

Jobs and Environmental Regulation

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NBER Conference on Environmental and Energy Policy and the Economy
May 16, 2019



Introduction

- Sharp disconnect between the political importance of jobs and the limited academic research on how environmental policy affects jobs
- Many potentially important questions:
 - How big are job effects of policy?
 - Are they aggregate job gains/losses or job reallocation across industries?
 - Are job losses social costs?
 - What are distributional implications of job gains/losses/reallocation?
 - What about job quality?

Key Elements of the Problem

- Spillovers across firms/industries are important
 - Can't just look at directly regulated firms and assume no effects elsewhere
 - Need general-equilibrium analysis
- Labor market frictions are important
 - Can't just assume demand=supply in labor market

Existing Literature

- Reduced-Form Empirical Studies
- Computable General Equilibrium (CGE) Models
- Search-Friction Models

Existing Literature

Reduced-Form Empirical Studies

Many studies use reduced-form empirical methods to measure effects of environmental regulation on employment in regulated firms

- Assume unregulated firms are unaffected by regulation (no spillovers)
- Almost all use unregulated firms as control group
 - Spillover effects on control group => biased estimates of effects on regulated firms

Existing Literature

Computable General Equilibrium (CGE) Models

- Full employment models assume the wage adjusts until labor supply equals labor demand
 - All changes in labor supply are voluntary
- Bernstein et al. (2017) and others convert changes in labor supply into changes in “full time equivalent” (FTE) jobs
 - Bernstein et al. (2017) was cited by President Trump in speech announcing exit from the Paris Agreement

Existing Literature

Search-Friction Models

- Recent literature uses search and matching frictions to incorporate key features of real-world labor markets
 - Hafstead and Williams (2018) shows environmental taxation yields substantial labor reallocation with very little net job loss
 - Hafstead et al. (2018) show that explicitly modeling employment frictions generates much smaller estimates of job losses than full-employment CGE models
 - Aubert and Chiroleu-Assouline (2019) and Fernandez Intrigo (2019) attempt to estimate the distributional implications of reallocation: what types of workers win and lose

Questions about Jobs and Policy Analysis

- Separations vs. Reductions in New Hires
- Job Losses as Social Costs?
- Social Costs of Labor Reallocation
- Distributional Effects
- Geographic Effects
- Job Quality

Questions about Jobs and Policy Analysis

- **Separations vs. Reductions in New Hires**
- **Job Losses as Social Costs?**
- Social Costs of Labor Reallocation
- **Distributional Effects**
- Geographic Effects
- **Job Quality**

Separations vs. Reductions in New Hires

- Reduction in jobs can come either via more separations (layoffs, plant closings) or reduced hiring
 - Separations are more visible, and much easier to identify affected workers
 - Costs may differ (separations => loss of firm-specific human capital)
- US labor market has substantial churn ($\approx 40\%$ turnover/year)
 - Possible to accommodate substantial job shifts via reductions in hiring alone
 - Simulation (Hafstead & Williams 2018) and empirical (Curtis 2018) studies find employment effects of regulation come largely via reduced hiring

Job Losses as Social Costs?

- General public sees job losses as cost, job gains as benefit
- Economists: “jobs are a cost, not a benefit”
- But cost-benefit analyses typically use wage as cost of labor
 - Should use opportunity cost (but that’s hard to measure)
 - If worker would otherwise be unemployed (or in low-quality job), opportunity cost could be much lower than wage
 - This argues for public investment during recessions (for example)
 - Counterfactual is key (what would worker otherwise be doing?)
 - Emphasizes need for general-equilibrium analysis
 - Also need to think carefully about why wage \neq opportunity cost of labor
 - In search-friction models, tradeoff between unemployment and search effort (both costly)

Distributional Effects

- Even if unemployment and earnings losses don't represent net social costs, they're still clearly costs for affected workers
- How big are differential effects across workers?
 - Depends on mobility across sectors/occupations. If workers can easily move, this limits differential effects.
 - Job flow data suggests movement is relatively easy: $\approx 2/3$ of workers who find new jobs switch to a different industry ($\approx 25\%$ of US workers switch each year)
 - Hard to reconcile with Davis & von Wachter (2011) estimate of earnings loss
 - Other causes of earnings loss? Industry-to-industry isn't relevant measure? Mass layoffs are fundamentally different? Hard to know. Need more research.

