Job Displacement, Unemployment, and Crime: Evidence from Danish Microdata and Reforms

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Teaching Slides - JEEA

Unemployment → Crime?

- **Question #1: What are the *consequences* of unemployment?**
  - **Earnings (Jacobson 1993),** health and mortality (Sullivan and von Wachter 2009), Family Structure (Charles and Stephens Jr. 2004), Child Outcomes (Oreopoulos 2008).
- **Question #2: What *causes* crime? Was Becker right?**
  - Significant social costs of crime. Crime a key driver of politicians' approval rates.
- **Question #3: UI Benefits and Crime**
  - How does the availability, generosity, and conditionality of the unemployment system impact the decision to commit crime?
- **County-level evidence:** Studies of the effect of unemployment on crime combine county-level (or equivalent) data with an IV (exchange rate, industrial spec. a la Bartik). (Gould, Weinberg & Mustard 2002, Öster & Agell 2007, Fougère, Kramarz & Pouget 2009)
  - total impact = Individual impact + Spillover effects.
  - Unemployment effects vs Separations

What we're doing

- **Data: Unique Danish administrative 1985-2000 employer-employee-unemployment-crime individual data** to estimate the impact of individual job separation $\Rightarrow$ individual crime.
- **Test of economic theory of crime:**
  - Earnings losses literature (Jacobson, Lalonde, Sullivan, AER, 1993) + Becker's (1968) theory of crime.
- **Identification strategy:** Using job displacement as an arguably idiosyncratic driver of job separations.
- **Placebo tests:** Dynamic endogeneity and pre-displacement trends.
- **Becker's Mechanism:** compare *individual-level* magnitude of earnings losses and propensity to commit crime.
- **Local Context Matters:** How local income inequality magnifies displacement impacts.
- **Policy Implications:** Incarceration periods correlated with largers earnings losses post-displacement.

Findings

Key findings

- Job displacement $\rightarrow$ crime $\uparrow$ by 26% of average probability.
- Effects on total crime, driven by an impact on property crime.
- Impacts long-lasting, up to 7 years after job loss.
- Earnings losses explain up to half of crime increase.

Unemployment Benefits and Crime

- Positive impact on crime when benefits are ***unconditional***.
- Introduction of active labor market laws $\Rightarrow$ a resurgence of crime.
- Spikes **at each transition**
  employment$\rightarrow$ *passive*$\rightarrow$ *active*$\rightarrow$ *social assistance*.
- Results robust to multiple definitions of displacement (**33 papers since 1990!**) and other specification adjustments.
- Career Criminals? New individuals induced to commit crime at each benefit threshold.

Outline

1. Danish registry: longitudinal individual history.
2. Correlations of crime and transitions into unemployment.
3. Idiosyncratic drivers of job separations: Mass layoffs and job displacement.
4. Main Results.
5. Unemployment Benefits Reform and Crime

Data Effort

- Database of every individual residing in Denmark from 1980-present.
  1. **Employment spells:** *Integrated Database for Labor Market Research.*
  2. **Unemployment spells:** *Central Register of Labor Market Statistics* from Unemployment funds (A-Kasse).
  3. **Citations, arrests, convictions, prison terms:** *Central Police Register.*
  4. **Family ties, education:** *Population Register.*
- Tied by an individual Central Person Register (CPR).
- Unemployment and crime data at weekly frequency.
- Focus on men, born 1945 to 1960, continuously in the sample. Endogenous exit and reentry not a significant issue.

Baseline Sample (1/2)

(i) Employer-Employee

Variable	Mean	S.D.	P25	P50	P75	Observations
Annual Wage (2000 DKK)	238,170	169,906	141,047	247,029	317,177	8,830,448
Weeks Fully Unemployed	2.88	9.06	0	0	0	8,830,448
Firm size	4124.46	9860.5	20	183	2273	7,494,777

