The Effects of a Shorter Workweek on Employment, Output, and Productivity

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Workweek reduction: a long-standing policy debate

- A major recurring labor policy: **cut the full-time workweek at constant pay**.
  - Adopted: Portugal '96, France '00, Belgium '01, Colombia '21, Chile '23, Mexico '26.
  - Contested: Spain (blocked, '25), Brazil (pending).
- At the core of the debate: **how do firms adjust employment and output?**
  - Mechanical: cut in hours & increase in hourly labor cost.
  - Arguments of proponents: work-sharing & productivity gains.
- Can **accompanying policies** offset the costs?
  - France and Belgium: adopted with payroll subsidies.
  - Spain: reform rejected without a cost offsetting policy.

This paper: evidence from France's 35-hour workweek

Reform package: 39h → 35h at constant pay + payroll tax cuts on low wages.

- Staggered by firm size: 2000 if ≥20 workers; 2002 otherwise.

How does the reform package affect employment, output & productivity?

- Difference-in-differences using the rollout.

Workweek reduction vs. tax cuts: what does each contribute?

- 2SLS, using joint variation in full-time share & tax-cut bite.

Data: admin sources (employment + balance sheets) & worker **surveys**.

- Main analysis: firms; complementary evidence: workers & commuting zones.

Preview of results

1. Employment decline of 4% due to the pay-preserving workweek reduction.

- Workforce recomposition: negative effect borne by lower-skill workers.
- Total hours decline by 9.5%.
- Firm-level results confirmed at the commuting-zone level.

2. Payroll tax cuts fully offset the employment losses.

- The reform package decreases total hours by 6%.
- No tax cut pass-through to wages; gross cost: 63% of annual wage per job saved.

3. TFP gains of 2% mitigate output losses.

- Workweek reduction lowers value added by 1.6%; 1% with tax cuts.

Roadmap

1. Reform
2. Data and descriptive evidence
3. Framework and empirical strategies
4. Results
   - First-stage outcomes
   - Employment effects
   - Output and productivity
   - Decomposition of the reform components

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From 39h to 35h: France's workweek reduction reform

In 1998:

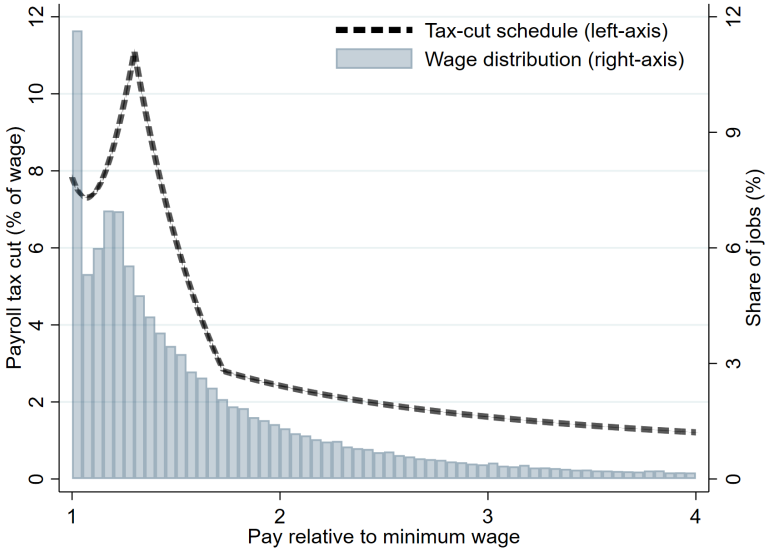
1. Announcement of mandatory reduction:
   - In **2000** for firms with $\geq$20 workers; in **2002** for smaller ones.
2. Introduction of payroll tax cuts conditional on hours reduction.
   - Firm-level agreement required to claim subsidy.

- Reform motivation: to reduce unemployment via work-sharing.

A 4-hour reduction for the same pay $\rightarrow$ 11.4% hourly wage increase

- Managers & high-skill professionals ("*cadres*" $\approx$10% of jobs): More holidays.
- Other employees: Fewer weekly hours or more holidays
- Overtime pay: 25% premium above 35h/week.

Employer payroll tax cut: schedule



How does the French reform compare to other workweek reductions?

Country	Workweek	Same pay	Payroll Tax Cuts
Australia (1983)	40→38h	Yes	No
Portugal (1996)	44→40h	Yes	No
Italy (1997)	48→40h	Yes	No
France (2000)	39→35h	Yes	Yes
Belgium (2001)	40→38h	Yes	Yes
South Korea (2003)	44→40h	Yes	No
Venezuela (2012)	44→40h	Yes	No
Israel (2018)	43→42h	Yes	No
Colombia (2021)	48→42h	Yes	No
Chile (2023)	45→40h	Yes	No
Mexico (2026)	48→40h	Yes	No

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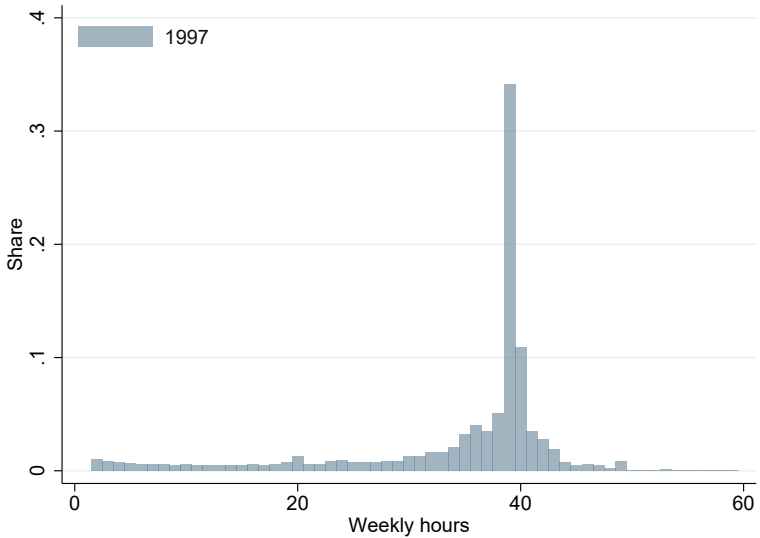
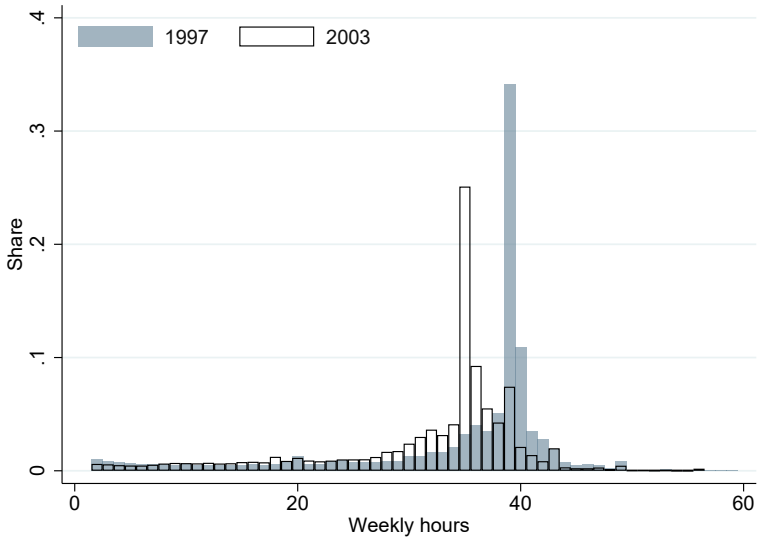
Data

