Wages, Productivity and Technology: What Have We Learned From Micro Evidence on Businesses

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New Economy and Productivity

- Much hype about role of new economy in surge in recent productivity statistics.
- Aggregate data beginning to show links between IT and productivity -- aggregate “Solow paradox” disappearing?
- Micro data provide a much richer and more complex picture of impact of adoption of new technologies on productivity.

Micro Data

- Business level data (primarily at Bureau of Census but some private sector databases) have become increasingly available.
- One Dominant finding: Productivity growth is a noisy and complex process with tremendous heterogeneity across businesses and learning and selection effects very important.

Noisy, complex growth…

- Reallocation effects dominate productivity growth.
- In Mfg, roughly 30 percent of productivity growth accounted for by less productive exiting plants being displaced by more productive entering plants over a 10 year horizon.
- In Retail Trade, 100 percent due to net entry!

Heterogeneity

- Differential Rates of Adoption of New Technologies (broadly defined)...
- Differential Rates of Success of Adoption of New Technologies...
- Paper today is about connection between computers, productivity and wages...focus is not on growth directly but dispersion...another important area for which micro data on businesses are potentially valuable...but also related to growth (e.g., differential adoption)

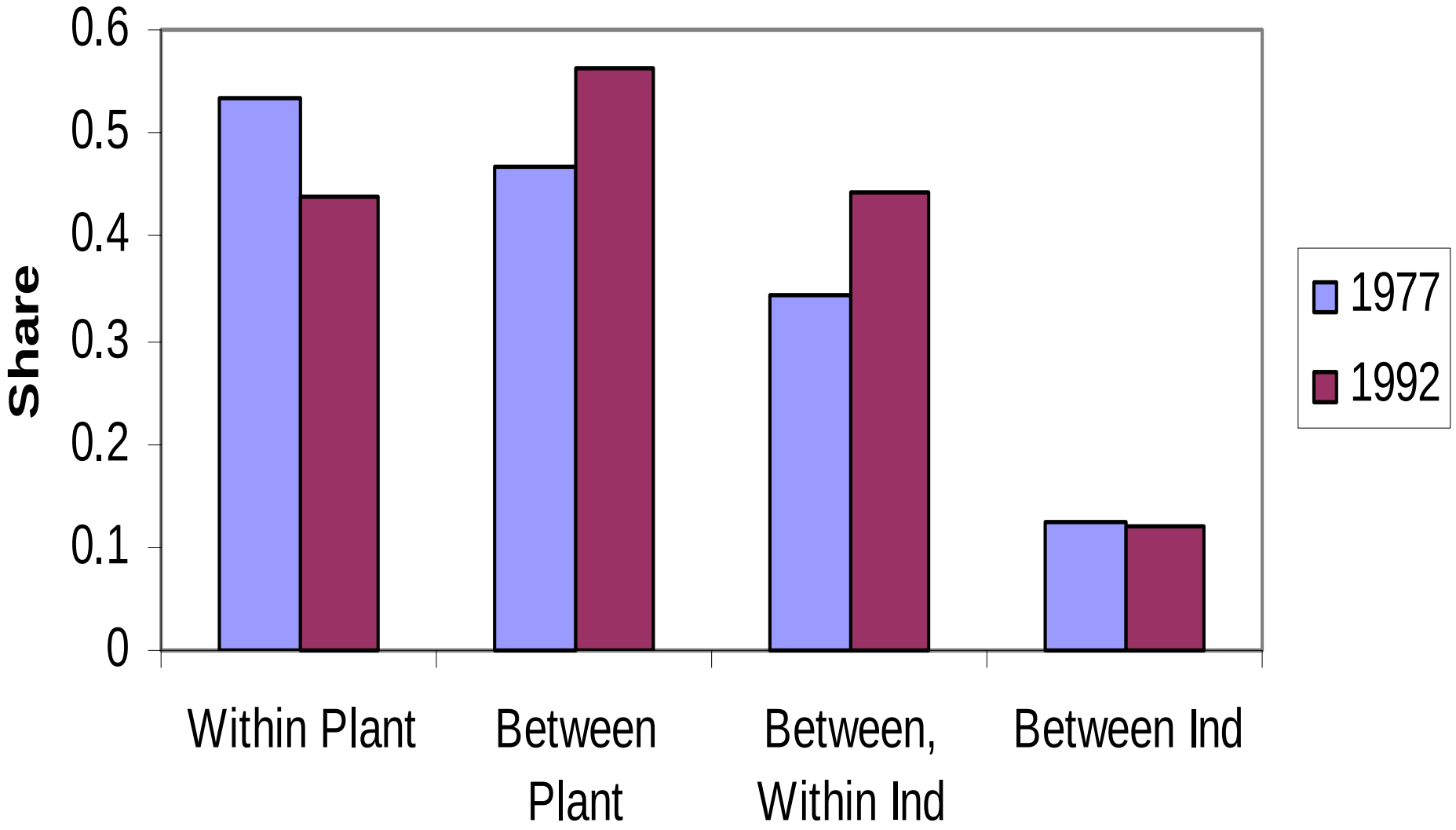
Between vs. Within Plant

- Does it matter where you work?
- Representative Firm?
- Recent studies show tremendous heterogeneity across businesses in narrowly defined industries.
- Interestingly, these between plant differences quite important for rising wage inequality…

Rising Wage Dispersion

- Manufacturing increase in wage dispersion mimics overall economy (Std Dev of Log Wages Increases by 1.2 from 1977-92)
- Virtually all of the increase in wage dispersion is due to between plant effects *within* narrowly defined industries.
- What is driving this increased dispersion between plants?

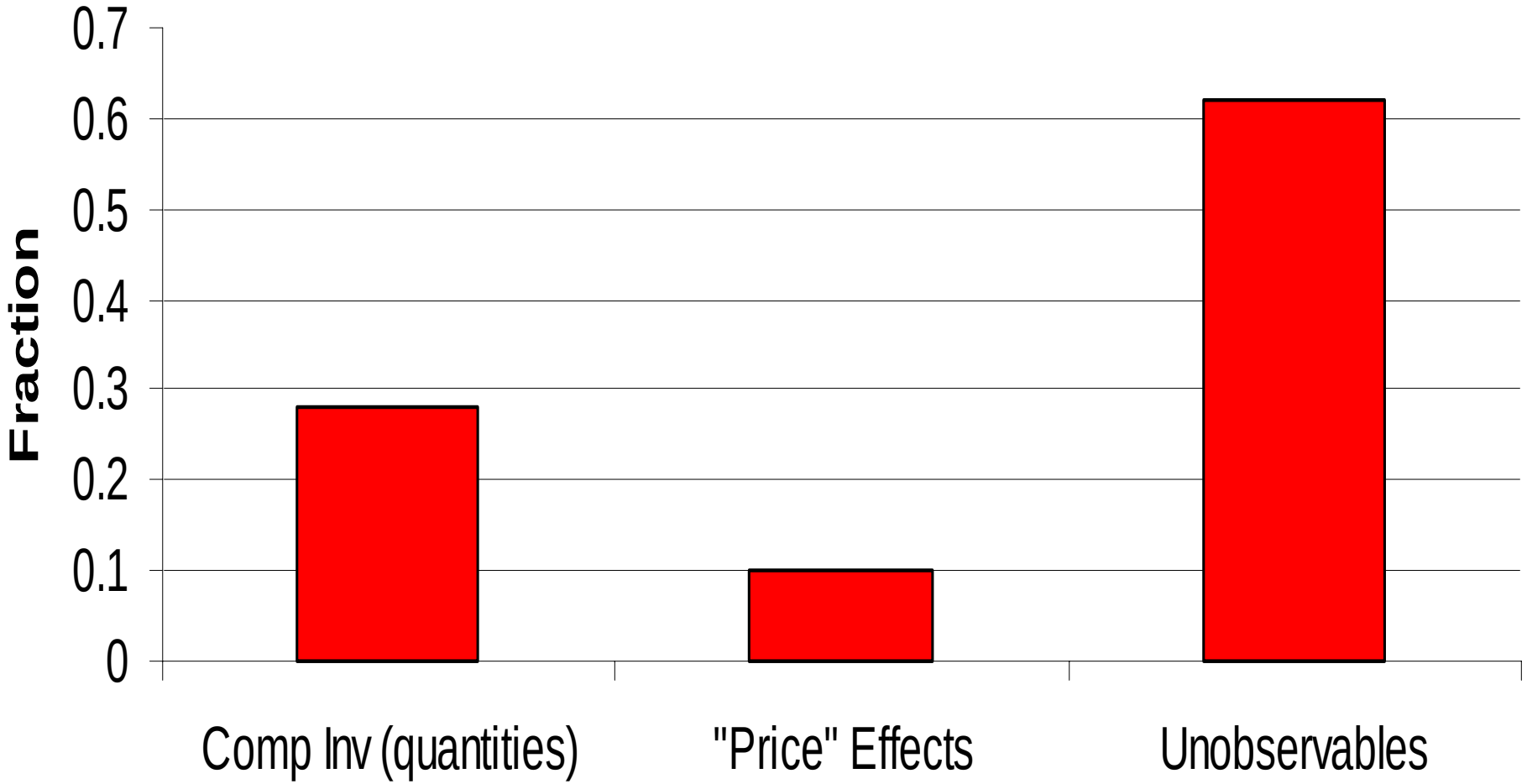
Between vs. Within Shares of Wage Dispersion