(ii) Demographics and Education

Variable	Mean	S.D.	P25	P50	P75	Observations
Age	39.23	6.56	35	39	44	8,830,448
Birth Year	1952.27	4.67	1948	1952	1956	8,830,448
Married	60.55%	48.87%	0	1	1	8,830,448
Less than high school	27.23%	44.52%	1	0	0	8,830,448
High School	4.20%	20.06%	0	0	0	8,830,448
Vocational	44.33%	49.68%	1	0	0	8,830,448
University or beyond	22.75%	41.92%	0	0	0	8,830,448
Missing education	1.49%	12.10%	0	0	0	8,830,448

Baseline Sample (2/2)

(iii) Family Structure

Variable	Mean	S.D.	P25	P50	P75	Observations
Family income (2000 DKK)	484,396	451,135	323,507	461,747	588,389	8,830,448
Wage as fraction of HH Income	50.47%	29.97%	36.11%	53.76%	67.10%	8,830,448
Family size	2.89	1.35	2	3	4	8,830,448
Adults in Family	1.89	0.62	2	2	2	8,830,448
Number of children	1.05	1.14	0	1	2	8,830,448

(iv) Police and Court Records

Variable	Mean	S.D.	P25	P50	P75	Observations
Probability of charge	2.27%	14.89%	0	0	0	8,830,448
Number of charges	1.66	3.34	1	1	1	200,391
Probability of conviction	1.91%	13.69%	0	0	0	8,830,448
Probability of conviction - Property	0.65%	8.06%	0	0	0	8,830,448
Probability of conviction - Violent	0.13%	3.67%	0	0	0	8,830,448
Probability of conviction - DUI	0.67%	8.14%	0	0	0	8,830,448
Number of convictions	2.26	5.89	1	1	2	168,517
Probability of conviction to Prison	26.29%	44.02%	1	0	0	168,517
Length of prison sentence (days)	2341.89	5844.60	14	30	240	44304

Crime: *Citations/Arrests → Conviction*

- We focus on citations/arrests occuring *after* job loss, and which lead to a conviction.

	Time from Offense to Charges (days)				
Sample	Mean	Median	P25	P75	Charges
At least 1 charge	59.6	0	0	22	3,729,636
Excluding speeding	78.1	1	0	44	2,759,322
Excluding zeros	149.1	42	10	136	1,488,564
	Time from Charges to Conviction (days)				
Sample	Mean	Median	P25	P75	Convictions
At least 1 conviction	111.9	70	37	143	1,882,930 (50.5%)[1]
Excluding speeding	136	94	43	180	1,172,128
Excluding zeros	116.5	74	40	148	1,808,722
	Time from Conviction to Prison (days)				
Sample	Mean	Median	P25	P75	Prison terms
At least 1 prison term	173	129	53	231	233,680 (12.4%)[2]
Excluding speeding	170.6	124	47	229	213,246
Excluding zeros	187.9	142	73	244	215,268

Unemployment Transitions are Endogenous

	(1)	(2)	(3)	(4)
Dependent:	Total Crime		Property Crime	
Specification:	OLS	Fixed Effect	OLS	Fixed Effect
Year +7	0.0156***	0.0012***	0.0064***	0.0012***
	(0.0004)	(0.0004)	(0.0002)	(0.0002)
Year +6	0.0155***	0.0016***	0.0069***	0.0020***
	(0.0004)	(0.0004)	(0.0002)	(0.0002)
Year +5	0.0173***	0.0029***	0.0077***	0.0027***
	(0.0004)	(0.0004)	(0.0003)	(0.0003)
Year +4	0.0196***	0.0049***	0.0094***	0.0043***
	(0.0004)	(0.0004)	(0.0003)	(0.0003)
Year +3	0.0218***	0.0068***	0.0100***	0.0047***
	(0.0004)	(0.0005)	(0.0003)	(0.0003)
Year +2	0.0232***	0.0082***	0.0110***	0.0057***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Year +1	0.0249***	0.0098***	0.0110***	0.0058***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Unemployment Year	0.0303***	0.0153***	0.0127***	0.0074***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)

