Walker (2013)
"The Transitional Costs of Sectoral Reallocation: Evidence From the Clean Air Act and the Workforce"

Hulai Zhang

Env.Climate

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Outline

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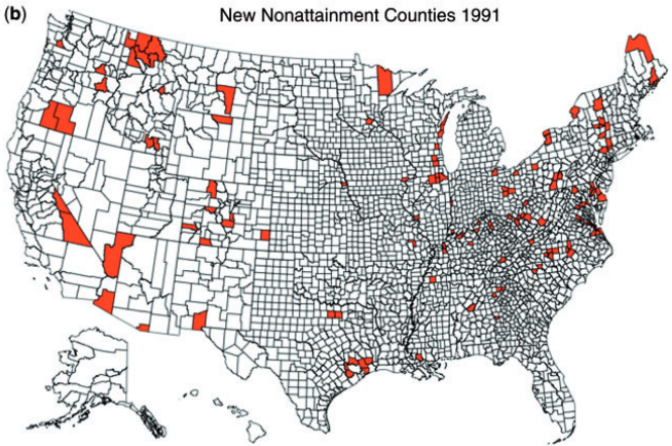
2. Data and Research Design
3. Results
4. Mechanism
5. Conclusion

Introduction

This paper studies the transitional cost to workers from environmental regulations

- Average earnings decline 5% in three years after the 1990 CAAA
  - The earnings declines are persistent and only begin to recover some five year after
  - All losses are driven by workers who separate from their firm
- Cross-sectional heterogeneity in the regulatory impact exists
  - Strength of local labor market
- Agrregate wage loss is $5.4 billion, two orders of magnitude below health benefit of the 1990 CAAA

The 1990 CAAAs



- More county nonattainment
  - New standard for PM10
  - Re-evaluation
- Operating permit $\rightarrow$ plant-level regulatory status

Data

The Longitudinal Employer Household Dynamics Files, 1990–

- Entire employment history and earnings for each worker
- Demographic information of workers
- No measurement error: Firms' report for tax liabilities calculation

Longitudinal Business Database, 1975–2005

- Plant-level employment, payroll, and firm age

EPA Air Facility Subsystem

- Plant-level pollutant permit

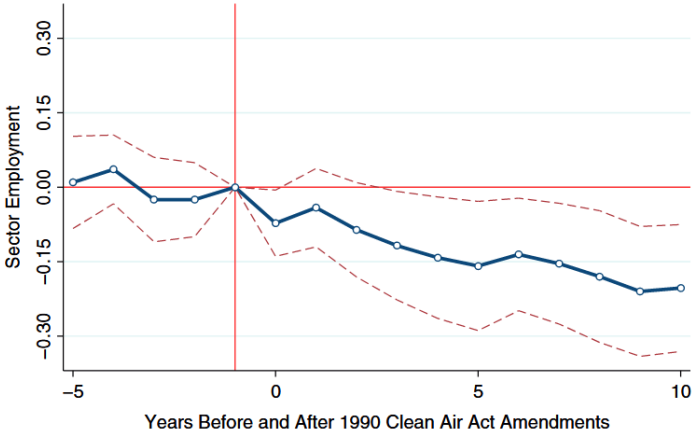
$\Rightarrow$ A plant is regulated in a year if a permit in AFS and it resides in a nonattainment county for the pollutant on the permit of the year

Research Design

$$Y_{jcst} = \eta_1 \left[N_c^{\rho} \times P_s^{\rho} \times 1\left(\tau_t > 0\right) \right] + \chi_{jcs} + n_{ct} + p_{st} + \Phi_{jt} + \epsilon_{jcst} \tag{1}$$

- N_c^{ρ}: county nonattainment for pollutant ρ
- P_s^{ρ}: plant of pollutant ρ, Sector $\in$ [PM10 only, O_3 only, Both PM10 and O_3, None]
- $1\left(\tau_t > 0\right)$: Post the 1990 CAAA, e.g. $Year > 1990$
- χ_{jcs}: industry×county×sector FEs, time invariant characteristics
- n_{ct}: common shocks in a year
- p_{st}: common shocks to all polluting plants in a year
- Φ_{jt}: common shocks to specific industries in a year

