Increase in Turbulence and Market Power

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Motivation

Over the last decades, the U.S. economy was characterized by:

- Increase in **market power**: increase in profit margins, price markups and market concentration [DEU (QJE 2020), Autor et al. (QJE 2020)]
- Increase in **turbulence**: a decline in the persistence of firms' idiosyncratic productivity [Bloom et al. (ECMA 2018), Dong et al. (2022)]

Sectoral Heterogeneity

However, these trends are **heterogeneity** across sectors, with a clear positive correlation between them:

- Sectors characterized by a sharp increase in turbulence $\rightarrow$ strong(er) increase in markups and concentration.
- Sectors with flat, or even decreasing, turbulence $\rightarrow$ weak or no increase in market power.

The goal of this paper is to build a **theoretical model** that can rationalize these findings.

Preview of Results

- In our framework, a sector-specific increase in turbulence can generate the heterogeneity in sectoral market power outcomes.
- **Mechanism**: an increase in turbulence shortens leadership duration and triggers reallocation *toward high-markup firms*.
- Empirically, we confirm that high-turbulence sectors **only** are characterized by this reallocation.

Data

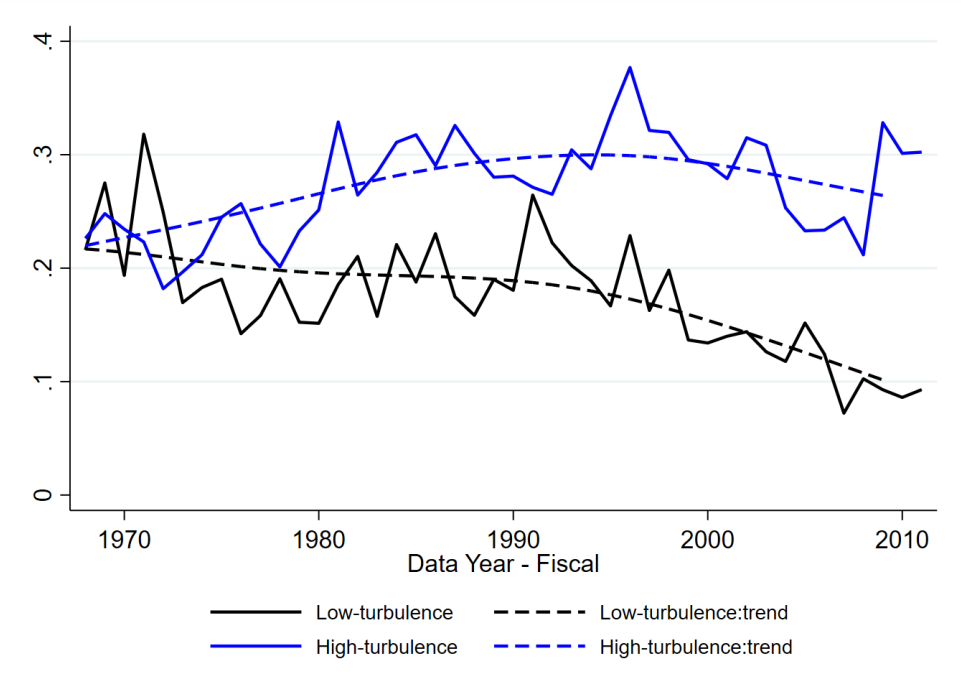
→ Compustat dataset, NAICS-3 sectors (*Appendix: CompNet*).

We measure **sectoral turbulence** as 1− the 5-year Spearman's rank correlation of firm-level productivity.

- We compute sectoral turbulence for each pair year-sector, using a rolling window.
- We split the economy in two: low-turbulence sectors, i.e. below median turbulence growth, and high-turbulence sectors.