Unemployment Transitions are Endogenous

Unemployment Year	0.0303***	0.0153***	0.0127***	0.0074***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Year −1	0.0300***	0.0150***	0.0108***	0.0056***
	(0.0005)	(0.0005)	(0.003)	(0.0003)
Year −2	0.0277***	0.0129***	0.0103***	0.0051***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Year −3	0.0252***	0.0108***	0.0098***	0.0048***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Year −4	0.0247***	0.0107***	0.0098***	0.0050***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Year −5	0.0231***	0.0098***	0.0092***	0.0046***
	(0.0005)	(0.0005)	(0.0003)	(0.0003)
Individual Fixed Effect	No	Yes	No	Yes
R Squared	0.005	0.001	0.003	0.001
Observations	8,830,448	8,830,448	8,830,448	8,830,448
Clusters	551,903	551,903	551,903	551,903

Correlations between Observables and Unemployment Transitions

Individual Observable:	Correlation with Job Separation (1)	Correlation with Any Crime (2)
Age	−0.084***	−0.039***
Less than High School	0.042***	0.070***
High School Education	−0.002***	−0.010***
Vocational Education	0.005***	−0.022***
University or Greater	−0.053***	−0.053***
Missing Education	+0.011***	0.034***
Married	−0.069***	−0.073***
Lag of Tenure	−0.108***	−0.073***
Lag Firm Size	−0.043***	−0.012***