Job Quality

- Claim: regulation causes loss of “good jobs”
- Relatively high-paying blue-collar jobs concentrated in certain industries (mining, manufacturing) often affected by regulation
 - Do these jobs pay well just to compensate for dirty, dangerous work?
 - Does pay difference come from better employees, not better jobs?
 - Evidence suggests genuine wage premium for these jobs
 - These jobs are disappearing, but largely for reasons unrelated to regulation (deunionization, technological shifts, etc.)
- Could regulation create good jobs?
- Potentially important issue, but hard to model/measure

Jobs and Environmental Regulation: Modeling Analysis

Modeling Overview

Steady State Analysis

Transitional Labor Market Dynamics

Modeling Overview

An extension of Hafstead et al. (2018)

- 22 private sectors plus government sector
- Mortensen-Pissarides search friction
- International trade
- Industry switching frictions and staggered wage bargaining in transition model
- Calibrated to 2015 with 5 percent baseline unemployment rate

Modeling Overview

Industry	Monthly Separation rate	% of total labor compensation
Oil&gas extraction	4.6	0.16
Coal mining	4.6	0.04
Other mining	4.6	0.07
Mining support services	4.6	0.52
Electric power	3.2	0.66
Natural gas distribution	3.2	0.18
Petroleum refining and coal products	2.3	0.17
Water/sewage utilities	3.2	0.03
Agriculture	4.6	0.54
Construction	4.7	5.10
Durable manufacturing	2.0	5.85
Nondurable manufacturing (excl. refining)	2.3	2.95
Wholesale trade	2.4	4.66
Retail trade	4.7	4.95
Transportation and warehousing	3.2	3.17
Information	2.8	2.79
Finance, insurance, real estate (incl. housing)	2.3	8.37
Professional business services	5.2	18.34
Education and health	2.6	12.33
Leisure and hospitality	6.1	4.70
Other services	3.6	3.84
Government (incl. enterprises)	1.5	17.63

Modeling Overview

Environmental Regulations

- Durable Manufacturing Input-Cost Shock
- Power Sector Performance Standard
- Economy-wide carbon tax

Each policy adjusts labor taxes to maintain revenue-neutrality

Steady State Analysis

Key Findings

- There are likely to be considerable spillovers, both positive and negative, in unregulated sectors
 - Difference-in-difference estimators are likely to yield substantially biased estimates
- Changes in employment in unregulated sectors are likely to be large relative to employment changes in the regulated sector
- Reallocation is large relative to net employment spillovers

Steady State Analysis

	Change in Employment (as fraction of labor force)				Difference -in- difference estimator
	Regulated Sector(s)	Negative Spillover Sectors	Positive Spillover Sectors	All Sectors	
Durable Manufacturing Regulation	-0.019%	-0.037%	0.020%	-0.036%	-0.002%
Power Sector Performance Standard	0.041%	-0.049%	0.002%	-0.006%	0.088%
Economy-Wide Carbon Tax (Labor Tax Cuts)	-0.032%	-0.343%	0.396%	0.021%	-0.086%

Steady State Analysis

Key Findings

- In the long run, environmental regulations are unlikely to significantly impact the dynamic US labor market
- Results are generally robust across alternative parameter values
 - Employer bargaining power is an especially important parameter

Steady State Analysis

	Monthly Job-Finding Rate	Average Unemployment Spell (months)	Percent Change in Household Income (real)
No Policy Baseline	62.44%	1.60	N/A
Durable Manufacturing Regulation	61.98%	1.61	-0.30%
Power Sector Performance Standard	62.36%	1.60	-0.05%
Economy-Wide Carbon Tax (Labor Tax Cuts)	62.69%	1.60	0.19%

