Job Dynamics with Staffed Labor

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Disclaimers

Job reallocation as the engine of productivity growth

- Secular decline in labor market dynamism since the early 1980s Davis et al., 2007; Davis, Faberman and Haltiwanger, 2012; Hyatt and Spletzer, 2013; Decker et al., 2014; Haltiwanger, Hathaway and Miranda, 2014; Decker et al., 2016

- Slowdown in the reallocation of jobs across plants potentially increases *misallocation* and hinders *productivity* Hopenhayn and Rogerson,1993

- Productivity enhancements happen by reallocating labor to more productive processes Foster, Haltiwanger and Krizan, 2001

This paper

Dynamism has not necessarily diminished — it has *changed* instead.

A large part of the *drop* in labor market dynamism is accounted for by a *shift* **from payroll labor to staffed labor**.

More literature

How staffing affects labor market dynamism

◇ Staffing accounts for **37% of the measured decline** in the aggregate job reallocation rate

◇ Staffed labor is **more responsive to shocks** than payroll labor

⋆ Staffing affects job dynamics and its measurement, both at the business and at the aggregate level

Staffing: unmeasured job flows
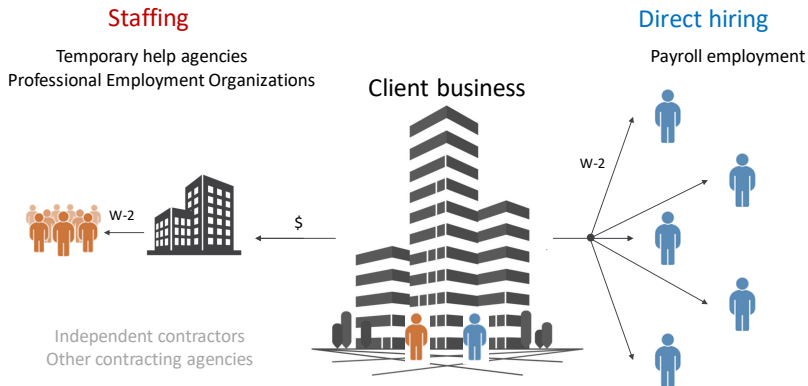
- Staffing breaks the equivalence between jobs and employers
- Staffed workers do **not** change their employer *of record* as they change jobs

Measurement and data

Flows Mismeasurement and Data to Remedy

Staffing leads to undercounting job flows: jobs are created and destroyed, but unless there is a change in the staffing agency's payroll employment, flows are not registered.

ESTABLISHMENT-LEVEL DATA (ASM, CM; LBD)

1. Expenses on temporary staff and leased employees (2006-2017), payroll, payroll employment
2. Location, age, payroll employment

FIRM-LEVEL DATA (RE-LBD)

3. Payroll/revenue for plants in Employment Services (NAICS 5613)

Staffing: definition in ASM

- **Expenditures on temporary staff and leased employees** are a subset of operating expenses (ASM form – item 16C)

Temporary staff and leased employee expense - Total costs paid to Professional Employer Organizations (PEOs) and staffing agencies for personnel. (Include all charges for payroll, benefits and services.) (Report in thousands of dollars)
Prior year temporary staff and leased employee expense - Total costs paid to Professional Employer Organizations (PEOs) and staffing agencies for personnel. (Include all charges for payroll, benefits and services.) (Report in thousands of dollars)

- Key characteristic: organization/agency must be in NAICS 5613
- Narrow definition is adopted on purpose: these types of outsourced workers typically work side-by-side payroll employees and are in production occupations. Outsourcing, instead

Staffing in U.S. manufacturing

Secular rise and cross-sectional prevalence over sectors, age, size, and revenue growth

1. The employment share of temporary help firms has grown by over 80% since the 1990s
2. Most staffed workers ($\simeq$30-35%) are assigned to manufacturing plants
3. About 8 in 10 establishments report expenditures for staffed labor *at least once* in their life cycle
4. About 4 in 10 report positive expenditures on staffed workers *for every year* between 2006-2017
5. The average manufacturer increased its staffed labor share of revenue by 85% in 2006–2017 (with little role for composition in the aggregate)
6. Larger, older, and hi-tech establishments are more likely to use staffing arrangements
7. However, the share of revenue spent on staffed labor is higher in smaller and younger establishments
8. The use of staffing is increasing in revenue growth
9. The share of revenue spent on staffed labor is U-shaped in revenue growth

Graph 1   Table 2   Graph 5   OP decomp   Table 6
Table 7   3-digit NAICS for 7   Graph 8   Graph 9

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Staffing and aggregate job flows

Gross job reallocation

- Gross job reallocation: the sum of **plant-level employment gains and losses** that occur between $t-1$ and t:

$$JR_t = \sum_{j \in \mathcal{J}_{t-1,t}} |\text{emp}_{jt} - \text{emp}_{jt-1}|$$

$$= \sum_{j \in \mathcal{J}^+_{t-1,t}} (\text{emp}_{jt} - \text{emp}_{jt-1}) + \sum_{j \in \mathcal{J}^-_{t-1,t}} |\text{emp}_{jt} - \text{emp}_{jt-1}|$$

$$\equiv \text{Job Creation}_t + \text{Job Destruction}_t$$

- We define employment to include **both** payroll and staffed employees, that is

$$\text{emp}_{jt} = \text{emp}^P_{jt} + \text{emp}^S_{jt}$$

- Traditionally, reallocation calculated only with emp^P_{jt}
- We also define *staffed* job reallocation using only emp^S_{jt}