Crime in Previous Year	+0.022***	–
Crime in Year t − 5	+0.016***	–
Individual × Year Observations	8,830,448	

Notes: The table presents the correlation of the transition into unemployment separately with (i) a crime indicator variable and (ii) a range of individual observables. This suggests that a regression of crime on unemployment transitions would be confounded. The 8,830,448 observations are those of the comprehensive Danish registry including all workers regardless of tenure. *** Significant at 1%.

- Similar signs for the correlation with crime and with displacement $\rightarrow$ overestimate.
- **Likely both dynamic and static endogenous selection into job separations.**

Mass Layoffs and Job Displacement

Focusing on a sample of arguably unexpected and sudden job separations.

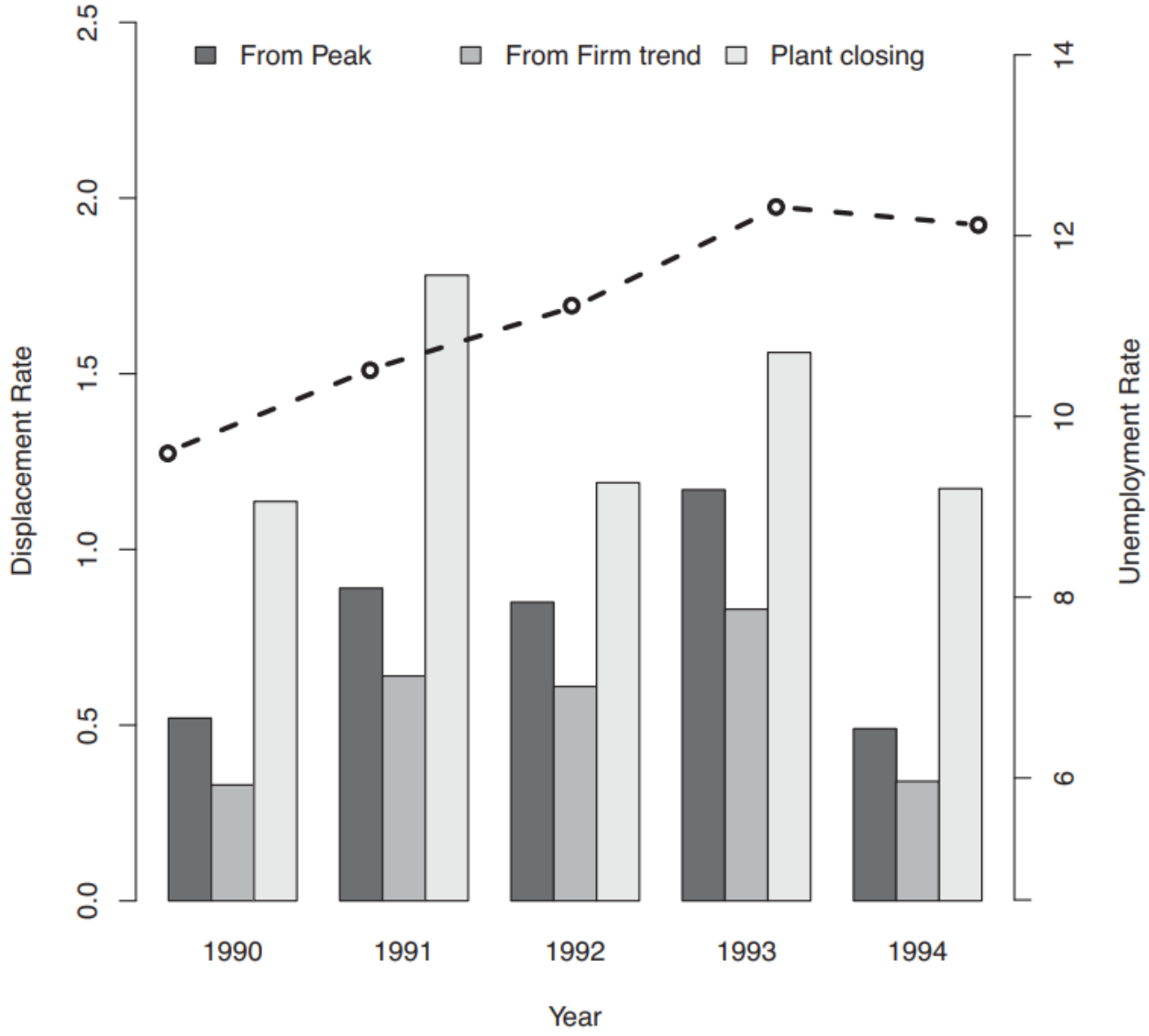
- **Mass layoffs:** a decline in firm size of 30% or 40% compared to
  - (i) peak firm size in 1985-1990 (JLS definition)
  - (ii) average firm size in 1985-1990.
  - (iii) firm-specific size trend in 1985-1990 for declining firms.
    - $n_{j,t} = \alpha_j + \beta_j \cdot t + \varepsilon_{j,t}$ on $1985 - 1990$ used to predict $\hat{n_{j,t}} = \hat{\alpha}_j + \hat{\beta}_j \cdot t$ for $t \geq 1990$