- **Linked employer-employee data (DADS)**
  - Mandatory firm reports for payroll taxes; universe of workers in private sector
  - Total earnings, annual hours, job spell dates, occupation
  - Worker-level panel version: 1/25th
- **Firm-level balance sheet (FICUS)**
  - Mandatory reports for corporate taxes
  - Value added, profits, inputs
- **Workweek reduction agreements**
  - Date of signature, tax cuts
- **Labor Force Survey**
  - Representative sample of 75,000 households
  - In 2001: supplement on working time changes (14,000 workers)

Distribution of hours in admin data: pre-reform

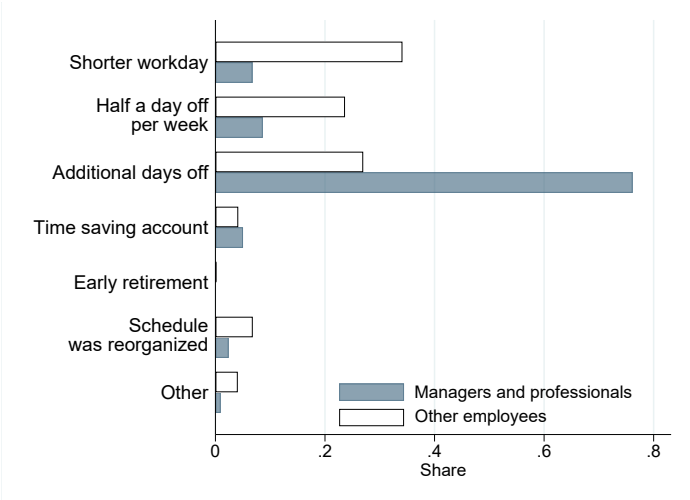


Distribution of hours in admin data: pre- and post-reform



Shift in hours distribution confirmed in Labor Force Survey

Modes of working time reduction in 2001 worker survey



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Objects of interest: preview

1. **Intent-to-treat (ITT) effect:** impact of the 35-hour mandate
   - Effect of requirement relative to the fiscal incentive only
     → *Difference-in-differences (DiD)*

2. **Local average treatment effect (LATE):** effect of adopting the 35h
   - 35-hour workweek opens eligibility to tax cut
     → *Wald-DiD*

3. **Decomposition of ITT and LATE:** separation of 35h and tax cuts
   - Effect of one component at zero exposure to the other
     → *2SLS + exposure variation*

Framework

- Unit is a firm, i, observed in multiple periods $t \in \{0, 1, ...\}$.
- **Two treatments:**
  1. Adoption of 35h: $H35_{it} \in \{0, 1\}$
  2. Claim of tax cut: $TC_{it} \in \{0, 1\}$
- **Legal mandate:** from period 1, firms with $S_i = 1$ are mandated to adopt $H35$.
  - $S_i \in \{0, 1\}$ is predetermined (firm size before announcement).
- **Potential outcomes:** $Y_{it}(h35, tc)$, with $H35_{it}(s)$ and $TC_{it}(h35)$.
  - Institutional context: $TC_{i0}(h35) = 0$ and $TC_{it}(0) = 0$.
  - Mandate-level indexation: $Y_{it}(s) \equiv Y_{it}\big(H35_{it}(s),\ TC_{it}(H35_{it}(s))\big)$.

Object of interest 1: intent-to-treat effect

$$\Delta_t^{ITT} = \mathbb{E}\big[\underbrace{Y_{it}(1)}_{\substack{\text{Mandate} \\ + \text{ Tax incentive}}} - \underbrace{Y_{it}(0)}_{\substack{\text{Tax incentive only} \\ \text{(Voluntary adoption)}}} \mid S_i = 1\big], \quad t \geq 1.$$

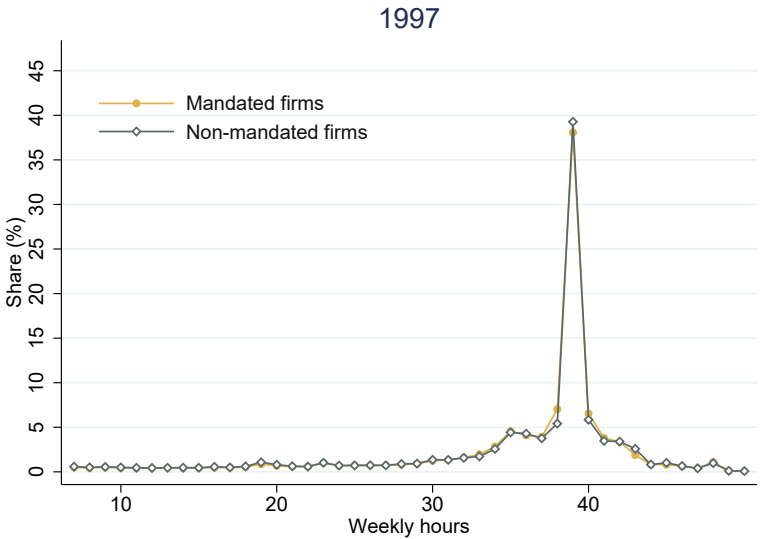
Interpretation: effect of the mandate relative to the tax incentive.

Estimation: $y_{it} = \sum_{\substack{\tau=1994 \\ \tau \neq 1997}}^{2001} \alpha_\tau \, S_i \, \mathbb{1}[t = \tau] + \mu_i + \rho_{rt} + \phi_{ct} + u_{it}$.

- Mandated status (based on 1997 firm size):
  - $S_i = 1$ for firms with 22–48 employees; $S_i = 0$ for firms with 10–18 employees.
- Fixed effects: firm (μ_i); time-varying industry (ρ_{rt}) & province (ϕ_{ct}).
- Balanced panel over 1994-2001.

Assumptions: no-anticipation + parallel trends.

Hours distribution in mandated and non-mandated firms



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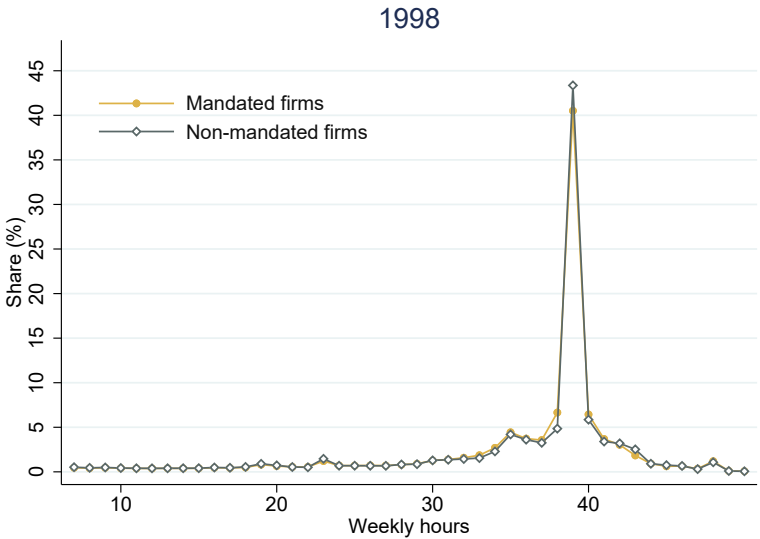

