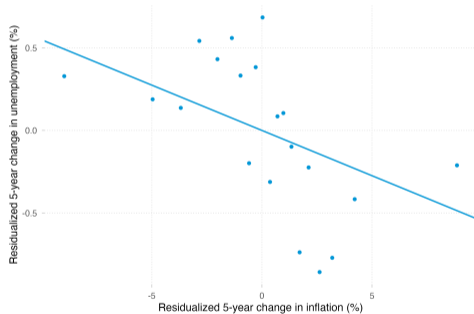


Grease or Grit? Optimal Inflation with Labor-Market Conflict

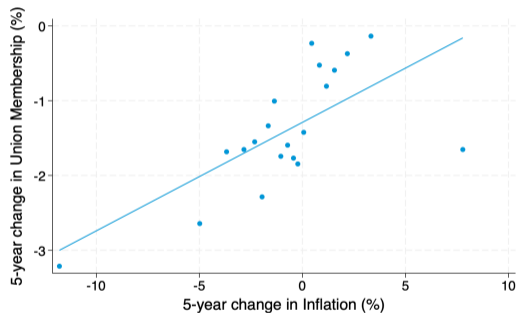
Chen Gao Joao Guerreiro Jonathon Hazell Chen Lian Christian Patterson

July 2026



Strong negative association between inflation and unemployment in data

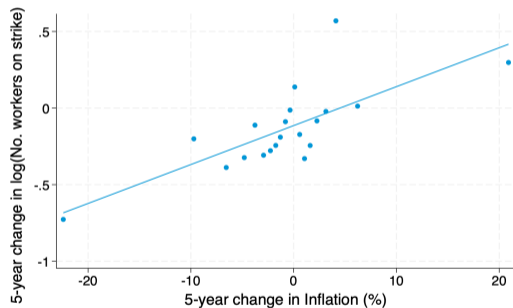
Tobin view: inflation greases the labor market by eroding real wages trapped above productivity and saving matches.



Strong positive association between inflation and labor market conflict

1. Unionization rates

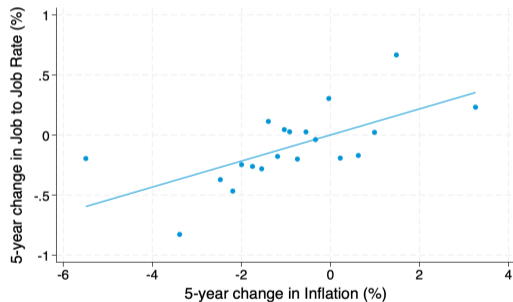
Conflict view: the same real-wage erosion pushes more workers into costly conflict.



Strong positive association between inflation and labor market conflict

1. Unionization rates
2. Workers on strike

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Strong positive association between inflation and labor market conflict

1. Unionization rates
2. Workers on strike
3. Workers in costly job search and switching employers

Conflict view: the same real-wage erosion pushes more workers into costly conflict.

The labor market consequences of inflation:

+ Grease

Inherited nominal wages can sit too high relative to productivity.

Inflation erodes real wages and saves efficient matches.

Positive: unemployment falls, so welfare rises.

[Tobin (1972), Akerlof et al. (1996), Card and Hyslop (1997)] (2024)]

- Grit

Nominal wage growth is not automatic.

Workers must sometimes renegotiate, search, or switch jobs to restore wages.

Negative: conflict costs rise, so welfare falls.

[Guerreiro et al. (2026), Afrouzi et al. (2026), Pilossoph et al.

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This paper: What is the optimal rate of long-run inflation?
when wage erosion \Rightarrow preserves matches + provokes conflict.

1. **Build a labor-market model of Tobin grease and conflict grit**
2. **Decompose the welfare effect of inflation**
3. **Quantify the long-run optimum:**
 - Model calibrated to micro data on wages and employment
 - Labor-market forces imply a positive optimum
 - Conflict costs lower the optimum by about 10 pp

Model

Search and matching in the labor market

- Unemployed search for vacancies
- Employers post job openings

Worker productivity – evolves stochastically over time

Nash bargaining on nominal wages

Conflict: workers and firms may pay cost to renegotiate wages.

