The Impact of Work From Home on Wage Contracts and Firm Productivity

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Motivation

- Work from home (WFH) has become a feature of the post-pandemic labor market
- The consequences of WFH are not uniform
  - Across space: city centers vs suburbs (Davis *et al.*, 2024)
  - Across occupations: which jobs can be done at home (Dingel and Neiman, 2020)
- **This paper:** WFH across **firms**
  - How does WFH affect sorting of workers across firms within industries and occupations?
  - What are the implications of RTO for aggregate productivity and inequality?

This paper

- **Facts** from French survey and administrative data
  - Workers at larger firms are more likely to WFH, within the same occupation and location
  - WFH workers earn higher hourly wage, but the premium may be *selection*
- **Model**: general equilibrium with heterogeneous firms and workers
  - Firms differ in productivity $\rightarrow$ different adoption of WFH
  - Workers differ in productivity and desired WFH hours $\rightarrow$ sort into firms
- **Implications**: Calibrate model to post-pandemic, study implications of RTO
  - RTO lowers aggregate productivity and average welfare
  - RTO makes high productivity workers worse off

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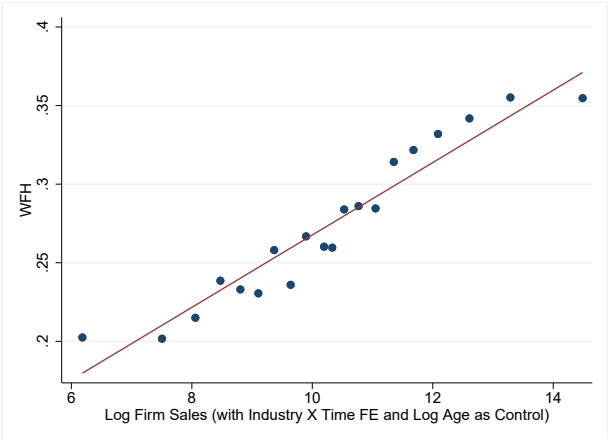
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Data

- **French Labor Force Survey** (Enquête Emploi): WFH status and days, wages, occupation, demographics
- Matched to **FARE** tax records for all firms: sales, employment, assets, TFP, measured in 2019
- Matched to **DADS** employer-employee data: wage histories before the pandemic
- Sample: 14,141 workers, 2022Q2–2023Q4, after WFH stabilized
- WFH dummy = 1 if the worker works from home at least one day a week (27.4%)

Fact 1: Workers at larger firms are more likely to WFH



$$\text{WFH}_{it} = \beta \ln \text{Sales}_{f(i,t),2019} + \gamma Z_{it} + \alpha_{\text{ind}\times\text{yr}} + \varepsilon_{it}$$

	β	s.e.
Industry FE	0.023	(0.002)
+ occupation, CZ FE	0.011	(0.002)
+ worker demographics	0.009	(0.002)

- One s.d. of log sales: **+2.9 pp** WFH, 11% of the mean
- Firm size measured in 2019, before the rise in WFH
- Robust to alternative size measures

Fact 2: WFH workers have higher hourly wages (Li, Sauvagnat and Schmitz, 2026)

- $\ln w_{it} = \beta \, \text{WFH}_{it} + \boldsymbol{\gamma} \boldsymbol{X}_{it} + \varepsilon_{it}$, with WFH = any amount of WFH
- The premium after the pandemic, 2022Q2–2023Q4:
  - Raw: 35%
  - Controlling for occupation, industry and location: 12%
  - Further controlling for worker characteristics: **7%**
- A puzzle for models with competitive labor markets: WFH is an amenity, so workers should accept *lower* wages for it (Barrero *et al.*, 2021)

Fact 3: The premium reflects pre-pandemic wages (Li, Sauvagnat and Schmitz, 2026)

- Workers who were better paid before the pandemic are more likely to WFH after it
  - WFH dummy on pre-pandemic log hourly wage: **0.166**
  - Controls for occupation, industry and location and worker characteristics
- WFH wage premium **disappears** when controlling for the pre-pandemic wage or the AKM worker effect
  - AKM worker effect (Abowd *et al.*, 1999), estimated on DADS 2010–2019
- WFH workers did not have faster wage growth

