Job Displacement and Crime: Evidence from Danish Micro Data

Patrick Bennett (Norwegian School of Economics)

Amine Ouazad (Ecole polytechnique)

Global Labor Markets Conference, September 2016

Unemployment → Crime

- **What are the *consequences* of unemployment?**
  - Impacts above and beyond the employer-employee pair → job separations may not be efficient.
- **What *causes* crime?**
  - Significant social costs of crime. Crime a key driver of politicians' approval rates.
- **1990-2016:** coincidence of crime and unemployment peaks in the US and in Denmark.
  - But Levitt (2004): the economy has too small an effect.
- Studies of the effect of unemployment on crime combine county-level (or equiv) data with an IV (exchange rate, industrial spec. a la Bartik).
  - ⇒ Captures the overall impacts of unemployment conditional on validity of IV.
  - Significant impacts of unemployment on property crime.

What we're doing

- Unique Danish administrative 1985-2000 individual data to estimate the impact of **individual job separation** $\Rightarrow$ **individual crime**.
  - Using job displacement as an arguably idiosyncratic driver of job separations.
  - Checks placebo tests and pre-displacement trends.
  - Estimates family dynamics following displacement.
  - How local income inequality magnifies displacement impacts.
  - Incarceration periods correlated with largers earnings losses post-displacement.
- **Prior contributions** use county-level or equivalent analysis:
  - Split total impact of unemployment on crime = Individual impact + Spillover effects.
  - Unemployment effects vs Separations.
- **Test of economic theory of crime:**
  - Earnings losses literature (Jacobson, Lalonde, Sullivan, AER, 1993)
    with Becker's (1968) theory of crime. Earnings losses $\rightarrow$ Property crime ?

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. Two extensions:
   - 5.1 Family spillovers.
   - 5.2 Inequality and Crime.

Danish Registry

- Database of every individuals residing in Denmark from 1980-present.
  1. **Employment spells:** *Integrated Database for Labor Market Research.*
  2. **Unemployment spells:** *Central Register of Labor Market Statistics.*
  3. **Citations, arrests, convictions, prison terms:** *Central Police Register.*
  4. **Family ties, education:** *Population Register.*
- Tied by an individual Central Person Register (CPR).
- 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

	(1) Transition into Unemployment	(2) Total Crime
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***
Age	−0.084***	−0.039***
Observations	8,830,448	

- Similar signs for the correlation with crime and with displacement $\rightarrow$ overestimate.