Total employment



Wage costs

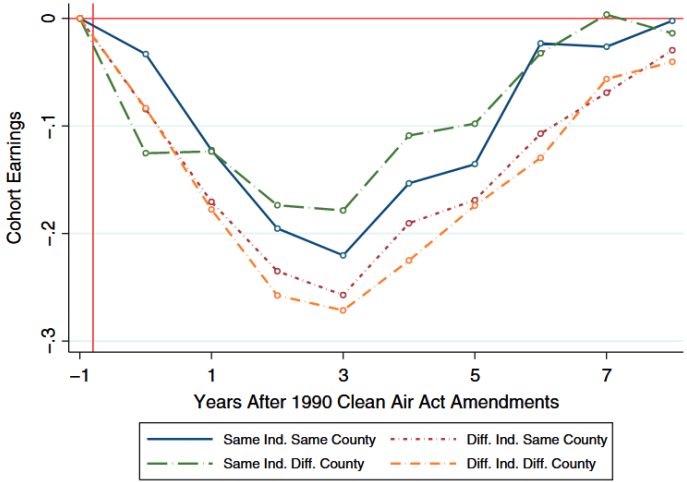
	(1)	(2)	(3)	(4)	(5)	(6)
Regulation $(t+0)$	−0.033**	−0.031**	−0.034**	−0.036**	−0.036**	−0.033***
	(0.014)	(0.012)	(0.017)	(0.015)	(0.017)	(0.010)
Regulation $(t+1)$	−0.058***	−0.056***	−0.057***	−0.059***	−0.056***	−0.051***
	(0.012)	(0.014)	(0.019)	(0.011)	(0.014)	(0.012)
Regulation $(t+2)$	−0.046***	−0.045***	−0.062***	−0.040***	−0.051***	−0.030**
	(0.012)	(0.011)	(0.009)	(0.009)	(0.010)	(0.012)
Regulation $(t+3)$	−0.036**	−0.034**	−0.048*	−0.028**	−0.035**	−0.019**
	(0.017)	(0.016)	(0.026)	(0.012)	(0.016)	(0.009)
Regulation $(t+4)$	−0.041	−0.040	−0.054	−0.034**	−0.040**	−0.019**
	(0.026)	(0.025)	(0.033)	(0.016)	(0.019)	(0.008)
Regulation $(t+5)$	−0.011	−0.010	−0.020**	−0.013	−0.015	−0.011
	(0.014)	(0.015)	(0.009)	(0.014)	(0.009)	(0.014)
Regulation $(t+6)$	0.000	0.001	−0.002	−0.003	0.001	−0.011*
	(0.016)	(0.017)	(0.012)	(0.012)	(0.009)	(0.006)
Regulation $(t+7)$	0.003	0.004	0.008	−0.004	0.007	−0.010
	(0.012)	(0.012)	(0.013)	(0.011)	(0.012)	(0.009)
Regulation $(t+8)$	0.005	0.006	0.009	0.001	0.004	0.008
	(0.010)	(0.010)	(0.008)	(0.011)	(0.009)	(0.008)
9-year PDV	−0.202***	−0.191***	−0.241***	−0.199***	−0.204***	−0.162***
	(0.047)	(0.046)	(0.050)	(0.044)	(0.044)	(0.054)
N	153,249	153,249	153,249	153,249	153,249	153,249
2-digit SIC × year FE				X	X	
County trends		X		X		
County × year FE			X		X	
County × SIC × year FE						X