- **Displaced workers:** focus on workers least likely to lose employment during a mass layoff event.
- **Sample:**
  - Workers continuously employed between 1987 and 1989. Full time employment.
  - Ten or more employees.
  - Not enrolled in education.

Placebo Test:
Current convictions of Future Displaced Workers

Subsample:	All workers in the 5 years before displacement				
Dependent:	Property Crime				
Dependent:	1990	1991	1992	1993	1994
	(1)	(2)	(3)	(4)	(5)
Future Displaced Worker	−0.0000	0.0014	0.0017	0.0012	0.0007
	(0.0017)	(0.0014)	(0.0013)	(0.0011)	(0.0016)
Fixed Effects	Year, municipality, employer				
R Squared	0.015				
Observations	1,973,619				
F Statistic, joint significance	0.850				
p value, joint significance	0.517				
Mean of Dep. Variable	0.016				

Displacement Rate along the Business Cycle



Specification

- Baseline regression.

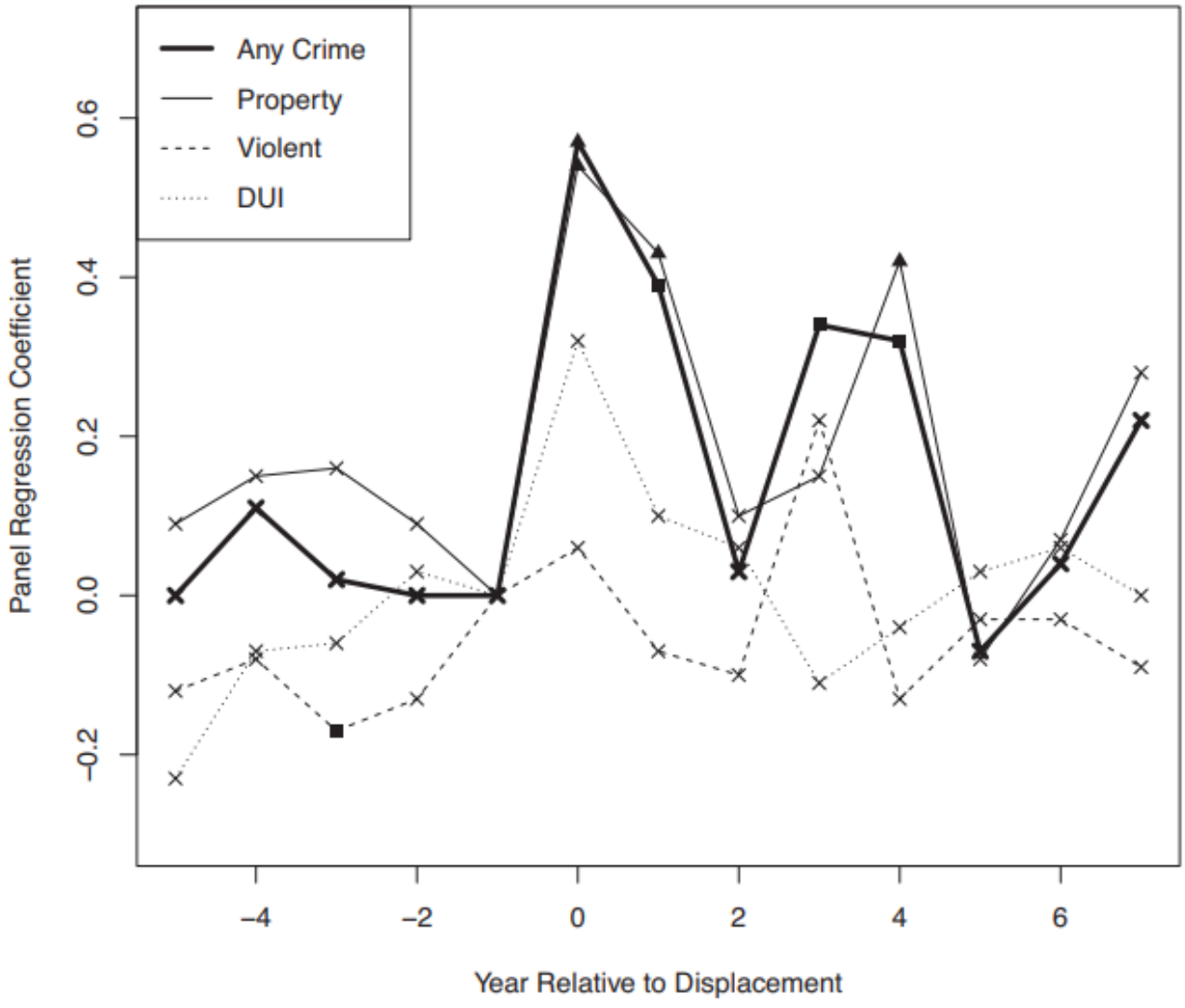
$$\begin{aligned} Crime_{it} \quad = \quad & \sum_{k=-5}^{+7} \delta_k \cdot 1(Displaced\ in\ year\ t-k) + Individual_i \\ & + Year_t + Municipality_{m(i,t)} + x_{it}\beta + Constant + \varepsilon_{it} \end{aligned}$$

- Effects $\delta_0, \ldots, \delta_7$ relative to the pre-displacement year -1.
- Placebo coefficients: δ_{-5}, ..., δ_{-2}.
- Individual fixed effect: individual unobservables.
- $Municipality_{m(i,t)}$: municipality unobservables, differences in policing efforts.
- Multinomial, propensity score matching, fixed effect f.d./within $\rightarrow$ similar results.