Endogenous separations: quits and firing/layoffs

Time is discrete $t = 0, 1, 2, \dots$

Workers

Firms

Time is discrete $t = 0, 1, 2, \dots$

Workers

Unit mass of workers

$$\mathbb{E}_t \left[\sum_{s=0}^{\infty} \beta^s (c_{t+s} - \kappa_{w,t} \mathcal{I}_{w,t+s}) \right]$$

If employed: $c_t = \exp\{w_t\}$

If unemployed: $c_t = \exp\{\bar{b}\}$

Firms

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If vacancy open: $\pi_t = -k_v$

If vacancy filled: $\pi_t = \exp\{z_t\} - \exp\{w_t\}$

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➤ For quantitative purposes: $z' = \rho_z z + z^+(\iota - \zeta) + \sigma \varepsilon$, $\varepsilon \sim N(0, 1)$ and $\iota \sim \text{Bernoulli}(\zeta)$

Workers and firms

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Matching function $M(u, v) = \Psi u^\eta v^{1-\eta}$. Job finding rate $f(\theta) = \Psi \theta^{1-\eta}$. Job filling rate $q(\theta) = \Psi \theta^{-\eta}$

Free entry: Exp. value of vacancy = 0

Search and wage determination

Incumbent Matches: state (z, w_-)

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Default wage: $w^d = w_- - (1 - \gamma)\pi$

- inherited default real wage

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Firing and quit decisions:

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- Worker can quit if w^d too low rel. z
- Agree to separate if z is too low

Conflict decisions: Worker can pay $\kappa_{w,t}$ (Firm can pay $\kappa_{f,t}$) to renegotiate wage

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Today: $\kappa_{f,t} \rightarrow \infty$ (no wage cuts)

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Home production \bar{b}

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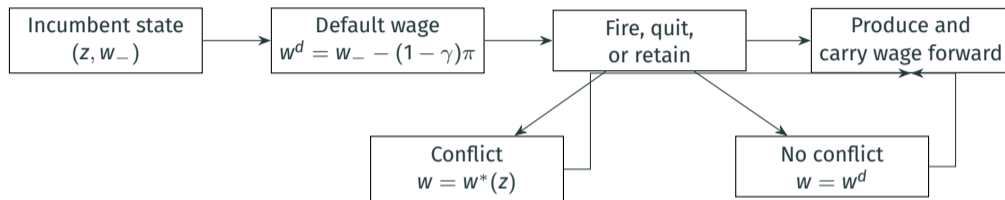
Search for firms

New Hires: state z

Match with probability $f(\theta)$

New hire wage: $w^*(z)$

Model – Grease and Grit Margins



+ Grease

- lower real wage pressure
- fewer inefficient fires
- more job creation

- Grit

- more costly wage conflict
- some workers quit before bargaining
- more low-surplus matches retained

Output, unemployment, and conflict

Define: $\phi(z, w_-) \sim$ Dist. incumbent post exog. s , and $\psi(z) \sim$ Dist. unemployed.

Output, unemployment, and conflict

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Flows accounting:

$$\text{New Hires} = s(1 - u) + \text{Fires} + \text{Quits}$$

$$\text{New Hires} = f(\theta) \int_{\underline{z}}^{\infty} \psi(dz)$$

$$\text{Fires} \equiv \int \int_{\bar{w}(z) + (1-\gamma)\pi}^{\infty} \phi(dz, dw_-)$$

$$\text{Quits} \equiv \int \int_{-\infty}^{\underline{w}^{\text{quit}}(z) + (1-\gamma)\pi} \phi(dz, dw_-)$$

$$\text{Output: } Y = \int \int_{\underline{w}^{\text{quit}}(z) + (1-\gamma)\pi}^{\bar{w}(z) + (1-\gamma)\pi} \exp\{z\} \phi(dz, dw_-) + f(\theta) \int_{\underline{z}}^{\infty} \exp\{z\} \psi(dz)$$

$$\text{Conflict: } \text{Conflict}_i = \lambda_i \int \int_{-\infty}^{\underline{w}^i(z) + (1-\gamma)\pi} \phi(dz, dw_-)$$