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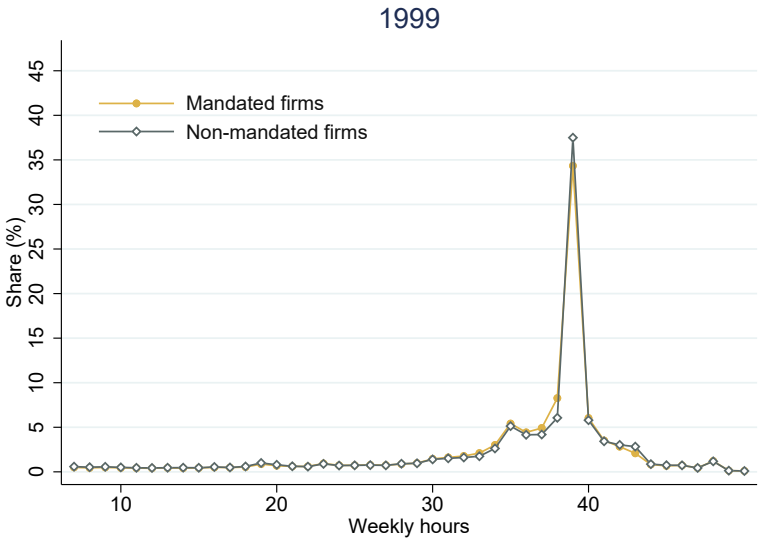

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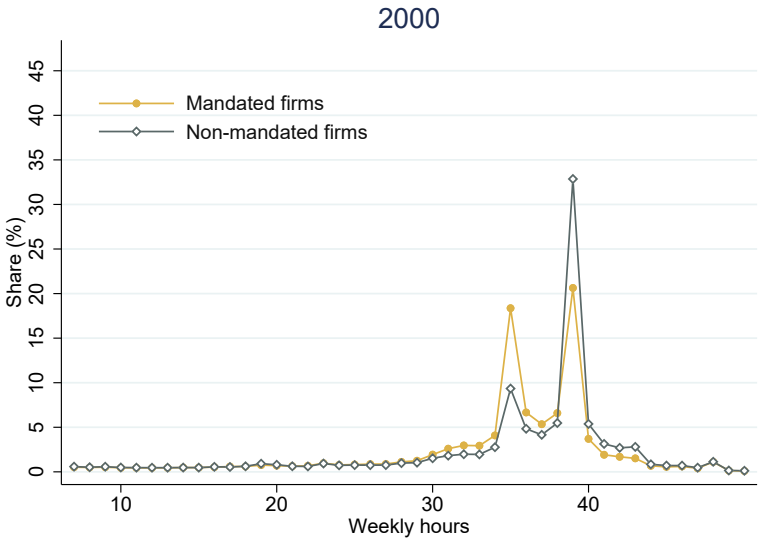
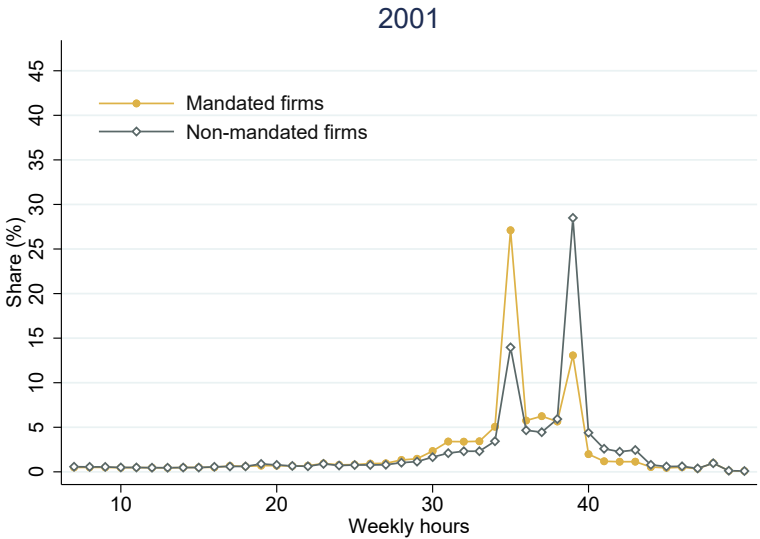
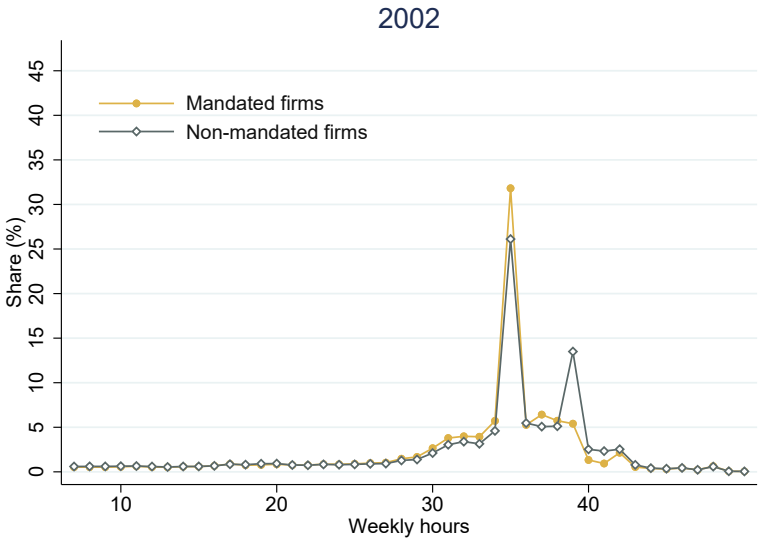


Hours distribution in mandated and non-mandated firms



Hours distribution in mandated and non-mandated firms



Object of interest 2: local average treatment effect

$$\theta_t^{LATE} = \mathbb{E}\Big[\underbrace{Y_{it}(1, TC_{it}(1))}_{\substack{\text{35h adoption} \\ + \text{ Tax claim response}}} - \underbrace{Y_{it}(0,0)}_{\substack{\text{Stay at 39h} \\ + \text{ No tax claim}}} \;\Big|\; \underbrace{S_i = 1}_{\text{Mandated}}, \underbrace{H35_{it}(1) - H35_{it}(0) = 1}_{\text{Compliers, } C_{it}=1} \Big], \; t \geq 1.$$

Interpretation: effect of 35h adoption with the firm's tax claim decision ($TC_{it}(1)$).

- Compliers: firms adopting under the mandate, but not under the subsidy alone.

Estimation: Wald-DiD; we instrument $H35_{it}$ by the mandate: $S_i \times \mathbb{1}[t \geq 2000]$.

Additional assumptions: Exclusion + Monotonicity + Mandate-invariance of TC.

Interpretation: ITT and LATE reflect the reform package

For firm i,

$$Y_{it}(1, TC_{it}(1)) - Y_{it}(0,0) = \underbrace{Y_{it}(1,0) - Y_{it}(0,0)}_{\equiv \tau_{it}^{H35}} + TC_{it}(1) \underbrace{\big[Y_{it}(1,1) - Y_{it}(1,0)\big]}_{\equiv \tau_{it}^{TC}}.$$

The LATE decomposes as

$$\theta_t^{LATE} = \underbrace{\mathbb{E}\big[\tau_{it}^{H35} \mid S_i = 1, C_{it} = 1\big]}_{\text{Workweek reduction}} + \underbrace{s_t^{TC}\,\mathbb{E}\big[\tau_{it}^{TC} \mid S_i = 1, C_{it} = 1, TC_{it}(1) = 1\big]}_{\text{Tax cuts}}.$$

with $s_t^{TC} = \mathbb{P}(TC_{it}(1) = 1 \mid S_i = 1, C_{it} = 1)$.

And $\Delta_t^{ITT} = \mathbb{P}\big[C_{it} = 1 \mid S_i = 1\big] \times \theta_t^{LATE}$.