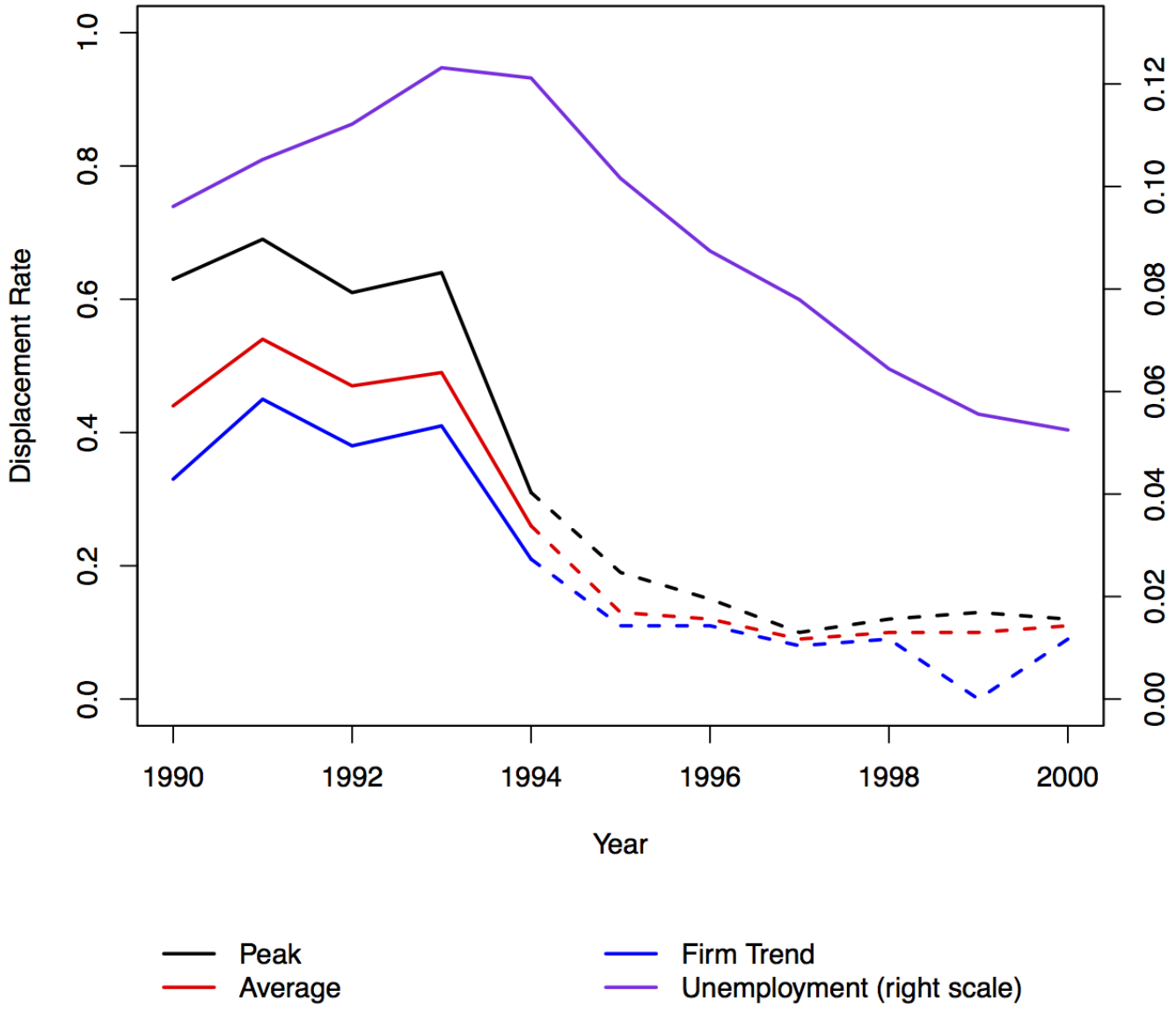
Mass Layoffs and Job Displacement

Focusing on a sample of arguably sudden and unexpected 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.
  - Workers continuously employed between 1987 and 1989. Full time employment. Ten or more employees. Not enrolled in education.

