Low-Skill Domestic Outsourcing and Healthcare Costs

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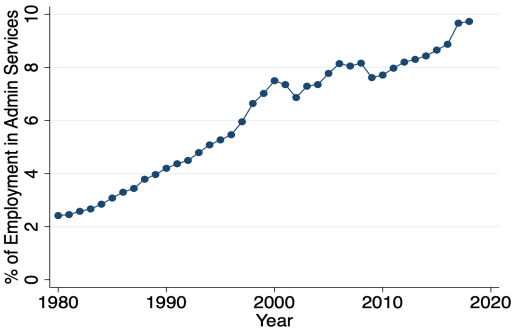
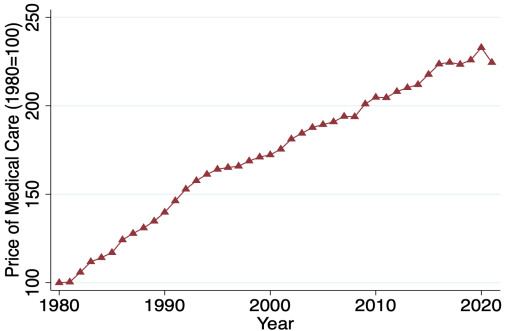
Two Increasing Trends

Low-Skill Domestic Outsourcing



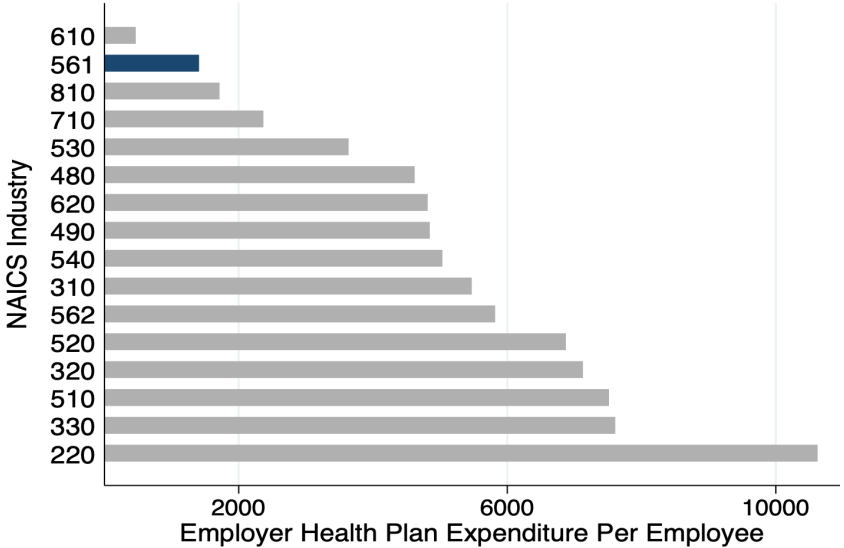
Price of Medical Care



Question and Hypothesis

- **Question -** Why is low-skill domestic outsourcing increasing?
- **Hypothesis**
  - Anti-discrimination laws force firms to offer all employees the same health plans.
  - Firms outsource low-skill workers to skirt this law.
  - Over time, price of medical care ↑
    - → Cost of health plans high-skill workers want ↑
    - → Laws cause relative price of in-house low-skill workers ↑
    - → Low-skill domestic outsourcing ↑

Evidence: admin services has low health plan costs



This Paper

- **Question** - What % of the increase in low-skill domestic outsourcing was caused by the rising price of medical care?
- **Theory** - Main mechanism:

$$\underbrace{\text{Laws} + \text{firm workforce composition}}_{\text{exogeneous}} \rightarrow \underbrace{\text{compensation packages} \rightarrow \text{outsourcing}}_{\text{endogenous}}$$

This Paper

- **Question** - What % of the increase in low-skill domestic outsourcing was caused by the rising price of medical care?
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- **Empirics -** Support + discipline main mechanism.
- **Computation -** Laws + $\uparrow$ price of medical care $\longrightarrow$ over **50%** of the trend.

Contributions

1. First to study the link between healthcare costs and domestic outsourcing.
2. New model with this link.
3. Quantify the model, show the effect is large.

Technology and Preferences

Time is static. 3 types of agents.

