

Cost Shocks and Price Pass-through

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Researcher(s) own analyses calculated (or derived) based in part on data from Nielsen Consumer LLC and marketing databases provided through the NielsenIQ Datasets at the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business. The conclusions drawn from the NielsenIQ data are those of the researcher(s) and do not reflect the views of NielsenIQ. NielsenIQ is not responsible for, had no role in, and was not involved in analyzing and preparing the results reported herein.

Food prices outran wages and someone got blamed

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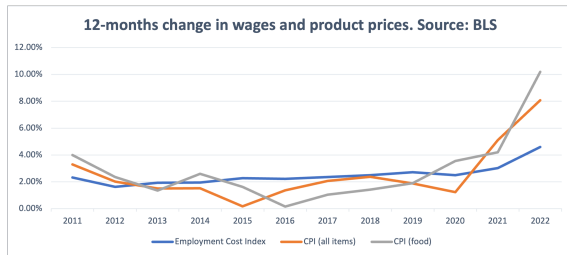
Wealth
Economics

Employment Costs Surge Most Ever, Stoking U.S. Inflation Concern

▪ Index increased 1.4% in first quarter, 4.5% from year ago

The New York Times *Food Prices Soar, and So Do Companies' Profits*

Some companies and restaurants have continued to raise prices on consumers even after their own inflation-related costs have been covered.



- Retail food inflation in 2021–23 has many candidate causes; the public debate settled on **greedflation**

Why look at minimum wages?

- Labor is **14%** of grocery operating costs, and **25%** of the sector's workforce earns the minimum wage

Complete pass-through of the direct cost implies an elasticity of $0.14 \times 0.25 = 0.035$.
Anything larger is over-shifting.

- **204 implementations** from 141 bills, 2011–2021: treatment is staggered, repeated, and continuous in size
- Pass-through heterogeneity is a direct test of the greedflation story: if large chains raise prices most, the narrative holds

This paper

- Do minimum wage increases raise grocery prices more than they raise costs?
Yes. A 10% increase raises the store price index 1.5% or four times the cost-share benchmark.
- Do large retailers pass through more?
No. A 10% larger market share lowers the pass-through rate 0.3 p.p. Large chains absorb costs better.
- Who ends up paying?
Poorer markets. A 10% lower county income raises pass-through 4.4 p.p.

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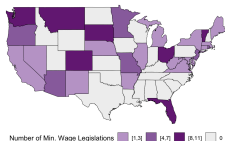
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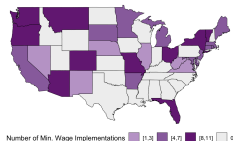
What this adds

- **Cost pass-through.** A long literature on taxes, exchange rates and input prices
Besley and Rosen (1998); Gopinath et al. (2010); Richards and Hamilton (2015); Conlon and Rao (2020).
- **Minimum wages and retail prices.** Extends Leung (2021) and Renkin et al. (2022) through the 2021–23 inflation episode
- **Method.** Stacked difference-in-differences for a treatment that is staggered *and* continuous
Wing, Freedman and Hollingsworth (2024).
- **Heterogeneity.** Double machine learning recovers a pass-through rate for every retailer, not an average
Chernozhukov et al. (2018).

Data: Chain-level scanner prices and 204 wage changes



legislations



implementations



price index and minimum wage

- Nielsen Kilts RMS, ~35,000 stores → chain-month price indices in 25 markets, 2011–2021
- Minimum wage series from Vaghul and Zipperer (2022); demographics from Kilts HMS and the Census

► summary statistics

► data detail

The classic two-way fixed effects is not ideal here

- Minimum wages are adopted repeatedly, at different times, in different sizes, so TWFE compares newly treated units against **already-treated** ones

Goodman-Bacon (2021).

► TWFE Bias

- Stacked DiD.** One sub-experiment a per wage change: treated counties plus their clean controls, over the window $e = t - a \in [-\kappa_{\text{pre}}, \kappa_{\text{post}}]$

$$\text{Stacked:} \quad \ln p_{ijt}^a = \alpha_{ij}^a + \beta_t^a + \gamma \ln mw_{jt} + \phi X_{jt} + \varepsilon_{ijt}^a, \quad (i, j, t) \in \mathcal{S}_a$$

i chain, j county, t month, a wage-change event, $\mathcal{S}_a$ estimation sample.

