

Productivity and Misallocation in General Equilibrium

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Markups in the Economy

- Trends in the US during the last 20~ years:
 - Rising profits.
 - Declining labor's share of income.
 - Rising industrial concentration.
 - Rising aggregate markups.
- Implications for growth and efficiency?
- Part of a broader agenda of macro as explicitly aggregated micro.

Theoretical Framework

- Let A be physical resources/technology of economy.
- Let X be allocation of resources.
- Real GDP depends on both:

$$Y(A, X).$$

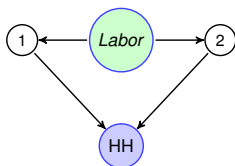
- Decompose growth into (see paper for formula):

$$d \log Y = \underbrace{\frac{\partial \log \mathcal{Y}}{\partial \log A} d \log A}_{\Delta \text{Technology}} + \underbrace{\frac{\partial \log \mathcal{Y}}{\partial X} d X}_{\Delta \text{Reallocation}}.$$

- For efficient/competitive economies:

$$\Delta \text{Reallocation} = 0.$$

Simple Example



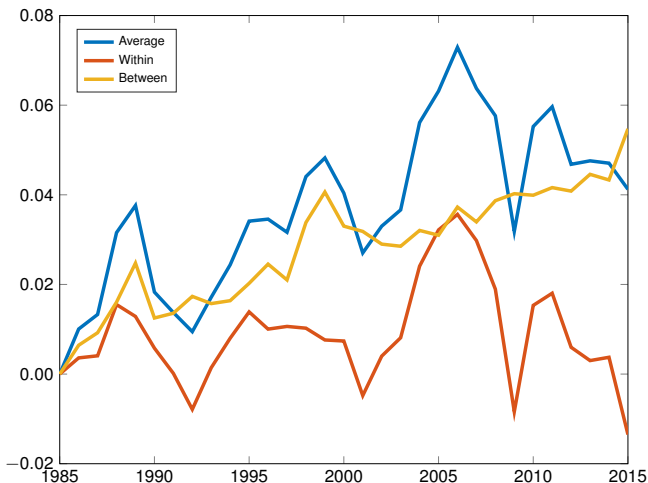
- Increase in prod. $d \log A_1 > 0$ with $Markup_1 > Markup_2$.
- Positive reallocation:

$$\frac{d \log Y}{dX} dX > 0.$$

- High-profit firm expands: improves aggregate productivity by reallocation.
- Loosely,

$$\Delta \text{Reallocation} \approx \Delta(\text{Average Markup}) - \text{Average}(\Delta \text{Markup}).$$

(Harmonic) Average Markups: Between and Within

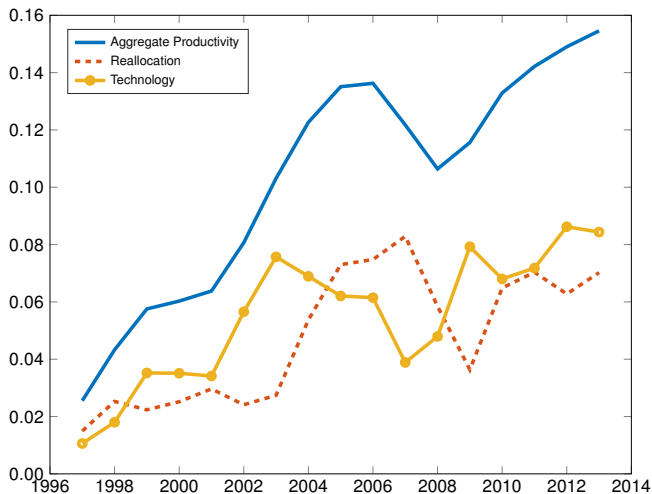


- Aggregate markup rising due to composition effect.
- Inefficiency of high markup: under-production.
- If high-markup firms expand, this boosts output.