$\rightarrow$ *Next Section: we decompose the ITT and the LATE into the reform components.*

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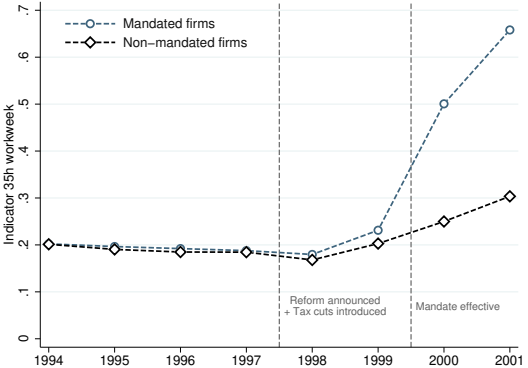
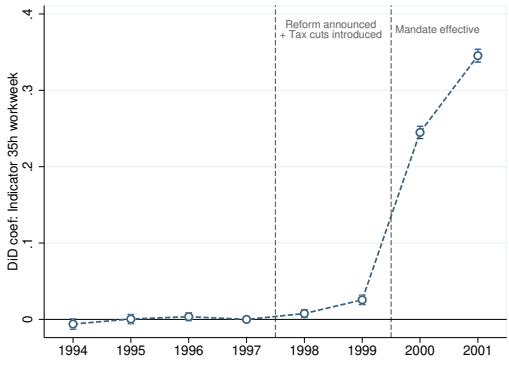
First-stage outcomes

Firms switching to the 35h workweek ($H35_{it}$)



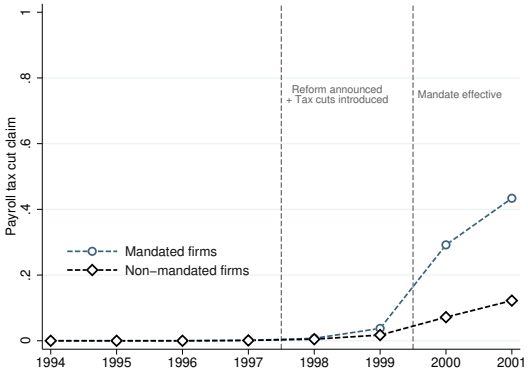
(a) Averages



(b) DiD coefficients: $H35_{it}$

$H35_{it}$: whether the workweek mode in firm i is at 35h.

Firms claiming tax cuts (TC_{it})



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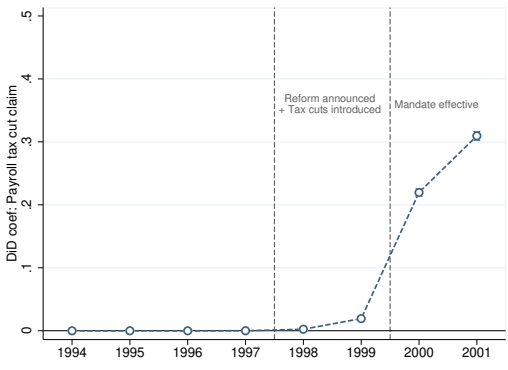
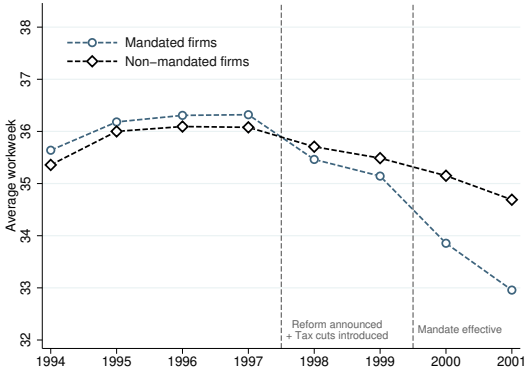


(b) DiD coefficients: TC_{it}

TC_{it}: from admin data on the tax claims.

Average workweek decreases by 2h with the mandate



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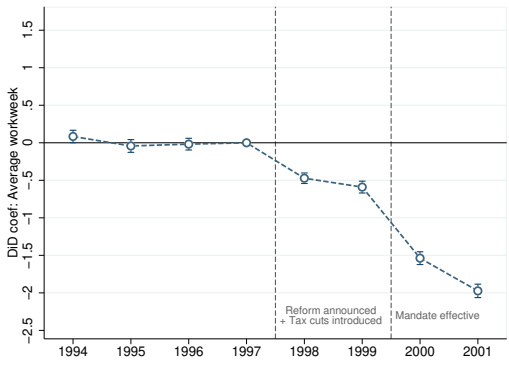
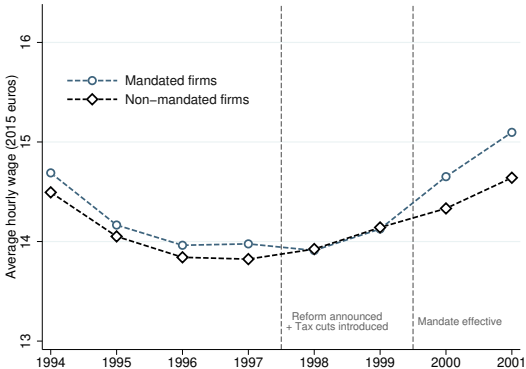


(b) DiD coefficients: # hours/week per job

Hourly wage: erosion between reform announcement & implementation



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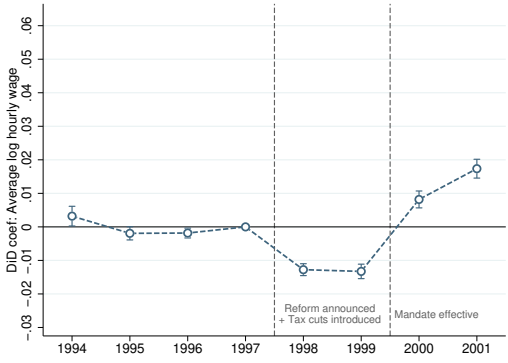
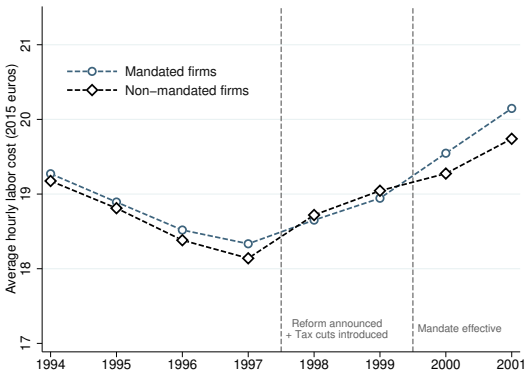


(b) DiD coefficients: hourly wage

Worker-level: +4% for full-time incumbents in mandated firms.

Hourly labor cost: tax cuts offset ≈60% of wage increase



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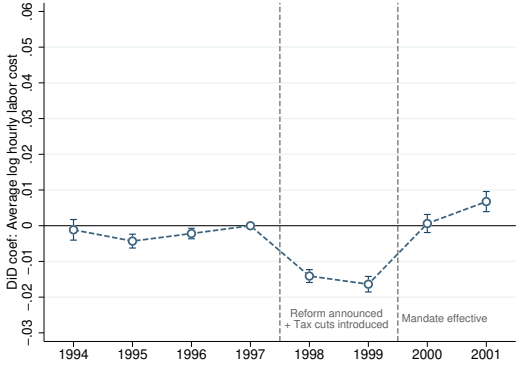
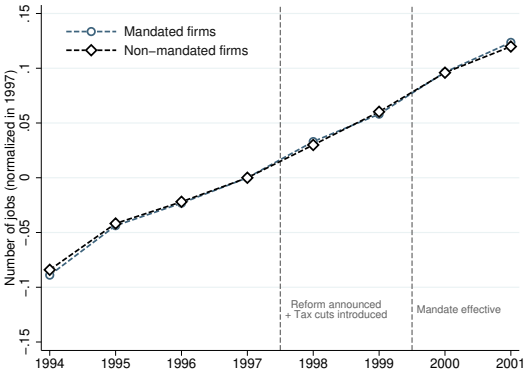


(b) DiD coefficients: hourly labor cost

Worker-level: +2.7% for full-time incumbents in mandated firms.