SJR

Imputation of staffed head count from staffing expenses

Goal: computing staffed employment flows

$$\text{exp}_{jt}^S = \text{emp}_{jt}^S \, w_{jt}^S (1 + \alpha)$$

$$\widehat{\text{emp}}_{jt}^S = \frac{1}{1 + \hat{\alpha}} \frac{\text{exp}_{jt}^S}{\hat{w}_{jt}^S}$$

- Need to make assumptions on (average) wages of outsourced workers and agencies' profit rates

- We will make conservative assumptions so that our results on aggregate outcomes are lower bounds Details
    - overestimate staffed wages
    - overestimate agency markups

Staffed job flows: a large and increasing share of aggregate job flows

	Staffed Job Creation SJC	Staffed Job Destruction SJD	Staffed Job Reallocations SJR
	Yearly staffed job flow		
Average	16.20	13.66	**14.61**
Std. Dev.	2.47	3.68	2.66
2017 - 2007	4.19	8.57	6.48

Note: annual outsourced job flows are reported relative to payroll job flows.

1. On average (2007–2017), **staffed** job flows are **about 15%** of payroll job flows.
2. Staffed job reallocation rates are **increasing** over time

Staffed job flows rationalize **37**% of secular decline in reallocation rate

Staffed jobs reallocate at a higher pace compared to payroll jobs

	JC	JD	JR
Yearly job flow rate			
Payroll			
Average	7.52	7.98	**15.49**
Std. Dev.	1.29	2.86	2.07
2017 - 2007	12.31	-12.35	-0.46
Staffed			
Average	30.38	25.99	**56.36**
Std. Dev.	6.12	6.70	10.01
2017 - 2007	-1.42	6.21	1.90
Job flow percentage change (2017 - 2007)			
Payroll	-2.14	-23.62	**-13.27**
Staffed	22.99	32.50	27.12
Total	1.39	-17.76	**-8.33**

SJC and SJD   Net SJC by growth decile   Tenure of staffed workers

Staffing as a flexible margin of adjustment

Why do firms use staffing?

- *Hypothesis*: plants use staffed employment to deal with transitory, idiosyncratic shocks and avoid labor adjustment costs

- A 1 SD increase in **volatility** increases a plant's staffing share by $\sim$15% of the population mean (Details)

- Plants also change payroll and staffed labor differentially *in response to* revenue shocks or productivity shocks

- Two exercises:
  - ▶ **revenue shocks**, instrumented exploiting trade linkages of U.S. manufactures
    - ⋆ changes in imported input prices
    - ⋆ changes in exchange rates (for exporters)
  - ▶ **deviations in plant-level TFPR** à la Decker et al. (2022)

Staffing is more responsive to revenue shocks than payroll labor

$$\Delta_\tau \exp_j^{\ell^c} = \beta_0 \cdot \Delta \mathrm{rev}_{jt} + \mathbf{X}'_{jt} \gamma + \varepsilon_{jt} \quad \text{for } c \in \{P, S\}$$
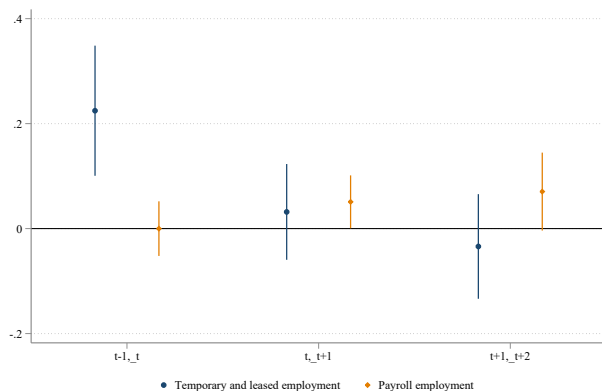
Dependent variable	OLS	IV – Import price	IV – Exchange rate
Payroll			
$t-1, t$	0.3327	0.4603	0.4174
	(0.0061)	(0.1073)	(0.1575)
$t, t+1$	0.0375	0.4002	0.5858
	(0.0047)	(0.1447)	(0.2132)
$t+1, t+2$	−0.0001	−0.0959	−0.8149
	(0.0043)	(0.1236)	(0.2608)
Staffing			
$t-1, t$	0.6708	2.092	5.053
	(0.0170)	(0.580)	(1.247)
$t, t+1$	−0.1403	0.0624	0.7697
	(0.0150)	(0.5116)	(0.7881)
$t+1, t+2$	−0.0874	−0.2383	−2.691
	(0.0155)	(0.5665)	(0.9977)
First-stage F-statistic	−	41.27	19.27
OBSERVATIONS	115,000	115,000	101,000

Size, age, year, industry, and state fixed effects utilized throughout. Standard errors clustered at the establishment level and denoted in parentheses.

