

How Do Health Insurance Costs Affect Firms' Labor, Its Composition, and Technology Investments?

Janet Gao¹ Shan Ge² Lawrence Schmidt³ Cristina Tello-Trillo⁴

¹Indiana University

²NYU

³MIT

⁴Census

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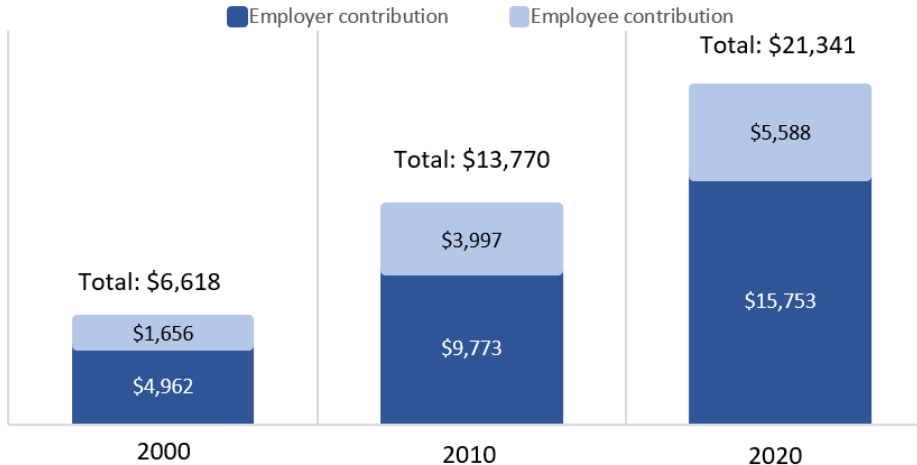
Some results do not use Census data.

Motivation

- Concern about ↓ demand for labor, especially low-skilled labor
 - ▶ Focus has been on imports, outsourcing, & automation
- A large cost of labor is health insurance
 - ▶ Firms paid 10% of wages for health insurance in 2021
- Health insurance costs has ↑; by 236% since 2000

Motivation

Costs of Employer-Sponsored Family Coverage



Motivation

- Health insurance is a heatedly debated topic in U.S. politics
 - ▶ 58% of Americans <65 obtain health insurance through employers
 - ▶ Employers' plans have to be affordable: workers pay <9.6% of wages
 - ▶ Costs to employers higher for low-skilled, esp. relative to productivity
- Important question: how health insurance costs affect firms' employment & investment

Research Questions & Hypotheses

When idiosyncratic shocks \uparrow health insurance costs, how do firms change

① employment

- ▶ hypothesis: \downarrow as the cost of labor \uparrow
- ▶ firms can't pass all the \uparrow as workers' outside options do not change

② labor composition

- ▶ hypothesis: low-skilled (low-wage) labor \downarrow by more because
- ▶ labor costs of low-skilled relative to high-skilled \uparrow
- ▶ low-skilled workers are more easily replaced by technology

③ technology investment

- ▶ hypothesis: \uparrow to replace workers

Results Overview

When firms' health insurance costs \uparrow ,

- firms' employment \downarrow
 - ▶ \downarrow by more if firms have a high premium/wage ratio
- low-wage workers are more likely to leave & become unemployed
- firms' technology investment \uparrow

Literature on the Effect of Health Insurance on Firms

All use aggregate shocks: workers' outside options also changing

- Baicker & Chandra (2005)
 - ▶ instrument imputed premiums with state-yr malpractice payments
 - ▶ when premiums \uparrow , survey respondents \downarrow employment & wages
- Gruber (1994): mandates that health insurance cover childbirth
 - ▶ childbearing-age women wage \downarrow , labor input no change
- Effect of ACA or mandating employers to provide health insurance
 - ▶ Almeida et al (2020): public firms \downarrow # covered, not employment
 - ▶ Mulligan (2020): firms \downarrow jobs to stay below the 50-employee mandate
 - ▶ Dillender et al (2020), Thurston (1997), etc.: \uparrow part-time employment