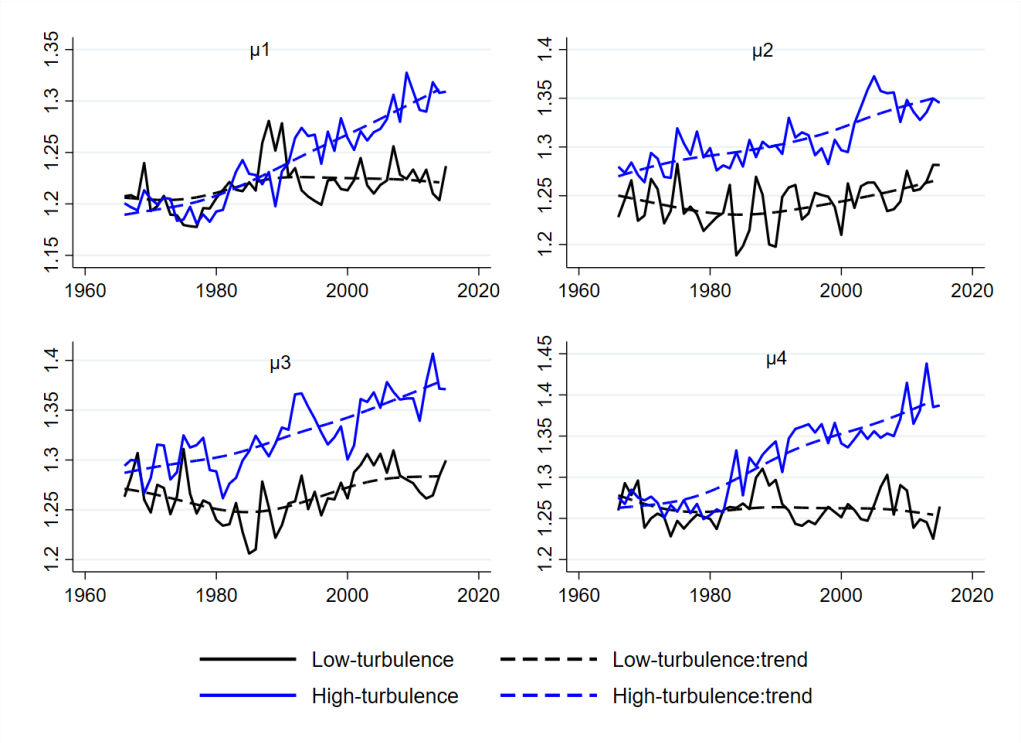
Heterogeneous Increase in Turbulence

Figure: Turbulence trends, high vs. low-turbulence sectors



Heterogeneous Increase in Markups

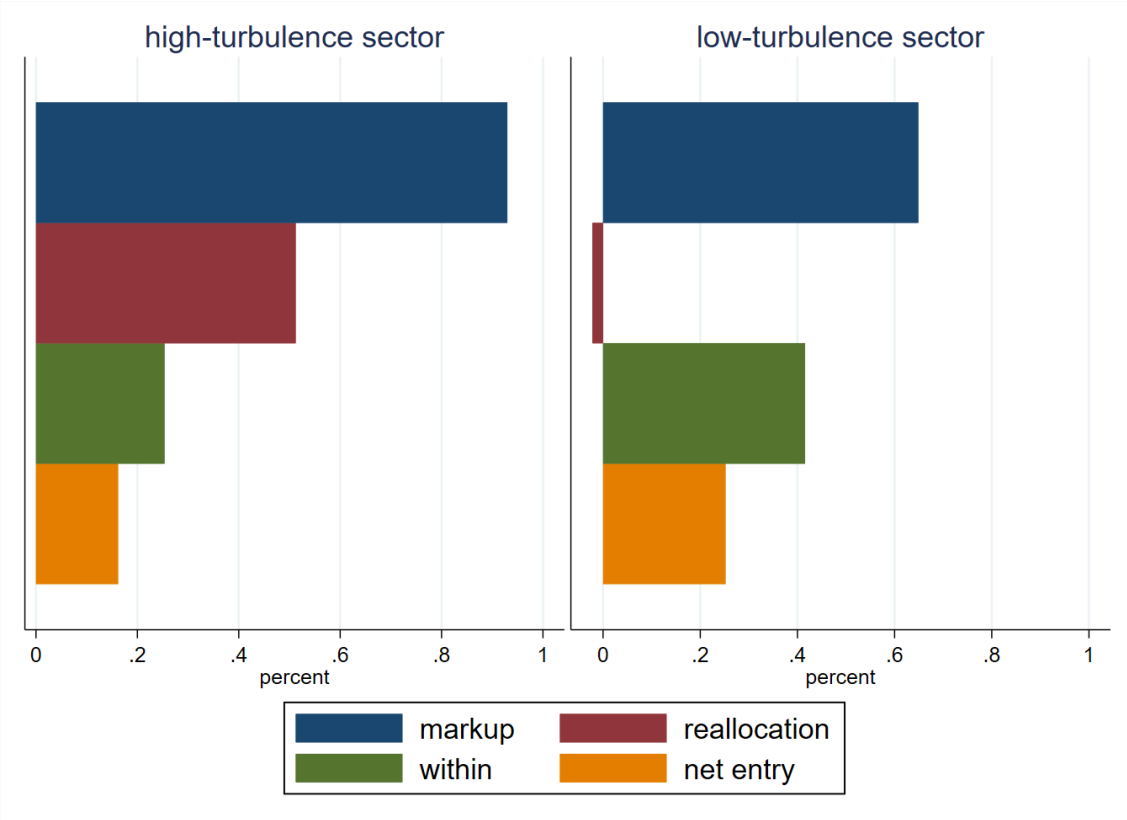
Figure: Cost-weighted **average markups**, 4 alternative measures, high vs. low turbulence sectors