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Model: general equilibrium

- Competitive labor markets
- Final good: $Y = \left(\int_0^M y(n)^{\frac{\varepsilon-1}{\varepsilon}} \, dn \right)^{\frac{\varepsilon}{\varepsilon-1}}$
- Intermediate good $y(n)$: monopolistic competition, heterogenous productivity z
- Require labor market and goods market to clear
- Free entry condition pins down mass of firms M

Model: households

- Two worker types $j = 1, 2$ with population shares τ_1 and $1 - \tau_1$; each supplies one unit of time
- Office productivity q_j^O, with $q_1^O = 1$
- Ideal share of hours worked at home $\nu \sim \Psi$, the same distribution for both types
- Utility over consumption and the share of hours at home h:

$$u = \ln c - \frac{1}{\gamma} \frac{|h - \nu|^\eta}{\eta}$$

- Choose among contracts (w, h). Consume w.

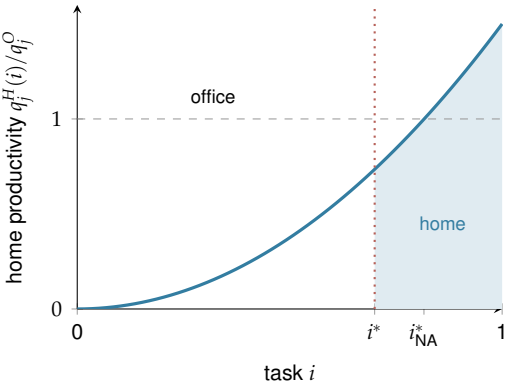
Model: intermediate good firms

- Entry: pay $f_E Y$ to draw z from $G(z) = 1 - (\underline{z}/z)^{\theta}$; pay fY if produce
- Production combines the effective labor of the two types:

$$y = z\left(\sum_j \left(q_j(i_j^*, h_j)\,\ell_j\right)^{\frac{\rho-1}{\rho}}\right)^{\frac{\rho}{\rho-1}}$$

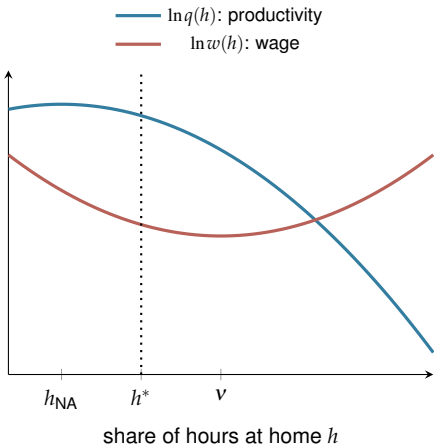
- Worker productivity $q_j(i_j^*, h_j)$: CES across tasks $i \in [0,1]$ with elasticity σ
  - Office: q_j^O in every task; home: $q_j^H(i) = \alpha_j\, i^{\zeta}\, q_j^O$
  - Tasks above a cutoff i^* are done at home, for a share h of hours
- Choose i_j^*, h_j, l_j to maximize profit
- Pay $f_{\text{WFH}} Y$ if use WFH

Tasks: some are done better at home



- Office productivity is the same for all tasks; home productivity rises with the task index
- Firms send tasks above a cutoff i_j^* home and choose the share of hours at home h_j
- Productivity of a worker is $q_j(i_j^*, h_j)$, a CES aggregate of office and home time

WFH is an amenity, so firms choose more of it



- With one ν per type, workers are indifferent across contracts:

$$w_j(h) = w_j^O \exp\left(\frac{|h-\nu|^\eta - \nu^\eta}{\eta\gamma}\right)$$

- Firms minimize the cost per unit of effective labor, $w_j(h)/q_j(h)$
- Optimal h^* lies between the productivity-maximizing h_{NA} and ν (when $\nu > h_{NA}$)