- Double ML.** Partial X out of both $\ln p$ and $\ln mw$ by lasso on split samples, then fit the residuals with a causal forest to recover $\hat{\gamma}(X)$. One pass-through rate per retailer-market

Chernozhukov et al. (2018).

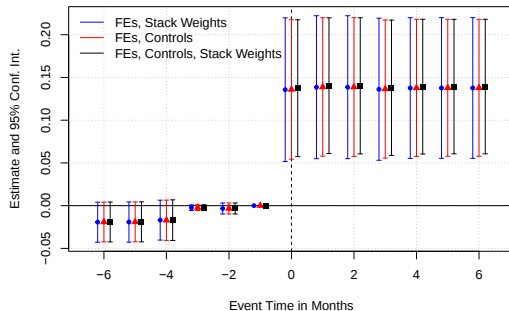
► DML detail

A 10% wage increase raises prices 1.5%

<i>Dependent variable: log price index</i>	(1)	(2)	(3)
Log minimum wage	0.147*** (0.043)	0.148*** (0.042)	0.149*** (0.041)
Stack weights	Yes	No	Yes
Controls	No	Yes	Yes
Sub-experiment $\times$ retailer FEs	Yes	Yes	Yes
Observations	47,528	47,528	47,528

- Complete pass-through of the direct labor cost would be **0.035**. The estimate is four times larger
- *** : $p < 0.01$ Standard errors in parenthesis clustered by county

Event study analysis on price effects of MW implementations



Stacked event study, minimum wage implementations, 2011–2021.

- Flat pre-trends, and the price response persists over roughly 6 months

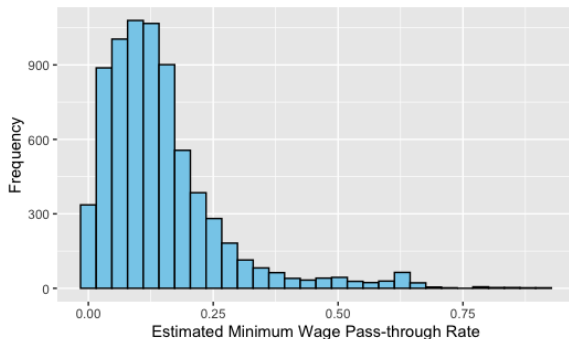
Three estimators all imply over-shifting

Estimator	Elasticity	Price response to a 10% wage increase
Two-way fixed effects	0.095	0.9%
Stacked DiD	0.149	1.5%
Double ML	0.100	1.0%
<i>Complete cost pass-through</i>	<i>0.035</i>	<i>0.35%</i>

- Over-shifting is consistent across all estimation methods
- Prices rise by more than the direct wage bill can explain

► TWFE estimates

But the average hides most of the story



Distribution of retailer-specific pass-through elasticities from DML.

- Pass-through varies widely across retailers and markets, so we ask **who over-shifts**

Larger retailers pass through *less*

<i>Dependent variable: retailer pass-through rate</i>	(1)	(2)	(3)
Log retailer market share	-0.0347*** (0.0067)	-0.0324** (0.0145)	-0.0322** (0.0152)
Log county median household income	-0.4571*** (0.1553)	-0.3873*** (0.0976)	-0.4365*** (0.1024)
Retailer FEs / Month FEs	- / -	Yes / -	Yes / Yes
Observations	7,200	7,200	7,200

- A 10% larger market share lowers the pass-through rate by 0.3 p.p.
- **The greedflation prediction is the opposite sign.** Big chains absorb cost shocks better (at least in our data)

Poorer markets absorb the least

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Retailer FEs / Month FEs	- / -	Yes / -	Yes / Yes
Observations	7,200	7,200	7,200

- A 10% lower county income raises the pass-through rate by 4.4 p.p.
- Retailers shield premium markets and seemingly reprice where budgets are tighter

Takeaways

- Minimum wage increases **over-shift** into grocery prices: 1.5% for a 10% wage increase, against a 0.35% cost benchmark. Robust across three estimators.
- Concentration (greater market share) reduces pass-through rather than amplifying it. This **contradicts greedflation** argument.
- The cost hits hardest in low-income counties, where the minimum wage was supposed to help.
- **Implication:** a wage floor might not be effective on its own. Pairing it with SNAP or similar transfers can better protect the intended beneficiaries.