◂ Table

Increase in Markups - Decomposition

Figure: **Decomposition** of the increase in weighted-average markups, high vs. low-turbulence sectors



Theoretical Framework

Our **dynamic** framework entails:

1. A countable number of heterogeneous firms
2. Oligopolistic competition
3. Idiosyncratic exit, entry and productivity shocks

- Given this competitive structure, we calibrate the model to proxy two alternative sectors, which differ in terms of **turbulence**.

Theoretical Framework - Competition

- Firms compete under oligopolistic competition á la Cournot.

From the F.O.C. of a type $x(i)$ firm, the real price $\rho_t(i)$ is:

$$\rho_t(i) = \mu_t(i) \frac{w_t}{x(i)}$$

where w_t is the real wage. The **idiosyncratic markup** $\mu_t(i)$ is:

$$\mu_t(i) = \left(\frac{\theta}{\theta - 1} \right) \left(\frac{1}{1 - \omega_t(i)} \right)$$

where $\omega_t(i)$ is the type-i market share.

Theoretical Framework - Shocks

- Productivity shocks are disciplined by a stationary Markov process.

The Markov process is crucial for our quantitative exercise, as its calibration characterizes the two sectors:

$\rightarrow$ (changes in) its probabilities are used to capture sectoral **turbulence (shocks)**.

METHODOLOGY

We use our framework to proxy the evolution over time of representative high and low-turbulence sectors.

1. We calibrate a **common** initial steady state, which replicates key features of the U.S. economy before 1980.
2. We shock the equilibrium by permanently changing **sector-specific primitives** to characterize the two scenarios.
3. We simulate the endogenous transition to the new equilibria.

Baseline Experiment

We identify the **two** representative sectors as follows:

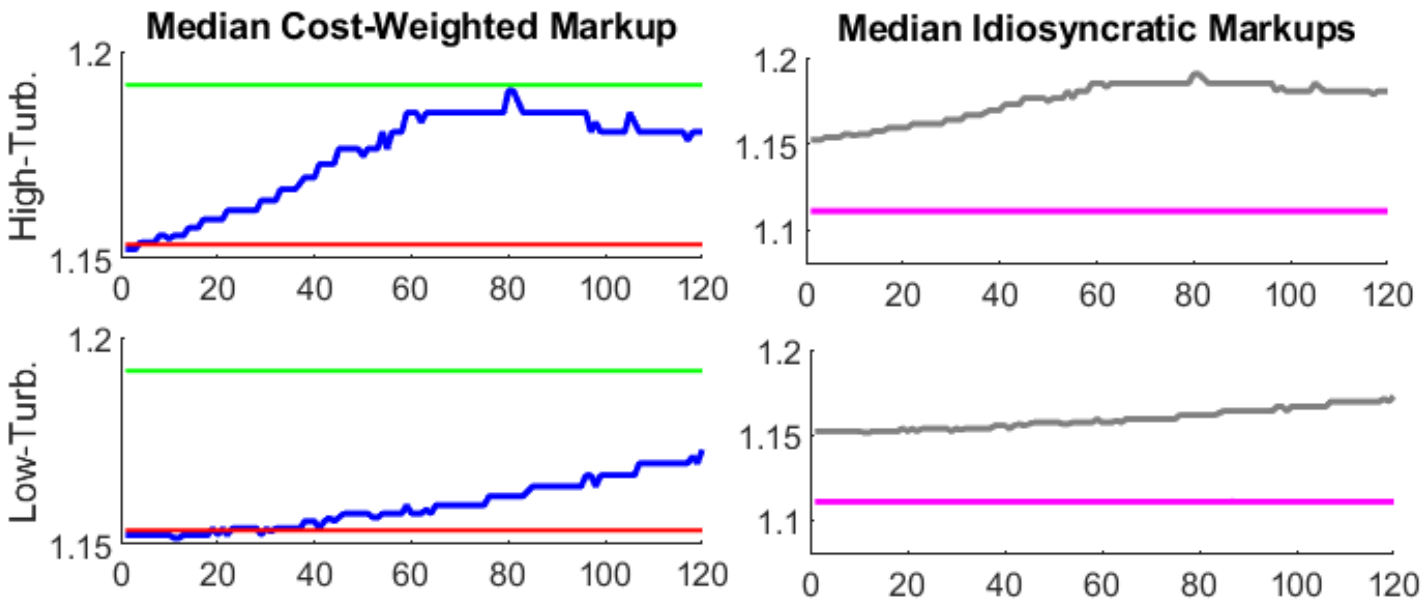
1. A sector characterized by an increase in entry costs only, proxy for a low-turbulence industry.