Contribution

- We improve on identification by using idiosyncratic & exogenous shocks; granular data, on mostly private firms
- We show the heterogeneous effect on employment across skill levels & on technology investment

Employer Health Insurance Market

- Employers shop policies through brokers
- Avg # of insurers in a year:
 - ▶ 291 (149 serve more than 100 employers in our sample)
 - ▶ 150 each state, 69 each commuting zone
- Avg insurer HHI: 1,881 at state level, 2,803 commuting zone
- Employer health insurance market is not competitive (Dafny (2010), Dafny, Duggan, & Ramanarayanan (2012))
- On avg, 11% of employers switch their insurers in a year

Data

Health insurance data

- Department of Labor's Form 5500, 2009-2019
- EIN, address, insurer, number of covered people, total premiums
 - ▶ → premiums per person, paid by worker & employer
- Exclude self-insured firms & union firms

Census

- W2: # of employees with wages \geq full time at minimum wage
- American Community Survey: 1/40 every year, occupation (routine, manual)
- Require the difference in growth rate between # of workers & # of participants to be [-30%, 30%]

Aberdeen survey

- Firms' budget on IT & PC

Summary Statistics

Variable	Mean	Standard Deviation
Number of employees	278	356
Number of participants	410	816
Participants to employee ratio	1.34	0.72
Premium per person (annual)	6162	2981
Total wage to premium ratio	8.33	7.19

Instrument for Health Insurance Costs

OLS bias:

- regressing # of workers on health insurance premiums:
- E.g., if a firm wants to attract/retain more workers, it may offer generous health insurance benefits with high premiums

Instrument for Health Insurance Costs

- Obamacare: individual insurers' 3-year medical loss ratio (claims/premiums) ≥ 0.85 in 3 consecutive years, or send rebates
- IV: $\max(\text{insurance group's past 3-year medical loss ratio}, 0.85)$
- Instrument firm i 's premium in t using its $t - 1$ insurer's performance from $t - 3$ to $t - 1$
- Insurers may \uparrow premiums when they suffer losses
 - ▶ use past losses to predict future costs
 - ▶ moving closer to optimal price subject to the 0.85 rule
 - ▶ relax financial constraints

Instrument for Health Insurance Costs: Exclusion

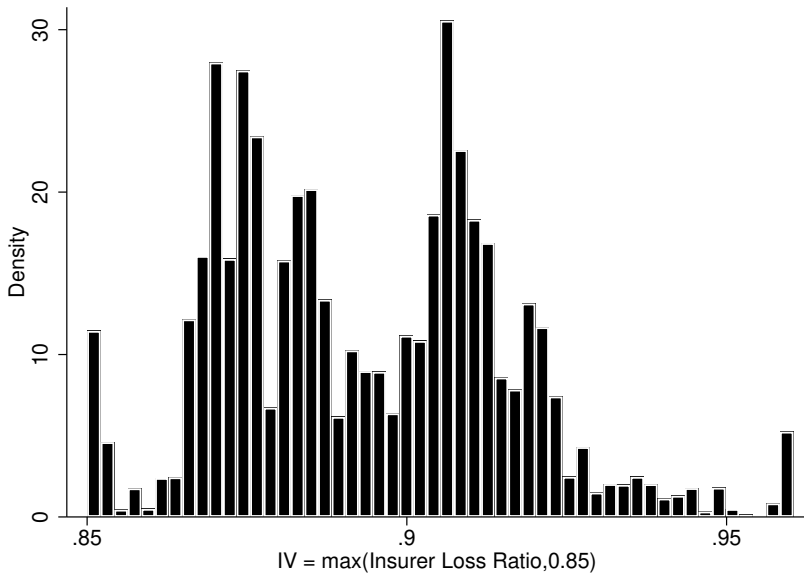
- Concern 1: insurers' losses may be due to high cost of medical care
↔ high cost of living → workers leaving
- We control for state*year FE, in addition to firm FE
- The next version:
 - ▶ control for commuting zone*year FE or commuting zone*ind*year FE
- Concern 2: insurers' losses may be due to employers' workforce getting sick more → workers leaving
- The next version:
 - ▶ restrict to firms whose lag premiums <1% of insurer-yr total

Instrument for Health Insurance Costs: Exclusion

Dependent Var:	$\log(\text{Claim per person})_t$	$(\text{Premium/Claim})_t$
Insurer Loss _{t-3 to t-1}	-0.35 (-1.64)	1.24* (1.73)
Fixed Effects	Firm, Yr	Firm, Yr
N	27602	27419
adj. R-sq	0.684	0.510

Insurers' losses do not predict higher claims, but is associated with higher premium/claim ratio (~ markup).