Employment effects of the mandate

No change in the number of jobs



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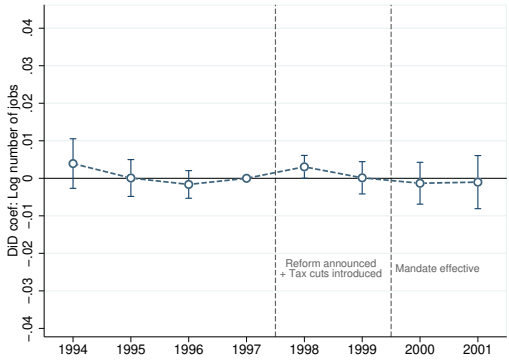
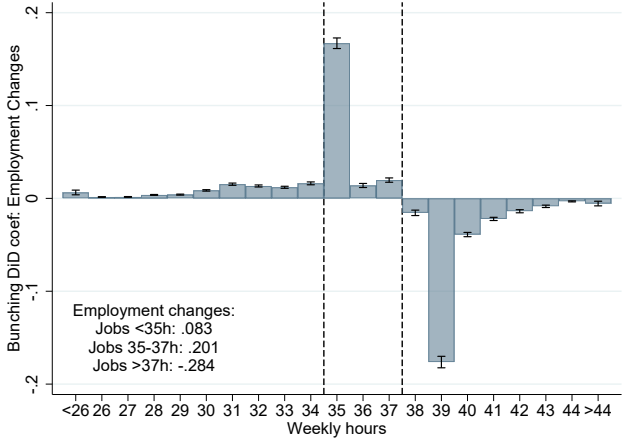


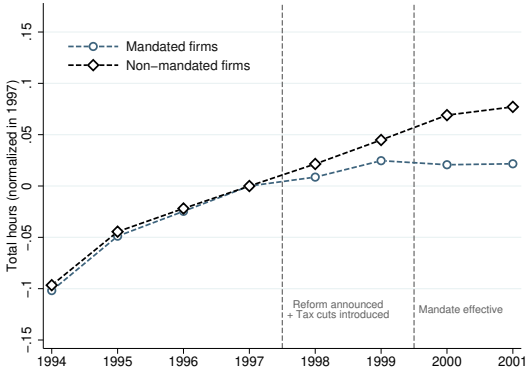
(b) DiD coefficients: log employment

The entire hours distribution shifts left

$$\frac{\#\text{ jobs bin } j_{it}}{\#\text{ jobs}_{i,1997}} = \sum_{k=25}^{45} \alpha_k \times S_i \times After_t \times \mathbb{1}[j = k] + \mu_{ij} + \rho_{jrt} + \phi_{jct} + u_{ijt}$$



6% reduction in total hours in the firm



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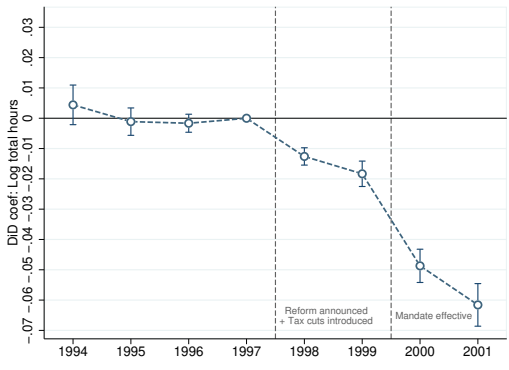


(b) DiD coefficients: log total hours

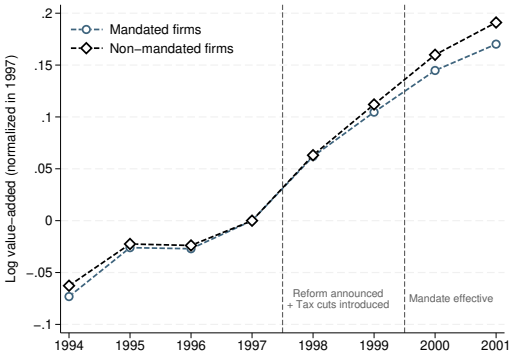
Heterogeneous employment and total hours effects by skill group

(a) $\frac{\text{Employment by skill in } t}{\text{Employment in 1997}}$

(b) $\frac{\text{Total hours by skill in } t}{\text{Total hours in 1997}}$

Output and productivity effects of the mandate

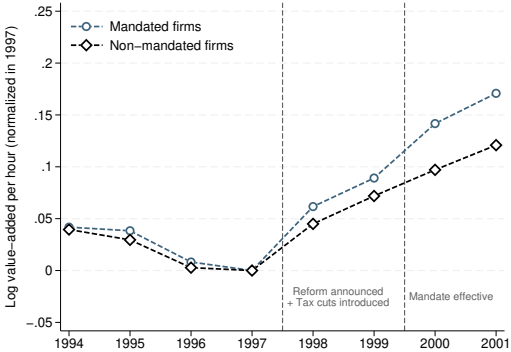
The mandate reduces firm value-added by 1%



(a) Averages

(b) DiD coefficients: log value-added

Total hours decrease by 6% and VA by 1% → large increase in VA per hour



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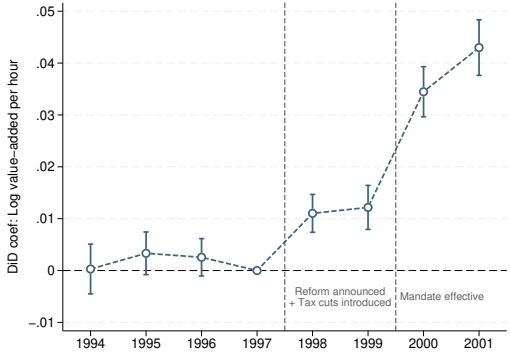
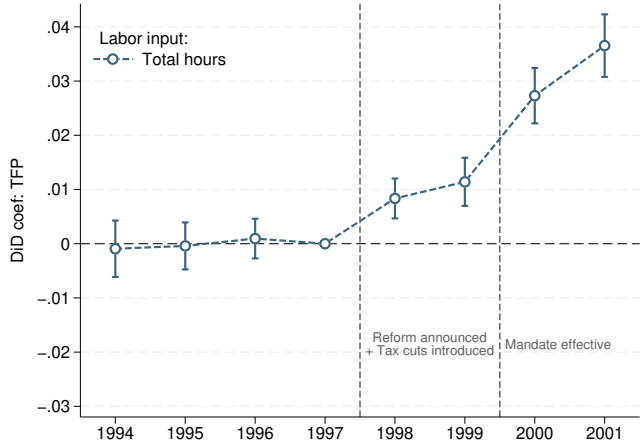


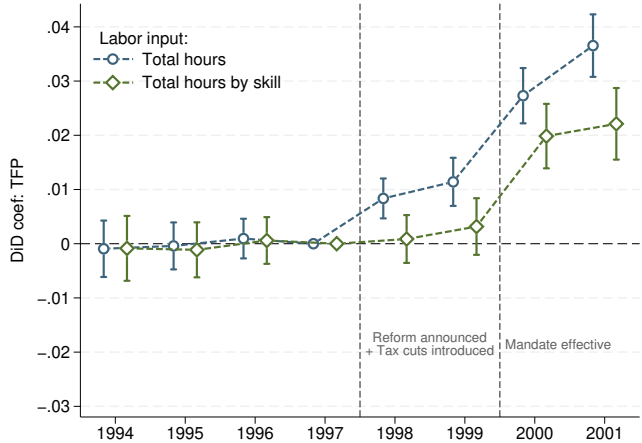
(b) DiD coefficients: log value-added per hour

Effect on firm TFP



- TFP computed using Ackerberg, Caves and Frazer (2015), accounting for capital.