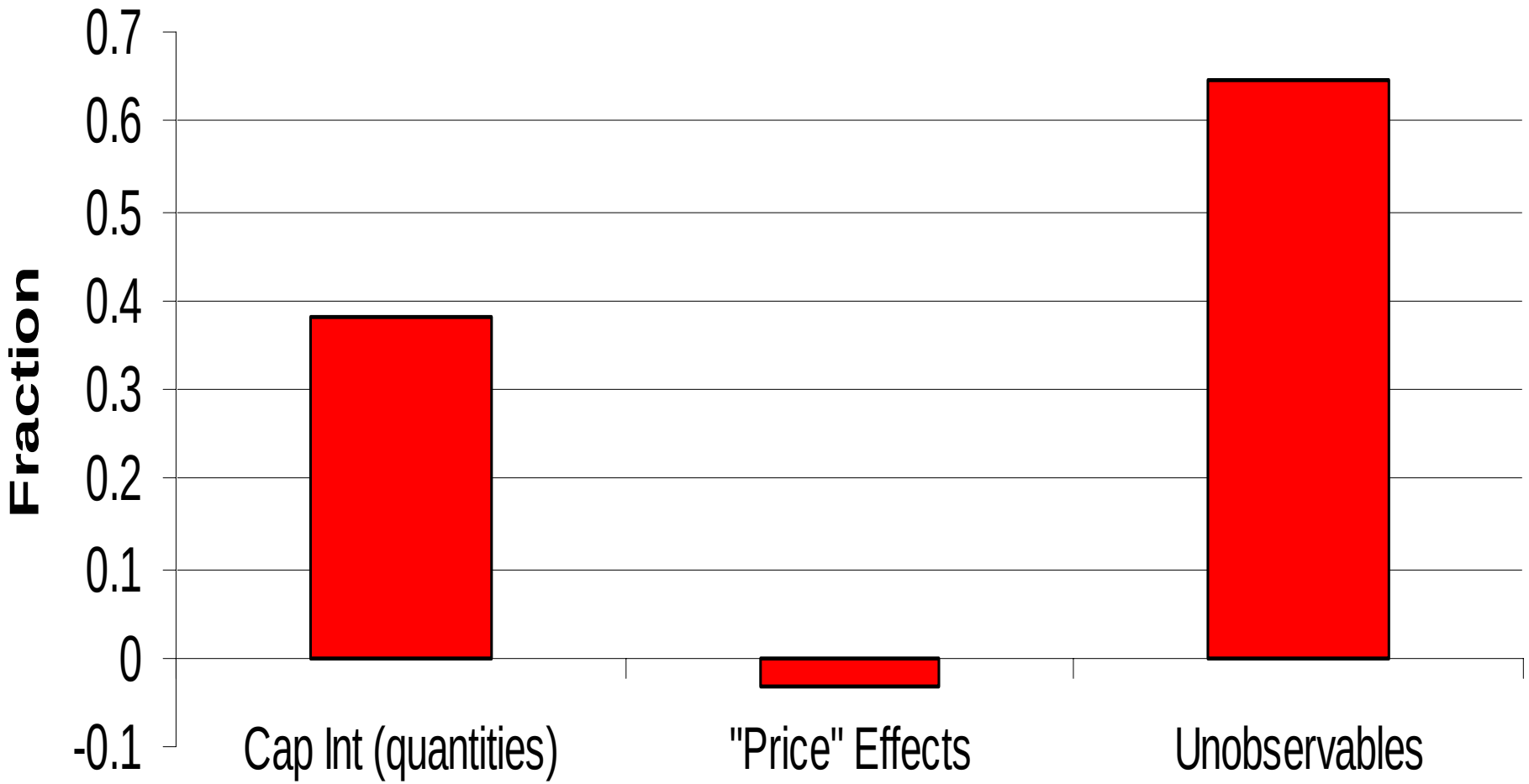
Rising Between Plant Dispersion

- Rising between plant productivity dispersion (increase in 90-10 differential for productivity from 1977 to 1992 is 0.16 and for wages is 0.12)
- Industries with rising productivity dispersion have rising wage dispersion (correlation is 0.34)
- Econometric decompositions show that a large fraction of rising dispersion in both wages and productivity can be accounted for by increasing dispersion in adoption of advanced technology -- the investment in computers and changing capital intensities.