Staffing is more responsive to productivity shocks than payroll labor

Details

$$\Delta_\tau \mathsf{emp}_j^{\ell^c} = \beta_1 \cdot \Delta_\tau \ln(\mathsf{TFPR}_j) + \mathbf{X}'_{jt}\gamma + \varepsilon_{j\tau} \text{ for } c \in \{P, S\}$$

● Temporary and leased employment   ● Payroll employment

Controls include change in productivity interacted with linear trend, third-degree polynomial of productivity change, initial employment size, initial employment size interacted with linear trend, plant age, industry-year and state FE, and cyclical indicators. Staffed employment change is set to 0 if plant j does not use staffing in neither period of interest, and equal to the DHS growth rate otherwise.

Staffing and labor market dynamism

KEY TAKEAWAYS

- Staffing employment is a growing part of labor for U.S. manufactures.
- ◇ This increase is across-the-board, more salient for smaller, younger, high-growth plants, and consistent with a drop in short-duration jobs.
- Staffing is a flexible margin of adjustment.
- ◇ Staffed employment is considerably more responsive than payroll employment.
- Staffing leads to mismeasurement of aggregate labor market flows.
- ◇ Staffed reallocations account for 37% of drop in job reallocation since 2006.

Appendix

Contribution to the literature

1. Staffing (or outsourcing) in macro

   Houseman (2001); Erickcek, Houseman, and Kalleberg (2003); Dey, Houseman, and
   Polivka (2010); Autor and Houseman (2010); Ono and Sullivan (2013); Houseman and
   Heinrich (2015); Bernhardt and Houseman (2017); Goldschmidt and Schmieder (2017);
   Bilal and Lhuillier (2021); Bergeaud et al. (2021); Estefan et al. (2024)

   - Cross-sectional and time series evidence from U.S. Census data
   - Evidence on the flexibility advantages of staffing

2. Labor market dynamism `Facts`

   Davis, Haltiwanger, and Schuh (1996); Davis, Faberman, and Haltiwanger (2006); Davis
   and Haltiwanger (2014); Decker et al. (2014, 2016, 2020)

   - Effect of staffing on measurement and interpretation of job creation,
   destruction, and reallocation

   `Back to intro`

Staffing: trade-offs

- **Staffing** is an intermediate technology to source labor.
- Businesses can source labor either through **direct hiring** (payroll) or via **staffing** agencies (outsourcing).
- Advantages of staffing:
1. Avoid labor adjustment costs
2. Reach optimal scale faster
- Costs of staffing:
1. Fixed cost: establish a relationship with a staffing agency
2. Variable costs: wage markups of staffing agency
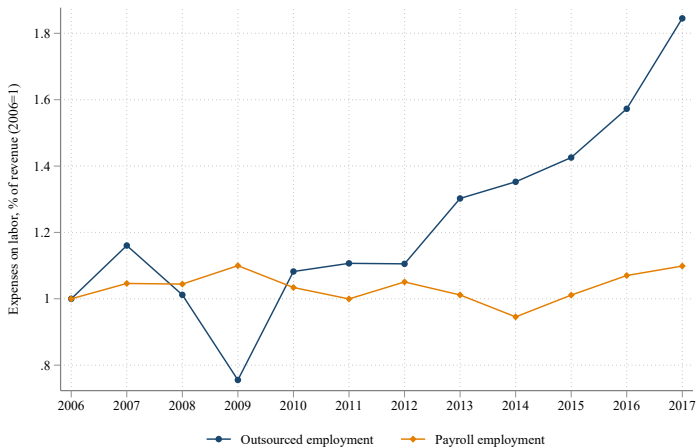3. Possibility of hiring less productive workers

Back

Labor share of staffing firms grew over 80% since 1990

$e_{tl} = e_{t-1,l}/E_t + h_{tl} - s_{tl}$

Temporary Help Employment
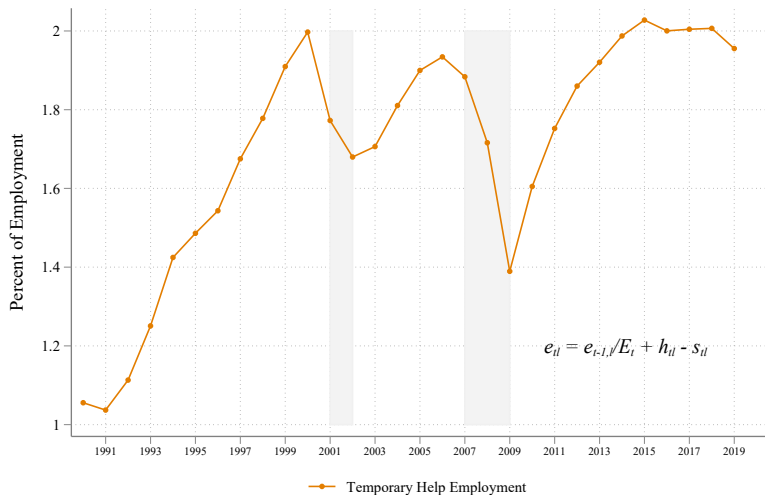
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Growth of staffed labor vs. payroll labor (2006–17)

- Revenue share of staffed labor for average plant has increased by more than 80% over 2006–2017.
- Payroll labor does not show this trend.

