Get Training or Wait?
Long–Run Employment Effects of Training Programs for the Unemployed in West Germany

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- Persistent and growing unemployment problem in Germany
- Public sector sponsored training (off–the–job) reduced recently as part of labor market reforms
- 'New Consensus': Sizeable investments in human capital of the unemployed take a long time to show positive effects
- Dynamic evaluation approach

Plan of the Talk

1. Introduction
2. Data
3. Estimation Strategy
4. Empirical Results
5. Conclusions

1. Introduction

- Public sector sponsored training (PSST) important part of active labor market policy in Germany
  2003: Total Expenditures of more than 21 billion Euro for ALMP in Germany (about 50% in East Germany) with € 5.0 billion for PSST
  Cuts in PSST: 2004 expenditures reduced to € 3.6 billion
- Previous studies for Germany typically based on survey data with very broad definition of PSST programs → employment effects contradictory but mostly negative
- For the first time, administrative data for the 80s and 90s made available for evaluation purposes (joint project with IAB and M. Lechner)
- Data allows for a concise economic classification of the program type
- Employment effects of three training programs for the unemployed based on inflow samples from employment into unemployment
- Dynamic approach: treatment differs by elapsed duration of unemployment at the start of the treatment (timing of events)

- Analyze medium to long run effects of treatment up to at least 6 years since beginning of treatment

2. Data

- Administrative data merging
  - IABS: Register data on employment based on social security records (daily records)
  - LED: Transfer payments by Federal Labor Office to unemployed/participants in training programs (daily records)
  - ST35: Administrative survey conducted in labor offices between 1980 and 1997 on training programs (monthly records)

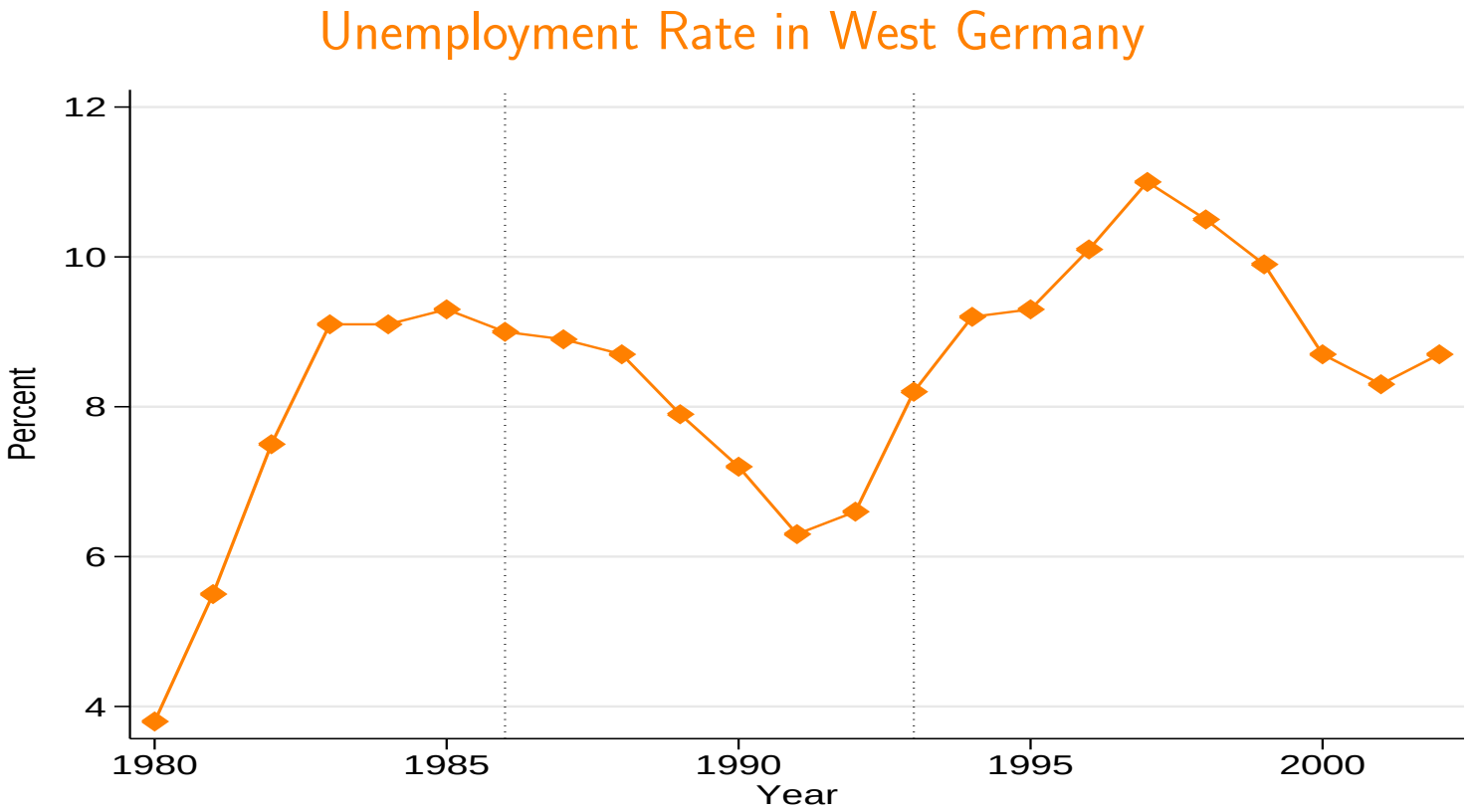
$\longrightarrow$ Construct merged monthly data based on spell information: keep dominating state in month

