Merger Guidelines for Labor Markets

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The views expressed herein are those of the authors and not those of the Census or the Federal Reserve System.

Introduction

- Horizontal Merger Guidelines. Presumption of anticompetitive effects based on HHI

$$HHI = 10,000 \sum_i \text{market share}_i^2$$

  - 1982 and 2023 (strict): Anticompetitive if $HHI > 1800$ and $\Delta HHI > 100$
  - 2010 (loose): Anticompetitive if $HHI > 2500$ and $\Delta HHI > 200$

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- Our contribution. Evaluate HHI and ΔHHI thresholds if applied to the labor market

Introduction

- Approach. Multi-plant ownership in oligopsony model (Berger, Herkenhoff, Mongey, 2022)
  - Theoretically characterize post-merger labor market outcomes
  - Show that model replicates post-merger outcomes documented by Arnold (2020)
  - Show that model generates sensible predictions in line with evidence in PRH, SS case
- Results. If mergers result in "standard" 5% efficiency gain
  - Applying stricter 1982 and 2023 guidelines makes workers better off
  - Applying looser 2010 guidelines harms workers
  - Under 2010 guidelines, many mergers generate monopsony losses not offset by efficiency gain

2023 Guidelines: Labor Section

(1) *HHI* thresholds may be lower in labor market – we use worker welfare to assess this.

"The level of concentration at which competition concerns arise may be lower in buyer markets than in seller markets, given the unique features of certain buyer markets" (p.25).

(2) Anticompetitive effects of product markets and labor markets treated in isolation.

"If the merger may substantially lessen competition or tend to create a monopoly in upstream markets, that loss of competition is not offset by purported benefits in a separate downstream product market. " (p.26).

- We assess worker welfare holding product market competition fixed
- Product market in slides: Perfectly competitive
- Product market in paper: Extend all results to monopolistic competition

Model

Model Environment

Key features

- Many local labor markets across which workers are mobile
- Workers preferences reflect amenity differences across firms (switching cost)
- Strategic firms (internalize effects on market aggregates) with heterogeneous productivity
- If non-strategic, merger has zero labor market effects (can't match Arnold, 2020)
- Nest in general equilibrium to evaluate welfare

Model environment

Markets

- Many local labor markets indexed by $j \in [0, 1]$
- 3-digit NAICS in Commuting Zone (e.g. primary metal mfg. in Minneapolis, BHKM 2023)
- Workers mobile across markets

Firms

- A finite number of firms M_j in market j engage in Cournot competition
- Firm i in market j has heterogeneous productivity z_{ij}, produces $f(z_{ij}, n_{ij})$
- Allow for increasing returns (i.e., scope for labor redundancy post -merger)

Household

- Supplies labor n_{ij} to firm i in market j at wage w_{ij}
- Yields labor supply curve $n_{ij} = g(w_{ij}, w_{-i,j})$ where $g_1(\cdot) > 0$ and $w_{-i,j}$ is other firm wages

More

Mergers

Suppose firm i and i' merge, profit maximization of merged firm is:

$$\max_{n_{ij}, n_{i'j}} \; f(z_{ij}, n_{ij}) - w_{ij} n_{ij} + f(z_{i'j}, n_{i'j}) - w_{i'j} n_{i'j}$$

subject to the labor supply curves: $n_{ij} = g(w_{ij}, w_{i',j}, \mathbf{w}_{-i,j})$, $n_{i'j} = g(w_{i'j}, w_{ij}, \mathbf{w}_{-i,j})$

Diversion. Merged firm internalizes diversion tax (e.g. $\frac{\partial w_{ij}}{\partial n_{i'j}} \neq 0$)

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- Hiring more at one plant makes labor more expensive at other plant

Proposition - Cournot, Firm heterogeneity, DRS

(i) Combined share of merging firms falls, (ii) Shares of all other firms increase,

(iii) Wages at all firms fall, (iv) Employment index of merging firms falls,

(iv) At least one merging firm shrinks.

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Corollary - Required Efficiency Gains

Efficiency z_{ij}, $z_{i'j}$ must increase for average wages to increase at

(i) market, (ii) merging firms.

→ *Work toward a Required Efficiency Gain view of guidelines.*

Calibration & Validation

- Model calibrated as in Berger, Herkenhoff, Mongey (2022)
  - Use within-firm-state, across-market responses to state-corporate taxes of n_{ij}, w_{ij} as a function of local market share to identify preference parameters that show up in labor supply system
- Show model replicates Arnold (2020) who uses Census data to study impact of mergers
  - Simulate 200,000 markets
  - (a) Draw two firms in every market, (b) Merge them if their average employment is $> y$
  - Choose $y = 49$ to match median market-firm employment

Calibration & Validation

- Model calibrated 940 G78(940 G78ing 0 G00 0.2 0.2 00 0.2 78(y)]TJ0Berger)50(,40 G78Her)-

Merger guidelines

Assessment of merger guidelines

- Simulate mergers under same criteria as our Arnold (2020) replication, and
  i. Assume a 5 percent efficiency gain to z_{1j}, z_{2j}
  ii. Pass the merger in each market if satisfies some 'guideline' assessed at the market level