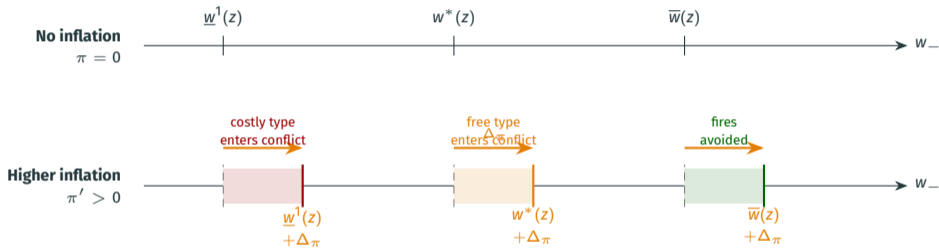
[Only worker]

$$\text{Conflict}_0: \text{Conflict is free } (\kappa_{w,t} = 0)$$

$$\text{Conflict}_1: \text{Conflict is costly } (\kappa_{w,t} > 0)$$

Wage Regions

For fixed z , raising inflation from 0 to $\pi' > 0$ shifts each cutoff in inherited-wage space by $\Delta\pi \equiv (1 - \gamma)\pi'$.



- **More conflict:** inherited wages near the lower cutoffs are pushed into bargaining regions.
- **More grease:** inherited wages near $\bar{w}(z)$ are no longer high enough to trigger firing.

Welfare Consequences of Inflation

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Goal: What is the optimal level of long-run inflation?

Study the welfare consequences of changing **steady-state inflation**

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Welfare: “Utilitarian” \Leftrightarrow Total surplus workers+firms

[With linear utility \Leftrightarrow]

➤ Also measure of economic efficiency

[Kaldor (1939), Hicks (1939), Dávila-Schaab (2025), Baqaee-Burstein (2025)]

➤ Redistribution does not matter for this planner

[Guerreiro-Baqaee-Burstein (2026)]

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Why does it matter?

➤ Inflation erodes wages \rightarrow affects employment and conflict

➤ but, also redistributes surplus between workers and firms

➤ Linear utility/Total surplus approach nets out the redistribution effect

Welfare Consequences of Inflation

Proposition 1

The marginal impact of inflation on welfare is given by

$$\frac{d\mathcal{W}}{d\pi} = \bar{S} \cdot \frac{dE}{d\pi} - k_v \frac{dv}{d\pi} + E \cdot \frac{d\bar{S}}{d\pi} - \int_0^{\bar{\chi}} \chi \frac{d \text{Fires}_\chi}{d\pi} d\chi - \sum_i \kappa_{w,i} \frac{d\text{Conflict}_i}{d\pi}$$

The welfare consequences of inflation can be decomposed into:

- Tobin/Employment Effects:** $\bar{S} \cdot \frac{dE}{d\pi} - k_v \frac{dv}{d\pi} + E \cdot \frac{d\bar{S}}{d\pi}$
 - Employment rises, so welfare rises, firms post fewer vacancies
 - Composition effect $E \cdot \frac{d\bar{S}}{d\pi}$
- Firing costs:** $\int_0^{\bar{\chi}} \chi \frac{d \text{Fires}_\chi}{d\pi} d\chi$
 - Firing costs fall, so welfare rises
- Conflict Costs:** $\sum_i \kappa_{w,i} \frac{d\text{Conflict}_i}{d\pi}$
 - Costly conflict rises, so welfare falls

Inflation is not only a wage-adjustment device.

- **Grease:** lower real default wages can preserve matches and stimulate vacancy creation.
- **Grit:** lower real default wages also push workers into costly conflict and can induce quits.
- The optimal inflation rate trades off these margins in the stationary distribution of matches.

However, these margins interact with each other as well:

- Firing risk makes workers more reluctant to conflict
- Conflict aversion dampens wage growth, which changes the size of the grease effect

Calibration

Standard externally calibrated parameters

Parameter	Role	Value	Source
β	Discount factor	0.995	6% annual rate
π_{ss}	Steady-state inflation	0.17%	2% per year
γ	Default-wage indexation	0	Guerreiro–Hazell–Lian–Patterson (2025)
η	Matching elasticity	0.7	Shimer (2005)
α	Nash bargaining weight	0.7	Hosios $\alpha = \eta$
Ψ	Match Efficiency	0.5	Normalization
$f(\theta)$	Job-finding rate	0.4	US data

Internally Calibrated Parameters

Remaining parameters are calibrated to match:

$[\rho, \sigma, \zeta, z^+, \lambda, \kappa_w, s, k_v, b, \theta, \bar{x}]$

1. Unemployment rate of 5.5%
2. Flow of unemployment is 50% of average wage
3. Avg. match duration 30 months
4. Exp. cost of filling a job is 10% of quarterly wages