1. **Workers** - Exogenous in skill $s \in \mathcal{S}$. Inelastic labor. Normal preferences.
2. **Traditional firms** - indexed by j.

$$y_j = \left(\Pi_{s\in\mathcal{S}} \mathbf{n}_{js}^{\varphi_{js}}\right)^{\nu}, \quad \mathbf{n}_{js} = \Big(\underbrace{n_{js}^{\frac{\theta_s-1}{\theta_s}}}_{\text{in-house}} + \alpha_{js}^{1/\theta_s} \underbrace{l_{js}^{\frac{\theta_s-1}{\theta_s}}}_{\text{outsourced}}\Big)^{\frac{\theta_s}{\theta_s-1}}.$$

3. **Outsourcing firms** - One for each skill level. Technology: $L_s = n_{os}$.

Traditional Firms in Equilibrium

- Compensation packages = wages w_{js} and health plans a_{js}.
- Anti-discrimination constraint - must offer all in-house workers same health plan.
- Free movement of labor - firms must match a worker's best outside option $\tilde{v}_s$.

Worker Problem

Traditional Firms Problem

$$V_j(\{p_{os}, \tilde{v}_s\}_s) = \max_{\{n_{js}, l_{js}, a_{js}, w_{js}\}_s} y(\{n_{js}, l_{js}\}_s) - \sum_{s \in \mathcal{S}} \Big(\underbrace{(w_{js} + a_{js}) n_{js}}_{\text{in-house expenditure}} + \underbrace{p_{os} l_{js}}_{\text{outsourcing expenditure}} \Big)$$

$$s.t. \quad a_{js} = a_{js'} \quad \forall s, s' \in \mathcal{S}$$

$$\underbrace{v(w_{js}, a_{js}; p_m)}_{\text{worker's indirect utility function}} \geq \tilde{v}_s \quad \forall s \in \mathcal{S}$$

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$$\underbrace{v(w_{js}, a_{js}; p_m)}_{\text{worker's indirect utility function}} \geq \tilde{v}_s \quad \forall s \in \mathcal{S}$$

- $a_{js} = a_{js'}$ prevents firm from offering all workers cheapest package that yields $\tilde{v}_s$.

Outsourcing Firms Problem

$$V_{os}(p_{os}, \tilde{v}_s) = \max_{n_{os}, a_{os}, w_{os}} p_{os} n_{os} - (w_{os} + a_{os}) n_{os}$$

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- Law has no effect because outsourcing firm uses only 1 skill level.
- Offers cheapest package that yields $\tilde{v}_s$.
- Outsourcing firms have pay lower prices for labor than traditional firms.

Optimal Outsourced Labor

- Recall traditional firm technology:

$$y_j = (\Pi_{s\in\mathcal{S}} \mathbf{n}_{js}^{\varphi_{js}})^{\nu}, \quad \mathbf{n}_{js} = \Big(\underbrace{n_{js}^{\frac{\theta_s-1}{\theta_s}}}_{\text{in-house}} + \alpha_{js}^{1/\theta_s} \underbrace{l_{js}^{\frac{\theta_s-1}{\theta_s}}}_{\text{outsourced}} \Big)^{\frac{\theta_s}{\theta_s-1}}.$$

  - α_{js} = weight on outsourced labor.
  - θ_s = elasticity of subs between in-house and outsourced labor.

- Optimality implies

$$\underbrace{\frac{l_{js}}{n_{js}}}_{\substack{\text{outsourced over} \\ \text{in-house labor}}} = \alpha_{js} \underbrace{\left(\frac{w_{js}+a_{js}}{w_{os}+a_{os}} \right)^{\theta_s}}_{\substack{\text{compensation costs relative} \\ \text{to the outsourcing firm's}}}.$$

Outsourcing in an economy without the anti-discrimination laws

- Outsourcing and traditional firms offer cheapest compensation packages possible.

$$\underbrace{\frac{l_{js}}{n_{js}}}_{\text{outsourced over in-house labor}} = \alpha_{js}$$

- Trends in price of medical care do not affect outsourcing.

Outsourcing in an economy with the anti-discrimination laws

- Assume utility is CES, complements.
- Suppose the price of medical care $p_m \uparrow$
  - $\rightarrow$ Health plan high-skill workers want $\uparrow$
  - $\rightarrow$ Health plan $a_j \uparrow \Longrightarrow$ cost of in-house high-skill $(w_{jh} + a_j) \downarrow$
  - $\rightarrow$ Consequently, cost of in-house low-skill $(w_{jl} + a_j) \uparrow \Longrightarrow$ low-skill outsourcing $\uparrow$

What about trends in demand for high skill labor φ_{jh}?