Wage costs: Heterogeneity

	(1) Stayer	(2) Separator	(3) Separator: same industry same county	(4) Separator: diff. industry same county	(5) Separator same industry diff. county	(6) Separator diff. industry diff. county
Regulation ($t+0$)	−0.011	−0.087***	−0.033	−0.084***	−0.125***	−0.084***
	(0.019)	(0.007)	(0.021)	(0.011)	(0.015)	(0.008)
Regulation ($t+1$)	−0.027**	−0.184***	−0.123***	−0.171***	−0.124***	−0.178***
	(0.012)	(0.011)	(0.012)	(0.011)	(0.022)	(0.012)
Regulation ($t+2$)	0.004	−0.265***	−0.195***	−0.235***	−0.174***	−0.258***
	(0.009)	(0.026)	(0.026)	(0.029)	(0.012)	(0.022)
Regulation ($t+3$)	0.004	−0.267***	−0.220***	−0.257***	−0.179***	−0.272***
	(0.012)	(0.039)	(0.064)	(0.046)	(0.012)	(0.029)
Regulation ($t+4$)	−0.008	−0.208***	−0.153***	−0.190***	−0.109***	−0.225***
	(0.018)	(0.036)	(0.054)	(0.045)	(0.020)	(0.022)
Regulation ($t+5$)	0.014	−0.169***	−0.136***	−0.169***	−0.098***	−0.174***
	(0.015)	(0.021)	(0.046)	(0.028)	(0.016)	(0.013)
Regulation ($t+6$)	0.019*	−0.113***	−0.023	−0.107***	−0.032	−0.130***
	(0.011)	(0.011)	(0.016)	(0.012)	(0.021)	(0.013)
Regulation ($t+7$)	0.006	−0.063***	−0.026	−0.069***	0.004	−0.056***
	(0.012)	(0.010)	(0.017)	(0.011)	(0.014)	(0.010)
Regulation ($t+8$)	0.007	−0.034**	−0.002	−0.030	−0.014*	−0.040***
	(0.016)	(0.014)	(0.010)	(0.020)	(0.008)	(0.007)
9-year PDV	−0.000	−1.225***	−0.810***	−1.155***	−0.770***	−1.244***
	(0.053)	(0.098)	(0.141)	(0.120)	(0.067)	(0.082)
N	152,988	153,160	151,523	152,715	151,929	153,025

- Separators are major earnings losers.