$\longrightarrow$ Consolidate further to quarterly data

- Use as much information as possible from both transfer data and ST35 survey to identify valid PSST treatments

Samples and Treatments

- Restrict analysis to 25–55 year old individuals at time of entry into unemployment
- Three training programs, which are not associated with a regular job:
  - (i) Practice Firm (PF): Training in a simulated work environment
    median duration 5 (6) month
  - (ii) Provision of specific professional skills and techniques (SPST) in (classroom) courses of medium length
    median duration 4 (6) month
  - (iii) Retraining (RT): two–year program providing complete vocational training in a new occupation
    median duration 12 (16) month
- Distinguish treatments starting during quarters 1–2 / 3–4 / 5–8 of elapsed unemployment (3 strata)



- Entries into unemployment in West Germany during the years 86/87 and the years 93/94

Participation in First Training Program for the Inflow Samples into Unemployment

Training Program	Frequency	Percent of inflow sample	Percent among Treated
Cohort 86/87			
Practice Firm	246	1.2	14.4
SPST	1,093	5.2	63.8
Retraining	375	1.8	21.9
No training program above	19,188	91.8	–
Total inflow sample	20,902	100	100
Cohort 93/94			
Practice Firm	325	1.3	11.9
SPST	1,944	7.8	71.3
Retraining	458	1.8	16.8
No training program above	22,324	89.1	–
Total inflow sample	25,051	100	100

Elapsed Duration of Unemployment in Months at Program Start

	Cohort 86/87	Cohort 93/94
	Practice Firm	
Average	15.8	11.4
25%–Quantile	5	5
Median	10	9
75%–Quantile	19	15
	SPST	
Average	13.3	12.9
25%–Quantile	3	5
Median	6	11
75%–Quantile	14	18
	Retraining	
Average	10.2	8.1
25%–Quantile	3	3
Median	6	7
75%–Quantile	12	12

Duration of Training Spell in Months

	Cohort 86/87	Cohort 93/94
	Practice Firm	
Average	5.1	5.7
25%–Quantile	2	3
Median	5	6
75%–Quantile	6	8
	SPST	
Average	4.9	6.3
25%–Quantile	2	3
Median	4	6
75%–Quantile	7	8
	Retraining	
Average	13.1	14.9
25%–Quantile	5	6
Median	12	16
75%–Quantile	22	21

3. Estimation Strategy: Multiple Treatments

- Multiple treatments (Lechner (2001), Imbens (2000)): $T = k$ with $k = 0, 1, 2, 3$
- Four potential outcomes $\{Y^0, Y^1, Y^2, Y^3\}$
- Average effect of treatment on the treated (ATT) for participation in treatment k against participation in treatment l, l can be nonparticipation in any of the three training programs
- Propensity score matching on the probability of treatment k vs l in the group of participants in either k or l

Estimation Strategy: Timing of Events

$\longrightarrow$ Extend static multiple treatment framework to dynamic setting

- comparison "treatment at t" vs. "no treatment at t which means Waiting"
- Treatment effects differ by elapsed duration of unemployment, u, at the program start (Sianesi, 2003, 2004)
- Aggregate starting dates into three time windows, i.e. quarters 1–2, 3–4, and 5–8 of elapsed unemployment
- Evaluate employment effects at different quarters since program start, $\tau = 0, 1, 2, ...$