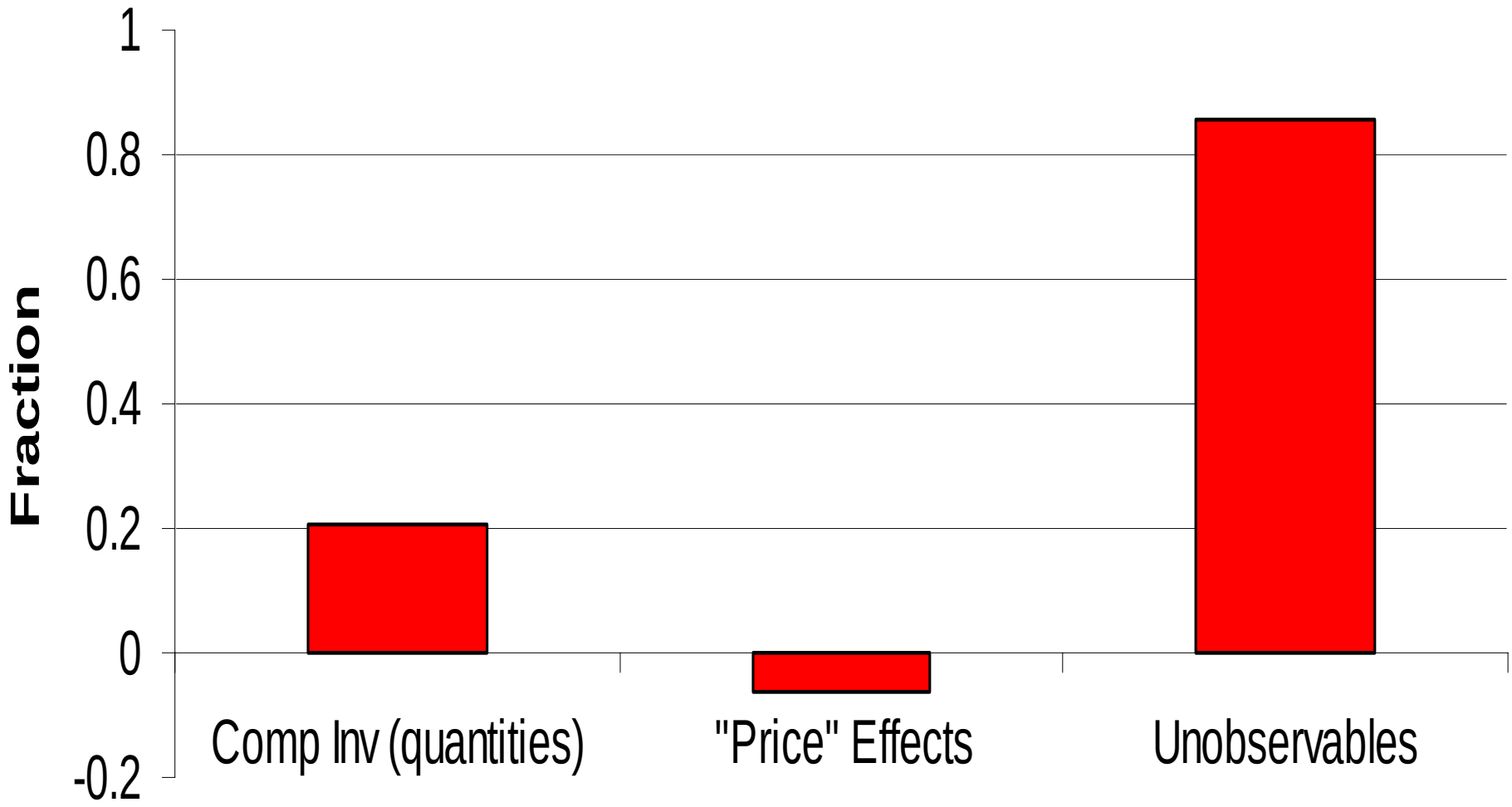
Fraction of Rising Wage Dispersion From Differential Computer Investment



