Market Externalities of Large Unemployment Insurance Extensions

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Motivation:

What is the effect of increasing generosity of UI on labor market outcomes?

- We $\approx$ know what micro effect ϵ^m is
  - In *theory*, increase in UI unambiguously increase U duration
  - *Empirically*, large number of well-identified micro estimates
- What about macro effect ϵ^M?
  - In *theory*, large literature on equilibrium search & matching, but anything goes: $\epsilon^m \gtreqless \epsilon^M$
  - *Empirically*, difficulty of estimating G-E effects of UI and to analyze how micro and macro estimates differ

Market externalities of UI:

- Market externality:
  - UI induced variations in the search effort of some unemployed affect job finding probability of other unemployed in the same labor market
- Market externality $\approx \epsilon^m - \epsilon^M$
- Sign and size of $\epsilon^m - \epsilon^M$ critical to determine optimal UI level (LMS ['13])

This paper:

- Regional Extended Benefit Progam (REBP): Large extensions of UI in Austria
  - Increase from 52 to 209 weeks for eligible 50+ in specific regions
  - Unique quasi-experimental setting to identify externalities
  - Strong evidence of positive effects of REBP on untreated workers in treated labor markets
- Discuss how evidence relates to different search & matching models:
  - Evidence refutes predictions of flexible wage & linear technology models
  - Evidence in line with job-rationing models

Related literature:

- Empirical literature on identification of spillovers of policy interventions
  - General literature on spillovers: Duflo & Saez (2003)
  - Spillovers of active labor market policies: Crepon & al. (2012), Ferracci & al. (2010), Blundell, & al. (2004).
  - Spillovers of UI: Levine (1993)
- Literature on optimal UI:
  - Direct continuity of LMS (2012)

Labor Market with Matching Frictions

- u unemployed workers:
  - Exert search effort e
  - e function of UI benefits B
- v vacancies.
- Number of matches: $m(e \cdot u, v) = \omega_m \cdot (e \cdot u)^\eta \cdot v^{1-\eta}$
- Labor market tightness: $\theta \equiv v/(e \cdot u)$
- Job-finding proba: $e \cdot f(\theta) = e \cdot m(1, \theta)$.
- Vacancy-filling proba: $q(\theta) = m\,(1/\theta, 1)$.

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- Job-finding proba: $e \cdot f(\theta) = e \cdot m(1, \theta)$.
  $\Rightarrow \frac{\partial e \cdot f(\theta)}{\partial \theta} > 0$
- Vacancy-filling proba: $q(\theta) = m(1/\theta, 1)$.

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- Vacancy-filling proba: $q(\theta) = m(1/\theta, 1)$.
  $\Rightarrow \frac{\partial q(\theta)}{\partial \theta} < 0$

Labor market equilibrium

- Aggregate labor supply (from equality of in- and outflows into employment):

$$n^s(e(B), \theta)$$

- Aggregate labor demand (from firm's maximisation program):

$$n^d(\theta)$$

- Labor market equilibrium:

$$n^d(\theta) = n^s(e(B), \theta)$$

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Figure 1 : A labor market equilibrium

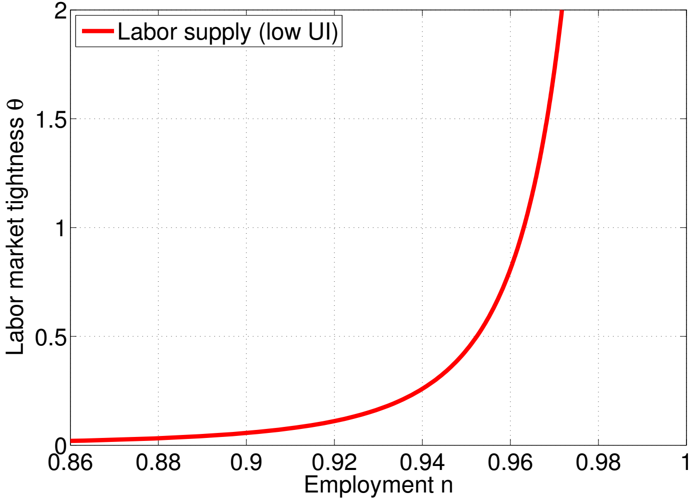


Figure 2 : A labor market equilibrium

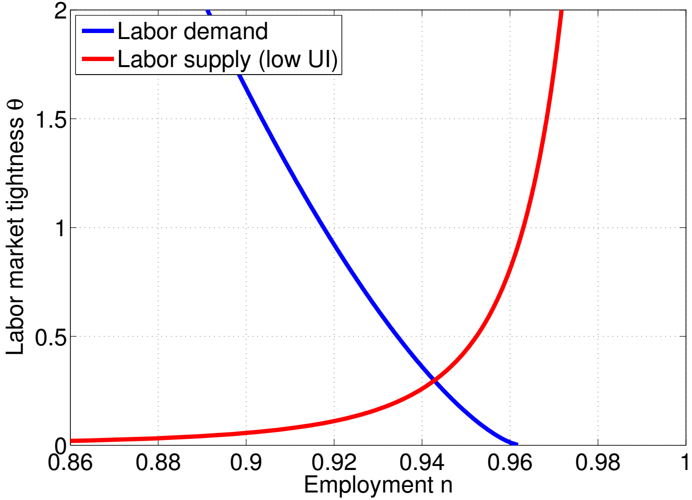
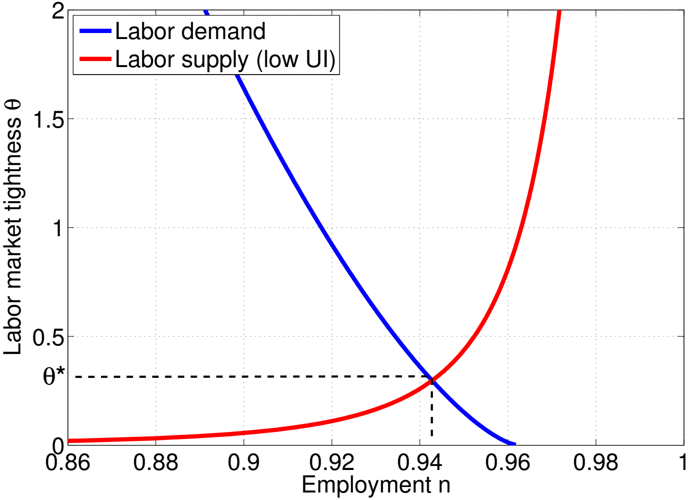