Impact of Job Displacement on Crime

Dependent:	Any Crime		Property Crime		Violent Crime		D.U.I. Crime	
Coeff.:	Annual (1)	Cumul. (2)	Annual (3)	Cumul. (4)	Annual (5)	Cumul. (6)	Annual (7)	Cumul. (8)
Year +7	0.0023	0.0068	0.0029	0.0117	−0.0009	−0.0038	0.0002	−0.0045
	(0.0020)	(0.0105)	(0.0017)	(0.0089)	(0.0011)	(0.0069)	(0.0024)	(0.0146)
Year +6	0.0006	0.0067	0.0008	0.0105	−0.0002	−0.0056	0.0008	−0.0038
	(0.0018)	(0.0091)	(0.0015)	(0.0077)	(0.0011)	(0.0061)	(0.0022)	(0.0128)
Year +5	−0.0006	0.0078	−0.0007	0.0113*	−0.0003	−0.0020	0.0004	−0.0020
	(0.0016)	(0.0079)	(0.0014)	(0.0068)	(0.0011)	(0.0052)	(0.0024)	(0.0112)
Year +4	0.0034*	0.0100	0.0043**	0.0128**	−0.0013	−0.0012	−0.0003	−0.0005
	(0.0019)	(0.0068)	(0.0018)	(0.0058)	(0.0009)	(0.0044)	(0.0024)	(0.0094)
Year +3	0.0036*	0.0083	0.0017	0.0092*	0.0022	0.0001	−0.0011	0.0001
	(0.0020)	(0.0057)	(0.0015)	(0.0047)	(0.0015)	(0.0038)	(0.0021)	(0.0076)
Year +2	0.0005	0.0071	0.0012	0.0090**	−0.0010	−0.0018	0.0006	0.0032
	(0.0017)	(0.0044)	(0.0014)	(0.0038)	(0.0011)	(0.0028)	(0.0025)	(0.0061)
Year +1	0.0040*	0.0081**	0.0044**	0.0088***	−0.0008	−0.0005	0.0011	0.0040
	(0.0021)	(0.0035)	(0.0018)	(0.0031)	(0.0011)	(0.0020)	(0.0026)	(0.0043)
Disp. year	0.0057**	0.0057**	0.0054***	0.0054***	0.0006	0.0006	0.0032	0.0032
	(0.0022)	(0.0022)	(0.0021)	(0.0020)	(0.0011)	(0.0011)	(0.0026)	(0.0026)
Year −1	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Year −2	0.0000	–	0.0009	–	−0.0013	–	0.0004	–
	(0.0018)		(0.0015)		(0.0010)		(0.0024)	
Year −3	0.0003	–	0.0016	–	−0.0017*	–	−0.0007	–
	(0.0017)		(0.0015)		(0.0010)		(0.0023)	
Year −4	0.0012	–	0.0016	–	−0.0008	–	−0.0007	–
	(0.0020)		(0.0017)		(0.0011)		(0.0025)	
Year −5	0.0001	–	0.0009	–	−0.0012	–	−0.0023	–
	(0.0019)		(0.0016)		(0.0011)		(0.0024)	
Fixed Effects	Individual, Municipality×Time		Individual, Municipality×Time		Individual, Municipality×Time		Individual, Municipality×Time	
R Squared	0.115		0.113		0.094		0.102	
Observations	5,167,318		5,167,318		5,167,318		5,167,318	
Individuals	154,694		154,694		154,694		154,694	
F Statistic	18.742		18.628		2.811		14.991	
Mean of Dep. Variable in Overall Sample	0.018		0.016		0.003		0.011	