Effect on firm TFP



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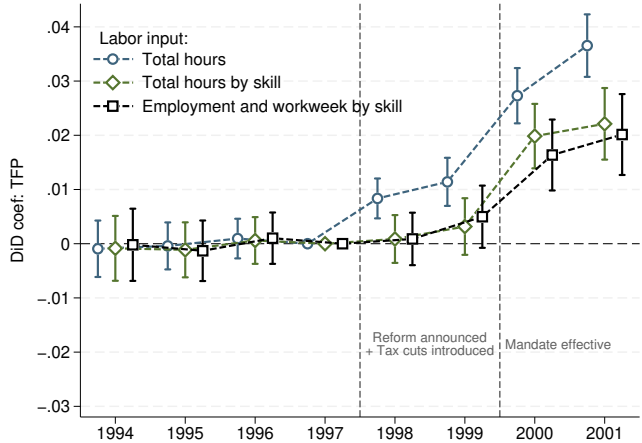
Effect on firm TFP



- TFP computed using Ackerberg, Caves and Frazer (2015), accounting for capital.

Effects of 35-hour adoption

Effects of 35h *adoption* (LATE)

$$H35_{it} = \gamma_0 + \gamma_1 S_i \times \mathbb{1}[t \geq 2000] + \alpha_i + \eta_{rt} + \psi_{ct} + \upsilon_{it}$$

$$y_{it} = \beta_0 + \beta_1 \widehat{H35}_{it} + \mu_i + \rho_{rt} + \phi_{ct} + \epsilon_{it}$$

	(1) First stage	(2) Workweek	(3) Wage	(4) Labor cost	(5) Hours	(6) Employment	(7) Managers and professionals	(8) Other employees	(9) VA	(10) Profit/Assets	(11) TFP
After x Treated	0.3454***										
	(0.0043)										
$\mathbb{1}_{\{35h\ workweek\}}$		-5.7023***	0.0511***	0.0204***	-0.1779***	-0.0029	0.0263***	-0.0265**	-0.0312***	-0.0138***	0.0485***
		(0.1263)	(0.0041)	(0.0041)	(0.0106)	(0.0104)	(0.0030)	(0.0113)	(0.0100)	(0.0026)	(0.0091)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cragg Donald F stat		13,105	13,105	13,105	13,105	13,105	13,105	13,105	12,974	11,559	8,621
Kleibergen Paap F stat		6,360	6,360	6,360	6,360	6,360	6,360	6,360	6,312	5,659	4,316
Observations	117,048	117,048	117,048	117,048	117,048	117,048	117,048	117,048	111,730	96,726	63,706

Interpretation: effect of adopting the 35h together with firm's tax claim response.

Decomposition of the reform effects

Decomposition of LATE and ITT into reform components

$$\theta_t^{LATE} = \underbrace{\mathbb{E}[\tau_{it}^{H35} \mid \mathcal{C}_t]}_{\text{Workweek reduction}} + \underbrace{s_t^{TC}\,\mathbb{E}[\tau_{it}^{TC} \mid \mathcal{C}_t,\, TC_{it}(1) = 1]}_{\text{Tax cuts}}.$$

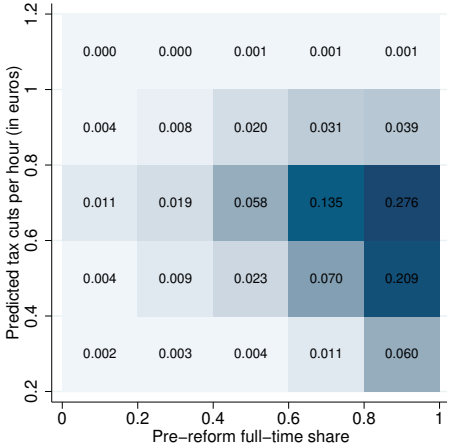
with $s_t^{TC} = \mathbb{P}(TC_{it}(1) = 1 \mid S_i = 1, C_{it} = 1)$,

and $\mathcal{C}_t \equiv \{S_i = 1,\ C_{it} = 1\}$.

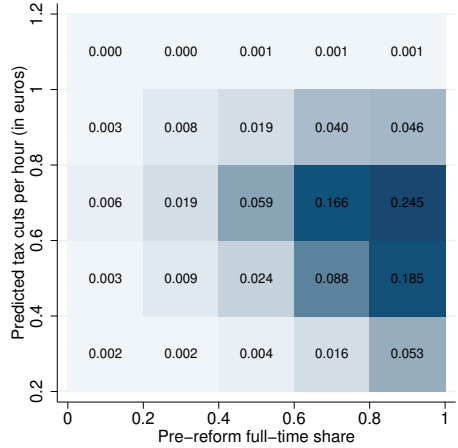
Additional sources of variation:

- Pre-reform full-time share (F_i).
- Predicted tax cuts based on pre-reform wage distribution (P_i).

Identification exploits joint variation in F and P

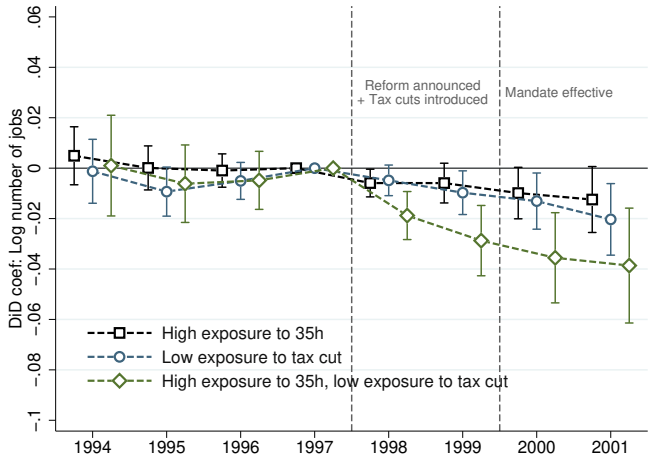


(a) Mandated



(b) Non-mandated

Employment effects under differential exposure to the reform's components



Decomposition of LATE and ITT into reform components

Assumption (linear exposure effects):

$$\mathbb{E}[\tau_{it}^{H35} \mid F_i, P_i, \mathcal{C}_t] = \beta_t^{H35} F_i,$$
$$\mathbb{E}[\tau_{it}^{TC} \mid F_i, P_i, \mathcal{C}_t, TC_{it}(1) = 1] = (\beta_t^{TC} + \gamma_t F_i)\, P_i.$$

Then,

$$\theta_t^{LATE} = \beta_t^{H35}\, \mathbb{E}[F_i \mid \mathcal{C}_t] + \beta_t^{TC}\, \mathbb{E}[P_i TC_{it}(1) \mid \mathcal{C}_t] + \gamma_t\, \mathbb{E}[F_i P_i TC_{it}(1) \mid \mathcal{C}_t]$$

$$\Delta_t^{ITT} = \underbrace{\beta_t^{H35}\, \mathbb{E}[F_i\, \Delta H35_{it} \mid S_i = 1]}_{\text{Workweek reduction}} + \underbrace{\beta_t^{TC}\, \mathbb{E}[P_i\, \Delta TC_{it} \mid S_i = 1]}_{\text{Tax cut}} + \underbrace{\gamma_t\, \mathbb{E}[F_i P_i\, \Delta TC_{it} \mid S_i = 1]}_{\text{Interaction}}$$

Empirical strategy in two steps

Step 1: Decomposition of LATE

$$Y_{it} = \beta_t^{H35}\left(F_i H35_{it}\right) + \beta_t^{TC}\left(P_i TC_{it}\right) + \gamma_t\left(F_i P_i TC_{it}\right) + \left(F_i, P_i, F_i P_i\right)' \Gamma_t \mathbb{1}[t \geq 2000] + \alpha_i + \eta_t + \varepsilon_{it}$$

Instruments: $S_i \times \mathbb{1}[t \geq 2000] \times \left(1,\ F_i,\ P_i,\ F_i P_i\right)'$

Interpretation: $\widehat{\beta}^{H35}$ is the effect of *adopting* the 35h absent tax cuts.