2. A sector characterized by the **same** increase in entry costs *and* by a **sector-specific** increase in turbulence, proxy for high-turbulence.

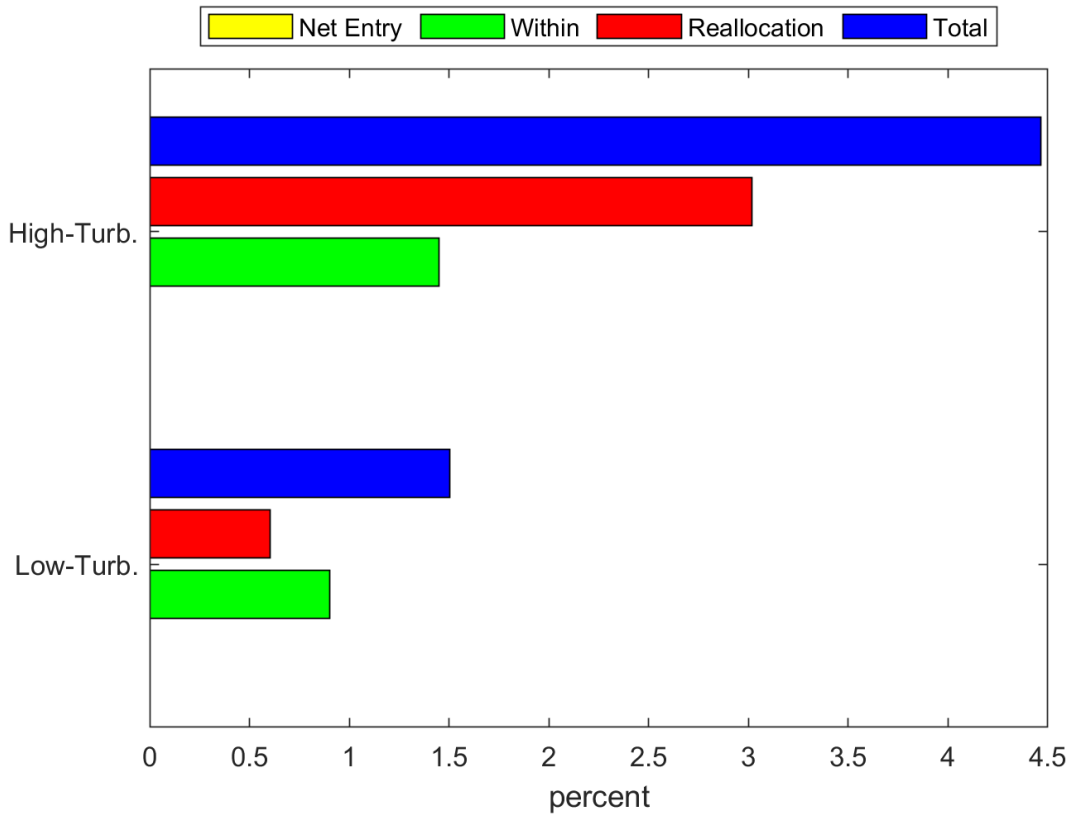
- We add robustness checks with shocks occurring in steps, further sector-specific primitives, heterogeneous entry costs...

Simulation - Benchmark

Figure: High vs. low-turbulence sectors, dynamic transition for 120 periods, median over 100 simulations. Quantities represented in levels.