Displacement Rate along the Business Cycle



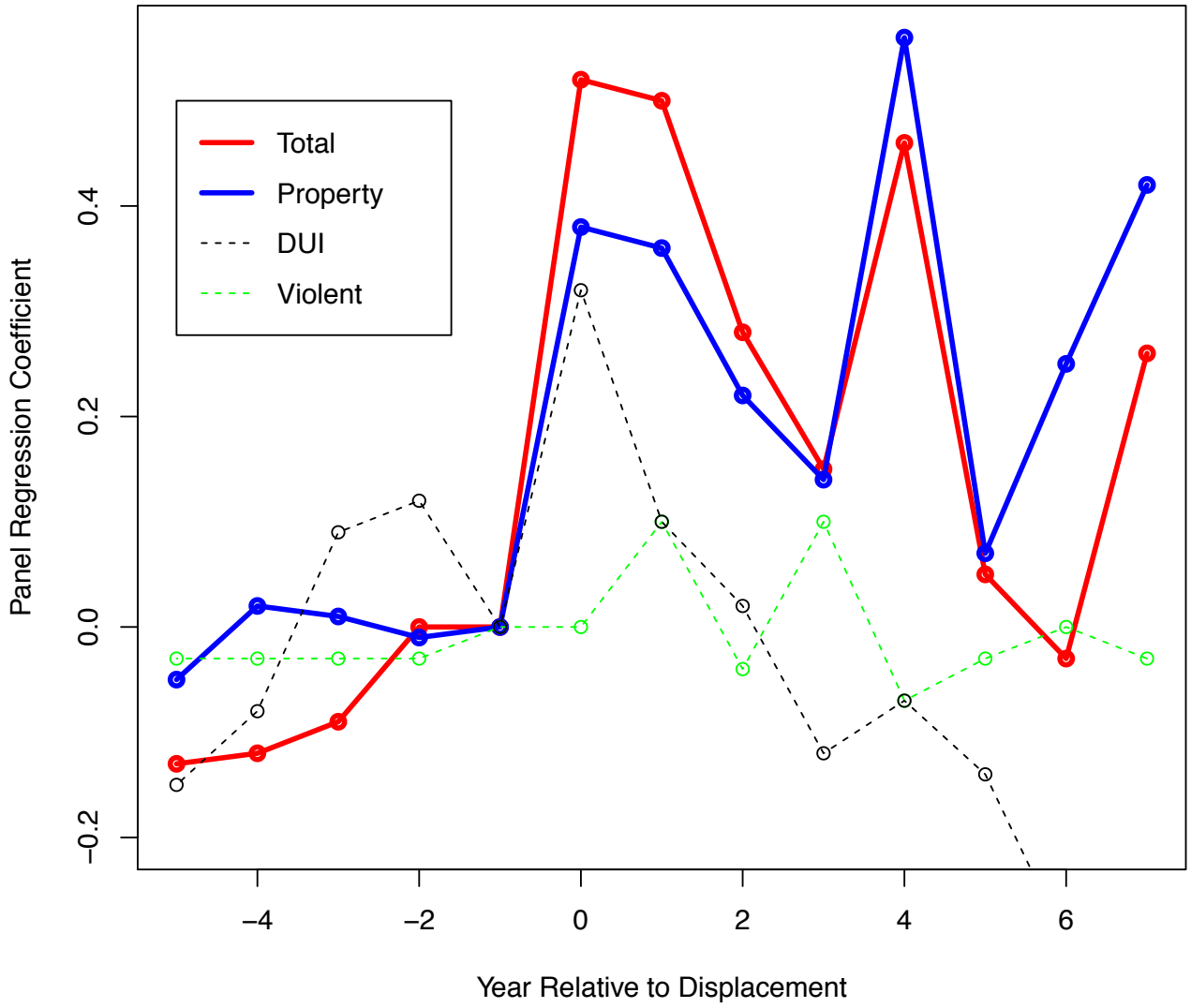
Specification

- Baseline regression.