     In progress: Measuring properties of across-market covariance structure of merging firms' establishments
- Compute welfare gain / loss in each market, and average across markets
- Result: Workers harmed by 2010 guidelines, better off with 2023 guidelines

	A. 2023 draft guidelines	B. 2010 guidelines
Prevent mergers above threshold (HHI & ΔHHI)	(1800 & 100)	(2500 & 200)
	(1)	(2)
Change in average welfare assuming 5 percent efficiency gain		
Permitted mergers	$19,963	$35,972
Blocked mergers	$805,476	$994,940

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Assessment of merger guidelines - Viewed through efficiency gains

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Assessment of merger guidelines - Viewed through efficiency gains

- Let D be the percent increase in both firms' z_{ij} such that $\mathbf{W}_j^{\emptyset} = \mathbf{W}_j$
- In the paper we refer to this as the *Required Efficiency Gain* of a merger

	A. 2023 draft guidelines	**B. 2010 guidelines**
Prevent mergers above threshold (*HHI* & D*HHI*)	(1800 & 100)	(2500 & 200)
	(1)	(2)
Average efficiency gain for worker surplus neutrality - Increasing returns - $a = 1.05$		
Permitted mergers	1.8%	2.8%
Blocked mergers	18.6%	21.5%

From assessment to optimal

1. Which establishments within / across markets are involved in a merger?

- Using Census data to understand the variance-covariance structure of

a. Overlap of firms in each market? - E.g. Not one firm in Baltimore, other in Boston

b. Correlation of firm-market employment in markets where both present

2. What are the costs of merger review?

- Requesting budget line items from DOJ

Penguin Random House Merger

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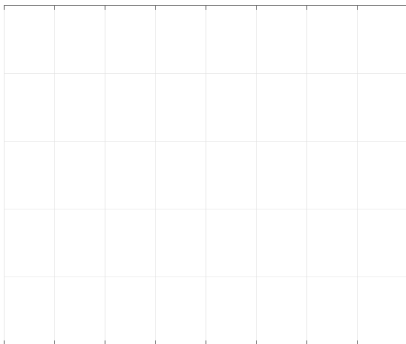
Replicate. Map contract shares (MOJ) to emp shares and simulate PRH & SS merger.

- Choose $\{z_{1j}, \ldots, z_{5j}\}$ to get contract shares of $\{0.37, 0.25, 0.12, 0.11, 0.07\}$
- Eight other firms with one percent market share each

Penguin Random House Merger

- Workers unharmed if industry wage ($\mathbf{W}_j$) is at least pre-merger levels
- REG of 17% for workers to be unharmed.



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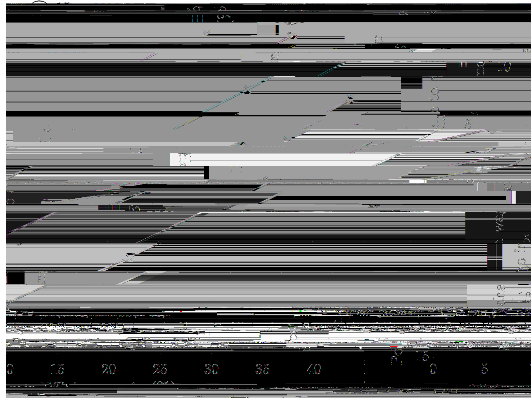
- Validation - Government witness estimate 3.7-7.4 percent wage loss at PRH



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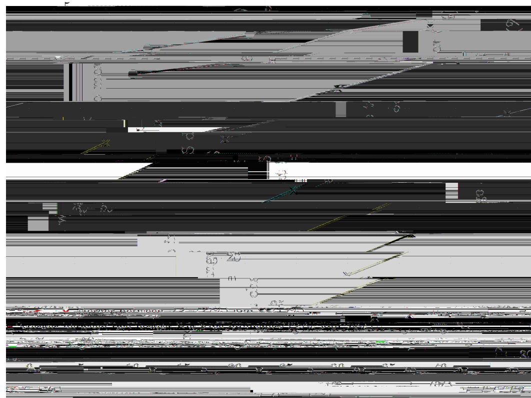
- Validation - Government witness estimate 6.4-19.2 percent wage loss at SS



Conclusion

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Contributions:

- Provide first analysis of merger guidelines in labor market
- Workers unharmed under 5% efficiency gain and 1982/2023 guidelines
- Workers harmed under 5% efficiency gain and 2010 guidelines

See paper for:

- Downwards wage pressure formulas – both measurement and implementation via REG's
- Distribution of gains / losses across different HHI, ΔHHI, $GDWPI$

Appendix

Downward wage pressure

- Rearranging the first order conditions for the firm:

$$w_{1j} = \left(\frac{\varepsilon_{1j}}{\varepsilon_{1j}+1}\right)\left(z_{1j} - \underbrace{n_{2j}\frac{\partial w_{2j}}{\partial n_{1j}}}_{:=\text{Downward wage pressure}}\right) \tag{1}$$

- We formally define downward wage pressure to be the term $n_{2j}\frac{\partial w_{2j}}{\partial n_1}$