Impact of Job Displacement on Crime

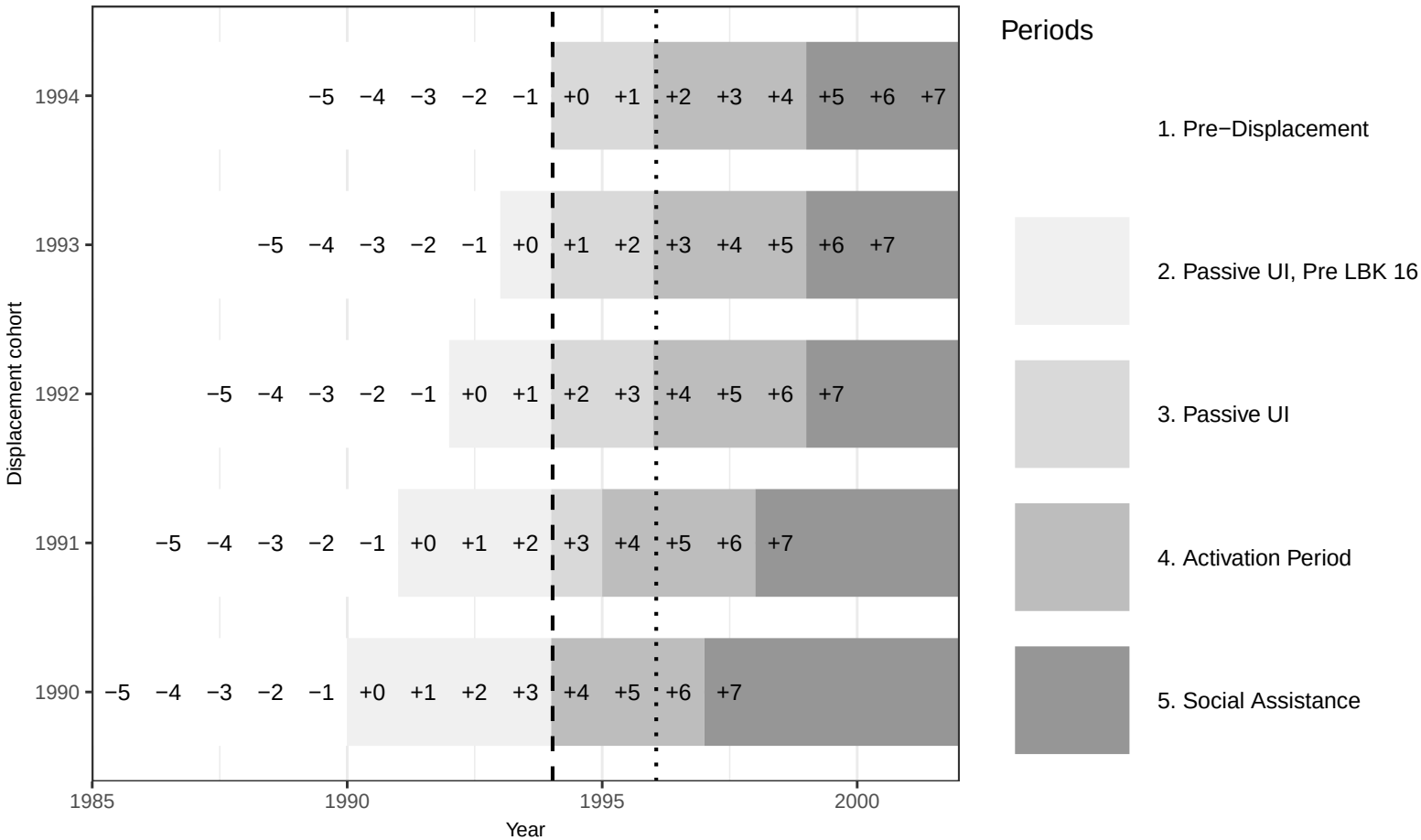


The Role of the Unemployment Insurance Benefit System

- Danish unemployment system:
  - Unemployment Insurance: membership voluntary, generous benefits, 90% replacement, maximum $\sim$140,000DKK
  - Social Assistance: maximum 60 or 80% of UI cap depending on family situation, means tested
- $>$95% of individuals in sample join UI fund
- Benefits are long-lasting, particularly by international standards

- A series of reforms scaling back the generosity of the UI system take place throughout the 1990s
- Prior to passage of reforms:
  - Individuals effectively entitled to infinite UI benefits as participation in a job training scheme, etc entitled the unemployed individual to a new benefit spell
- 1994 Act on Unemployment Insurance:
  - Passive duration period of 48 months (out of 60)
  - Followed by a mandatory activation period of 36 months (out of 48)
  - Must work at least 26 weeks over past 3 years to be entitled to a new spell
    - Activation measures no longer bring new spell entitlement

- 1996 Amendment:
  - Passive duration period of 24 months (out of 36)
  - Followed by a mandatory activation period of 36 months (out of 48)
- Scaling back of the system continued throughout the later 1990s
- Introduction of these measures generally believed to decrease unemployment rates in second half of 1990s


Displacement cohort
1994
1993
1992
1991
1990
−5 −4 −3 −2 −1 +0 +1 +2 +3 +4 +5 +6 +7
1985
1990
1995
2000
Year
Periods
1. Pre−Displacement
2. Passive UI, Pre LBK 16
3. Passive UI
4. Activation Period
5. Social Assistance