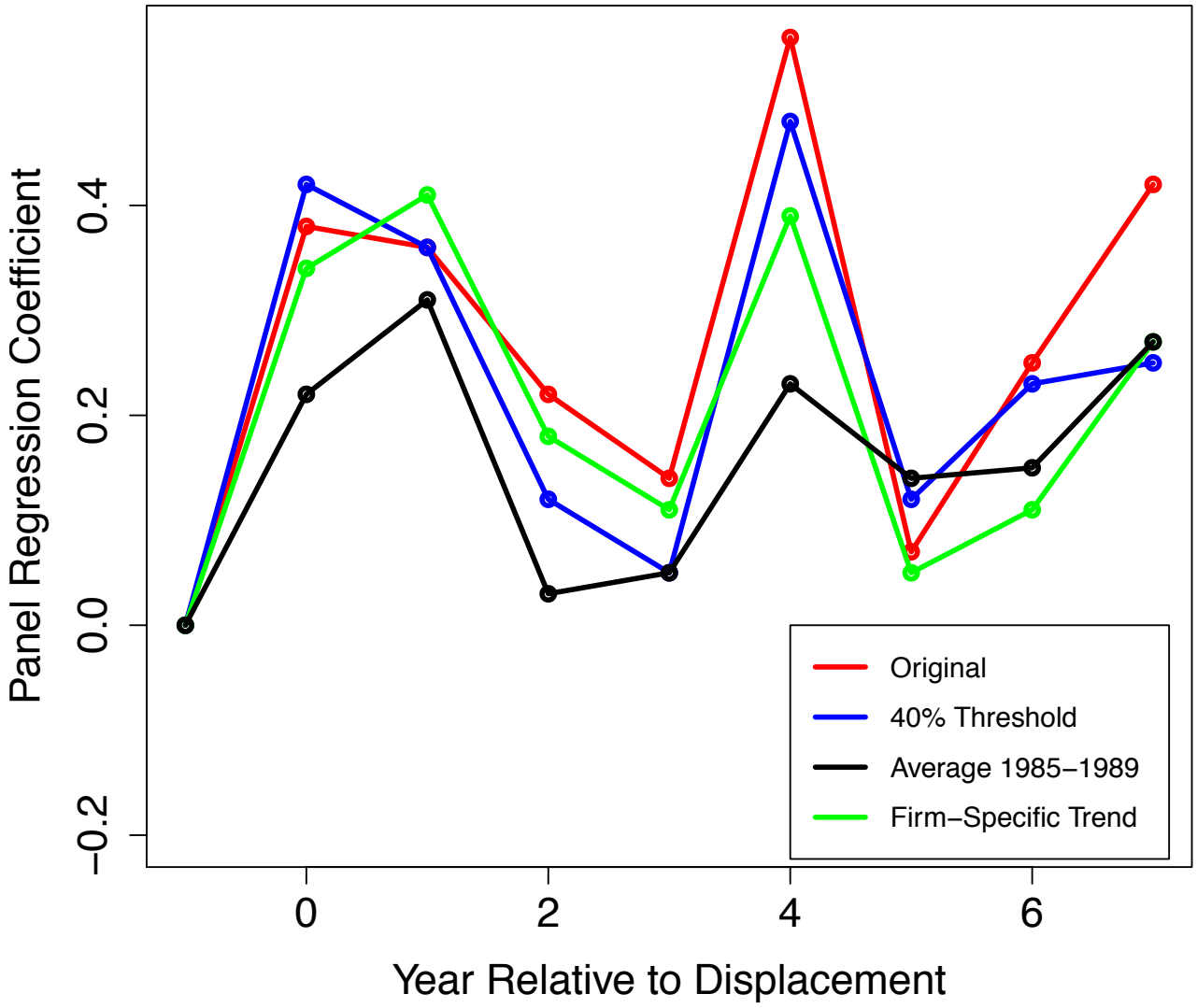
$$\begin{aligned} \textit{Crime}_{it} \quad = \quad & \sum_{k=-5}^{+7} \delta_k \cdot \mathbf{1}(\textit{Displaced in year } t-k) + \textit{Individual}_i \\ & + \textit{Year}_t + \textit{Municipality}_{m(i,t)} + \mathbf{x}_{it}\beta + \textit{Constant} + \varepsilon_{it} \end{aligned}$$