Step 2: Decomposition of ITT

$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \mathrm{DiD}_t^{F \times H35} + \widehat{\beta}_t^{TC} \times \mathrm{DiD}_t^{P \times TC} + \widehat{\gamma}_t \times \mathrm{DiD}_t^{F \times P \times TC}$$

Interpretation: $\widehat{\beta}_t^{H35} \times \mathrm{DiD}_t^{F \times H35}$ is the effect of *mandating* the 35h absent tax cuts.

Decomposition of LATE: employment effects

	OLS	2SLS with Continuous Instruments	2SLS with Binned Instruments
$\widehat{\beta}^{H35}$	0.066***	-0.113***	-0.143***
	(0.004)	(0.034)	(0.050)
$\widehat{\beta}^{TC}$	0.110***	0.127***	0.148**
	(0.004)	(0.037)	(0.060)
$\widehat{\gamma}$	0.006	0.098	0.134
	(0.020)	(0.088)	(0.149)
Firm FE	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Province × Year FE	Yes	Yes	Yes
Kleibergen-Paap rk Wald F		140.21	41.84
Hansen J-test (p-value)		0.4110	0.5627
Observations	117,048	117,048	43,450

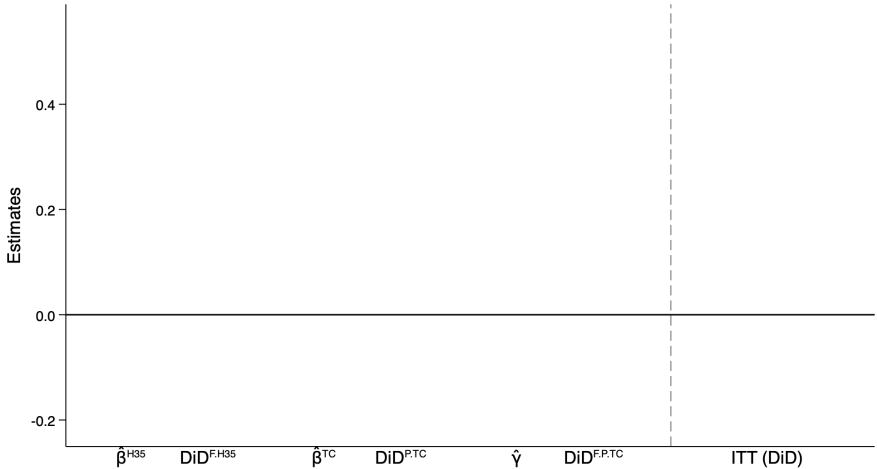
Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

- F and P normalized by the mean.
- Binned instruments: based on F and P being in top vs. bottom 30%.

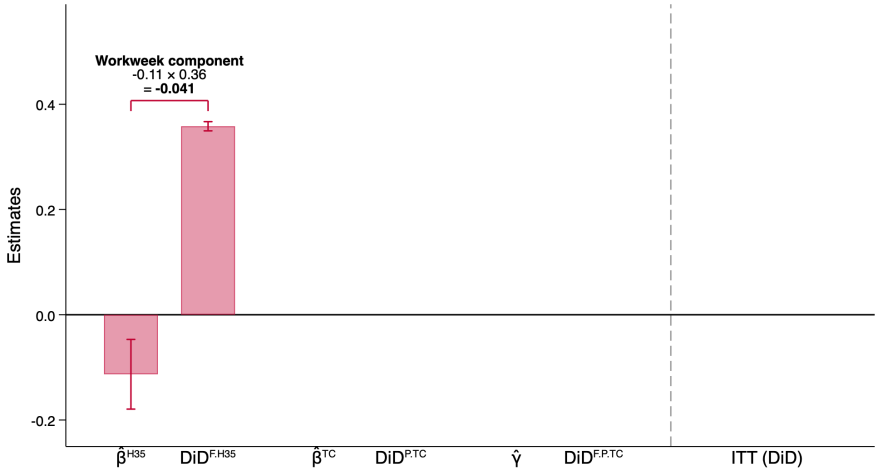
Decomposition of ITT: employment effects

$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \text{DiD}_t^{F \times H35} + \widehat{\beta}_t^{TC} \times \text{DiD}_t^{P \times TC} + \widehat{\gamma}_t \times \text{DiD}_t^{F \times P \times TC}$$



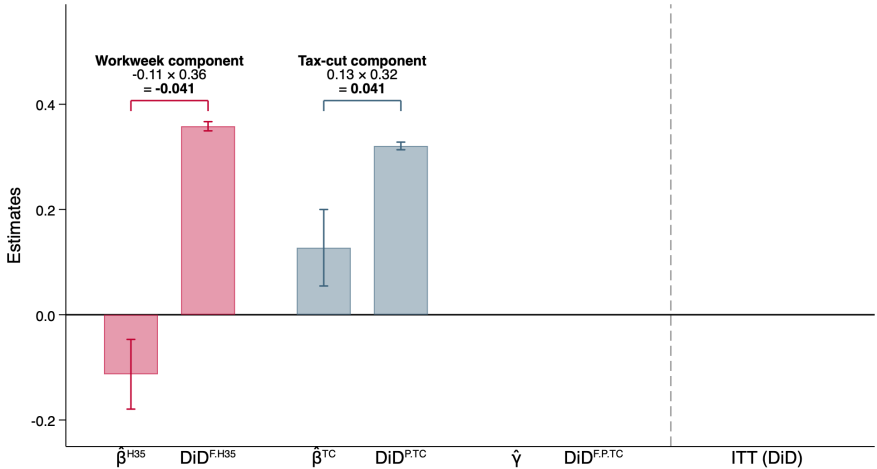
Decomposition of ITT: employment effects

$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \text{DiD}_t^{F \times H35} + \widehat{\beta}_t^{TC} \times \text{DiD}_t^{P \times TC} + \widehat{\gamma}_t \times \text{DiD}_t^{F \times P \times TC}$$



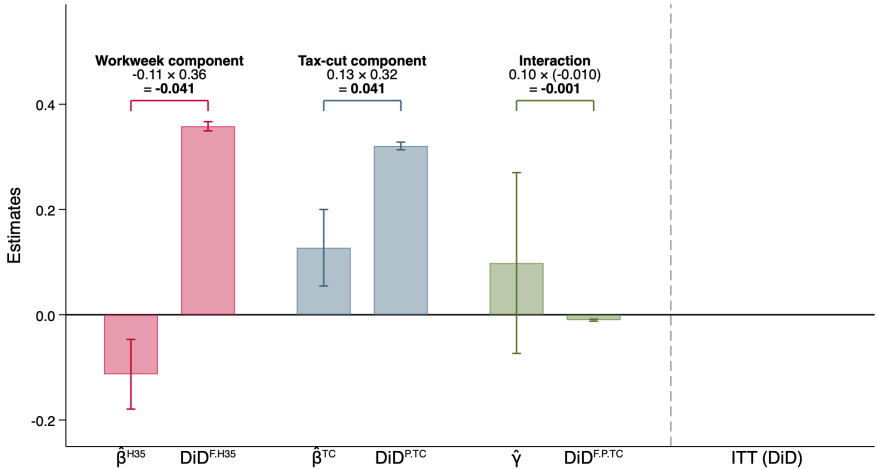
Decomposition of ITT: employment effects

$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \text{DiD}_t^{F \times H35} + \widehat{\beta}_t^{TC} \times \text{DiD}_t^{P \times TC} + \widehat{\gamma}_t \times \text{DiD}_t^{F \times P \times TC}$$