Reallocation in the US economy

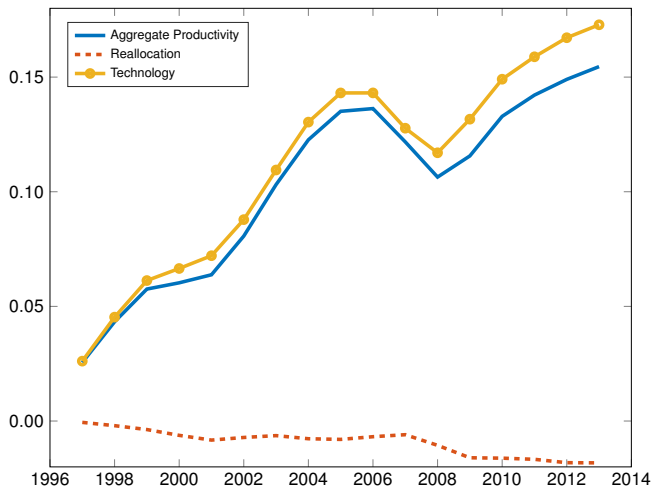
- Perform non-parametric decomposition without any assumptions about nature of technological change.
- Use annual IO tables from BEA from 1997-2015.
- Assign Compustat firms to industries.
- Use firm-level markups from three approaches: user cost, production function, and accounting profits.
- Aggregate-up from firm level.

Sources of Growth



- With user-cost-approach markup data.
- Similar with other approaches for markups.

Sources of Growth: Industry Level Instead of Firm Level



- Illustrates importance of disaggregation.

Distance to the Frontier

- Efficient economy:

$$Y^*(A) = \max_X Y(A, X).$$

- The gap between inefficient economy and efficient economy

$$\mathcal{L} = \log \frac{Y(A, X)}{Y(A, X^*)} \approx \frac{1}{2} dX' \frac{\partial^2 \log Y}{\partial X} dX.$$

- Sum of Harberger triangles in GE:

$$\mathcal{L} \approx - \sum_j \frac{1}{2} \frac{\text{sales}_j}{GDP} \Delta \log \mu_j \Delta \log y_j.$$

- Structural formula:

$$\mathcal{L} \approx \sum_j \frac{1}{2} \lambda_j \theta_j \text{Var}_{\Omega^{(j)}} \left(\sum_k \Psi_{(k)} \Delta \log \mu_k \right).$$

Application: Gains from Eliminating Markups in US

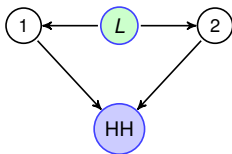
- Calibrate parametric model.
- Use IO table from BEA from 2015.
- Benchmark elasticities of substitution: across industries in consumption 0.9; between value-added and intermediates 0.5; across intermediates in production 0.01; between labor and capital 1; within industries 8.

Gains from Eliminating Markups in US

| | User Cost (UC) | Accounting (AP) | Production Function (PF) |
|------|----------------|-----------------|--------------------------|
| 2015 | 13% | 11% | 25% |
| 1997 | 3% | 5% | 17% |

- Gap has been getting larger between 1997 and 2014.
- Contrast with 0.1% estimate of Harberger (1954) triangles.

Simple Example



- Increase in prod. $d \log A_1 > 0$.
- Distance from frontier gets larger:

$$\Delta \mathcal{L} \approx \frac{1}{2} \theta d \text{Var}_\lambda (\log \text{Markup}) > 0.$$

- Frontier is moving away faster.

Gains from Eliminating Markups: Robustness

| | Benchmark | No Input-Output | Sectoral |
|----|-----------|-----------------|----------|
| UC | 13% | 5 % | 0.7% |
| AP | 11% | 5 % | 1% |
| PF | 24 % | 13% | 3% |

- Elasticities matter.
- Input-output structure matters.
- Disaggregation matters.

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- However, costs of inefficiency much larger over time.
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- Approach extended to include endogenous entry/innovation in Baqaee & Farhi (2020).