Industry composition of temporary help workers

	1995	1997	1999	2001	2005	2017
Agriculture, forestry, fishing	0.30	0.00	0.40	0.90	0.80	0.80
Mining	0.20	0.70	0.10	0.90	0.50	0.70
Construction	2.90	2.60	2.70	3.50	3.50	3.40
Manufacturing	**34.10**	**32.10**	**31.20**	**22.70**	**29.50**	**34.90**
Wholesale trade	2.90	4.40	4.10	3.10	5.70	4.00
Retail trade	5.30	3.30	4.10	4.10	3.30	2.90
Transportation	7.40	6.40	6.30	8.00	3.80	5.30
FIRE	6.90	8.40	7.10	7.00	3.80	4.30
Business & repair	22.60	25.90	25.60	30.30	29.20	23.20
Personal services	2.70	1.90	3.40	1.00	3.30	0.90
Entertainment & recreation	0.70	0.90	0.50	1.90	0.00	0.60
Professional services	12.60	13.20	13.20	14.10	13.80	18.10
Public administration	1.30	0.00	1.20	2.40	2.90	1.00

Source: CPS Contingent Worker Supplement (1990 census industrial classification system)

Back

Hopenhayn and Rogerson (1993)

- A tax τ on firing employees equal to 1 year's of wages is associated with a $(30-22=)$ 8% decline in job turnover rates.
    1. Reduction of aggregate productivity by 2.1%
    2. Reduction of aggregate employment by 2.5%
    3. Reduction of welfare (utility-adjusted consumption) by 2.8%
- Adjustment cost function: $g(n_{t-1}, n_t) = \tau \cdot \max\{0, n_{t-1} - n_t\}$
- Changes are relative to a frictionless economy.

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Staffing: definition in ASM

- Our definition, purposefully, does **not** include outsourced services such as:
- ◇ Purchased professional and technical services (including management consulting, accounting, auditing, bookkeeping, legal, actuarial, payroll processing, architectural, engineering and other professional services)
- ◇ Other services including data processing and other purchased computer services, purchased communication services, and purchased advertising and promotional services are included in different items.
- This is to ensure that staffing employment is related to the core of a plant's business.
- Contract work is counted towards material inputs.

Age, size, tech status and growth

	Share of clients	Share of revenue
Whole sample	**47.14**	**1.70**
Establishment age		
0-4	41.51	2.23
5-9	44.29	1.81
10-29	47.63	1.60
30+	51.97	1.45
Establishment size		
1-9	27.60	2.54
10-49	39.88	1.99
50-249	67.51	1.31
250+	81.19	1.01
High-tech status		
High-tech	63.62	1.46
Low-tech	46.11	1.72

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Intensive and extensive margin by 3-digit NAICS

	Establishments (%)	Temp and leased staff revenue share (clients)
Food Manufacturing	47.33	1.81
Beverage and Tobacco Product	48.06	1.92
Textile Mills	51.03	1.60
Textile Product Mills	34.37	1.73
Apparel	26.98	1.81
Leather and Allied Product	33.03	1.27
Wood Product	37.17	2.11
Paper	70.78	1.14
Printing	44.14	1.93
Petroleum and Coal Products	25.36	1.27
Chemical	59.63	1.32
Plastics and Rubber Products	67.48	2.07
Nonmetallic Mineral Product	26.29	1.52
Primary Metal	59.24	1.05
Fabricated Metal Product	47.22	1.81
Machinery	52.69	1.46
Computer and Electronic Product	61.83	1.58
Electrical Equipment, Appliance, and Component	62.44	1.44
Transportation Equipment	60.64	1.55
Furniture and Related Product	40.35	1.86
Miscellaneous	41.17	1.97

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Revenue growth (1)
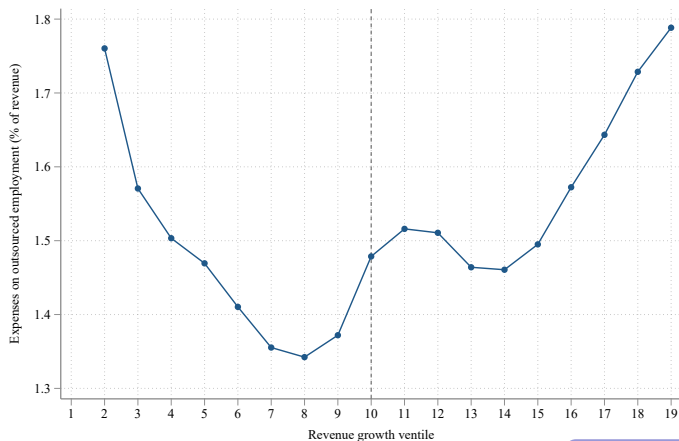
- The **use** of domestic outsourcing is increasing in revenue growth.
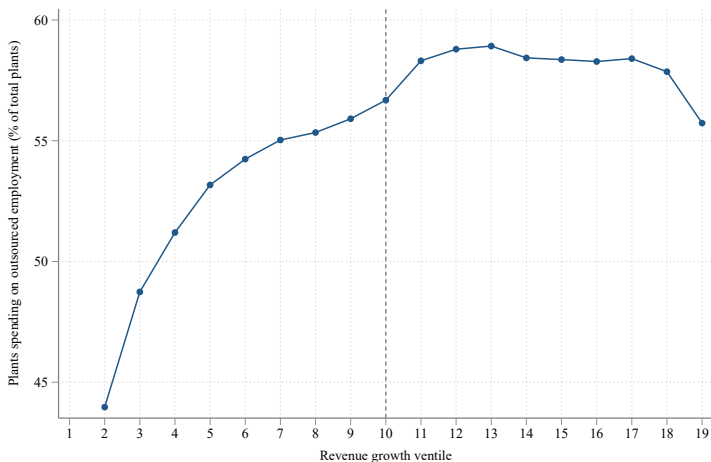
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Revenue growth (2)