Unemployement Regime Transitions and Crime

	Property Crime (1)	Property Crime (2)	Property Crime (3)
Social Assistance	0.0029	0.0027	0.0029
	(0.0021)	(0.0021)	(0.0021)
Transition Active Benefits → SA	0.0031*	0.0031*	0.0030*
	(0.0016)	(0.0017)	(0.0017)
Active Benefits	0.0004	0.0004	0.0004
	(0.0013)	(0.0013)	(0.0013)
Transition Passive → Active Benefits	0.0036**		
	(0.0017)		
× First Cohort Affected by 1993 Act	–	0.0158**	–
		(0.0069)	
× Other Cohorts	–	0.0018	–
		(0.0015)	
× Weeks ∈ [0, 26)	–	–	0.0110*
			(0.0057)
× Weeks ∈ [26, 104)	–	–	0.0037
			(0.0025)
× Weeks ∈ [104, 250]	–	–	0.0010
			(0.0016)
Passive Benefits	0.0032***	0.0033**	0.0032**
	(0.0012)	(0.0012)	(0.0012)
Transition Empl. → Passive Benefits	0.0057***	0.0057***	0.0056***
	(0.0020)	(0.0020)	(0.0020)
Pre-displacement Year	Ref.	Ref.	Ref.
Fixed Effects	– Municipality × Time, Individual –		
R Squared	0.113	0.113	0.113
Observations	5,167,318	5,167,318	5,167,318
Individuals	154,694	154,694	154,694
F Statistic	21.304	19.865	18.705
Mean of Dep. Variable	0.016	0.016	0.016

- Prior to the 1994 reform, participation in what became activation measures entitled unemployed individual to a new benefits spell
- Following the 1994 reform, eligibility for a new spell is only based on regaining 26 weeks of full time employment within the last 3 years
- We divide the sample of displaced from 1990-1992 into three groups based on their employment levels in years +1 to +3 (prior to 4 years after displacement):
  - 0-25 weeks of full time employment
  - 26-102 weeks of full time employment
  - 103-152 weeks of full time employment

Career Criminals? Reoffending or New Marginal Workers

This table examines the impact of displacement on crime only for first-time *offenders following displacement, such that an individual's first instance of post-displacement crime = 1 and any subsequent crime = 0. The columns of this table correspond to different crime types as dependent variable.*

	(1) Any Crime	(2) Property	(3) Violent	(4) Traffic Alc.
Year +7	0.0001	0.0012	−0.0012	−0.0007
	(0.0018)	(0.0015)	(0.0010)	(0.0023)
Year +6	−0.0010	−0.0009	−0.0005	−0.0018
	(0.0016)	(0.0012)	(0.0011)	(0.0021)
Year +5	−0.0022	−0.0014	−0.0009	−0.0015
	(0.0016)	(0.0013)	(0.0011)	(0.0023)
Year +4	0.0017	0.0036**	−0.0013	−0.0006
	(0.0018)	(0.0017)	(0.0009)	(0.0024)
Year +3	0.0012	0.0002	0.0019	−0.003
	(0.0019)	(0.0015)	(0.0014)	(0.0021)
Year +2	−0.0010	0.0002	−0.0013	−0.0008
	(0.0016)	(0.0012)	(0.0010)	(0.0023)
Year +1	0.0025	0.0035**	−0.0011	0.0008
	(0.0020)	(0.0017)	(0.0011)	(0.0026)
Disp. Year	0.0057**	0.0054***	0.0006	0.0032
	(0.0022)	(0.0020)	(0.0011)	(0.0026)

Conclusion

- Find economically and statistically significant impacts of displacement on crime
  - Unemployment benefit system plays an important role: resurgence in criminal activity is likely driven by the design of unemployment benefits
    - crime is lower during active benefits than during passive benefits and spikes at the end of benefit eligibility
- **Policy implications**: impacts beyond employer-employee pair
  - Reductions in potential benefit duration lead to corresponding shifts in crime spikes at the end of benefits