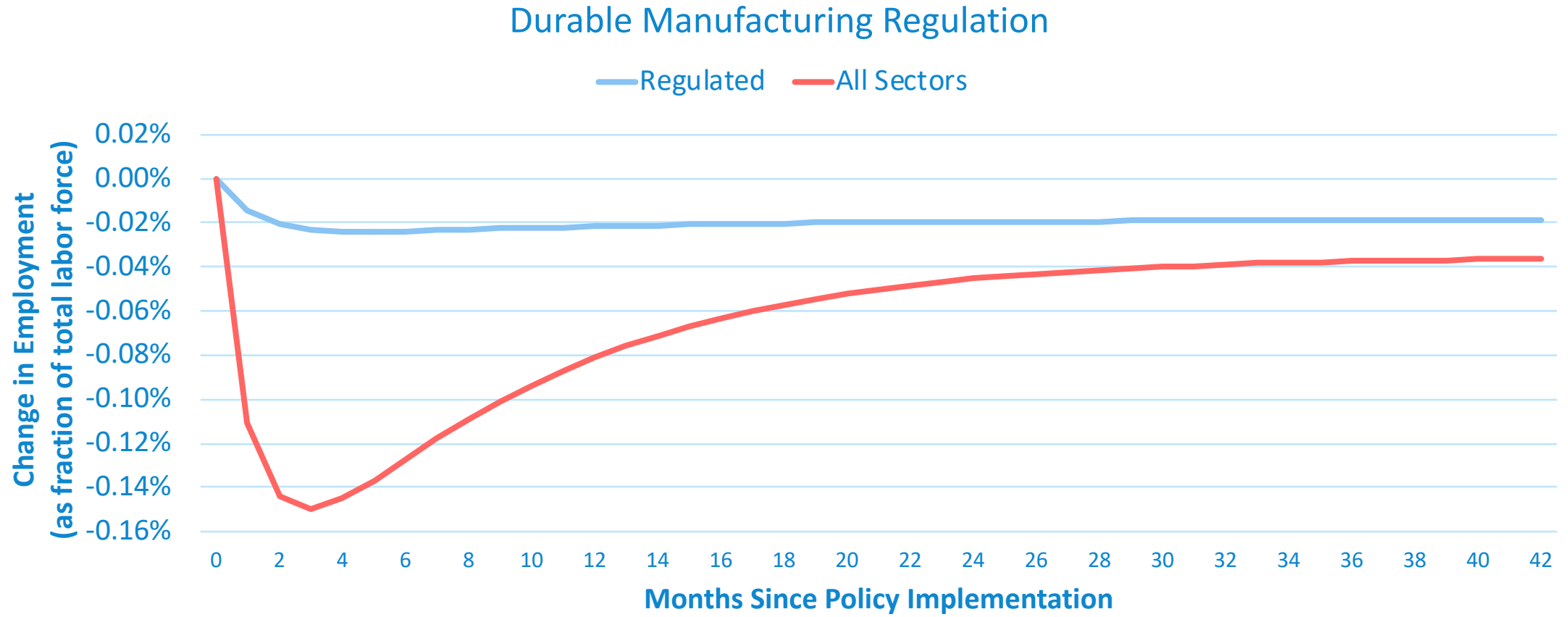
Transitional Labor Market Dynamics

Key Findings

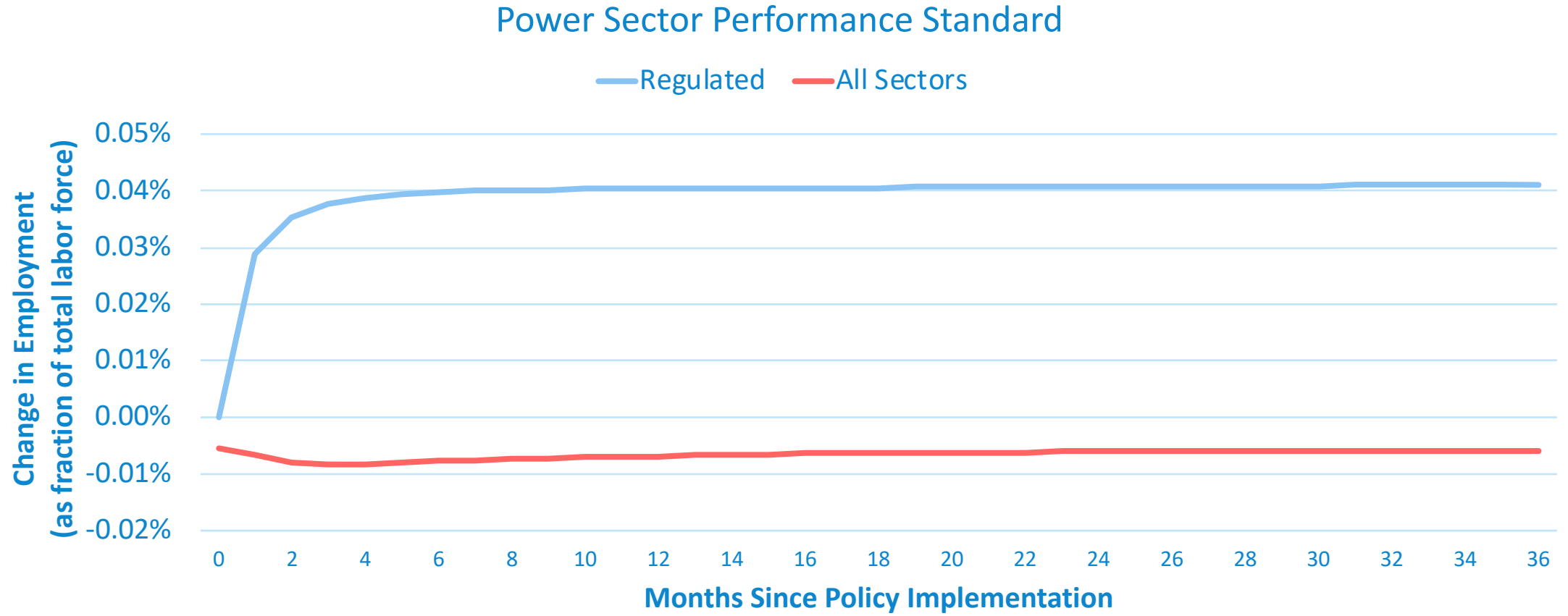
- Increased separations may occur in the first-period of the policy
- Employment in regulated sectors quickly converges to new long-run level
- Short-run spillovers to unregulated industries are likely to be larger (and more negative) than long-run spillovers to same industries
 - Wage adjustment is important mechanism for spillovers

Pattern of adjustments not robust across policies: implicit subsidy in power sector performance standard offsets negative impacts in power sector