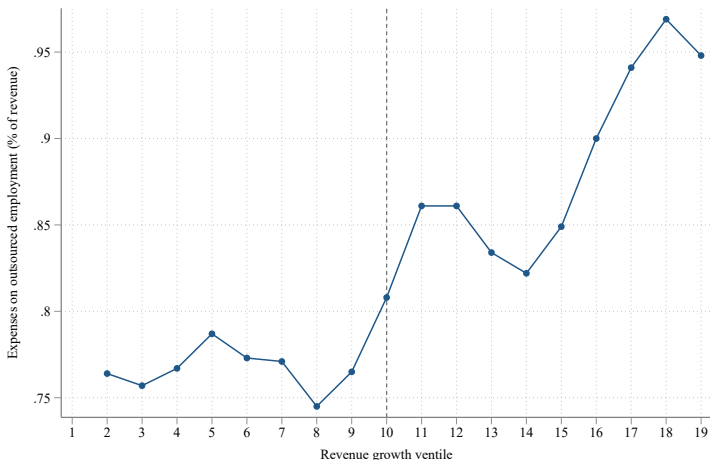- The **share of revenue** spent on outsourced labor is U-shaped in revenue growth.

Revenue growth (3)

- Temporary and leased staff use intensity varies along revenue growth

Rise in staffing: no role for composition

- Aggregate revenue share of staffing is a revenue-weighted average of staffing shares: OP decomposition

$$\sigma_t^{\text{staffing}} = \sum_{j \in \mathbf{J}_t} \omega_{jt} \cdot \varsigma_{jt}^{\text{staffing}} = \underbrace{\frac{1}{|\mathbf{J}_t|} \sum_{j \in \mathbf{J}_t} \varsigma_{jt}^{\text{staffing}}}_{\text{OP–MEAN}} + \underbrace{cov(\omega_{jt}, \varsigma_{jt}^{\text{staffing}})}_{\text{OP–COV}}$$

- No role for composition within- or across industries:
◇ Rise in staffing is due to OP-MEAN component.
◇ Holding industry shares fixed leads to almost identical rise in staffing.

Details

Back

Composition

- OP decomposition: OP-MEAN drives rise in staffing.
- Holding industry shares fixed at 2007 levels: nearly identical rise in staffing

		OLLEY-PAKES DECOMPOSITION		FIXED INDUSTRY SHARES
Year	**Data**	**OP–MEAN**	**OP–COV**	**Counterfactual**
2007	0.4850	0.7936	-0.3085	0.4850
2012	0.5172	0.8993	-0.382	0.5189
2017	0.6176	0.9962	-0.3786	0.6023

Note: values are denoted in percentages.

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Aggregate payroll job reallocation rate

$jr = (Creation + Destruction) / Employment$

Percent of Employment
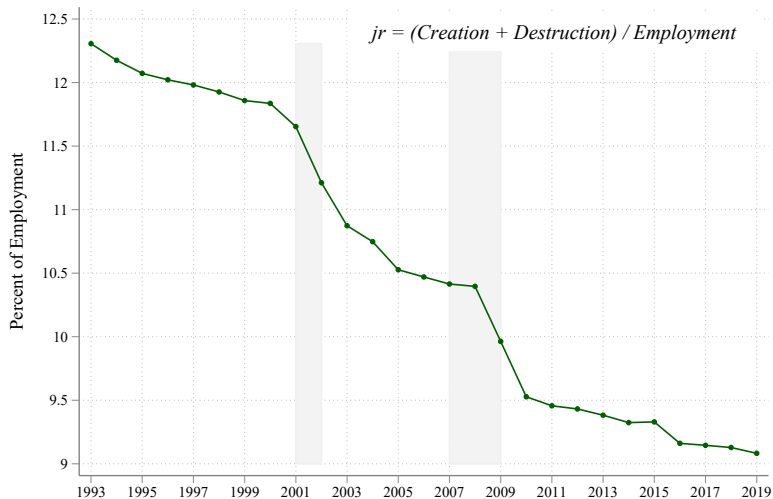
Source: Quarterly Workforce Indicators, U.S. Census Bureau Back

