.311	0.198	0.326
5	0.003	0.296	0.006	0.329	0.015	0.365	0.043	0.387
6	0.001	0.316	0.002	0.348	0.005	0.390	0.013	0.422
7	0.001	0.323	0.001	0.358	0.002	0.399	0.005	0.435
8	0.000	0.328	0.001	0.365	0.001	0.410	0.003	0.448
9	0.000	0.344	0.000	0.383	0.001	0.429	0.001	0.467

q denotes the quarter in which the program starts.

Predicted Participation and Employment Rates: Female, West

	One quarter		Two quarters		Three quarters		Four quarters	
q	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$
0	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000
1	0.416	0.070	0.825	0.070	0.922	0.070	0.931	0.070
2	0.099	0.166	0.311	0.151	0.748	0.147	0.836	0.147
3	0.030	0.246	0.071	0.253	0.269	0.249	0.647	0.248
4	0.011	0.292	0.021	0.325	0.059	0.357	0.219	0.377
5	0.005	0.328	0.008	0.372	0.019	0.422	0.051	0.452
6	0.002	0.350	0.004	0.398	0.007	0.456	0.016	0.501
7	0.001	0.364	0.002	0.415	0.004	0.475	0.007	0.524
8	0.001	0.375	0.001	0.428	0.002	0.490	0.005	0.540
9	0.001	0.386	0.001	0.440	0.002	0.501	0.003	0.552

q denotes the quarter in which the program starts.

Predicted Participation and Employment Rates : Male, East

	One quarter		Two quarters		Three quarters		Four quarters	
q	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$	$\hat{Q}_t$	$\hat{E}_t$
0	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000
1	0.455	0.048	0.869	0.048	0.946	0.048	0.952	0.048
2	0.096	0.127	0.333	0.117	0.798	0.115	0.873	0.115
3	0.027	0.178	0.068	0.177	0.295	0.171	0.723	0.171
4	0.009	0.214	0.020	0.227	0.062	0.229	0.264	0.215
5	0.004	0.256	0.007	0.279	0.018	0.296	0.052	0.294
6	0.001	0.281	0.003	0.308	0.006	0.336	0.013	0.353
7	0.001	0.291	0.001	0.321	0.003	0.352	0.006	0.374
8	0.000	0.308	0.001	0.341	0.001	0.374	0.003	0.398
9	0.000	0.339	0.000	0.373	0.001	0.408	0.001	0.434

q denotes the quarter in which the program starts.

Predicted Participation and Employment Rates: Female, East

q	One quarter $\hat{Q}_t$	One quarter $\hat{E}_t$	Two quarters $\hat{Q}_t$	Two quarters $\hat{E}_t$	Three quarters $\hat{Q}_t$	Three quarters $\hat{E}_t$	Four quarters $\hat{Q}_t$	Four quarters $\hat{E}_t$
0	1.000	0.000	1.000	0.000	1.000	0.000	1.000	0.000
1	0.443	0.039	0.899	0.039	0.959	0.039	0.961	0.039
2	0.075	0.083	0.352	0.076	0.866	0.074	0.919	0.074
3	0.019	0.123	0.062	0.123	0.345	0.119	0.823	0.119
4	0.006	0.159	0.016	0.175	0.064	0.191	0.323	0.198
5	0.002	0.195	0.006	0.219	0.018	0.249	0.064	0.260
6	0.001	0.217	0.002	0.242	0.007	0.279	0.019	0.309
7	0.001	0.237	0.001	0.263	0.003	0.302	0.008	0.340
8	0.000	0.263	0.001	0.290	0.002	0.330	0.005	0.373
9	0.000	0.287	0.001	0.314	0.002	0.354	0.003	0.398

q denotes the quarter in which the program starts.

ATT of Attending a Program Scheduled for 1 vs 2 Quarters

	Male West		Female West		Male East		Female East	
q	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.022	0.006	0.016	0.006	0.011	0.006	0.007	0.007
3	0.002	0.006	-0.007	0.007	0.001	0.007	-0.000	0.008
4	-0.023	0.007	-0.033	0.008	-0.013	0.007	-0.016	0.009
5	-0.033	0.007	-0.045	0.008	-0.023	0.008	-0.024	0.010
6	-0.033	0.007	-0.049	0.009	-0.027	0.008	-0.025	0.011
7	-0.034	0.007	-0.051	0.009	-0.030	0.009	-0.026	0.011
8	-0.037	0.007	-0.053	0.009	-0.033	0.009	-0.027	0.011
9	-0.039	0.008	-0.054	0.009	-0.035	0.009	-0.026	0.012

q denotes the quarter in which the program starts.

ATT of Attending a Program Scheduled for 3 vs 2 Quarters

	Male West		Female West		Male East		Female East	
q	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	-0.006	0.002	-0.003	0.002	-0.002	0.002	-0.001	0.002
3	-0.012	0.006	-0.004	0.007	-0.006	0.006	-0.004	0.008
4	0.021	0.007	0.031	0.009	0.001	0.007	0.016	0.009
5	0.037	0.008	0.049	0.009	0.017	0.007	0.030	0.010
6	0.042	0.008	0.058	0.010	0.028	0.008	0.037	0.011
7	0.042	0.008	0.060	0.010	0.030	0.008	0.039	0.011
8	0.044	0.008	0.061	0.010	0.033	0.009	0.040	0.011
9	0.046	0.008	0.062	0.010	0.035	0.009	0.040	0.012

q denotes the quarter in which the program starts.

ATT of Attending a Program Scheduled for 4 vs 2 Quarters

	Male West		Female West		Male East		Female East	
q	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	-0.007	0.002	-0.004	0.002	-0.002	0.002	-0.001	0.002
3	-0.015	0.008	-0.005	0.008	-0.006	0.007	-0.004	0.008
4	0.036	0.013	0.052	0.015	-0.012	0.012	0.023	0.016
5	0.059	0.012	0.080	0.015	0.014	0.012	0.041	0.016
6	0.074	0.012	0.103	0.015	0.045	0.013	0.067	0.017
7	0.078	0.013	0.109	0.015	0.052	0.013	0.077	0.018
8	0.082	0.013	0.111	0.016	0.057	0.014	0.083	0.019
9	0.084	0.013	0.112	0.016	0.060	0.014	0.084	0.020

q denotes the quarter in which the program starts.