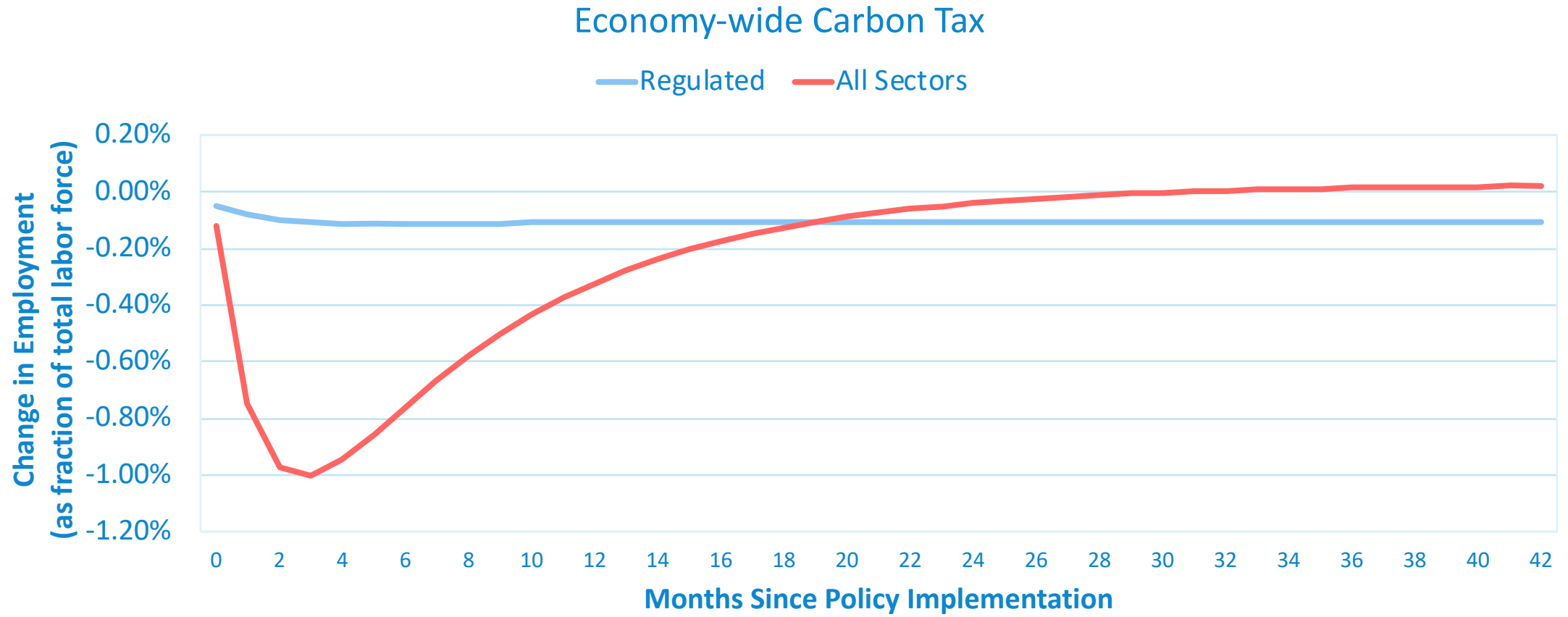
Transitional Labor Market Dynamics



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Transitional Labor Market Dynamics