Figure 3 : A labor market equilibrium



Introducing differences in UI

- Two groups of unemployed, $i \in a, b$ with effort $e_i = e(B_i)$ and share p and $1 - p$
- Labor supply:

$$n^s = p[\underbrace{1 - u(1 - f(\theta) \cdot e_a)}_{\tilde{n}_a^s}] + (1 - p)[\underbrace{1 - u(1 - f(\theta) \cdot e_b)}_{\tilde{n}_b^s}]$$

- Equilibrium

$$n^s(\theta, e_a(B_a), e_b(B_b), p) = n^d(\theta)$$

- Externalities:

$$\frac{d(e_b \cdot f(\theta))}{dB_a} = f'(\theta) \cdot \frac{\partial \theta}{\partial B_a} \cdot e_b \tag{1}$$

Figure 4 : A two group equilibrium

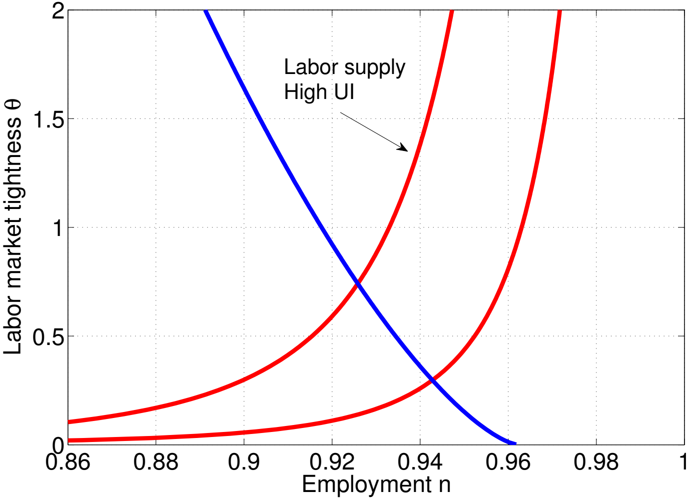


Figure 5 : A two group equilibrium

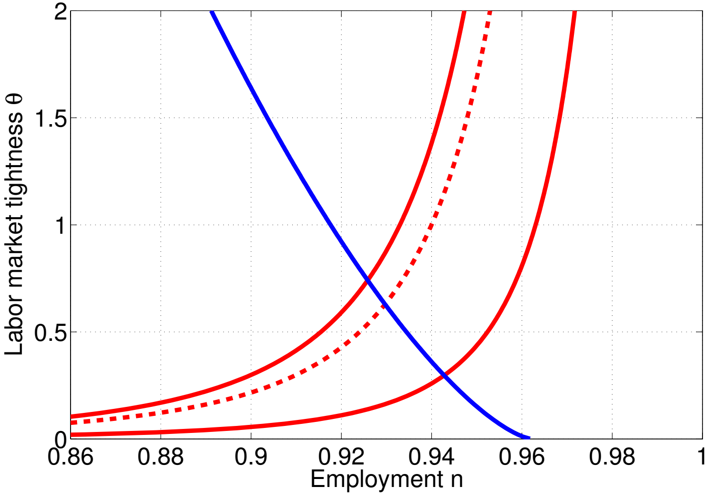


Figure 6 : A two group equilibrium

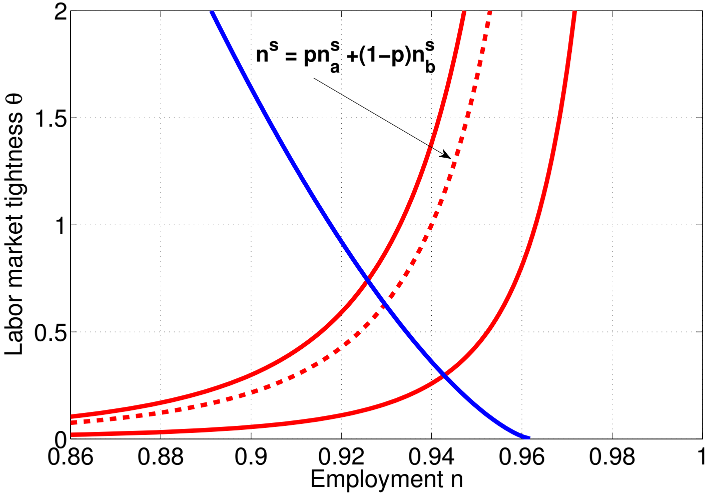


Figure 7 : A two group equilibrium

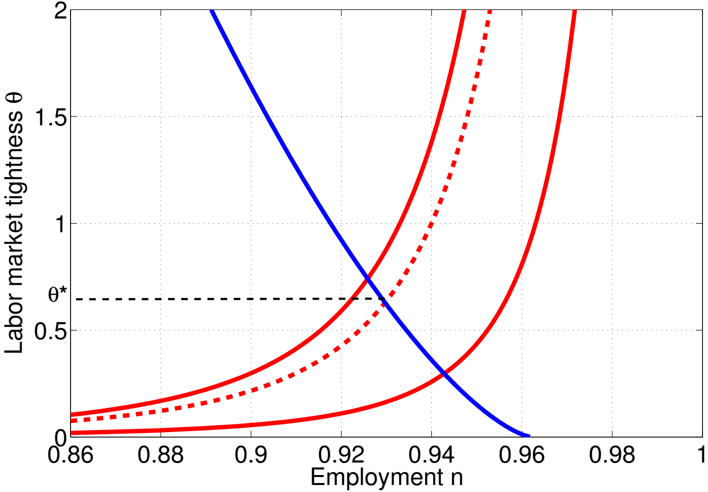
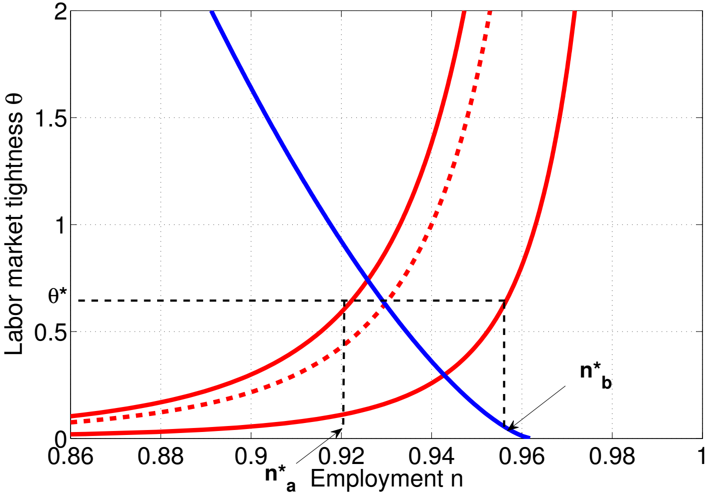