[Silva-Toledo, 2009]

5. Wage dynamics

[Grigsby, Hurst, Yildirmaz, 2021]

- GHY (2021): (1) frequency of wage changes, and (2) average, (3) st. dev., (4) skewness, (5) kurtosis of **distribution conditional** $\Delta w > 0$; persistence of wages as untargeted check

6. **Firing**: 1 st. dev. drop in z triggers firing in 1.8% of matches

[Ilut-Kehrig-Schneider, 2018]

Parameters			Matched moments		
Param.	Description	Value	Moment	Model	Data
s	Exog. separation	0.03	Avg. duration match [Shimer, 2005]	30	30
κ_V	Vacancy cost	0.12	Exp. cost to fill job / qtr. wage [Silva-Toledo, 2009]	11.5%	10%
θ	Tightness	1.57	Unemployment rate	5.5%	5.5%
ρ	Persistence z	0.985	Persistence of wages	0.49–0.74	0.78
σ	Standard deviation z	0.016	S.d. wage raise	6.84 p.p.	7.00 p.p.
z^+	Jump size z	0.29	Skewness wage raise	2.46	2.20
ζ	Jump rate z	0.004	Kurtosis wage raise	8.9	10.5
κ_W	Conflict cost	0.048	Avg. wage raise	5.99%	6.30%
λ	Free-conflict prob.	17.8%	Frequency Ann. Wage Change	55.9%	63.9%
$\bar{\chi}$	Firing-cost UB	48.1	Firing increase [Ilut et al., 2018]	1.8%	1.8%
b	Home-prod. level	−0.719	Replacement rate	50%	50%

Persistence: within-job AR(1) of annual wages; 0.49 on ≥ 2 -yr stayers (GHY sample), 0.74 on ≥ 6 -yr tenure (least Nickell-biased).

Wage Dynamics Fit (Untargeted)



Model provides good accounting of the entire distribution of wage changes

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Conflict costs are key! Both for:

1. Workers
2. Firms

Wage Dynamics Fit (Untargeted)



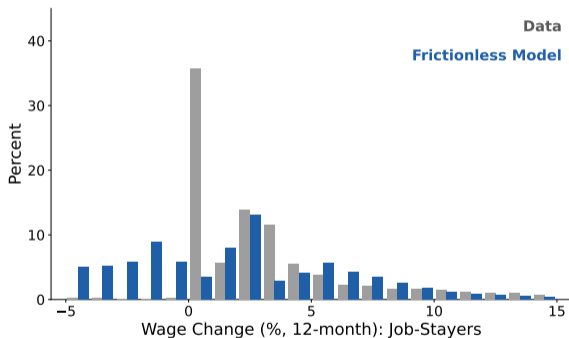
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What would happen if $\kappa_W = \kappa_f = 0$?

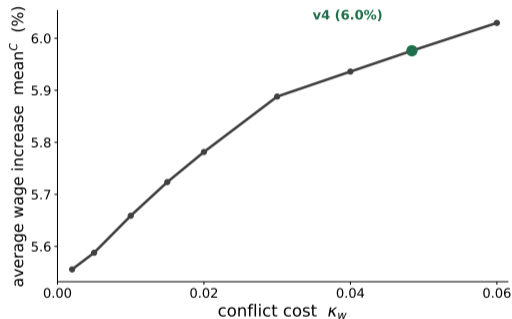
Wage Dynamics Without Conflict Costs



Without conflict costs, model produces:

1. Too many small changes – very high frequency of wage changes
2. Few large changes
3. Counterfactual large number of negative wage changes – not observed in data

Worker Conflict Costs and the Average Wage Growth



GHY (2021) – Average wage growth conditional on $\Delta w > 0$ is 6.3%

Worker conflict costs essential to generate **large average wage growth** (conditional on change)