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

Impact of Job Displacement on Crime



Robustness to Alternative Definitions

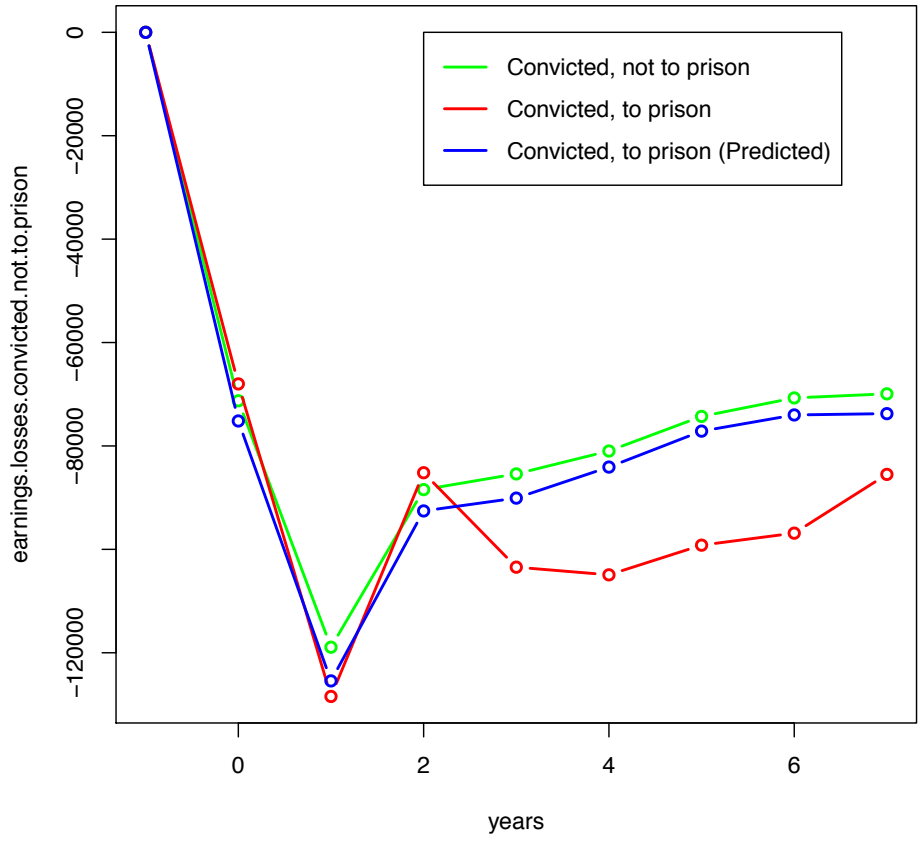


Placebo Test:
Current convictions of Future Displaced Workers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample:	1989				1985-1989			
Dependent:	Property		Violent		Property		Violent	
Future Displaced	0.0008	0.0007	0.0005	0.0004	0.0000	-0.0002	0.0003	0.0002
Worker	(0.0008)	(0.0008)	(0.0005)	(0.0005)	(0.0003)	(0.0003)	(0.0002)	(0.0002)
Year Dummies	-	-	-	-	Yes	Yes	Yes	Yes
Municipality Dummies	No	Yes	No	Yes	No	Yes	No	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
R Squared	0.000	0.003	0.000	0.002	0.000	0.001	0.000	0.001
Observations	102,360	102,360	102,360	102,360	511,800	509,955	511,800	509,955
Number of Individuals	102,360	102,360	102,360	102,360	102,360	102,360	102,360	102,360
F	1,232	0.315	0.896	0.085	0.011	1.548	1.897	0.507