Figure 8 : A two group equilibrium



Externalities in different matching models

- In models with flexible wages:
  - $\uparrow B_a \Rightarrow \uparrow w \Rightarrow \downarrow n^d$
  - **Negative externality** on untreated unemployed
  - Macro effect larger than micro effect
- In models with rigid wages & diminishing returns:
  - $\uparrow B_a \Rightarrow \uparrow (f' - w) \Rightarrow \uparrow n^d$
  - **Positive externality** on untreated unemployed
  - Macro effect smaller than micro effect

Figure 9 : Externalities with flexible wages and ≈ linear technology

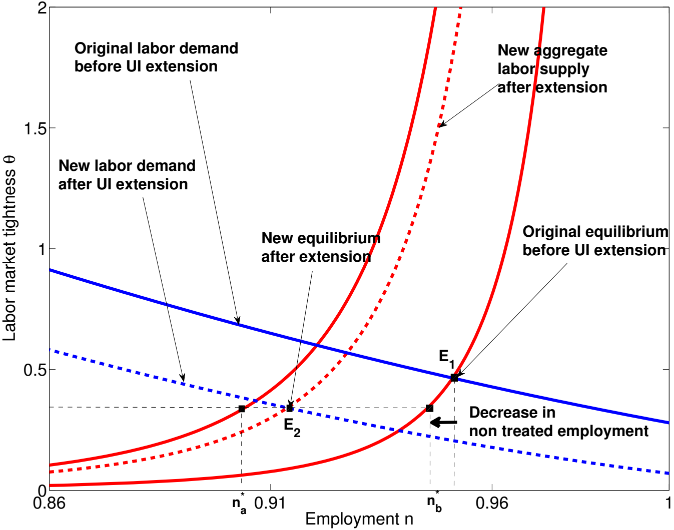
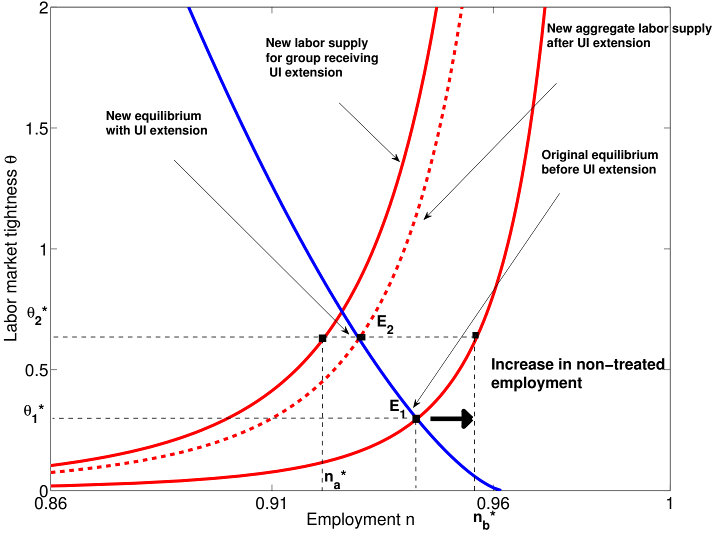


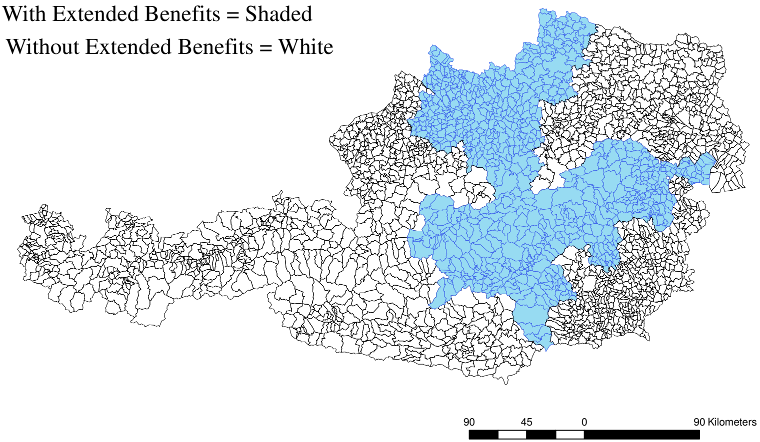
Figure 10 : Externalities with rigid wages and diminishing returns



REBP reform in Austria

- Large UI benefit extension program enacted in Austria
  - 209 weeks instead of 52 weeks
- Eligibility requirements:
  - Age: more than 50
  - Reside in selected regions at least 6 months before becoming unemployed
  - At least 15 years of continuous work history in the past 25 years
  - Spell beginning between June 1988 and Dec 1993

Figure 11 : **Austrian regions by REBP treatment status**



Data:

- Universe of UI spells in Austria from 1980 to 2010:
  - Info on age, residence, education, marital status, etc...
- Universe of social security data in Austria from 1949 to 2010:
  - Info on each employment spell
  - Compute experience in past 25 years
  - Merge with UI data to determine REBP eligibility
  - Info on wages, industry, tenure,

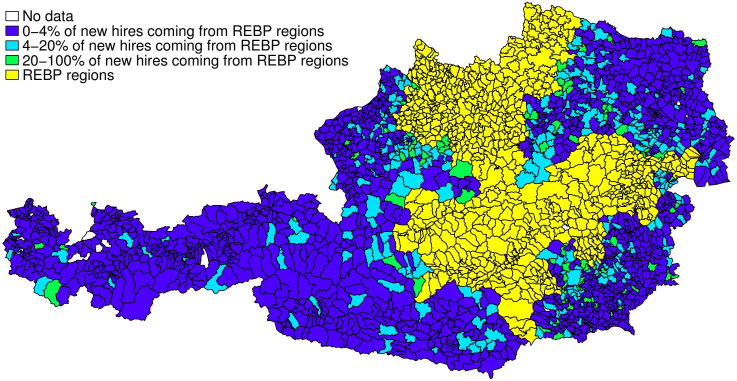
Empirical strategy:

