Accounting for Factorless Income

Loukas Karabarbounis
University of Minnesota

Brent Neiman
University of Chicago

April 2018

What is Factorless Income?

$$\text{Factorless Income} = Y - WL - \sum_j R^j K^j$$

How to Allocate and Interpet Factorless Income?

- Three polar cases (among other possibilities):
  1. Maybe it's all economic profits (*Case* Π)
  2. Maybe we are "missing" investment (*Case* K)
  3. Maybe our imputation of rental rate isn't good (*Case* R)

How to Allocate and Interpet Factorless Income?

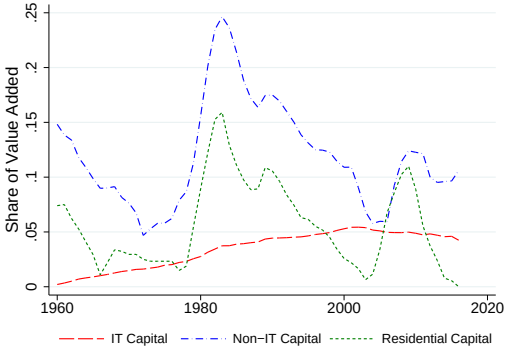
- Three polar cases (among other possibilities):
  1. Maybe it's all economic profits (*Case* Π)
  2. Maybe we are "missing" investment (*Case* K)
  3. Maybe our imputation of rental rate isn't good (*Case* R)
- Variants of threse three strategies are common in literature:
  1. *Case* Π : Rotemberg-Woodford (1995), Basu-Fernald (1997), Karabarbounis-Neiman (2014), Rognlie (2016), Barkai (2017), + others
  2. *Case* K : Hall (2001), McGrattan-Prescott (2005), Corrado-Hulten-Sichel (2009), Eisfeldt-Papanikolaou (2013), + others
  3. *Case* R : KLEMS Project, Gomme-Ravikumar-Rupert (2011), Koh-Santaelalia-Llopis-Zheng (2016), Caballero-Farhi-Gourinchas (2017)
- We explore these interpretations and their implications

Constructing Factorless Income ($Y - WL - \sum_j R^j K^j$)

- Data from US NIPA and FAT, excludes government, 1960-2016
- Y is GDP and WL is raw compensation (robust to common alternatives)
- We aggregate to three capital stocks K^j:
  - $j = I$: IT capital (used by business sector)
  - $j = N$: Non-IT capital (used by business sector)
  - $j = H$: Housing (used by households)
- Rental rate (ala Hall-Jorgenson (1967), from model, taxes removed):

$$R_t^j = \xi_t^j \left[\left(\frac{\xi_{t-1}^j}{\xi_t^j} \right) (1 + r_t) - \left(1 - \delta_t^j \right) \right]$$

Factor Shares Before Allocating Factorless Income



(Note: All plots throughout are 5-year moving averages.)

Case Π

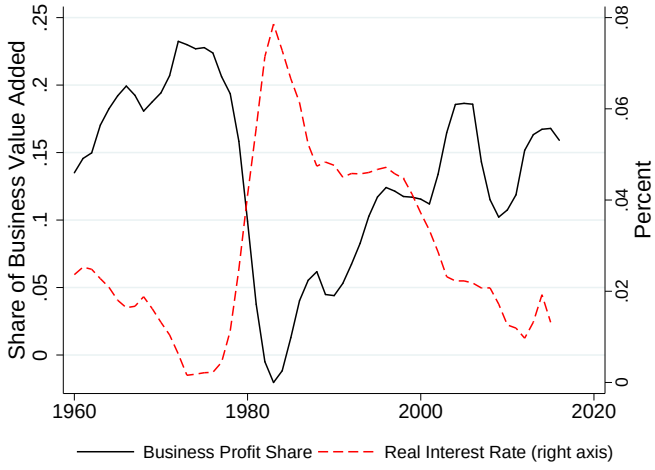
- Increase in s_Π since 1980 related to s_L decline
- Referenced by view that monopoly power ↑ or call for antitrust

Case Π

- But s_Π remains below average levels from 1960s/1970s

Case Π

- Correlation$(r, s_\Pi) = -0.91$: Not a change in markups alone!
- Cost share variation has implications for technology