- Recall technology $y_j = (\Pi_{s \in \mathcal{S}} \mathbf{n}_{js}^{\varphi_{js}})^{\nu}$.
- $\varphi_{jh} \uparrow$ has similar effect on low-skill domestic outsourcing as $p_m \uparrow$.

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- Suppose $\varphi_{jh} \uparrow$
  - $\rightarrow$ Demand for high-skill workers at firm $j \uparrow$
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  - $\rightarrow$ Consequently, cost of in-house low-skill $(w_{jl} + a_j) \uparrow \Longrightarrow$ low-skill outsourcing $\uparrow$
- Mechanism implies: across industries, positive relationship between
  1. High-skill share of labor expenditure.
  2. Outsourcing share of low-skill labor expenditure.

Cross-Sectional Industry Data

- Skills $\leftarrow$ Group occupations into terciles by average compensation.
- OEWS: Wages w_{js} and in-house employment n_{js}
- ASM and SAS: Health plans a_j

Cross-Sectional Industry Data

- Skills $\leftarrow$ Group occupations into terciles by average compensation.
- OEWS: Wages w_{js} and in-house employment n_{js}
- ASM and SAS: Health plans a_j
- Input Output: Outsourcing Expenditure $p_{os}l_{js}$, ie:
  - Subindustries of Admin and Professional Services = outsourcing industries.
  - Map sub-industries to skill levels using employment shares.
  - i.e. janitorial services $\rightarrow$ low-skill.

Main Mechanism has Empirical Support

- Recall: positive relationship btw high-skill share and low-skill outsourcing share.
- Support in data:

	$\frac{\text{low-skill outsourcing exp}}{\text{low-skill labor exp}}$
$\frac{\text{high-skill exp}}{\text{total labor exp}}$	0.973^{***}
	(0.113)
Observations	128
R^2	0.371

Standard errors in parentheses

$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Accounting Exercise

- Calibrate the model to 1975, then change the following:
  1. Add the anti-discrimination law.
  2. Increase the price of medical care to its 2012 value.
  3. Increase the high-skill weight φ_{high} to match change in skill wage premium $\frac{\bar{w}_{high,t}}{\bar{w}_{low,t}}$.
- Compare outsourcing rates in each counterfactual economy.

Calibration

The interaction between the laws + rising price of medical care is key

Rise in Low-Skill Domestic Outsourcing, 1975-2012

	Δ p.p.	% explained
Data:	10.6	
Model:		
Price of medical care ↑ alone	0	0
Law alone	2.6	24.1
Law + price of medical care ↑	6.0	**56.1**

Increase in demand for high-skill is not a driving force

Rise in Low-Skill Domestic Outsourcing, 1975-2012

	Δ p.p.	% explained
Data:	10.6	
Model:		
Demand for high-skill ↑ alone	0	0
Law alone	2.6	24.1
Laws + demand for high-skill ↑	2.6	**24.2**

- ↑ demand for high-skill ⟶ firm increases high-skill wages instead of health plans.

Removing the anti-discrimination laws increases utility

Counterfactual: Removing the anti-discrimination laws

	Skill	
	Low	High
$\%\Delta$ Utility $\tilde{v}_s$	19.2	9.8

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Counterfactual: Removing the anti-discrimination laws

	Skill	
	Low	High
%Δ Utility $\tilde{v}_s$	19.2	9.8
%Δ Wage $E[w_{js}]$	25.6	-23.9
%Δ Health Plan $E[a_{js}]$	-20.0	104.6

Removing the anti-discrimination decreases wage inequality

	Ratio, high- to low-skill
Economy	Wage $\frac{E[w_{jh}]}{E[w_{jl}]}$
Baseline	4.8
Remove anti-discrimination laws	2.9

Removing the anti-discrimination decreases wage inequality

	Ratio, high- to low-skill	
Economy	Wage $\frac{E[w_{jh}]}{E[w_{jl}]}$	Utility $\frac{\tilde{v}_h}{\tilde{v}_l}$
Baseline	4.8	3.1
Remove anti-discrimination laws	2.9	2.9