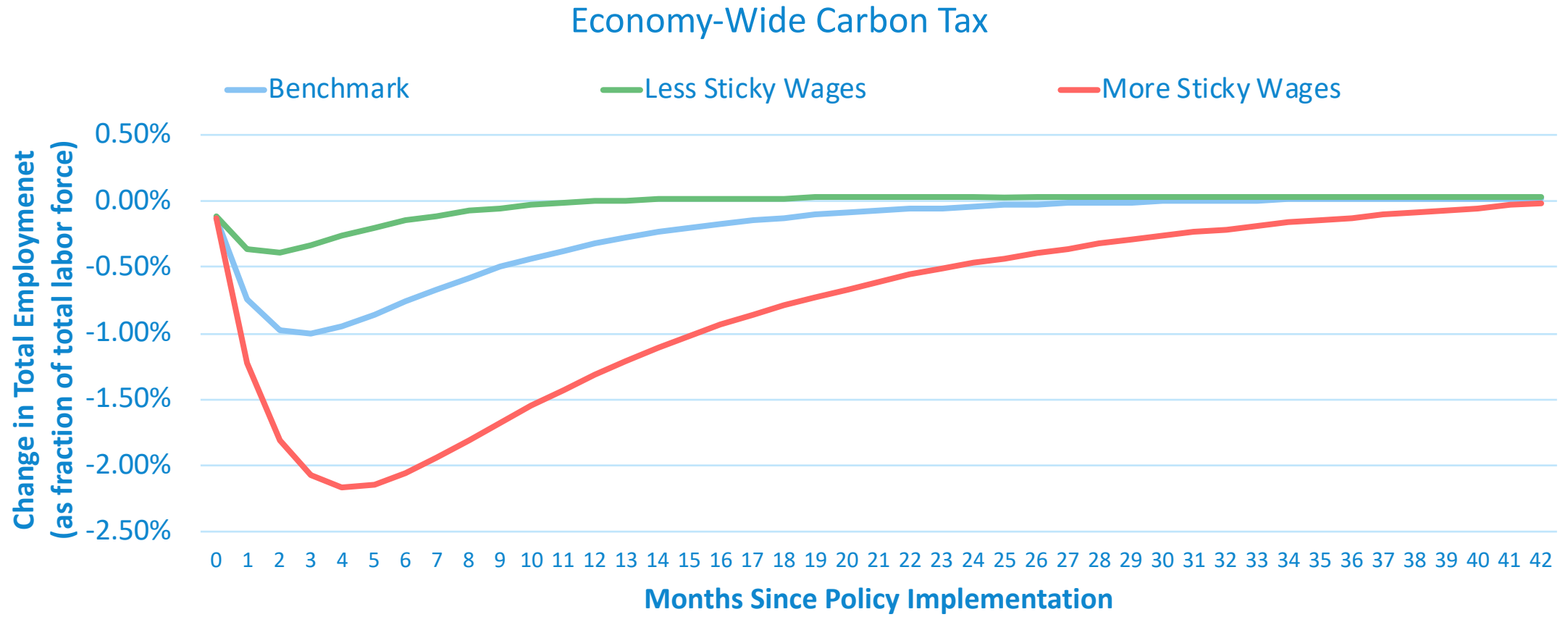


Transitional Labor Market Dynamics

Key Findings

- Wage adjustment is key mechanism for determining size of short-run spillovers

Transitional Labor Market Dynamics

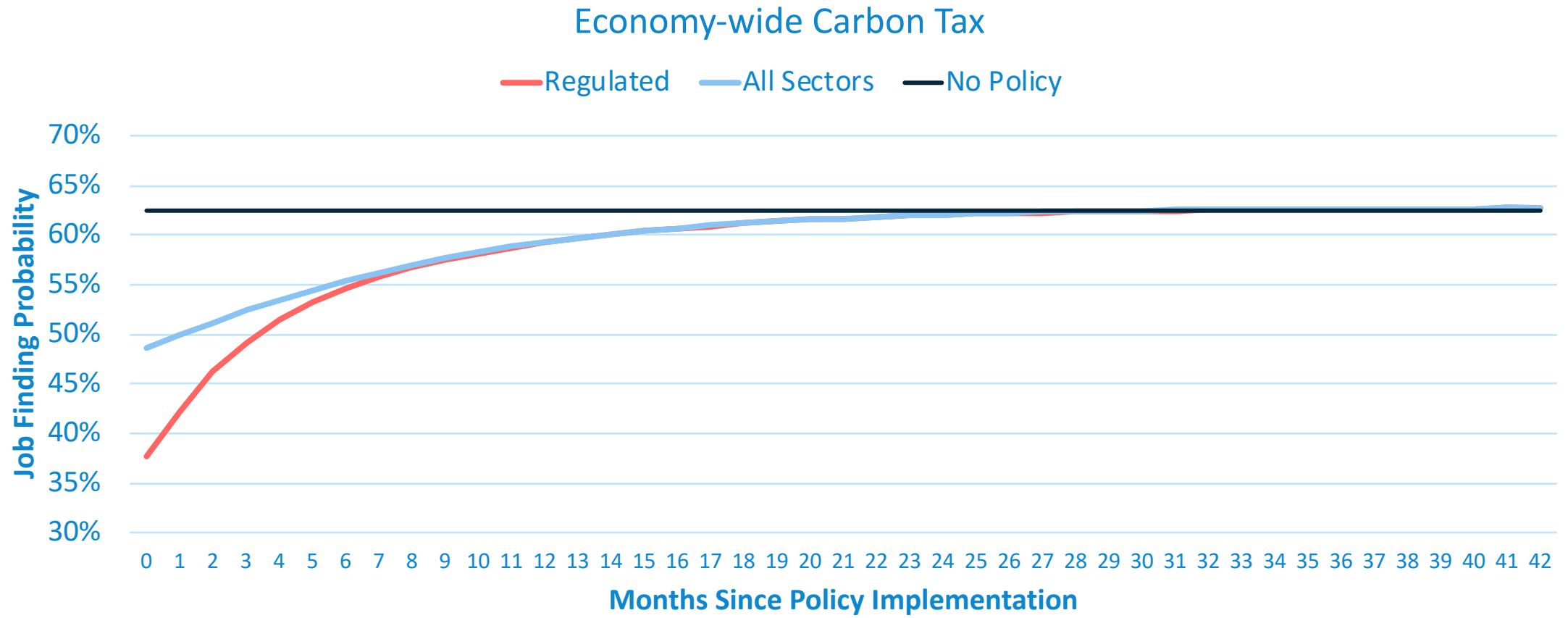


Transitional Labor Market Dynamics

Key Findings

- Workers associated with regulated sectors likely to experience lower job-finding rates (and longer unemployment spells) immediately after implementation of new environmental regulations

Transitional Labor Market Dynamics



Conclusions

- Vital to consider spillovers and labor-market frictions in analyzing effects on jobs
- For some questions, research provides clear answers
 - Policy-driven changes in jobs are mostly reallocation, not net job losses or gains
 - Reallocation can occur through changes in rates of new hiring, rather than increasing separations
- For other questions, the answers are less clear
 - Does job reallocation entail significant social costs?
 - How important are the distributional effects of reallocation?
 - Quantity vs. quality of jobs?

Conclusions

Economists have started to bridge the gap between academic research and policymakers on the jobs question, but there is more work to be done.