Case K

- Unmeasured investment spending $\xi^U X^U$ and income $R^U K^U$
- "Revised" GDP $\tilde{Y}$ related to measured income Y as:

$$\tilde{Y} = Y + \xi^U X^U = WL + \sum_{j \in I,N,H} R^j K^j + \Pi + R^U K^U$$

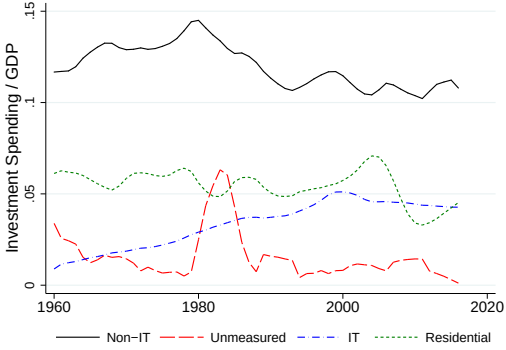
- We rearrange so RHS is all known or assumed:

$$R^U K^U - \xi^U X^U = Y - WL - \sum_{j \in I,N,H} R^j K^j - \Pi^Q - \Pi^H$$

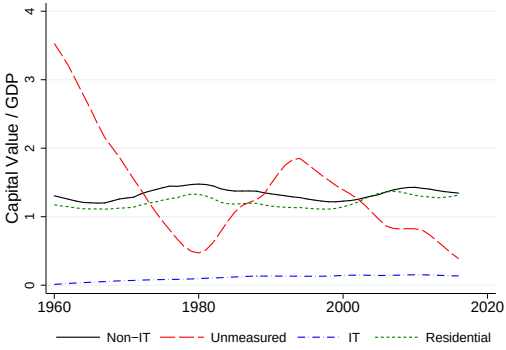
- Find $\{\xi_t^U, X_t^U, R_t^U, K_t^U\}$ for $t \in (1960, 2016)$ which satisfy:
  - Above equation
  - $R_{t+1}^U = R(\xi_t^U, \xi_{t+1}^U, \delta^U, r_t)$
  - $K_{t+1}^U = (1 - \delta^U) K_t^U + X_t^U$

Case K

$\xi_t^j X_t^j / \tilde{Y}_t$



$\xi_t^j K_t^j / \tilde{Y}_t$



Case R

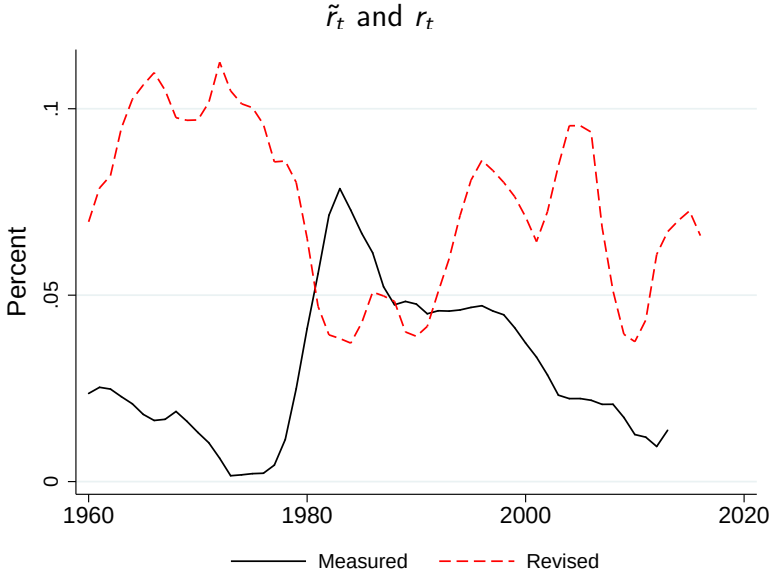
- Idea is lots of factors omitted from our rental-rate calculation (risk premium, adjustment costs, etc.)

- Solve for revised opportunity cost of capital $\tilde{r}$ such that:

$$P^Q Q - WN - \tilde{R}^I K^I - \tilde{R}^N K^N - \Pi^Q = 0,$$

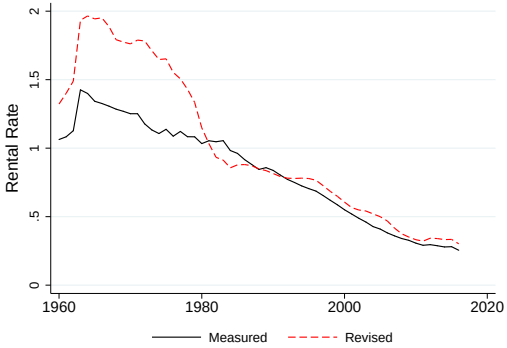
where $\tilde{R}^j = R(\tilde{r}, \cdot)$ and where Π^Q as in Case K.