Removing the tax advantage of employer health plans increases utility

Counterfactual: Removing the tax advantage of employer health plans

	Skill	
	Low	High
%Δ Utility v_s	15.8	3.7

Removing the tax advantage of employer health plans increases utility

Counterfactual: Removing the tax advantage of employer health plans

	Skill	
	Low	High
%Δ Utility v_s	15.8	3.7
%Δ Wage $E[w_{js}]$	8.9	3.2
%Δ Health Plan $E[a_{js}]$	-8.5	-13.5

Removing tax advantage slightly decreases inequality

	Ratio, high- to low-skill	
Economy	Wage $\frac{E[w_{jh}]}{E[w_{jl}]}$	Utility $\frac{\tilde{v}_h}{\tilde{v}_l}$
Baseline	4.8	3.1
Remove health plan tax advantage	4.5	2.8

Conclusion

- Novel theory, supported by data.
- Law + price of medical care $\uparrow \longrightarrow$ **56%** of the low-skill domestic outsourcing $\uparrow$.
  - Law + demand for high-skill $\varphi_h \uparrow \longrightarrow$ not a driver.
- Repealing the anti-discrimination law:
  - Increases utility.
  - Decreases wage inequality.
  - Slightly decreases utility inequality.

Next Step

- Job Market.

Worker Problem

$$v(w_{js}, a_{js}; p_m) = \max_{c,m} u(c, m_1 + m_2)$$
$$s.t. \quad c + p_m m_1(1+\gamma) \leq w_{js}(1-T)$$
$$p_m m_2 \leq a_{js}$$

- T is tax on wages
- γ captures the fact workers face higher prices than firms for health care.
- $T > 0$ or $\gamma > 0$ is necessary so that $a_{js} > 0$.

back

Summary of Parameters and Moments

Parameter	Description	Value	Moment	Model	Data
Normalized					
p_m	Price of medical care	1			
z	Efficiency	1			
N_s	Mass of workers of skill s	1			
External					
η	Elast. of subs., goods vs medical care	0.11			
ψ	Weight on goods in utility	0.81			
γ	% more workers pay for medical care out of pocket	0.1			
ν	Returns to scale, traditional firms	0.95			
θ_l	Elast. of subs., low-skill, in vs outsourced	3.26			
φ_{js}	Skill weights		Expenditure shares		
MDE					
α_l	Weight on low-skill outsourced labor in production	0.08	% of low-skill outsourced	0.14	0.14

back

Key Parameter: Elasticity of Sub, in vs out, θ_l

- Recall:

$$\frac{l_{js}}{n_{js}} = \alpha_{jl}\left(\frac{w_{js}+a_{js}}{w_{os}+a_{os}}\right)^{\theta_s}$$

- Regression:

$$\underbrace{\log \frac{p_{ol}l_{jl}}{n_{jl}}}_{\substack{\text{outsourcing expenditure} \\ \div \text{ in-house employees}}} = \theta_l \log(\underbrace{w_{jl}+a_j}_{\substack{\text{compensation} \\ \text{costs}}}) + \underbrace{(1-\theta_l)\log p_{ol}}_{\text{constant}} + \underbrace{\log \alpha_{jl}}_{\text{shifter}} + \underbrace{\epsilon_{js}}_{\substack{\text{error} \\ \text{term}}}$$

- Control for shifter: IT expenditure and non-low-skill outsourcing expenditure.

Result: $\theta_{low} = 3.258$. Positive, large, statistically significant

	(1)	(2)
	Low-skill out expnd per low-skill emp	
Low-skill compensation package cost	5.509***	3.258***
IT expnd per employee		0.400***
Non-low-skill out expnd per employee		0.828***
Observations	127	125
R^2	0.304	0.735

All variables are in logs. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Justification for firms offering one health plan

- Data: 1993 Robert Wood Johnson Foundation Employer Health Insurance Survey
- Plan id, employer id, and employer premiums.
- 22,000 plans, 15,000 employer.
- Variance decomposition of employer paid premiums:

$$\underbrace{Var(x_{ij} - \bar{x})}_{\text{Total dispersion}} = \underbrace{Var(x_{ij} - \bar{x}_j)}_{\text{Within firm}} + \underbrace{Var(\bar{x}_j - \bar{x})}_{\text{Between firm}}$$

- 83% of the total variation of single plan employer premiums is between firms.
- 86% of the total variation of family plan employer premiums is between firms.