Estimation Strategy: Dynamic Matching

- Aim: control for differences in observable characteristics X with matching
- assume randomness of treatment given X
- Dynamic CIA:

$$E[Y^l(\tilde{u}, \tau - (\tilde{u} - u))|T_u = k, u \leq \tilde{u} \leq \bar{u}, U \geq u - 1, T_1 = ... = T_{u-1} = 0, X]$$

$$= E[Y^l(\tilde{u}, \tau - (\tilde{u} - u))|T_{\tilde{u}} = l, u \leq \tilde{u} \leq \bar{u}, U \geq u - 1, T_1 = ... = T_{u-1} = 0, X]$$

- could match treated and controls with same X
- estimator would be difference in outcomes
- dimension reduction: match on probability of treatment (Rosenbaum/Rubin)
- smoothness: use kernels
- average effects over the treated: get ATT

Interpretation of Treatment Parameter

- Parameter to be estimated:

$$\theta(k,l;u,\tau) = E(Y^k(u,\tau)|T_u = k, U \geq u-1, T_1 = ... = T_{u-1} = 0)$$
$$-E(Y^l(\tilde{u},\tau-(\tilde{u}-u))|T_u = k, u \leq \tilde{u} \leq \bar{u}, U \geq u-1, T_1 = ... = T_{u-1} = 0)$$

- Treatment parameter mirrors decision problem of the unemployed and the caseworker: Participate in any of the programs now or postpone participation to the future?
- No simple relationship between unconditional ATT and ATT conditional on elapsed duration of unemployment

Estimation Strategy: Technical Aspects

- Estimate nontreatment outcome by a local linear regression on the propensity score and the calendar month of the beginning of the unemployment spell
- Product kernel:

$$KK(p,c) = K\left(\frac{p-p_j}{h_p}\right) \cdot h_c^{|c-c_j|}$$

- Bandwidths h_p, h_c obtained by crossvalidation for treated individuals i

$$\sum_{\tau=0}^{\tau_{\max}} \left[\frac{1}{N_k} \sum_{i=1}^{N_k} \left(Y^l_{nn(i),u,\tau} - \sum_{j \in \{T_{\tilde{u}(i)}=l, u \le \tilde{u} \le \bar{u}\} \setminus nn(i)} w_{(N_l(i)-1)}(i,j) Y^l_{j,\tilde{u},\tilde{\tau}} \right) \right]^2$$

  - prediction of employment status for $nn(i)$ without $nn(i)$ himself
  - $N_l(i)$ size of the eligible l–group for i, $\{T_{\tilde{u}(i)} = l\}$
- Bootstrap standard errors based on 200 resamples

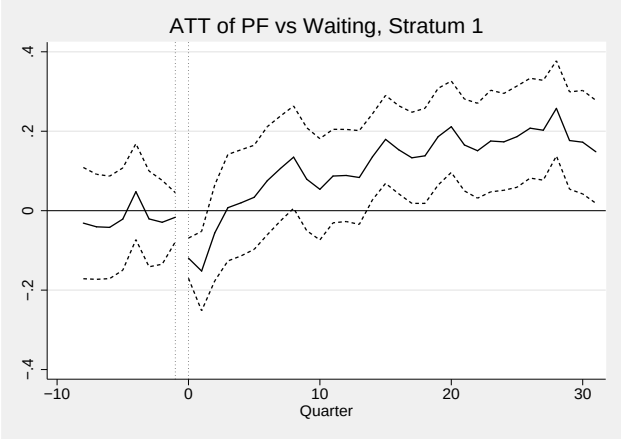
4. Empirical Results: Estimation of Propensity Scores