Instrument for Health Insurance Costs



Regression Specification at the Firm Level

First Stage:

$$\log(\text{premium per person})_{i,t} = \lambda + \gamma \cdot \text{insurer loss}_{i,t-3 \text{ to } t-1} + FE_i + FE_t + \epsilon_{i,t}$$

Second Stage:

$$Y_{i,t} = \alpha + \beta \cdot \widehat{\log(\text{premium per person})}_{i,t} + FE_i + FE_t + u_{i,t}$$

i : firm

t : year

Y : # of participants, employees, & technology investment

Premiums for t are determined in $t - 1$

Instrument for Health Insurance Costs: Relevance

	IV 1st Stage
Dependent Var:	$\log(\text{Premium per participant})_t$
Insurer Loss _{t-3 to t-1}	0.6192*** (6.79)
Fixed Effects	Firm, Yr
Observations	85000
Cragg-Donald F Stat	135.90

When insurer loss \uparrow by 1 std dev (0.02), premium per participant \uparrow by 1.3%

Effect of Health Insurance Costs on # of Participants

If health premiums have an effect, # of participants should change

	(1)	(2)	(3)	(4)	(5)
Method:	OLS	IV	IV	IV	IV
Dependent Var:	log(# of Participants) _t				
log(Premium) _t	-0.5900*** (-85.54)	-0.7600*** (-5.68)	-0.7723*** (-6.49)	-0.7452*** (-5.69)	-0.7796*** (-5.84)
log(Employment) _{t-4}					0.02052*** (10.45)
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr*State	Firm, Yr*Ind	Firm, Yr
Observations	155000	85000	85000	85000	83500
Cragg-Donald F Stat		135.90	183.80	140.20	135.40

Exclude firms in health insurance associations (repeated obs)

Demeaned log(premium)'s std dev is 0.2

- When premiums ↑ by 20%, # of participants ↓ 14%
- An elasticity of -0.7; Avg is -0.6 in the literature, Liu & Chollet (2006)

Effect of Health Insurance Costs on Employment

Dependent Var:	(1)	(2)	(3)	(4)
		log(Employment) _t		
log(Premium) _t	-0.2704** (-2.38)	-0.2019** (-2.09)	-0.2502** (-2.27)	-0.2615** (-2.33)
log(Employment) _{t-4}				0.01772*** (10.05)
Fixed Effects	Firm, Yr	Firm, Yr*State	Firm, Yr*Ind	Firm, Yr
Observations	92000	88500	89000	90500
Cragg-Donald F Stat	147.50	195.80	149.90	147.60

Include firms in health insurance associations

- When premiums ↑ by 20%, firms ↓ employment by 4%

Effect of on # of Participants > Effect on Employment

Mechanism 1

- Workers pay for some of the \uparrow in health insurance premiums
- Some workers opt out of employers' insurance (e.g., join spouses')
- A smaller # of workers leave due to \uparrow in premiums or are laid off

Mechanism 2

- Firms pay for all the \uparrow in premiums, but stop offering health insurance to some workers (e.g., by converting them to part-time)
- A smaller # of workers leave due to losing health insurance benefits or are laid off

Effect of Health Insurance Costs on Employment

Dependent Var:	(1) log(# of Retained) _t	(2) log(# of New Hires) _t
log(Premium) _t	-0.2540** (-2.20)	-0.1414 (-0.63)
Fixed Effects	Firm, Yr	Firm, Yr
Observations	92000	92000
Cragg-Donald F Stat	145.40	145.40