- **First stage**: Compare treated workers in treated regions and untreated regions *before/during/after*
- **Second stage**: Compare untreated workers in treated and untreated regions *before/during/after*
- Identification assumptions:
  - Treated and untreated regions are somehow isolated
  - Unobserved differences between treated and untreated workers fixed over time
  - Unobserved differences between labor markets are fixed over time

Sample selection:

- Endogeneity of choice of REBP regions:
  - Regions are not selected at random: restructuring of steel sector
  - Remove all steel sector workers (at most 15% of unemployed in treated regions), and all workers in related industries
- Geographical spillovers:
  - We exclude non-treated counties that are highly integrated to REBP counties

Figure 12 : **Local labor markets integration**: Fraction of new hires from REBP regions in total number of new hires by county



Sample: male age 50 to 54 in non steel-related industries, 1980-1987.

Table 1 : Summary statistics:

	(1)	(2)	(3)	(4)
	A. All workers treated vs untreated counties before 1988			
	M=0	M=1	Difference	p-value
Age	51.9	51.9	0	.366
U duration	18.7	19.4	-.7	.12
Non employment duration	31.7	29.9	1.8	.018
Fraction spells > 100 wks	.033	.039	-.006	.023
Fraction spells >26 wks	.135	.122	.013	.016
Real wage before spell	52.1	50.5	1.6	0
Real wage after spell	51.8	50.8	1.1	0
White Collar	.063	.035	.028	0
Fraction not in construction	.38	.369	.011	.148
	B. Treated workers vs untreated workers in treated counties before 1988			
	T=0	T=1	Difference	p-value
Age	51.8	51.9	-.1	.181
Experience	4089.365	8292.634	-4203.269	0
U duration	16.3	19.6	-3.3	.025
Non employment duration	52.5	28	24.5	0
Fraction spells > 100 wks	.018	.041	-.023	.022
Fraction spells > 26 wks	.091	.124	-.033	.056
Real wage before spell	47.3	50.8	-3.6	0
Real wag after spell	47.4	51	-3.6	0
White Collar	.01	.037	-.027	.006
Fraction not in construction	.345	.371	-.026	.307

Figure 13 : **Difference in U duration between REBP and non REBP regions**: male 50-54 with **more** than 15 years of experience

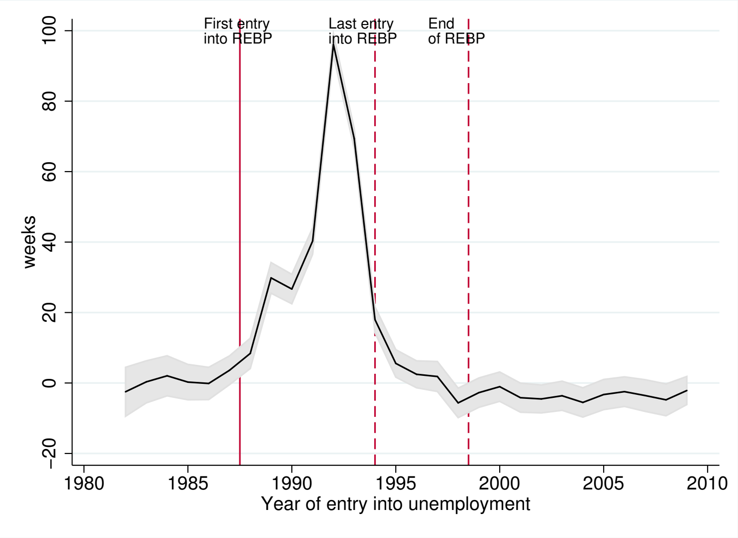


Figure 14 : **Difference in U duration between REBP and non REBP regions**: male 50-54 with **<u>less</u>** than 15 years of experience

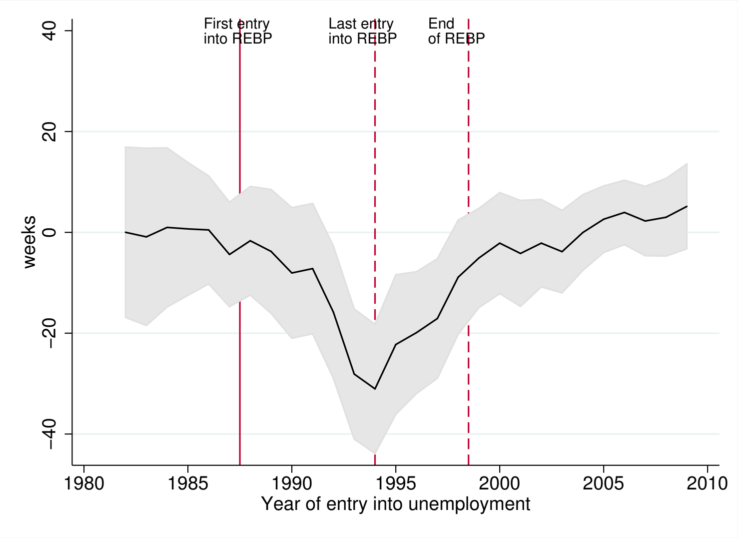


Figure 15 : Relationship between previous work experience and unemployment duration: male 50-54, **Before and after REBP**

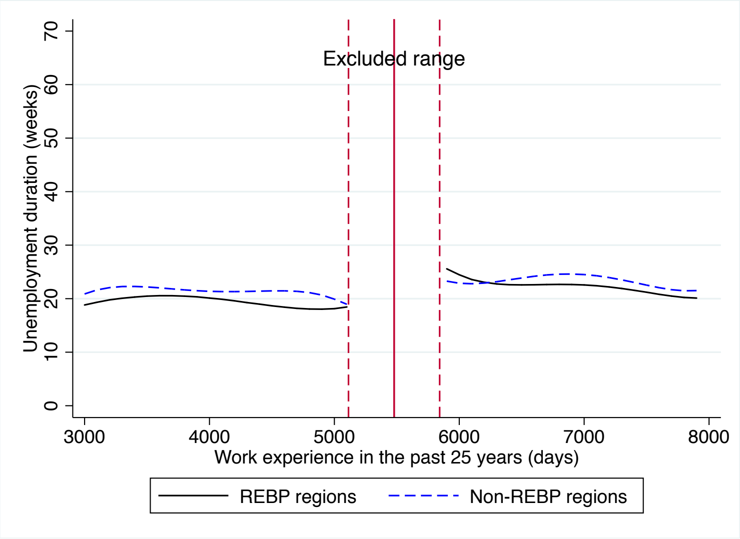


Figure 16 : Relationship between previous work experience and unemployment duration: male 50-54, **during REBP**