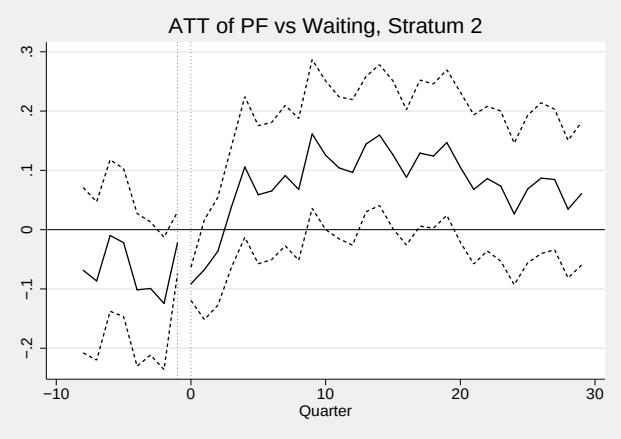
- Determinants of participation
  - Individual characteristics: age, education, occupation, ...
  - Characteristics related to previous job: wage, industry, firmsize, ...
  - Individual employment history
  - Regional information
- Extensive specification search for each k/l–pair in each stratum and each cohort
- Balancing test: regression test of Smith and Todd (2005)

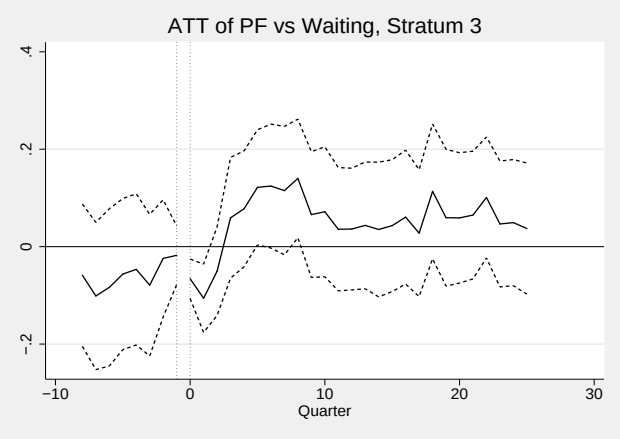
$$X_g = \sum_{d=0}^{\delta} \beta_d \hat{P}(X)^d + \sum_{d=0}^{\delta} \gamma_d D_k \hat{P}(X)^d + \eta_{kl}$$

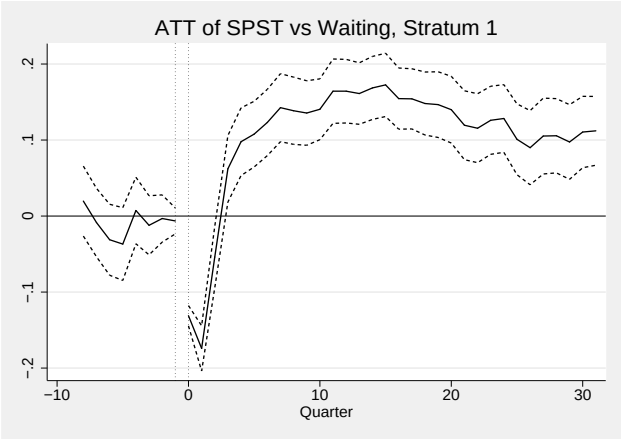
  Test: Are γ_d jointly zero (for $\delta = 3, 4$)?
- Matching quality: balancing test passes in most cases
- In addition perform pre-program test
- In most cases no significant differences in employment rates before beginning of unemployment spell

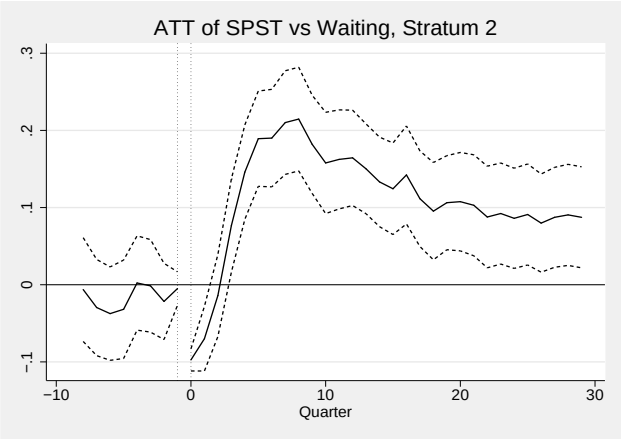
Average Treatment Effect on the Treated Cohort 86/87, West Germany