- Effect on employment mostly through # of retained workers

Heterogeneous Effect on Firm-Level Employment

Effect larger for firms with a high total premium/wage ratio

	(1)	(2)	(3)
Dependent Var:	log(Employment) _t		
Sample:	High (Premium/Wage)	Low (Premium/Wage)	All
log(Premium) _t	-0.3963** (-2.12)	0.01959 (0.17)	-0.3848** (-2.24)
log(Premium) _t *Low (Premium/Wage)			0.2882 (1.35)
Low (Premium/Wage)			-2.4760 (-1.33)
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr
Observations	52000	36000	92000
Cragg-Donald F Stat	60.790	111.40	41.610

Effect on Wages

- Why don't firms pass the \uparrow in health insurance costs to workers through \downarrow wages or \uparrow workers' own contribution
- If firms do, workers' net of health insurance pay $\downarrow \rightarrow$ some workers leave (outside options do not change)
- If firms want to keep the same employment, their cost of labor will \uparrow
- Nonetheless, we can examine how wages change, but not workers' own health insurance contribution

Effect on Wage Growth at Worker Level

Dependent Var:	Wage Grth Rate	
	t-4 to t	t-4 to t+1
$\log(\text{Premium})_t$	0.04617 (0.61)	0.02389 (0.29)
Fixed Effects	Firm, Yr	Firm, Yr
Observations	12470000	10700000

- Health insurance costs do not affect workers' wage growth rate

Pre-trend & Persistence

Dependent Var:	(1) $\log(\text{Employment})_{t-4}$	(2) $\log(\text{Employment})_{t+1}$	(3) $\log(\text{Employment})_{t+2}$
$\log(\text{Premium})_t$	-0.1028 (-0.61)	-0.3875* (-1.90)	-0.05407 (-0.16)
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr
Observations	67000	71000	52500
Cragg-Donald F Stat	71.620	51.600	15.720

Heterogeneous Effect on Workers' Retention

Hypothesis: low-skilled workers are more likely separated

- Low-skilled workers earn lower wages
- Affordability mandate requires firms to bear more of the \uparrow in premiums for low-skilled workers
- \uparrow labor costs of low-skilled relative to high-skilled
- low-skilled labor is more easily replaced by technology

Use avg. income from past 5 years (not including 0) to proxy skill

Using David Dorn's classification for routine & manual jobs

Heterogeneous Effect on Workers

IV Second Stage:

$$Y_{i,j,t} = \beta_2 \cdot \log(\text{premium})_{i,t} \cdot \log(\text{past avg wage})_{i,j,t} + \\ \beta_3 \cdot \log(\text{premium})_{i,t} \cdot \text{Routine}_{i,j} + \beta_4 \cdot \log(\text{premium})_{i,t} \cdot \text{Manual}_{i,j} + \\ \beta_5 \cdot \log(\text{past avg wage})_{i,j,t} + \beta_6 \cdot \text{Routine}_{i,j} + \beta_7 \cdot \text{Manual}_{i,j} + FE_{i,t} + u_{i,j,t}$$

i : firm; j : individual; t : year

$\log(\text{past avg wage})_{i,j,t}$, $\text{Routine}_{i,j}$, $\text{Manual}_{i,j}$ are standardized

Y :

- $I(\text{Retained})_t$ if worker earns at least minimum wage full-time pay from her employer of $t - 1$
- $I(\text{Unemployed})_t$ if worker earns less than minimum wage full-time pay in year t

Heterogeneous Effect on Workers' Retention

Dependent Var:	I(Retained) _t	I(Retained) _{t+1}
$\log(\text{Premium})_t * \text{Routine}$	-0.007397 (-0.61)	-0.01031 (-0.63)
$\log(\text{Premium})_t * \text{Manual}$	-0.05668* (-2.23)	-0.07587* (-2.23)
$\log(\text{Premium})_t * \log(\text{AvgWage})$	0.1094*** (3.94)	0.1479*** (4.04)
Controls	Yes	Yes
Fixed Effects	Firm * Yr	Firm * Yr
Observations	4542000	4542000