Aggregate payroll job creation and destruction rates
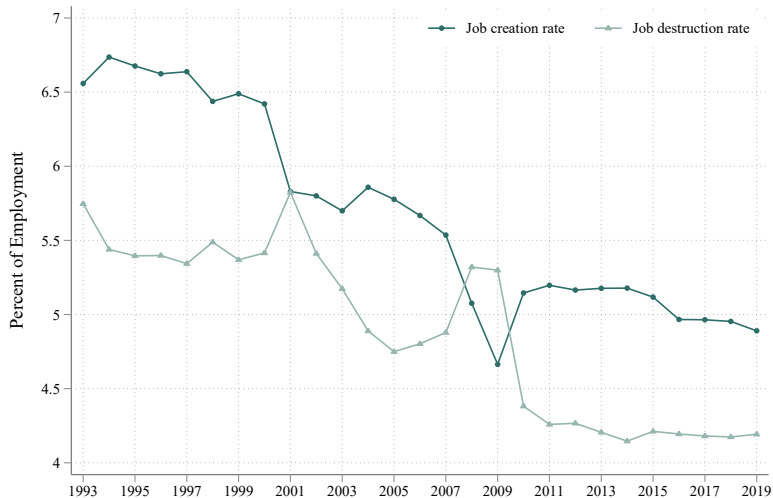
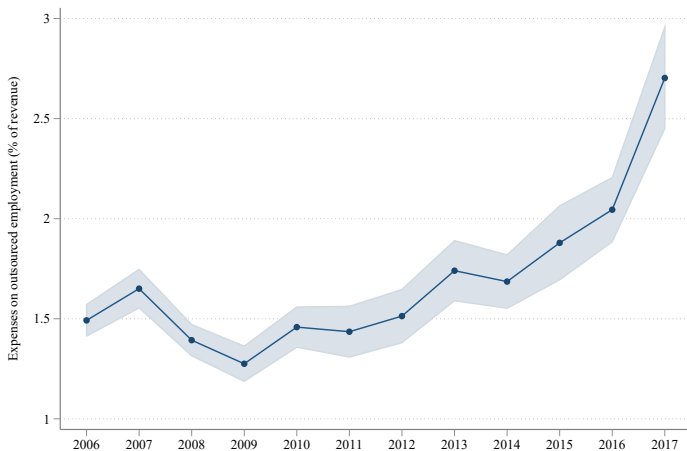Source: Quarterly Workforce Indicators, U.S. Census Bureau Back

Worker reallocation = hires + separations

Source: Quarterly Workforce Indicators, U.S. Census Bureau [Back]

Expenses on temporary and leased staff are increasing


Residualized, average revenue share of expenditures on temporary and leased staff (Source: ASM/CM 2006–2017)
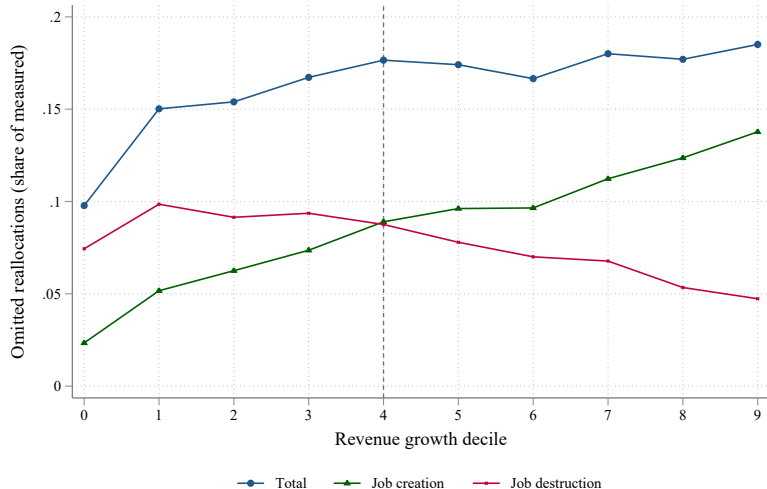
Back

Staffed job reallocations: business cycle

- Gap between omitted job creation and destruction is largest after Great Recession: **underestimation of economic recoveries**

Omitted jobs created (share of payroll jobs created)
Omitted jobs destroyed (share of payroll jobs destroyed)
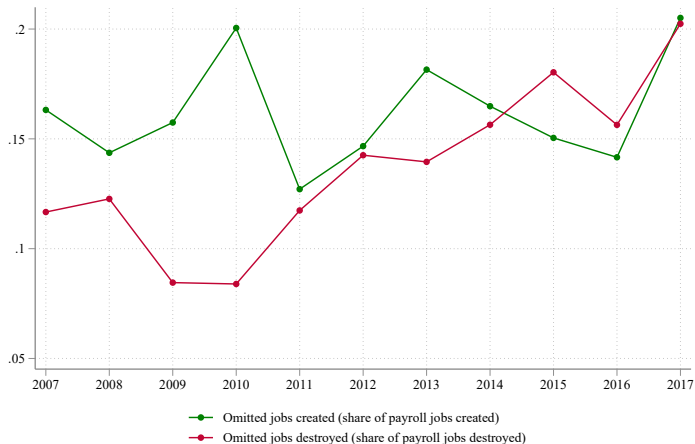
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Evidence from fast-growing plants

- Staffed **net** job creation is highest for fast-growing plants.

Imputation of staffed **head count** (2)

Recall

$$\text{emp}_{jt}^{S} = \frac{\text{exp}_{jt}^{S}}{w_{jt}^{S}} \cdot \frac{1}{(1+\alpha)}$$

1. Equalization of wages (upper bound): $w_{jt}^{S} = w_{jt}^{P}$

2. Inverse markup = staffing firm σ's labor share (lower bound):

$$\text{revenues}_{\sigma t} \leq (1+\alpha)\text{payroll}_{\sigma t} \;\Leftrightarrow\; \frac{1}{1+\hat{\alpha}} = \frac{\text{payroll}_{\sigma t}}{\text{revenues}_{\sigma t}} \equiv \beta_{\sigma t}$$

   - Strong competition among staffing agencies + ASA data for $\alpha \in [0.10, 0.15]$

3. Agency-client relationships are unobserved; infer $\beta_{\sigma t}$ from *average* staffing agency in state $s(j)$ and year t.