Large firms adopt WFH, high-wage workers sort into them

- WFH lowers a firm's unit cost by a factor $\bar{a} > 1$
- Variable profit rises in proportion to $z^{\varepsilon-1}(\bar{a}^{\varepsilon-1} - 1)$, while the cost f_{WFH} is fixed
  $\Rightarrow$ only firms above a productivity cutoff z^*_{WFH} adopt (**Fact 1**)
- Workers with a comparative advantage at home gain more from WFH
  - WFH firms tilt their workforce toward the type with a comparative advantage at home
  - WFH workers earn more if that type also has higher onsite productivity (**Facts 2–3**)

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Assigned parameters

- EoS across firms $\varepsilon = 5$ (Broda and Weinstein, 2006)
- EoS across tasks $\sigma = 3$ (Davis *et al.*, 2024)
- Utility curvature $\eta = 2$, task curvature $\zeta = 2$
- Distribution of ideal shares Ψ from Bloom (2020)

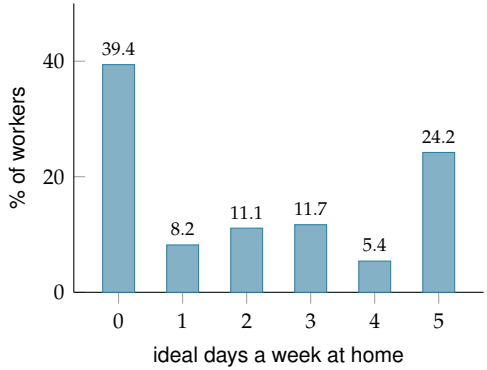


Figure 5 of Bloom (2020); "never" and "rarely" set to 0.

Calibrated model fit

Calibrate 10 parameters to 10 moments

Target	Data	Model
1. Acceptable wage discount for WFH 2–3 days a week (US)	7%	7%
2. Mean firm employment	22	22
3. One-year survival rate of new firms	75%	75%
4. Top 10% firm employment share	78%	78%
5. Aggregate share of hours worked from home (US)	27%	27%
6. WFH dummy on log firm sales	0.023	0.023
7. Post-pandemic log wage on any-WFH dummy	0.066	0.066
8. Any-WFH dummy on pre-pandemic log wage	0.166	0.166
9. Wage variance, WFH / fully onsite workers	1.57	1.57
10. Share of workers who WFH at least one day a week (US)	40%	52%

Calibrated parameters

Parameter	Description	Value	Main target
γ	Weight of the WFH amenity	0.606	Pay cut for WFH 2–3 days
f_E	Entry cost	2.979	Survival rate
f	Overhead cost	0.425	Mean firm employment
f_{WFH}	WFH adoption cost	0.158	WFH–size gradient
θ	Pareto shape	4.432	Top 10% employment share
τ_1	Share of type-1 workers	0.167	Share of WFH workers
q_2^O	Office productivity, type 2 ($q_1^O = 1$)	0.301	WFH dummy on pre-pandemic wage
ρ	EoS between worker types	226	Post-pandemic wage premium
α_1	Relative home productivity, type 1	1.229	Share of hours at home
α_2	Relative home productivity, type 2	1.105	Wage dispersion of WFH workers

- High ρ, types are close substitutes $\rightarrow$ firms sort workers strongly by relative cost
- Type 1 earns 3.3 times as much onsite and is over-represented at WFH firms $\rightarrow$ WFH premium

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Return to office: 60% of workers fully onsite

Simulate RTO by raising f_{WFH}, all other parameters fixed.

	Baseline	RTO
Share of fully onsite workers	33.6%	60.0%
Top 10% employment share	78%	85%
WFH wage premium	6.6%	–31.8%
Consumption and output per worker		–2.3%
Welfare, all workers equally weighted		–5.2%
Welfare, workers with $\nu = 0$		+4.3%
Welfare, high-productivity workers		–5.6%

- Higher firm concentration, WFH premium turns negative
- Lower aggregate productivity and average welfare
- Winners: workers who want little or no WFH
- Losers: high-productivity workers

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- We construct a general equilibrium model with heterogeneous workers and firms to explain, within industry and occupation,
  - increasing propensity to WFH for workers at larger firms
  - WFH wage premium
- In the calibrated model, RTO
  - lowers productivity and average welfare
  - benefits workers who want little or no WFH
  - hurts high-productivity workers