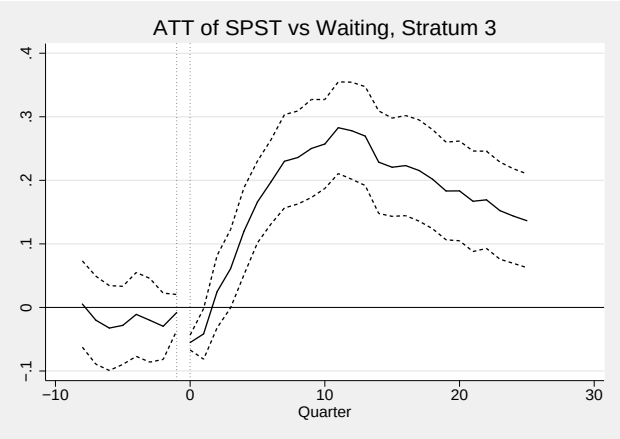


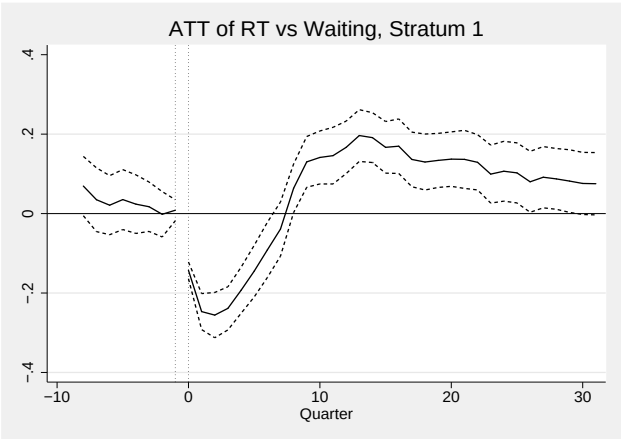


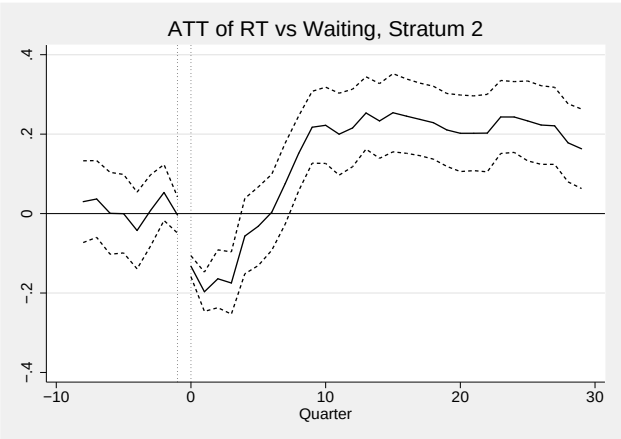


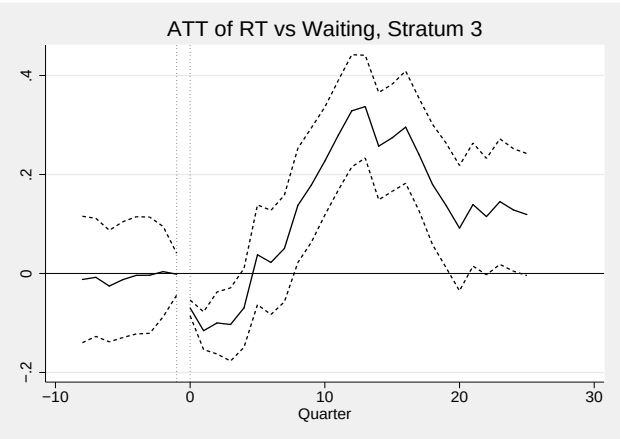




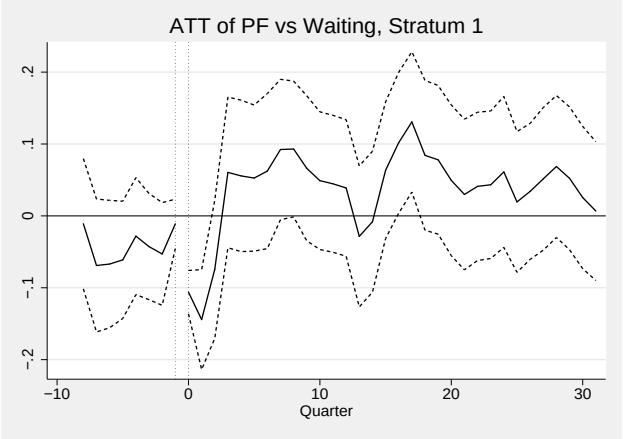