Simulation - Markup Decomposition



◂ Robustness

Table: **Model vs. data: high and low-turbulence**

	Over-time					
	High-turbulence		Low-turbulence		Ratio	
	Data	Model	Data	Model	Data	Model
$\Delta\mu_T^1$	6.13	3.50	5.56	2.60	1.10	1.35
$\Delta\mu_T^2$	8.02	3.50	5.54	2.60	1.48	1.35
Δd_T	23.98	21.06	16.19	17.03	1.48	1.24
	Cross-section					
	High-turbulence		Low-turbulence		Ratio	
	Data	Model	Data	Model	Data	Model
$\sigma_{\Delta\mu_T^1}$	0.554	0.016	0.246	0.007	2.252	2.178
$\sigma_{\Delta\mu_T^2}$	0.404	0.016	0.283	0.007	1.425	2.178
$\sigma_{\Delta d_T}$	2.094	0.298	1.461	0.248	1.431	1.200

Conclusions

- Empirically, high-turbulence sectors present a stronger increase in markups and concentration.
- When paired to an increase in entry costs, a **sector-specific** increase in turbulence generates the sectoral heterogeneity in market power dynamics.
- The **reallocation** toward high-markup firms explains the observed trends, both in the data and the model.

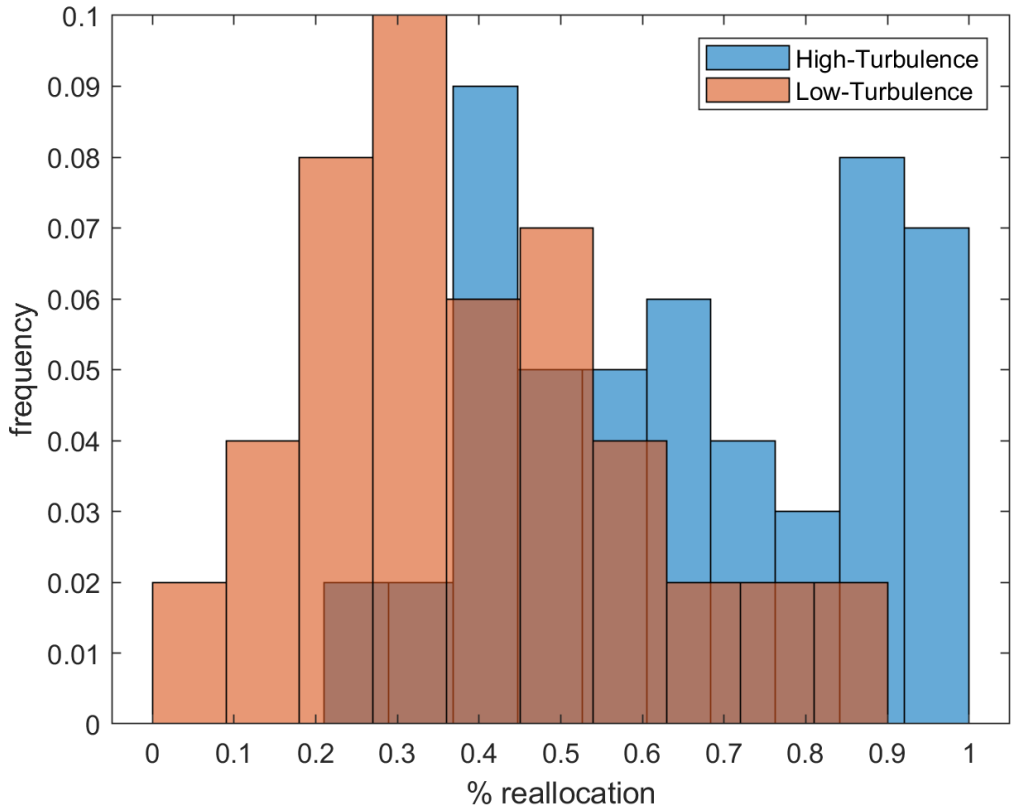
Turbulence and Markups

$\mu_{it} = \alpha_i + \beta\tau_{it} + \gamma_t + \epsilon_{it}$		
Markup	Cost-weighted	Rev-weighted
μ^1	0.019^{**}	0.034^{**}
	(0.008)	(0.012)
μ^2	0.023^{***}	0.037^{***}
	(0.010)	(0.012)
μ^3	0.38^{***}	0.052^{***}
	(0.008)	(0.012)
μ^4	0.25^{***}	0.036^{***}
	(0.007)	(0.009)
μ^5	0.037^{***}	0.052^{***}
	(0.003)	(0.012)
N. obs.	4309	4309

Notes: This table reports the correlation coefficients from the regressions above. μ_{it} and τ_{it} represent, respectively, the markup and turbulence in sector i and year t, while α_i and γ_t are sector and time fixed effects.

◂ Go Back

Simulation - Reallocation



Go Back