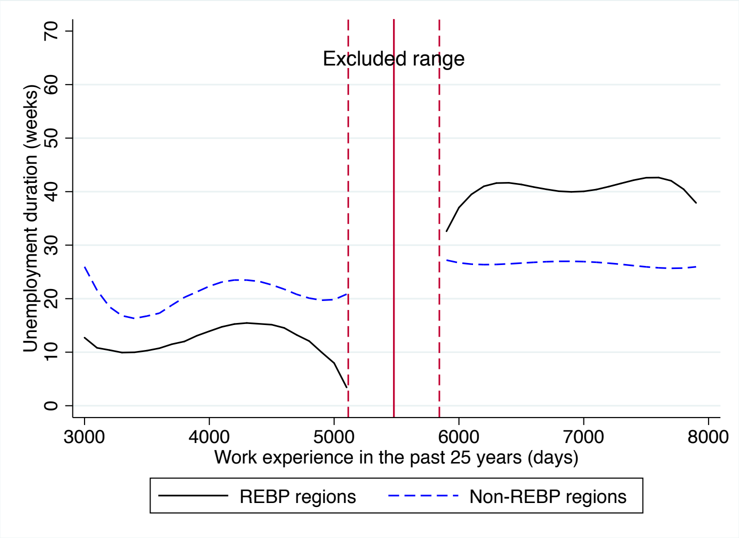


Figure 17 : Relationship between age and non-employment duration: male 50-54, **Before and after REBP**

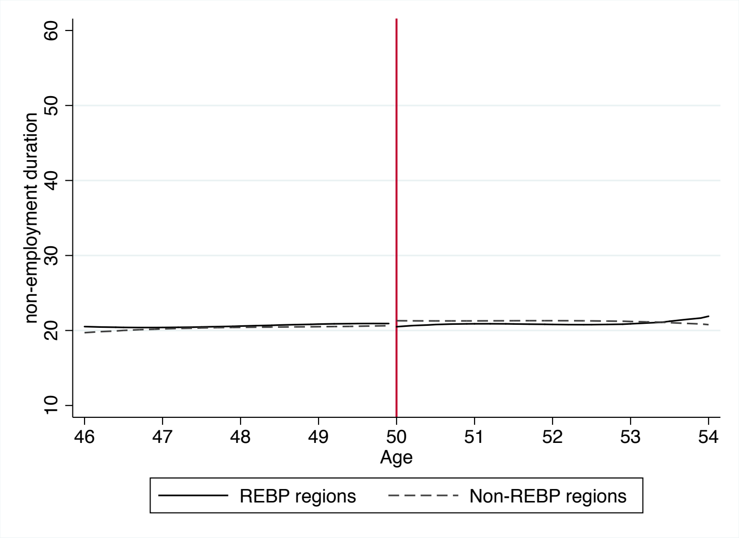
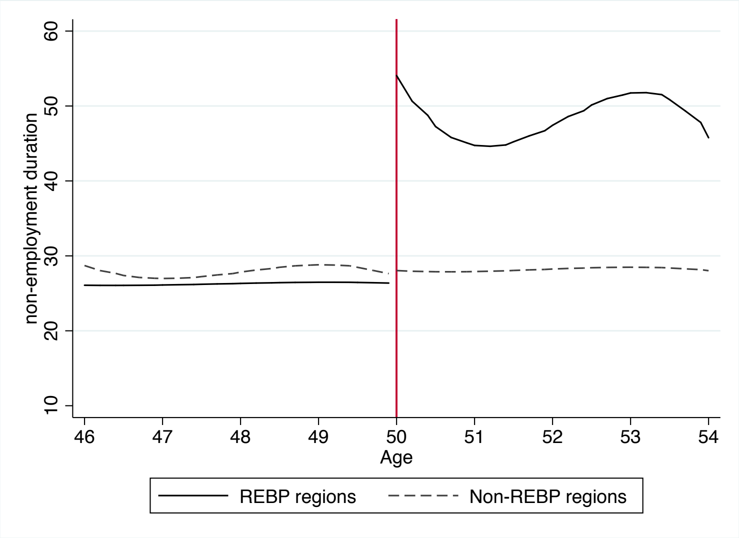


Figure 18 : Relationship between age and non-employment duration: male 50-54, **during REBP**



Baseline specifications:

$$\begin{aligned} Y_{irt} &= \alpha + \overbrace{\beta_0 \cdot Z_{irt} \cdot R_r \cdot T_t}^{\text{Effect of REBP on treated}} + \overbrace{\gamma_0 \cdot (1 - Z_{irt}) \cdot R_r \cdot T_t}^{\text{Effect of REBP on non-treated}} \\ &+ \eta_0 R_r + \eta_1 B_{irt} + \eta_2 B_{irt} \cdot R_r \\ &+ \sum \nu_t + \sum \eta_3 B_{irt} \cdot \iota_t + X'_{it}\rho + \varepsilon_{irt} \end{aligned}$$

- R_r: indicator for residing in REBP region
- T_t: indicator for spell starting btw June 1988 and Dec 1997
- $B_{irt} = \mathbb{1}[exp > 15]$: indicator for more than 15 yrs of exp
- $Z_{irt} = B_{irt} \cdot \tilde{T}_t$: indicator for being eligible to REBP extensions

Table 2 : Baseline estimates of the treatment effect of REBP on treated unemployed and untreated unemployed

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Unemployment duration					Non-empl. duration	
β_0	62.41***	54.57***	55.48***	58.14***	18.26***	26.03***	4.718**
	(9.565)	(8.345)	(9.051)	(9.159)	(3.492)	(5.797)	(2.236)
γ_0	-6.941***	-7.165***	-11.86***	-8.979***	-4.706**	-9.725***	-4.643**
	(1.690)	(2.017)	(1.640)	(1.433)	(2.123)	(1.487)	(1.903)
Educ., marital status, industry, citizenship		×	×	×	×	×	×
Restricted range exp=4578 +/- 1000 days					YES		YES
Preexisting trends							
by region			×				
by region×exp				×		×	
N	127802	124947	126091	126091	60934	106164	53559

S.e. clustered at the year×region level in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.010$.