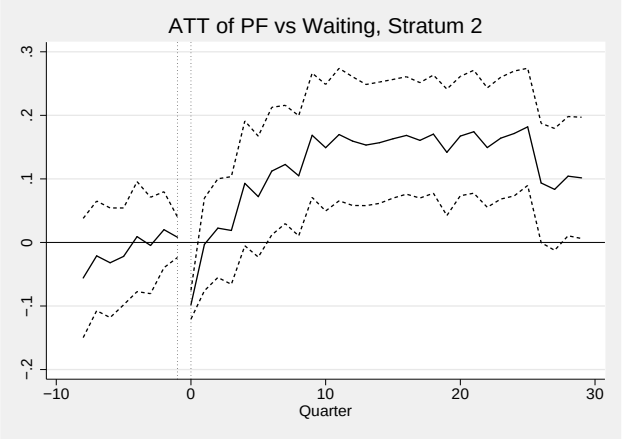


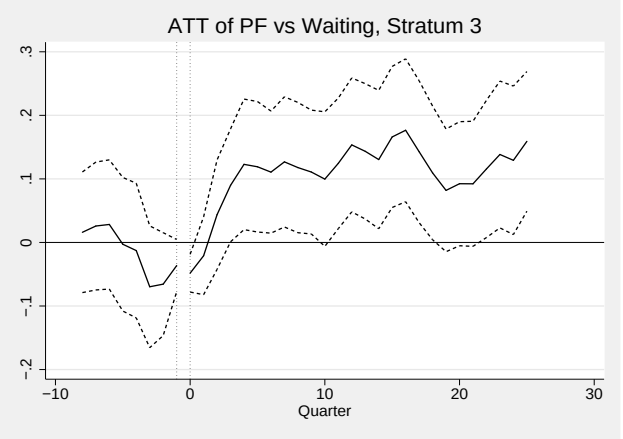


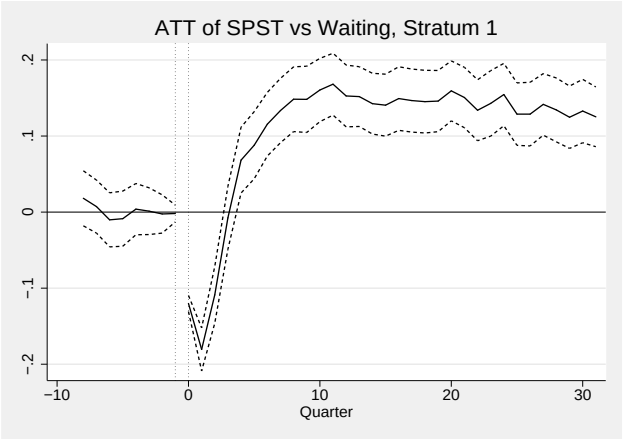


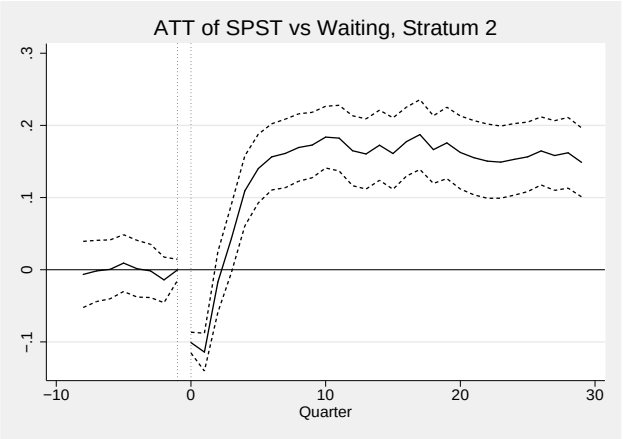
Average Treatment Effect on the Treated Cohort 93/94, West Germany