- When premiums ↑ by 20%, if a worker's past wage is 2 std dev lower, the worker is 6 pp more likely to be separated, 40% of mean (16%)

Heterogeneous Effect on Workers' Unemployment

Dependent Var:	$I(\text{Unemployed})_t$	$I(\text{Unemployed})_{t+1}$
$\log(\text{Premium})_t * \textit{Routine}$	-0.006586 (-1.13)	0.001022 (0.12)
$\log(\text{Premium})_t * \textit{Manual}$	0.0007712 (0.07)	0.01579 (1.02)
$\log(\text{Premium})_t * \log(\text{AvgWage})$	-0.04221*** (-3.35)	-0.03978* (-2.41)
Controls	Yes	Yes
Fixed Effects	Firm * Yr	Firm * Yr
Observations	4542000	4542000

- When premiums \uparrow by 20%, if a worker's past wage is 2 std dev lower, the worker is 1.6 pp more likely to unemployed, 53% of mean (3%)

Outline

When health insurance costs \uparrow , results suggest that

- ① firms' employment \downarrow
 - ▶ by more for firms with high premium/wage ratios
- ② low-skilled (low-wage) labor \downarrow by more
- ③ Next we study how firms change technology investment
 - ▶ hypothesis: \uparrow to replace workers
 - ▶ going back to firm-year level

Effect on Firms' PC Investment

Dependent Var:	log(Total PC Budget) _t			
	(1)	(2)	(3)	(4)
log(Premium) _t	1.09 (1.30)	0.86 (1.11)	1.29** (1.99)	1.22** (2.05)
log(Employment) _{t-1}				0.39*** (38.38)
Fixed Effects	Firm, Yr	Firm, Yr*State	Firm, Yr*Ind	Firm, Yr
N	102805	100510	91195	88970
Cragg-Donald F Stat	31.91	35.30	49.64	48.91

When premiums ↑ by 20%, firms ↑ PC budget by 20%.

Effect on Firms' PC Intensity

Dep. Variable	log(PC Budget Per Worker)			
	(1)	(2)	(3)	(4)
log(Premium)	1.67** (2.04)	1.32* (1.86)	1.30** (2.24)	1.19** (2.11)
log(Employment) _{t-1}				-0.07*** (-6.88)
FE	Firm Yr	Firm State-Yr	Firm Ind-Yr	Firm Yr
<i>N</i>	102499	100208	90925	88899
Cragg-Donald F Stat	31.12	35.49	48.36	48.85

When premiums ↑ by 20%, firms ↑ PC budget per person by 20%.

Effect on Firms' IT Investment

Dependent Var:	log(Total IT Budget) _t			
	(1)	(2)	(3)	(4)
log(Premium) _t	1.52* (1.72)	0.93 (1.19)	1.06* (1.69)	1.01* (1.76)
log(Employment) _{t-1}				0.39*** (40.28)
Fixed Effects	Firm, Yr	Firm, Yr*State	Firm, Yr*Ind	Firm, Yr
N	102949	100645	91323	89045
Cragg-Donald F Stat	32.05	35.29	49.84	49.01

When premiums ↑ by 20%, firms ↑ PC budget by 20%.

Effect on Firms' IT Intensity

Dep. Variable	log(IT Budget Per Worker)			
	(1)	(2)	(3)	(4)
log(Premium)	2.22** (2.47)	1.51** (2.06)	1.13** (2.06)	1.02* (1.90)
log(L.Employment)				-0.05*** (-5.80)
FE	Firm Yr	Firm State-Yr	Firm Ind-Yr	Firm Yr
<i>N</i>	102631	100331	91041	88974
Cragg-Donald F Stat	31.32	35.54	48.64	48.95

When premiums \uparrow by 20%, firms \uparrow IT budget by 20%.

Contribution

Causal effect of \uparrow health insurance costs:

- \downarrow employment, especially for low-skilled workers
- \uparrow technology investment

Contribute to policy debate on:

- Mandate employers to provide health insurance
- Effect of \uparrow in health insurance costs
- Potential force that distort labor demand
- Policy suggestion: subsidy for low-skilled workers' insurance