Back

Staffed job reallocations

- Given a measure for staffed **head count**, we can also create job reallocation rates *for staffed workers*:

$$SJR_t \equiv \sum_{j \in \mathcal{S}_{t-1,t}} |\widehat{\mathrm{emp}}^S_{jt} - \widehat{\mathrm{emp}}^S_{jt-1}|$$

$$= \sum_{j \in \mathcal{S}^+_{t-1,t}} (\widehat{\mathrm{emp}}^S_{jt} - \widehat{\mathrm{emp}}^S_{jt-1}) + \sum_{j \in \mathcal{S}^-_{t-1,t}} (\widehat{\mathrm{emp}}^S_{jt} - \widehat{\mathrm{emp}}^S_{jt-1})$$

$$\equiv SJC_t + SJD_t$$

- $\widehat{\mathrm{emp}}^S_{jt}$: estimated, **staffed** employment by establishment j in year t

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Staffing job reallocations have increased

- Job reallocations of temp and leased staff 23%↑ vs. 12%↓ of payroll reallocations
- Omitted reallocations would have lowered the observed secular decline in JR by 38%.
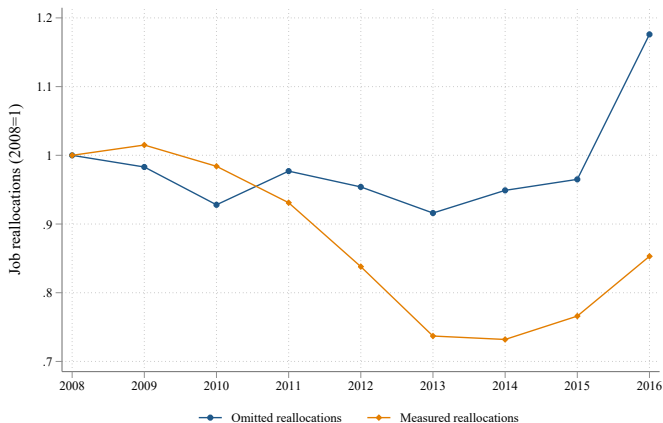
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Staffed employment 23%↑

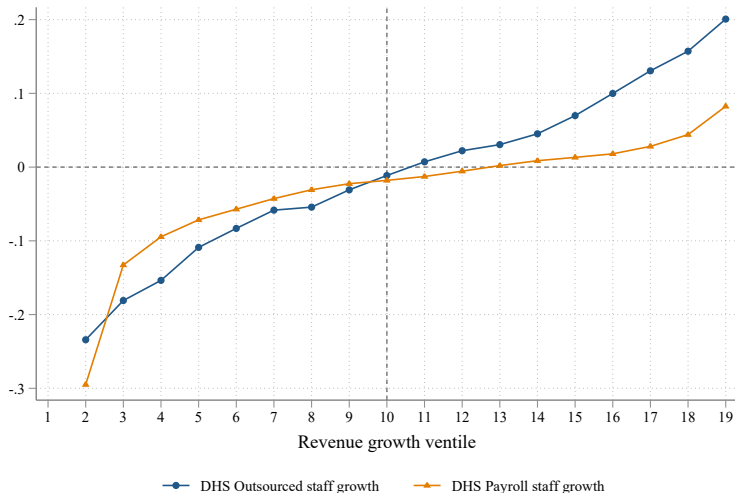- Over 2006-2017, the manufacturing sector created more outsourced jobs than it destroyed.

Back

Payroll employment 12%↓

- Job destruction drives the negative, overall trend.

Payroll employment vs. temporary and leased staff growth

Productivity and employment effects

- Productivity vs. wage loss/ unemployment (Bilal and Lhuillier, 2021)
- ◇ Rise in aggregate output of 6% (France, 1997–2016)
- Annual labor productivity growth between 2007 and 2015 in manufacturing is 15% lower once the hours of temporary workers are considered (Dey et al., 2017)
- The 4.1% decline in payroll manufacturing employment between 1989 to 2000 becomes an estimated 1.4% *increase* after factoring in temporary workers (Dey et al., 2017)

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Idea behind revenue growth regressions

- Identical assumptions to Yeh et al. (2022)
- First-order conditions from plant j's cost minimization problem:

$$\frac{F_{jt}^{\ell^P}}{\exp_{jt}^{\ell^P}} \cdot \text{rev}_{jt} = \mu_{jt} \cdot \nu_{jt}$$

$$\frac{F_{jt}^{\ell^S}}{\exp_{jt}^{\ell^S}} \cdot \text{rev}_{jt} = \mu_{jt}$$

- Wedges (i.e., ratios between output elasticities and revenue shares) reflect market power.
- Then, log changes in labor expenditures are proportional to changes in revenues:

$$\Delta\exp_{jt}^{\ell^c} = \beta \cdot \Delta\text{rev}_{jt} + \mathbf{X}_{jt}'\gamma + \varepsilon_{jt} \quad \text{for } c \in \{P, S\}$$

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Responsiveness: revenue shocks

- Cost minimization motivates **revenue** shocks `Derivation`

$$\Delta_\tau \exp_j^{\ell^c} = \beta_0 \cdot \Delta\text{rev}_{jt} + \mathbf{X}'_{jt}\gamma + \varepsilon_{jt} \quad \text{for } c \in \{P, S\}$$

- Instrument Δrev_{jt} by exploiting trade linkages of manufacturers:

1. Real price changes of imported goods
2. Fluctuations in real exchange rates for exporters

- Two instruments are constructed with administrative data from the universe of import and export transactions (LFFTD) `Details`

`Back`

Instruments for revenue growth regressions

- Industry-year level instruments:

1. **Import price inflation index**

   Expenditure-weighted average of changes in products' prices

   Products are defined as 10-digit HS-country pair.