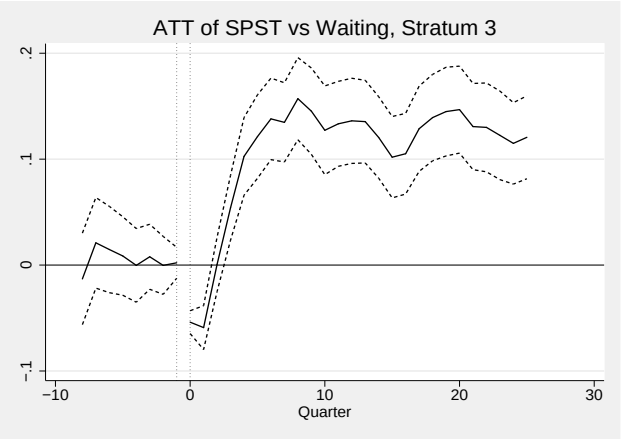


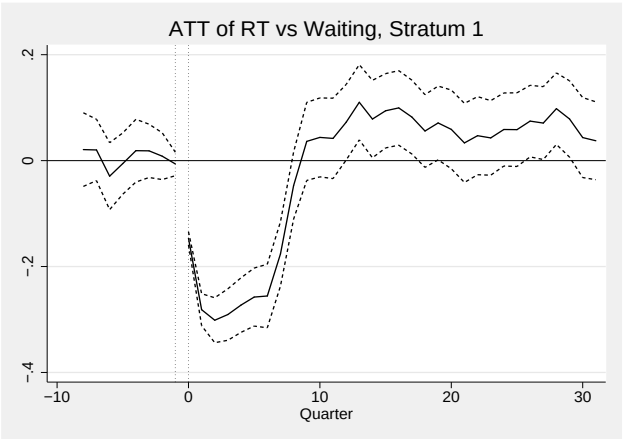


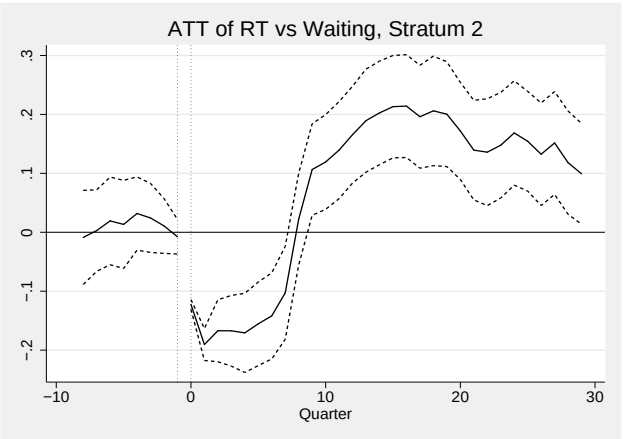


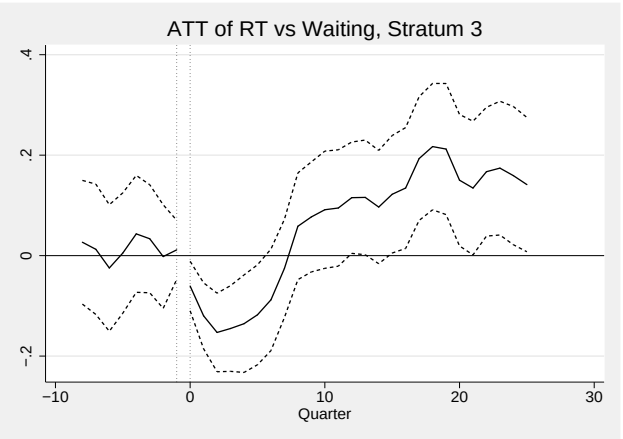












Overview Pairwise Comparisons between PF, SPST, RT

- Targeting of Programs
- Differences during the lock-in period
- no significant long–run differences between programs
- participation may be more important than program (but large SE)

Cumulated ATT for Pairwise Comparisons between PF, SPST, RT

Cumulated Treatment Effects, PF vs SPST, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	0.028 (0.355)	-0.199 (0.686)	0.023 (1.036)
Stratum 2	-0.159 (0.426)	-0.014 (0.833)	0.431 (1.224)
Stratum 3	0.635 (0.348)*	0.435 (0.876)	0.722 (1.499)

Cumulated Treatment Effects, PF vs RT, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	0.853 (0.395)**	0.348 (0.736)	0.259 (1.117)
Stratum 2	0.485 (0.526)	0.887 (1.165)	1.072 (1.868)
Stratum 3	1.237 (0.350)***	0.907 (0.836)	0.140 (1.402)

Cumulated Treatment Effects, SPST vs PF, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	-0.125 (0.339)	-0.848 (0.714)	-2.114 (1.041)**
Stratum 2	0.442 (0.606)	0.039 (1.148)	-0.810 (1.556)
Stratum 3	0.798 (0.406)**	1.837 (1.022)*	1.768 (1.601)