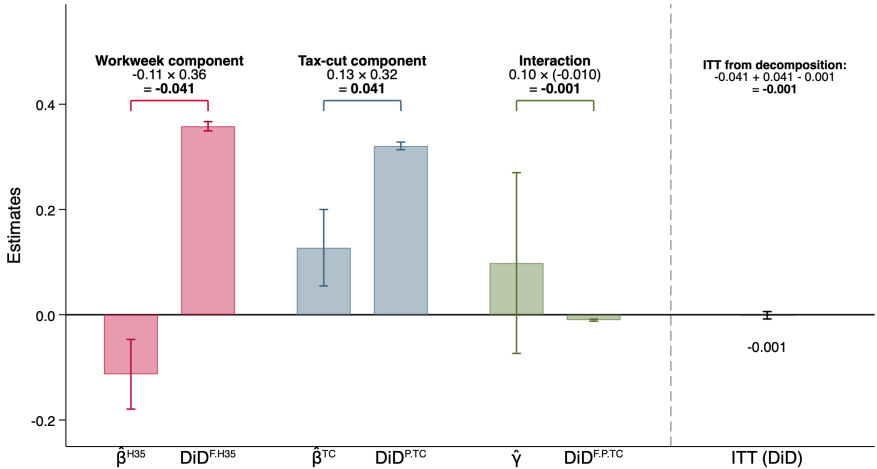
Decomposition of ITT: employment effects

$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \text{DiD}_t^{F\times H35} + \widehat{\beta}_t^{TC} \times \text{DiD}_t^{P\times TC} + \widehat{\gamma}_t \times \text{DiD}_t^{F\times P\times TC}$$



Decomposition of ITT: employment effects

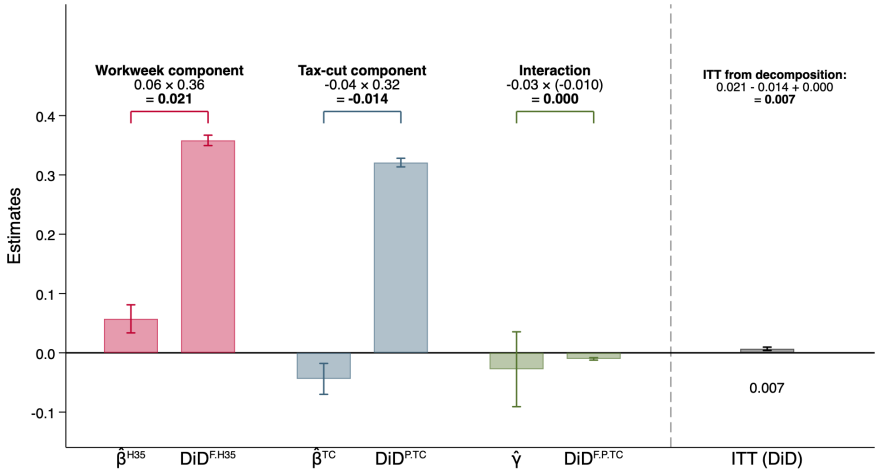
$$\widehat{\Delta}_t^{ITT} = \widehat{\beta}_t^{H35} \times \text{DiD}_t^{F\times H35} + \widehat{\beta}_t^{TC} \times \text{DiD}_t^{P\times TC} + \widehat{\gamma}_t \times \text{DiD}_t^{F\times P\times TC}$$



Decomposition results

- Employment would have decreased by 4% without the tax cut.
  - Corroborating evidence: 4% employment decline in firms with top 30% full-time share & bottom 30% tax cut exposure.
  - Total hours: -9.5%.
- The tax cut offsets a large fraction of the wage increase.

Decomposition of ITT: hourly labor cost



Decomposition results

- Employment would have decreased by 4% without the tax cut.
  - Corroborating evidence: 4% employment decline in firms with top 30% full-time share & bottom 30% tax cut exposure.
  - Total hours: -9.5%.
- The tax cut offsets a large fraction of the wage increase.
  - No pass-through of the tax cut to wages.
  - Tax cut was presented as a compensation to firms.
  - Gross cost per job saved: 63% of annual gross wage.
- Decline in VA would have been larger without tax cuts.
- TFP increase driven by the workweek reduction component.

Market-level analysis and robustness

Commuting zone-level analysis

Objectives:

- Cover the entire economy: including firm entry and exit, and larger firms.
- Allow for spillovers across firms.

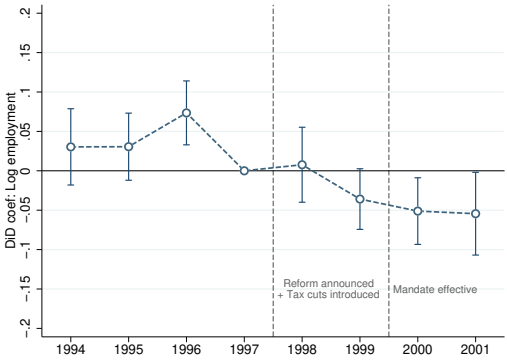
Strategy:

- We compare the evolution of CZs with different exposure to the reform.
- Exposure: employment share in full-time jobs in firms larger than 20 employees, pre-reform.

$$y_{ct} = \sum_{\substack{\tau=1994 \\ \tau \neq 1997}}^{2001} \alpha_\tau \times Exposure_c \times \mathbb{1}[t = \tau] + \mu_c + \phi_t + u_{ct}$$

y_{ct}: outcome in CZ c in year t

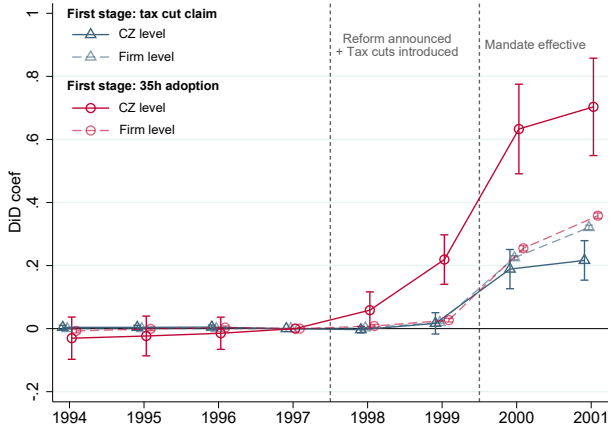
CZ-level employment effects



(a) Log employment

(b) Log employment by skill group

CZ-Level estimates primarily reflect the workweek reduction component



- Employment effects consistent with $\widehat{\beta}^{H35}$ and $\widehat{\beta}^{TC}$ estimated at firm level:

$$\widehat{\beta}^{H35}(\text{firm}) \times \text{DiD}^{F\times H35}(\text{CZ}) + \widehat{\beta}^{TC}(\text{firm}) \times \text{DiD}^{P\times TC}(\text{CZ}) \approx -5\%.$$

Robustness checks

ITT and LATE:

- No effect on firm exit
- Results not driven by mean reversion
- Similar treatment effects for firms with 20–100 employees
- Heterogeneity: tradable / non-tradable

Decomposition:

- The overidentifying restrictions are not rejected (4 instruments, 3 endogenous).
- Robustness to linearity assumption
- Similar results with binned instruments

Conclusion

Workweek reductions have been central to the policy debate for decades.

We use France's 35-hour reform to provide evidence on three questions:

#1. Employment: large negative effect of the workweek reduction.

- The accompanying fiscal policy offsets this effect.
- Losses unequally distributed: lower-skill workers particularly affected.

#2. Output: 1% decline for a 6% drop in total hours.

- Borne 30% by profits and 70% by the lower-skill wage bill.

#3. Productivity: TFP increases by 3.5%.

- Accounting for skill mix & decreasing returns $\rightarrow +2\%$.