2. **Real exchange rate change index** (exporters only)

   Expenditure-weighted average of real exchange rate changes (between US and foreign country)

   IDENTIFYING ASSUMPTION. Idiosyncratic, unobservable factors are orthogonal to real import price/exchange rate changes.

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Staffing and technology

- QuickBooks is an accounting software package widely used by firms.

Accountants, auditors and bookkeepers
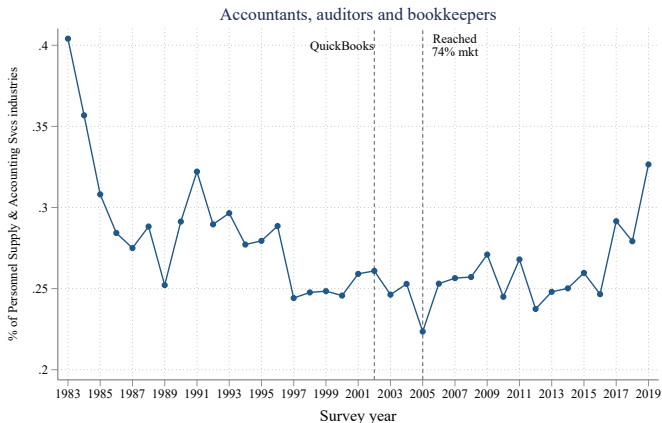
Source: CPS-ACES data Back

Responsiveness: productivity shocks

- Empirical design similar to Decker et al. (2022) uses idiosyncratic productivity shocks:

$$\Delta_\tau \text{emp}_j^c = \alpha_{it} + \beta_1 \cdot \Delta a_{jt} + \mathbf{X}_{jt}' \gamma + \varepsilon_{j\tau}$$

with $c \in \{P, S\}$ and $\tau \in \{(t-1, t), (t, t+1), (t+1, t+2)\}$

- Revenue TFP: $\Delta a_{jt} = \ln(\text{TFPR}_{jt}^S) - \ln(\text{TFPR}_{jt-1}^S)$

- Extensive margin of staffing:

$$\Delta_\tau \text{emp}_j^S = \begin{cases} 2 \times \frac{\text{emp}_{j\tau}^S - \text{emp}_{j\tau-1}^S}{\text{emp}_{j\tau}^S + \text{emp}_{j\tau-1}^S}, & \text{if } \text{emp}_{j\tau}^S + \text{emp}_{j\tau-1}^S > 0 \\ 0 & \text{otherwise} \end{cases}$$

Controls $\mathbf{X}_{jt}$: change in productivity interacted with linear trend, third-degree polynomial of productivity change, initial employment size, initial employment size interacted with linear trend, plant age, state FE, and cyclical indicators

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Staffed workers' tenure in staffing agencies is increasing

- Tenure of average staffing worker 18m↑ (payroll worker 8m↑)
- Average assignment length at client is 11 weeks.
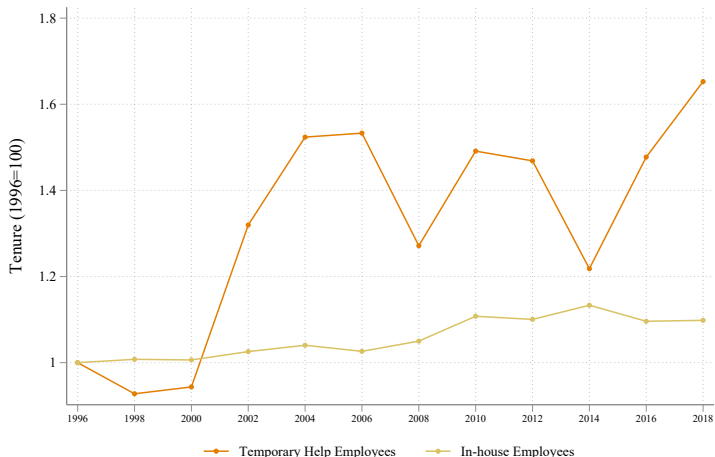
Source: Job tenure supplement of CPS Back

Volatility-staffing share regressions

- Volatility and staffed revenue shares are positively correlated.
- Stronger correlation when volatility is skewed towards positive growth.

	Standard volatility	Positive-biased volatility
Staffing revenue share	0.2448 (0.0320)	0.3377 (0.0441)
Controls/fixed effects		
Size	Yes	Yes
Age	Yes	Yes
Industry-year	Yes	Yes
State	Yes	Yes
OBSERVATIONS	350,000	350,000

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