Cumulated Treatment Effects, SPST vs RT, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	1.246 (0.354)***	1.072 (0.599)*	0.199 (0.789)
Stratum 2	1.208 (0.372)***	0.842 (0.708)	0.126 (1.062)
Stratum 3	1.310 (0.286)***	1.625 (0.771)**	1.575 (1.240)

Cumulated Treatment Effects, RT vs PF, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	-0.590 (0.476)	0.957 (1.064)	2.413 (1.728)
Stratum 2	-0.496 (0.498)	0.413 (1.022)	1.252 (1.528)
Stratum 3	-0.133 (0.431)	1.498 (1.104)	1.632 (1.654)

Cumulated Treatment Effects, RT vs SPST, Cohort 86/87, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	-1.173 (0.227)***	-1.024 (0.440)**	-0.774 (0.698)
Stratum 2	-0.674 (0.376)*	0.354 (0.848)	1.778 (1.345)
Stratum 3	-0.430 (0.269)	-0.207 (0.691)	-0.066 (1.098)

Cumulated Treatment Effects, PF vs SPST, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	0.209 (0.282)	-0.498 (0.605)	-1.054 (0.930)
Stratum 2	-0.085 (0.354)	-0.324 (0.741)	-0.300 (1.136)
Stratum 3	0.333 (0.376)	0.485 (0.782)	0.439 (1.165)

Cumulated Treatment Effects, PF vs RT, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	2.002 (0.376)***	1.723 (0.763)**	1.534 (1.234)
Stratum 2	1.500 (0.387)***	2.623 (0.795)***	3.322 (1.296)**
Stratum 3	1.463 (0.355)***	2.559 (0.879)***	2.893 (1.408)**

Cumulated Treatment Effects, SPST vs PF, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	0.174 (0.391)	0.920 (0.824)	1.017 (1.240)
Stratum 2	0.210 (0.366)	0.620 (0.828)	1.306 (1.374)
Stratum 3	0.081 (0.370)	0.733 (0.898)	1.852 (1.378)

Cumulated Treatment Effects, SPST vs RT, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	1.926 (0.263)***	2.065 (0.614)***	1.984 (0.981)**
Stratum 2	0.801 (0.311)**	0.958 (0.616)	0.963 (0.950)
Stratum 3	0.929 (0.215)***	0.886 (0.560)	0.420 (0.860)

Cumulated Treatment Effects, RT vs PF, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	-1.707 (0.374)***	-1.477 (0.805)*	-1.481 (1.164)
Stratum 2	-1.890 (0.445)***	-2.453 (1.017)**	-2.158 (1.678)
Stratum 3	-2.112 (0.743)***	-2.988 (1.713)*	-3.341 (2.694)

Cumulated Treatment Effects, RT vs SPST, Cohort 93/94, West Germany			
	8 quarters	16 quarters	24 quarters
Stratum 1	-1.485 (0.257)***	-1.698 (0.540)***	-1.453 (0.848)*
Stratum 2	-1.411 (0.250)***	-1.661 (0.536)***	-1.389 (0.869)
Stratum 3	-0.940 (0.201)***	-1.372 (0.519)***	-1.122 (0.825)

5. Conclusions

- Unique merger of administrative data sets
- Treatment definition according to economic interpretation of treatment type
- Inflow samples into unemployment 86/87 and 93/94
- Multiple treatments: average treatment effect on the treated for three training programs
- Dynamic approach: distinguish treatment starting during quarters 1–2, 3–4, 5–8 of unemployment
- Long–run employment effects up to 6–8 years after beginning of treatment

5. Conclusions <cont.>

- Results 'treatment vs waiting'
  - Most cases negative lock–in effects in short run and significantly positive treatment effects in the medium and long run
  - Lock–in longest for RT and shortest for PF
  - Lock–in deeper and longer in 93/94 compared to 86/87
  - SPST mostly best results for the treated individuals
- Results 'pairwise comparison' of three treatments:
  - Differences in the lock–in periods
  - Most cases insignificant treatment effects in the medium and long run
  - SPST and PF outperform RT in the medium/long run, especially 93/94
- Draw a somewhat more positive picture of public sector sponsored training compared to most of the previous studies based on survey data
  ... but data set lacks information for a comprehensive cost–benefit–analysis

Thank you for your attention :-)