Wage costs: Heterogeneity

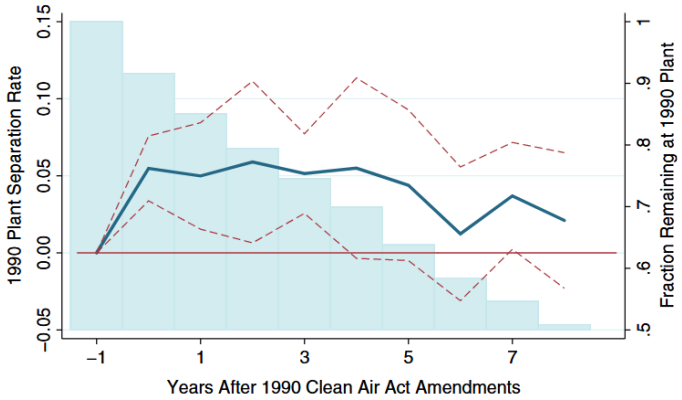


Robustness checks

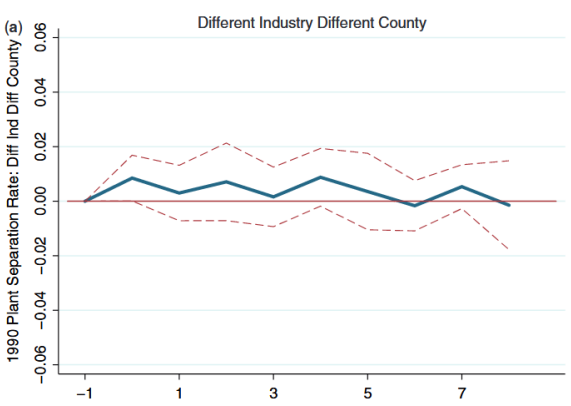
	(1) $0 \leq p \leq 1$	(2) $1 < p \leq 5$	(3) $5 < p \leq 10$	(4) $10 < p \leq 25$	(5) $25 < p \leq 50$	(6) $50 \leq p \leq 75$	(7) $75 < p \leq 90$	(8) $90 < p \leq 95$	(9) $95 < p \leq 99$	(10) $99 < p \leq 100$
9-year total	0.045*	−0.005	−0.009	0.013	0.061	0.016	−0.005	−0.024	−0.064**	−0.028***
	(0.025)	(0.017)	(0.006)	(0.030)	(0.063)	(0.033)	(0.051)	(0.028)	(0.026)	(0.009)
N	156,324	156,324	156,324	156,324	156,324	156,324	156,324	156,324	156,324	156,324

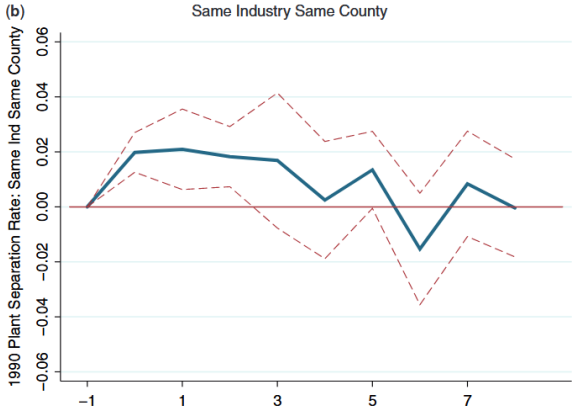
- The very top of the earnings distribution loses
- The very bottom gains

Mechanism: Separation rate

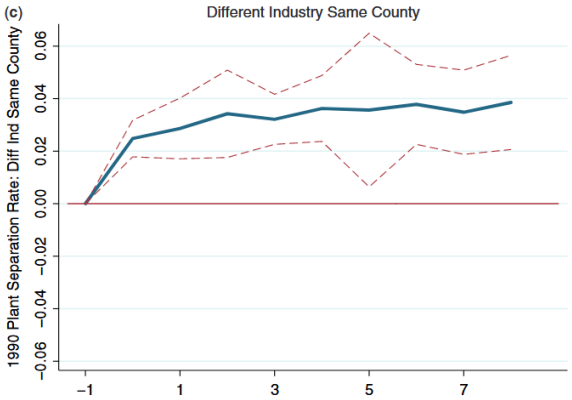


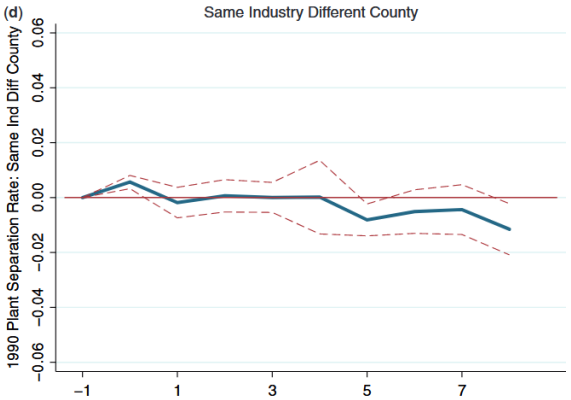
Mechanism: Separation rate I





Mechanism: Separation rate II





Conclusion

- The 1990 CAAA costs 20% loss to worker earnings
  - Amount to $5.4 billion, two orders of magnitude below health benefit of the 1990 CAAA
  - The earnings losses are persistent in three years after the regulation
  - Weak local labor market seems more loss

- All losses are driven by workers who separate from their firms

References

Walker, W. R. (2013). The transitional costs of sectoral reallocation: Evidence from the clean air act and the workforce. *The Quarterly journal of economics 128*(4), 1787–1835.