Untargeted: the implied **conflict threshold** close to the estimated in Guerreiro–Hazell–Lian–Patterson (2025)

$$\mathbb{T} \in [1\%, 2\%]$$

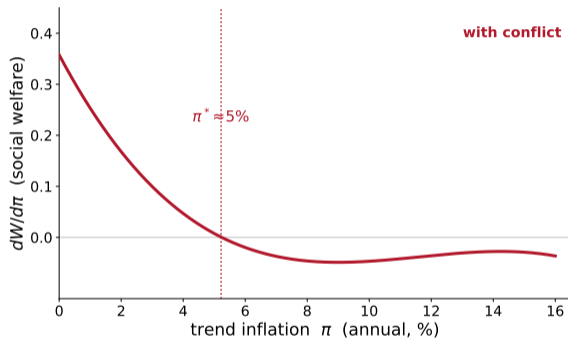
The Optimal Inflation Rate

$$\frac{dW}{d\pi} = \bar{S} \cdot \frac{dE}{d\pi} - k_v \frac{dv}{d\pi} + E \cdot \frac{d\bar{S}}{d\pi} - \int_0^{\bar{\chi}} \chi \frac{d \text{Fires}_\chi}{d\pi} d\chi - \sum_i \kappa_{W,i} \frac{d \text{Conflict}_i}{d\pi}$$

The optimal inflation rate trades off the margins:

1. **Employment/Tobin Effects**
2. **Firing Effects**
3. **Conflict Effects**

The Optimal Inflation Rate



The optimal inflation rate sets

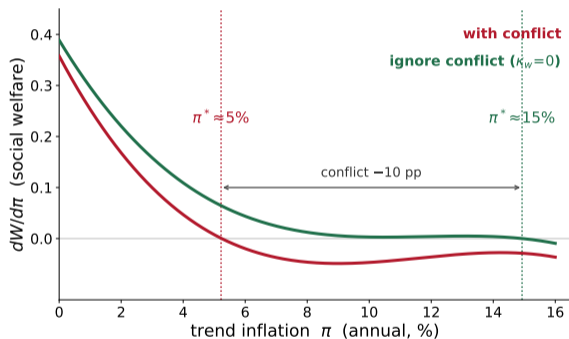
$$dW/d\pi = 0$$

$$\pi^* = 5\% \text{ a year}$$

The Tobin force is strong: many fires are inefficient

- But conflict costs are also strong: workers are conflict averse
- These costs limit very high inflation rates

The Optimal Inflation Rate



What would be the optimal inflation rate if conflict costs were zero?

With $\kappa_W = 0$, the labor-market optimum is much larger

$\pi^* = 15\%$ a year

Conclusion: conflict costs lower optimal inflation by about 10 pp.

Table 1: Welfare decomposition

Effect	Inflation increase	
	5% Optimal	15% Tobin
Total welfare	+0.22%	-0.13%
Tobin effect	+0.28%	+0.38%
Firing relief	+0.14%	+0.18%
Conflict cost	-0.20%	-0.69%

Why is the optimal inflation rate so much lower than the Tobin optimum?

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- Small increase in inflation has large positive effect on employment and firing

But, those effects become smaller as inflation rises

Instead, conflict costs keep rising with inflation

As inflation becomes moderate, losses from conflict outweigh gains from employment and firing

Conclusion

Inflation greases labor markets, but it also creates labor-market grit.

1. **Question:** revisit the Tobin argument with several labor-market benefits and costs of inflation.
2. **Tobin force:** lower real default wages preserve matches and raise employment.
3. **Conflict force:** the same erosion pushes workers into costly renegotiation and quits.
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Scope and next step: so far, we study only labor-market impacts. Future work = add standard New Keynesian inflation costs: price dispersion and related monetary distortions.

Appendix

	(1)	(2)	(3)	(4)
$\Delta_5 \pi_{it}$	-0.0976***	-0.0982***	-0.0443**	-0.0548**
Std. error	(0.0150)	(0.0159)	(0.0184)	(0.0209)
<i>p</i> -value	0.0000	0.0000	0.0198	0.0117
Observations	847	836	847	836
Countries	66	66	66	66
Years	1975–2024	1975–2024	1975–2024	1975–2024
Country FE	No	Yes	No	Yes
Year FE	No	No	Yes	Yes

	5-Year Difference			2-Year Difference		
	Job-to-Job (1)	Union (2)	Strikes (3)	Job-to-Job (4)	Union (5)	Strikes (6)
$\Delta_{t,t-5}$ Inflation	10.017*** (3.435)	11.150** (5.187)	2.361*** (0.478)			
$\Delta_{t,t-2}$ Inflation				3.486 (2.496)	7.468** (3.093)	0.929** (0.400)
Observations	282	1,308	1,962	381	1,419	2,196