Case R


$\tilde{r}_t$ and r_t
Percent
0
.05
.1
1960
1980
2000
2020
Measured
Revised

Case R

$\tilde{R}_t^I$ and R_t^I



$\tilde{R}_t^N$ and R_t^N

Model

- Business and housing sectors, multiple capital types, capitalists and hand-to-mouth workers, perfect foresight, and exogenous interest rate path
- Intermediates produced with CES technology:

$$Q_t = \left(\alpha \left(A_t^K K_t^Q \right)^{\frac{\sigma-1}{\sigma}} + (1-\alpha) \left(A_t^L L_t \right)^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

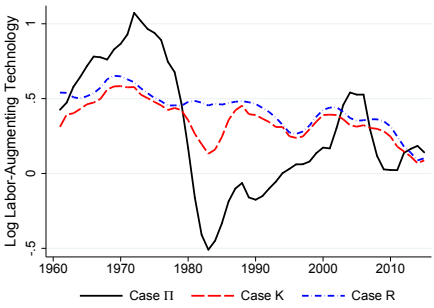
- Business capital bundle:

$$K_t^Q = \left(\sum_{j \neq H} \left(\nu_t^j \right)^{\frac{1}{\theta}} \left(K_t^j \right)^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{\theta-1}}$$

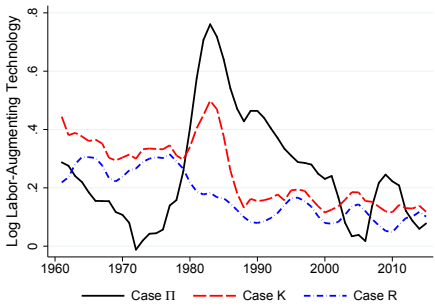
- Input/extract exogenous processes to match endogenous variables during 1960-2016 under each of the three cases

Extracted Labor-Augmenting Technology (Detrended)

$$A_t^L = (1-\alpha)^{\frac{\sigma}{1-\sigma}} \left(s_{L,t}^Q\right)^{\frac{1}{\sigma-1}} \left(\mu_t^Q\right)^{\frac{\sigma}{\sigma-1}} W_t$$



$\sigma = 1.25$



$\sigma = 0.75$

Counterfactuals

Changes (1986-1990 vs. 2011-2015) in s_L^Q

	Elasticity $\sigma = 1.25$			Elasticity $\sigma = 0.75$		
	Case Π	*Case* K	*Case* R	*Case* Π	*Case* K	*Case* R
Baseline	**-0.030**	**-0.029**	**-0.030**	**-0.030**	**-0.029**	**-0.030**
μ^Q	-0.071	0.000	0.000	-0.083	0.000	0.000
(A^K, ν^I)	0.041	-0.056	-0.048	0.063	0.025	-0.003

Changes (1961-1965 vs. 2011-2015) in ln Q

	Elasticity $\sigma = 1.25$			Elasticity $\sigma = 0.75$		
	Case Π	*Case* K	*Case* R	*Case* Π	*Case* K	*Case* R
Baseline	**-0.068**	**-0.087**	**-0.068**	**-0.068**	**-0.087**	**-0.068**
ξ^I	0.177	0.183	0.215	0.129	0.125	0.151

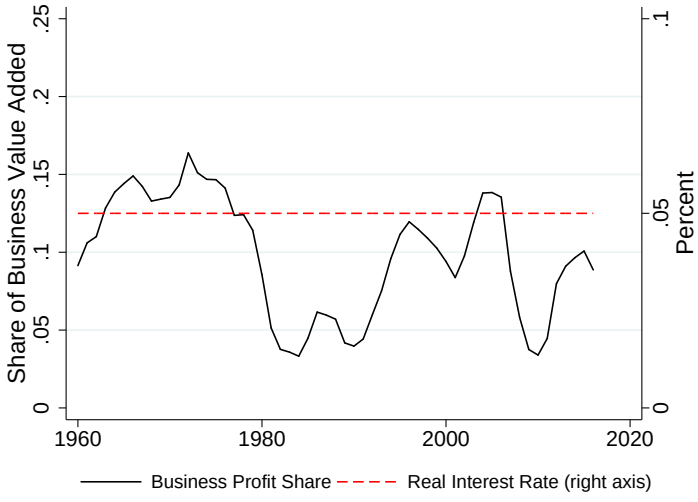
Conclusions

- For many questions – including cause of s_L decline, but also **much** more – interpretation of factorless income matters!
- Skeptical of *Case* Π :
  - Not a change in markups alone!
  - Requires longer view than just early-1980s onward
- A bit less skeptical of *Case* K : Our version requires too much K^U early-on, but other versions might do better
- Most optimistic about *Case* R : But what is source of wedge?
- Hope to see explorations of factorless income around the world