Backup: summary statistics

Variable	Unit/month	Obs.	Mean	St. Dev.	Min	Max
Retail volume	Units ('000)	39,098	3,847	5,505	1.2	41,620
Retail expenditure	\$ ('000)	39,098	13,021	20,589	3.8	216,637
Retail variety	# ('000)	39,098	12.6	7.7	0.6	38.3
Retail price index	\$/unit	39,098	3.6	1.6	1.3	18.8
Market expenditure	\$ ('000)	39,098	62,910	86,595	57	475,869
Median income	\$ ('000)	39,098	67.5	6.9	49.3	85.9
Minimum wage	\$/hr.	39,098	9.0	1.7	7.3	14.0
Legislation–implementation lag	Months	39,098	12	3.5	1	24
Number of competitors	#	39,098	6.9	2.8	1	12

Retail data: Kilts RMS (chain level). Demographics: Kilts HMS and US Census. Minimum wage: Vaghul and Zipperer (2022).

Backup: data construction

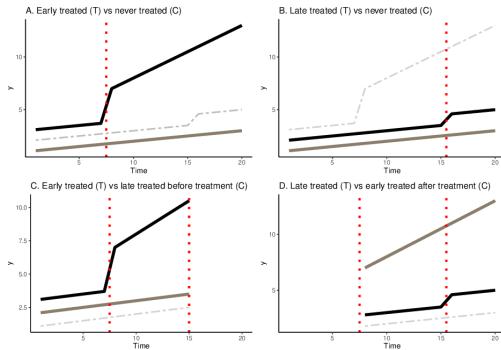
- **Prices.** Chain-month price, sales and quantity indices built to approximate the BLS CPI
Following Beraja et al. (2019) and Leung (2021).
- **Store attributes.** SKUs sold, share of items on display, share featured, same-chain store counts
- **Market.** Defined as the county; final sample is 25 counties with at least one continuously observed chain, 2011–2021
- **Minimum wages.** Legislation and implementation dates from government and media sources: 141 bills, 204 implementations

Backup: TWFE estimates

<i>Dependent variable:</i> log price index	(1)	(2)	(3)
Log minimum wage	0.1824*** (0.0373)	0.0976** (0.0450)	0.0946** (0.0439)
Retailer and time FEs, covariates	Yes	Yes	Yes
Retailer-specific linear trends		Yes	Yes
Retailer-specific quadratic trends			Yes
R^2	0.9664	0.9826	0.9732

Any estimate above $0.035 = 0.14 \times 0.25$ implies over-shifting. Even the specification with the smallest estimate implies it by a factor of three.

Backup: why TWFE is biased here



Goodman-Bacon (2021): the forbidden comparison uses already-treated units as controls, biasing estimates downward when treatment effects break trends.

Backup: double ML

Let $D = \log$ minimum wage, $Y = \log$ retail price index, $X = \text{retailer and county covariates}$:

$$Y = \alpha D + f(X) + U, \quad \mathbb{E}[U \mid X, D] = 0; \quad D = m(X) + V, \quad \mathbb{E}[V \mid X] = 0.$$

- Predict $\mathbb{E}[Y \mid X]$ and $\mathbb{E}[D \mid X]$ by lasso
- Residualize: $\hat{U} = Y - \widehat{\mathbb{E}[Y \mid X]}$, $\hat{V} = D - \widehat{\mathbb{E}[D \mid X]}$
- Fit $\hat{U}$ on $\hat{V}$ with a causal forest, yielding $\hat{\alpha}(X)$ — a pass-through rate per retailer, which is then projected on market share and county income