Table 3 : Baseline estimates of the treatment effect of REBP on treated unemployed and untreated unemployed

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Unemployment duration				Non-empl. duration	Spell >100 wks	Spell >26 wks
β_0	62.41***	54.57***	55.48***	58.14***	26.03***	0.233***	0.236***
	(9.565)	(8.345)	(9.051)	(9.159)	(5.797)	(0.0312)	(0.0290)
γ_0	-6.941***	-7.165***	-11.86***	-8.979***	-9.725***	-0.0186***	-0.0297**
	(1.690)	(2.017)	(1.640)	(1.433)	(1.487)	(0.00509)	(0.0116)
Educ., marital status, industry, citizenship		×	×	×	×	×	×
Preexisting trends							
by region			×				
by region×exp				×	×	×	×
N	127802	126091	126091	126091	106164	126091	126091

S.e. clustered at the year×region level in parentheses. * p<0.10, ** p<0.05, *** p<0.010.

Table 4 : Heterogeneity analysis by previous wage level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Unemployment duration				Non-empl. duration	Spell $>$100 wks	Spell $>$26 wks
	P0-P40 of previous wage distribution						
β_0	48.48***	44.85***	40.36***	44.58***	19.46***	0.181***	0.177***
	(8.097)	(7.299)	(6.631)	(6.801)	(6.841)	(0.0288)	(0.0280)
γ_0	-7.930***	-7.414***	-16.97***	-9.606***	-11.01***	-0.0101	-0.0500***
	(2.173)	(2.425)	(2.224)	(1.906)	(1.531)	(0.00753)	(0.0144)
	Top 20% of previous wage distribution						
β_0	77.84***	65.40***	69.89***	71.62***	44.37***	0.275***	0.247***
	(11.47)	(10.22)	(10.75)	(10.82)	(10.71)	(0.0353)	(0.0332)
γ_0	-9.317**	-12.16**	-10.51***	-9.011**	-18.80**	-0.0490**	-0.0584
	(3.895)	(5.747)	(3.648)	(3.557)	(7.150)	(0.0215)	(0.0690)
Educ., marital status, industry, citizenship		×	×	×	×	×	×
Preexisting trends							
by region			×				
by region×exp				×	×	×	×

S.e. clustered at the year×region level in parentheses. * p<0.10, ** p<0.05, *** p<0.010.

Potential confounders:

- Confounder 1: **region-specific shocks**
  - REBP regions experience differential shock on labor market conditions at the time REBP was implemented
  - If anything, we expect negative shock if REBP regions endogenously selected
- Confounder 2: **selection**
  - Self-selection into unemployment affected by the reform for non-treated group in treated counties
  - If anything, bias likely to attenuate estimate of spillover effect on non-treated

Table 5 : Region-specific shocks: using unemployed age 30 to 40 in REBP regions as a control

	(1)	(2)	(3)	(4)	(5)	(6)
	Unemployment duration		Non-empl. duration		Spell $>$100 wks	Spell $>$26 wks
β_0	76.04***	71.57***	28.15***	28.00***	0.275***	0.268***
	(11.53)	(10.78)	(7.512)	(7.094)	(0.0374)	(0.0367)
γ_0	-8.158*	-6.885*	-7.427***	-5.985**	-0.0252	-0.0500***
	(4.113)	(3.982)	(2.060)	(2.316)	(0.0154)	(0.0179)
Educ., marital status, industry, citizenship		$\times$		$\times$	$\times$	$\times$
N	182675	180074	170381	168146	180074	180074

S.e. clustered at the year$\times$region level in parentheses. * p$<$0.10, ** p$<$0.05, *** p$<$0.010.

Table 6 : Using regions close to REBP border with high labor market integration as spillover group

	(1)	(2)	(3)	(4)	(5)	(6)
	Unemployment duration			Non-empl. duration	Spell >100 wks	Spell >26 wks
β_0	66.20***	58.24***	65.09***	27.68***	0.254***	0.251***
	(10.13)	(8.865)	(9.869)	(6.298)	(0.0339)	(0.0316)
γ_0	-1.813	-1.588	-3.110	-3.446	-0.0117	-0.0602**
	(3.323)	(2.954)	(3.261)	(2.563)	(0.0118)	(0.0257)
Educ., marital status, industry, citizenship		×	×	×	×	×
Preexisting trends by region			×	×	×	×
N	160714	157578	159104	135702	159104	159104

S.e. clustered at the year×region level in parentheses. * p<0.10, ** p<0.05, *** p<0.010

Table 7 : Testing for selection: inflow rate into unemployment and log real wage in previous job

	(1) log separation rate	(2) log real wage in previous job	(3)
eligible	0.287***		
	(0.0355)		
non-eligible	-0.0346		
	(0.0306)		
β_0		0.144**	0.132**
		(0.0691)	(0.0614)
γ_0		-0.0638	-0.0479
		(0.0629)	(0.0608)
N	1733	114770	112242

Standard errors in parentheses, * $p<0.10$, ** $p<0.05$, *** $p<0.010$

Table 8 : Effects of REBP on subsequent wages and match quality

	(1)	(2)	(3)	(4)	(5)	(6)
	log real wage in next job		wage drop from next to previous job		distance to next job (min)	
β_0	-0.0236	-0.0381**	-0.157	-0.0904	-0.456	0.223
	(0.0154)	(0.0152)	(0.214)	(0.208)	(0.554)	(0.549)
γ_0	0.00515	-0.0477	0.269	0.462	-0.233	2.476*
	(0.0448)	(0.0441)	(0.591)	(0.562)	(1.138)	(1.240)
Educ., marital status, industry, citizenship		$\times$		$\times$		$\times$
N	90345	88634	94503	92719	103678	101715

Standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.010$

Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 1981-1988

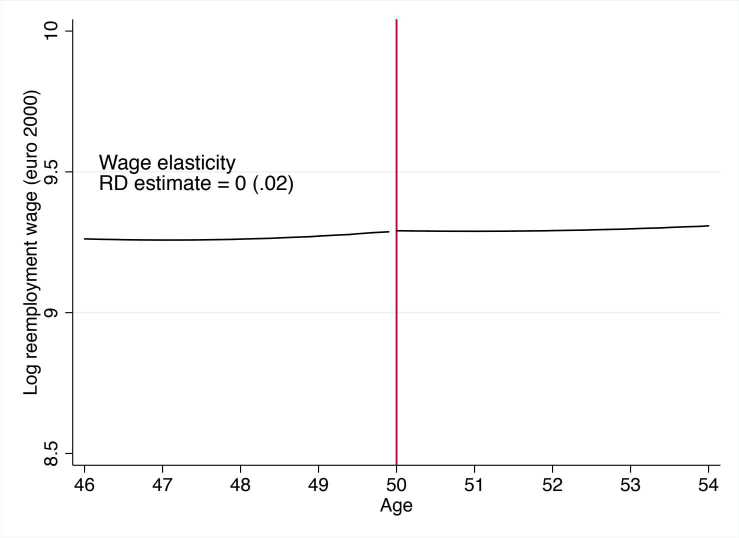


Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 1988-1990

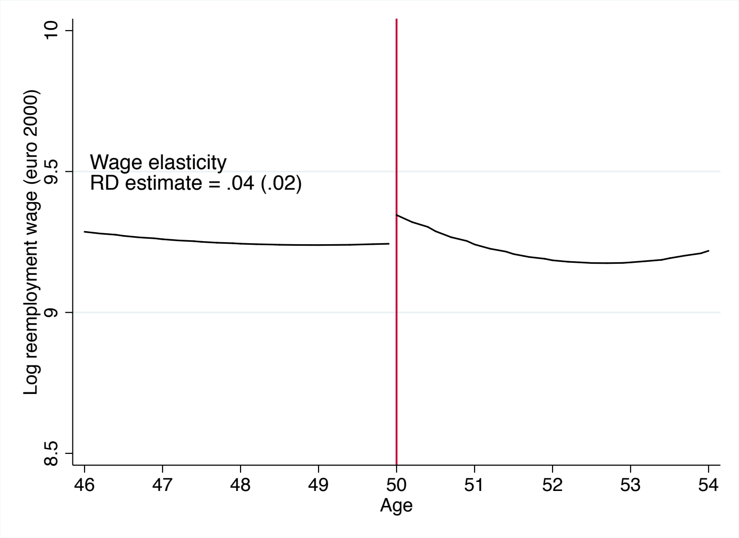


Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 1991-1993

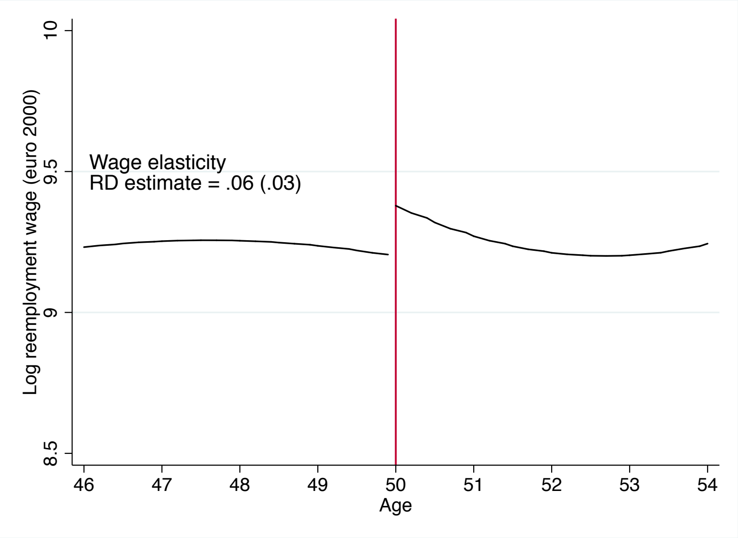


Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 1994-1998

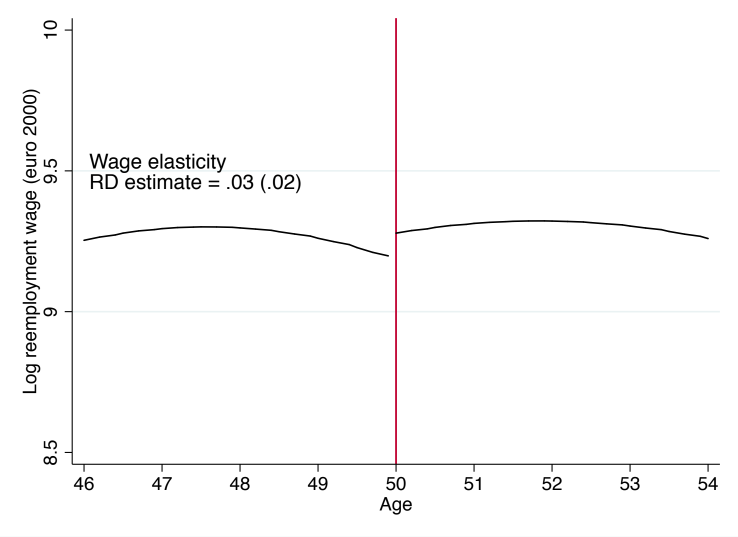


Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 1998-2005

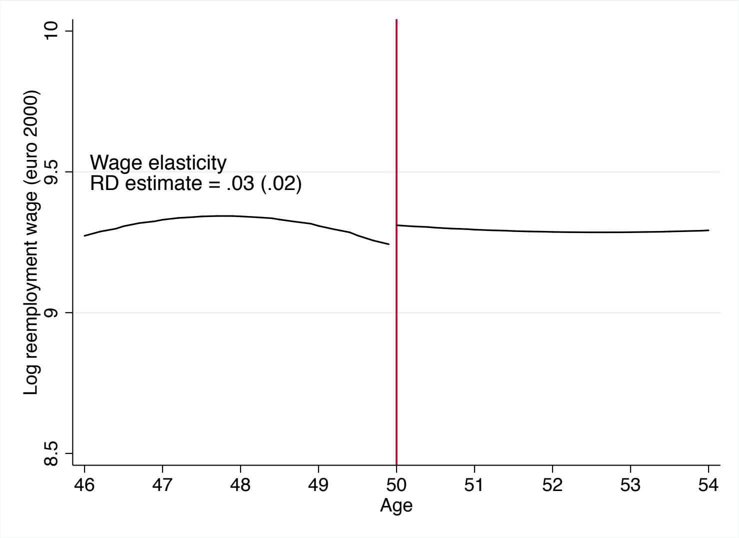
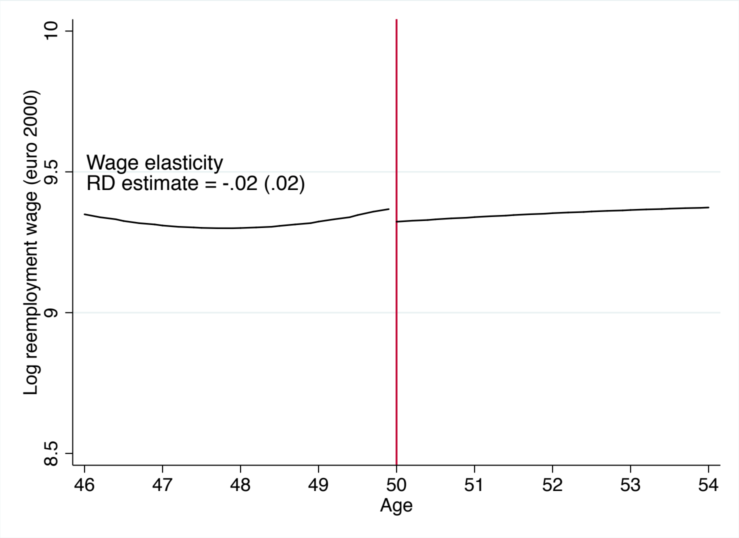


Figure 19 : Relationship between age and reemployment wages conditional on unemployment duration 2006-2010



Backing out ϵ^M and ϵ^m :

- Relationship between externalities, ϵ^M and ϵ^m

$$\frac{d(e \cdot f(\theta))}{dB} = \underbrace{\underbrace{\frac{\partial e}{\partial B} f(\theta)}_{\text{Micro effect}} + \overbrace{f'(\theta) \cdot \frac{\partial \theta}{\partial B} \cdot e}^{\text{Equilibrium adjustment}}}_{\text{Macro effect}}$$

- $\beta_0 \approx \epsilon^M$: around 85% treated in REBP regions
- $\beta_0 - \gamma_0 \approx \epsilon^m$: effect of treatment net of spillovers