Fraction of Rising Wage Dispersion From Differential Capital Intensities



Fraction of Rising Productivity Dispersion From Differential Computer Investment



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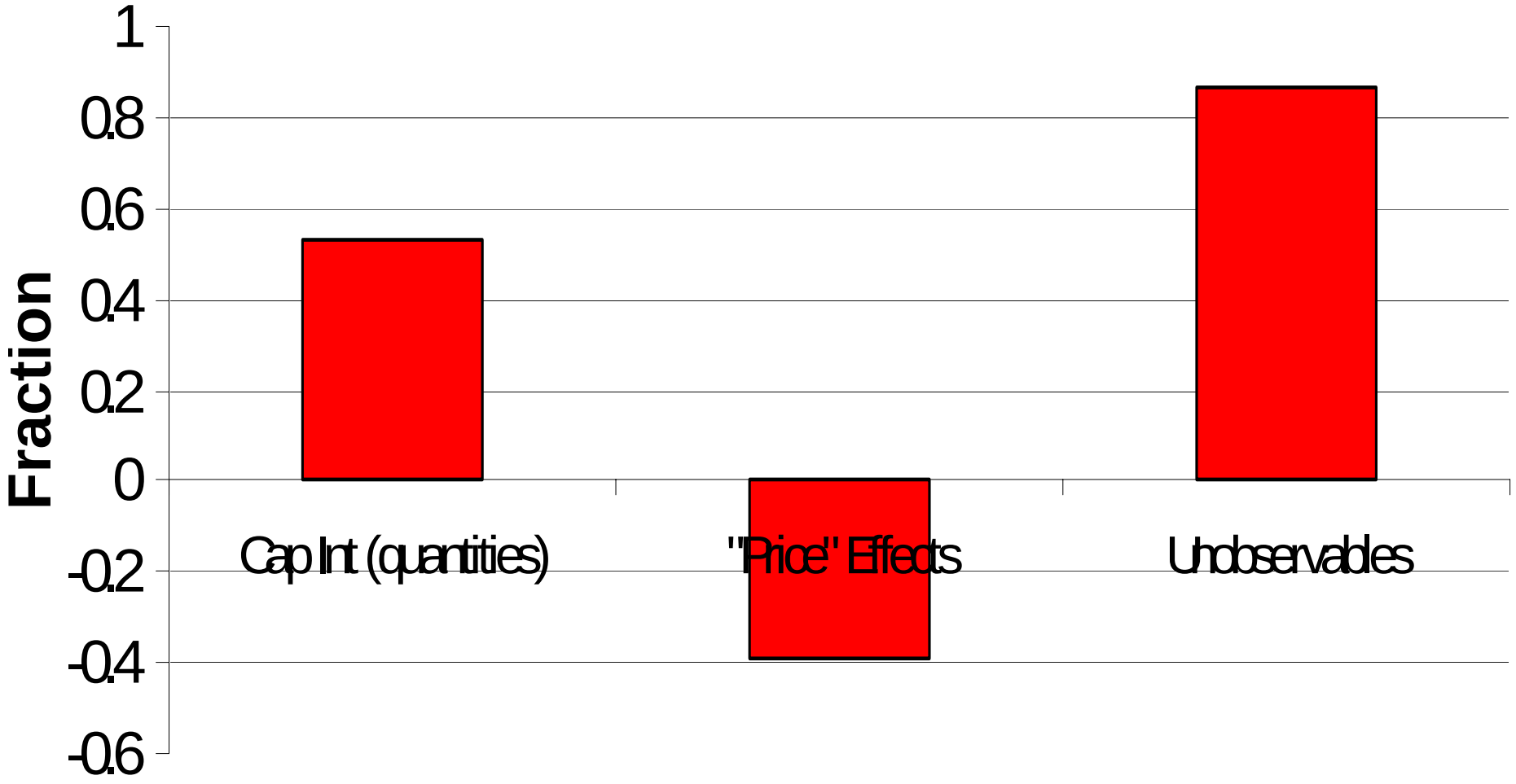

Possible Explanations?

- Consistent with Differential Technology Adoption and Skill Biased Technical Change
- Trade explanations? -- within industry and role of computers/capital intensity raise doubts...
- Institutional explanations? --- rising wage and productivity dispersion and role of computers/capital intensity raise doubts....
- But remember “unobservables” are important...
- Also, technology/trade/outsourcing may be working together...

Some open questions...

- Impact of capital intensity on wages and productivity dispersion quite similar – high wage, high productivity, high capital intensive plants...
- Impact of computers on wages and productivity differ in terms of sign of effect – high computer intensive businesses have high wages but lower productivity in 1977 – by 1992, wage gap has grown larger and impact of computers on productivity is neutral...
- Decompositions still find role for computers in productivity due to large changes in dispersion of computer intensities.

Broader implications…

- Emerging micro literature emphasizes differences across businesses in the way of doing business...
- Emerging micro literature emphasizes differences in success rates of implementing new technologies (broadly defined)...
- Emerging micro literature emphasizes learning effects important...

Growth/Change is Noisy and Complex...

- Learning/selection are source of complex adjustment...accounts for Solow paradox and now its resolution?
- Net entry and thus job/worker reallocation important part of the process...labor market impact large!
- With skill biased changes, important distributional consequences of growth/change...

Open Questions…

- What are appropriate market/government institutions to promote efficient restructuring and reallocation process?
- What are sources of inefficiencies (e.g., imperfect capital markets and small and young businesses)?
- What is downside of this reallocation process? Displaced workers? Rising inequality?
- U.S. vs. Rest of World?