EXTRA SLIDES

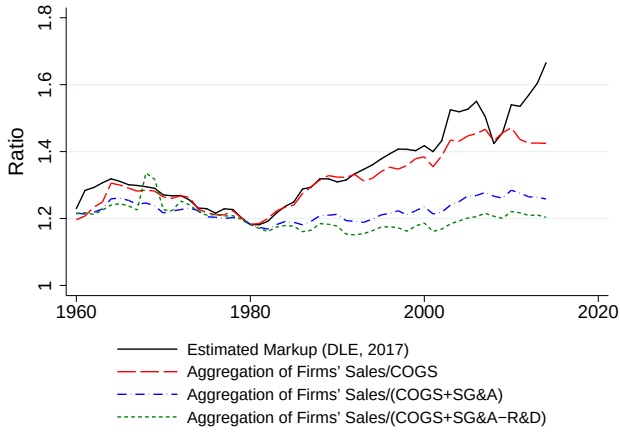
Case Π

- What about with (hypothetical) flat real interest rate?



What About De Loecker and Eeckhout (2017)?

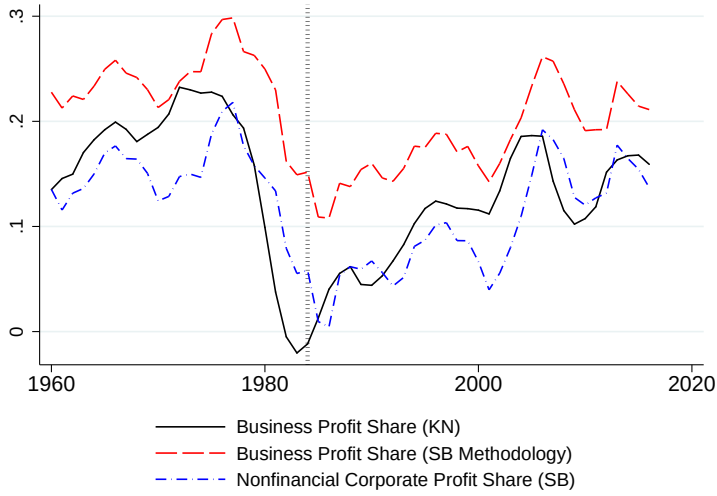
- But rise in Sales/COGS due to fall in COGS/(COGS+SG&A)!
  - First showed by Traina (2018)
  - Consistent with Gutierrez and Philippon (2017)



What About De Loecker and Eeckhout (2017)?

Country	Trend (per 10 years) $\frac{\text{Sales}}{\text{COGS}}$	Trend (per 10 years) $\frac{\text{Sales}}{\text{COGS+SG\&A}}$	Years Covered Start	Years Covered End	Firms Included Min	Firms Included Max
Brazil	-0.04	-0.00	1996	2016	128	284
China	-0.01	-0.02***	1993	2016	314	3683
France	-0.07*	-0.01	1999	2016	111	631
Germany	0.00	0.03***	1998	2016	119	668
India	0.12***	0.06**	1995	2016	630	2890
Italy	0.00	-0.06***	2005	2016	202	264
Japan	0.06***	0.03***	1987	2016	2128	3894
Korea	0.00	-0.03***	1987	2016	419	1682
Russia	-0.13	-0.01	2004	2016	127	245
Spain	0.27**	-0.03	2005	2016	102	128
Taiwan	-0.05**	-0.02	1997	2016	160	1789
United Kingdom	0.28***	0.07***	1988	2016	183	1489
United States	0.09***	0.02***	1981	2016	3136	8403
Simple Average	**0.04**	**0.00**				

Case Π


0
.1
.2
.3
1960
1980
2000
2020
Business Profit Share (KN)
Business Profit Share (SB Methodology)
Nonfinancial Corporate Profit Share (SB)

back