$$\Rightarrow \epsilon^m / \epsilon^M \approx 1.35$$

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Policy implications:

- Extensions less distortionary than previously thought using only ϵ^m
- Incidence of UI extensions on employers: $\uparrow$ recruiting costs
- In the long run, wages adjust, but very little
- In the long run, reversal of sign of $\epsilon^m - \epsilon^M$ possible if substitution and flattening of n^d
- Explains difference between small reform-based and large cross-country estimates of ϵ^M

Conclusion:

- Identification of positive effects of increasing UI on untreated workers in the same labor market
- Externalities matter in the labor market and must be taken into account for optimal UI
- Next steps: heterogeneity analysis

Figure 20 : Difference in in hazard rates between REBP and non REBP regions: male 50-54 with **more** than 15 years of experience

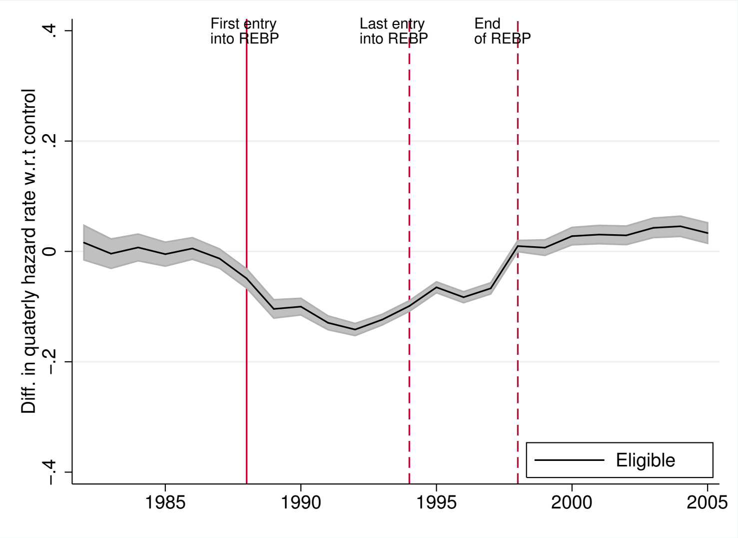

Figure 21 : Difference in hazard rates between REBP and non REBP regions: male 50-54

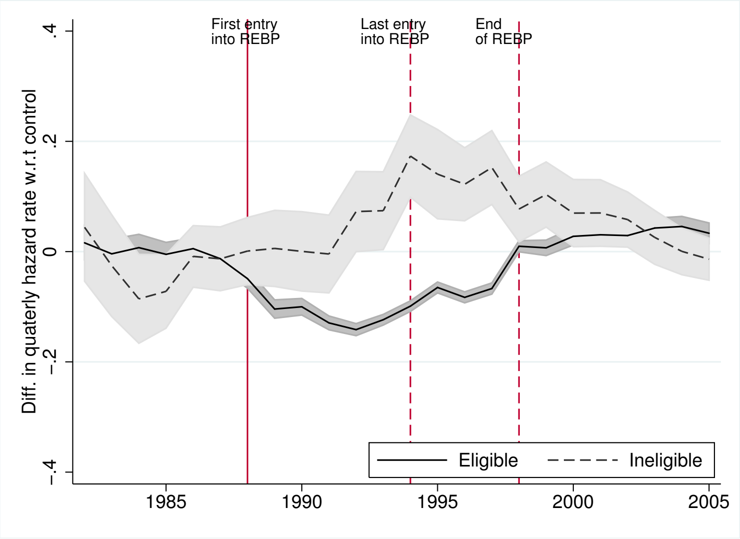

Figure 22 : **Local labor markets integration**: Fraction of new hires from non-REBP regions in total number of new hires by county