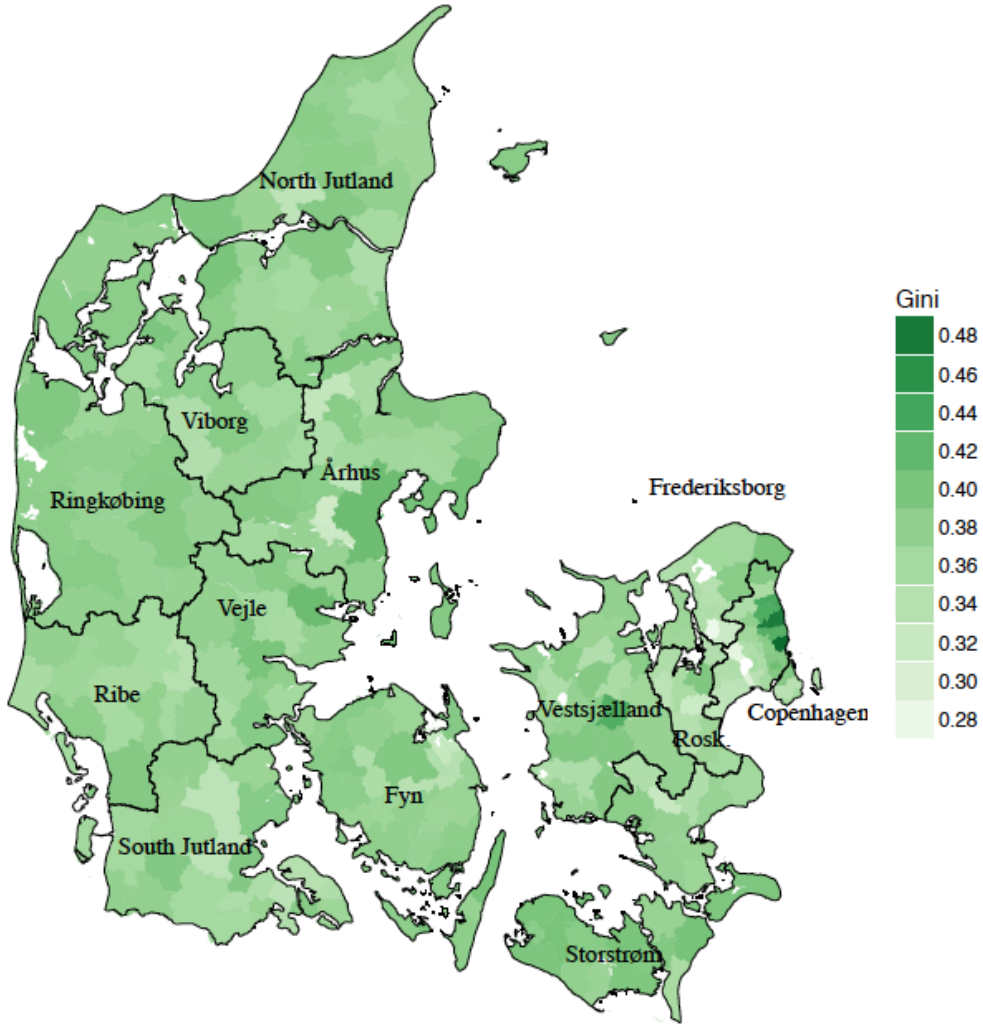
Incarceration: Larger Earnings Losses?

- Mechanical incapacitation effect of incarceration on earnings.



- Larger earnings losses than what is predicted by the incapacitation effect.

Local Income Inequality and Displacement Impacts



- Impact of displacement is twice as high at P75 of Gini (+0.43) than at the P25 of Gini (+0.2 ppt).
- Results hold when excluding Copenhagen and Frederiksberg.

Family Dissolution, Marital Status, and Intra-Family Crime Spillovers

- Pre-displacement marital status is a statistical predictor of the impact of displacement on crime.
  - Impact of job displacement on crime is $+0.9$ ppt for single individuals, $+0.3$ ppt for individuals with children, and $+0.19$ ppt for 2-adult or more families.
- Displacement leads to long-run increases in the probability of mariage dissolution.
  - 0.9 ppt in the short run (year of displacement), 3.5 ppt seven years after displacement.
- Weak evidence of impacts of parental displacement on younger family members' crime.
  - one year after displacement for sons' property crime ($+0.3ppt$).

Conclusion

- Find economically and statistically significant impacts of displacement on crime.
  - Inequality seems to magnify the impact of mass layoffs on crime.
  - Displacement leads to separations, but little evidence of family spillovers.
  - Incarceration correlated with larger, non-mechanical, earnings losses.
- **Institutional differences?** External validity?
- **Prior literature**: **Unemployment** and Crime. Our paper: **Displacement** and crime.
  - ΔSeparation Rate + ΔArrival Rate + ΔWage distribution $\simeq$ ΔUnemployment
- **Policy implications**: Impacts beyond employer-employee pair.
  - Separations unlikely to be efficient: Blanchard and Tirole's (2008) tax on layoffs.