70 Years of US Corporate Profits

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Agenda

1. Introduction

2. Measuring Capital Cost and Profits

3. Results
   - Baseline Measure of Capital and Profit Shares
   - Comparison to Alternative Specifications of the Required Rate of Return
   - Comparison to Alternative Measures of Expected Inflation
   - Comparison to Alternative Measures of Profits

4. Discussion
   - Adjustment Costs
   - Intangible Capital
   - Competition

Goal of the Paper

1. Extend Barkai (2016a) and measure capital costs and profits over the period 1946–2015
2. Offer explanations for the profit share trend

Relevance of "Profits"

1. In models of economic growth and development
   - An incentive for innovation
   - An indicator of anti-competitive behavior
2. In models of macroeconomic fluctuations
   - Theorized to play a key role in mediating the Phillips curve
3. In all economic models
   - Distinguishing between capital and profit income is essential for properly measuring the elasticity of substitution between capital and labor.

Findings

1. Profit share decreased from 1946 to the early 1980s and has increased since
2. Capital share increased from 1946 to the early 1980s and has decreased since

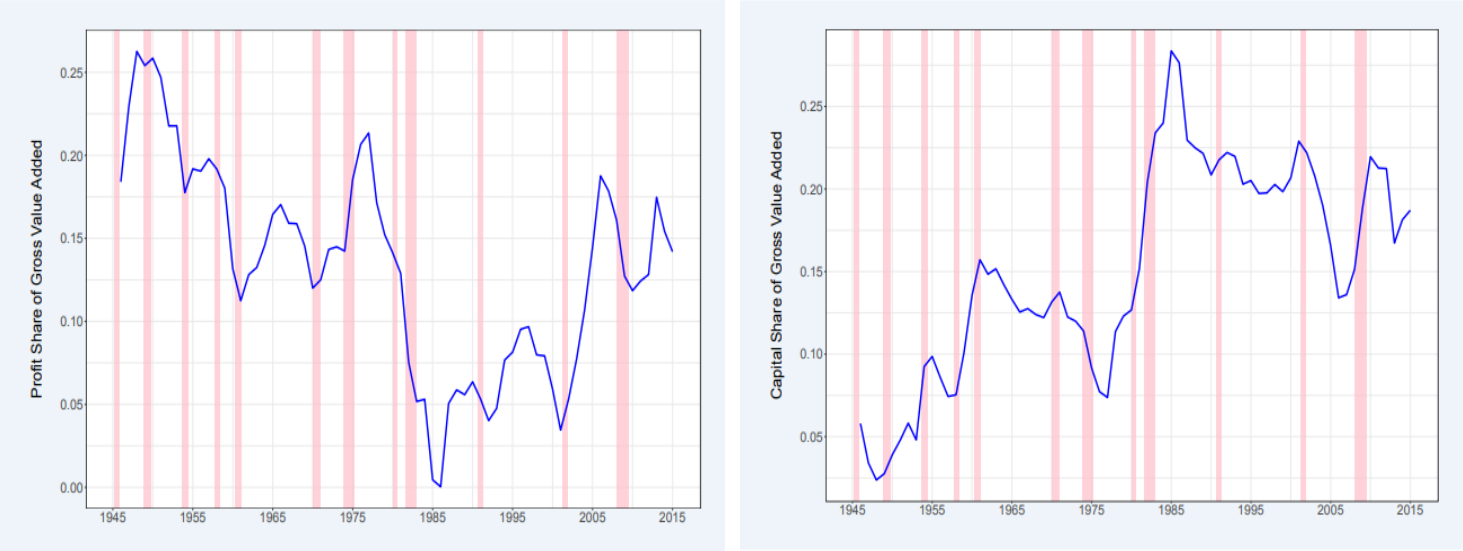

Figure 1: Profit Share VS Capital Share

Capital Share

- Capital Cost - Product of an aggregate required rate of return on capital and the nominal value of the capital stock

$$\sum_s R_s P_s^K K_s = \underbrace{\sum_s \frac{P_s^K K_s}{\sum_j P_j^K K_j} R_s}_{R} \underbrace{\sum_s P_s^K K_s}_{P^K K} \tag{1}$$

- Capital Share - Ratio of aggregate capital costs to nominal gross value added

$$S^K = \frac{\sum_s R_s P_s^K K_s}{P^Y Y} \tag{2}$$

Required Rate of Return - Hall and Jorgenson (1967)

1. Only accounts for debt financing

$$R_s = \left(i^D - \mathbb{E}\left[\pi_s\right] + \delta_s\right) \tag{3}$$

2. Accounts for both debt and equity financing

$$R_s = \left(\left(\frac{D}{D+E} i^D + \frac{E}{D+E} i^E\right) - \mathbb{E}\left[\pi_s\right] + \delta_s\right) \tag{4}$$

3. Account for the tax treatment of both capital and debt

$$R_s = \left(\left(\frac{D}{D+E} i^D (1-\tau) + \frac{E}{D+E} i^E\right) - \mathbb{E}\left[\pi_s\right] + \delta_s\right) \frac{1 - itc_s - z_s \tau}{1-\tau} \tag{5}$$

Required Rate of Return - Hall and Jorgenson (1967)

1. Only accounts for debt financing

$$R_s = \left(i^D - \mathbb{E}\left[\pi_s\right] + \delta_s\right) \tag{6}$$

2. Accounts for both debt and equity financing

$$R_s = \left(\left(\frac{D}{D+E} i^D + \frac{E}{D+E} i^E\right) - \mathbb{E}\left[\pi_s\right] + \delta_s\right) \tag{7}$$

- D - market value of debt
- E - market value of equity
- i^D - debt cost of capital
- i^E - equity cost of capital
- π_s - inflation rate of capital s
- δ_s - depreciation rate of capital s

Required Rate of Return - Hall and Jorgenson (1967)

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- D - market value of debt
- E - market value of equity
- i^D - debt cost of capital
- i^E - equity cost of capital
- π_s - inflation rate of capital s
- δ_s - depreciation rate of capital s
- τ - corporate income tax rate
- itc_s - investment tax credit of capital s
- z_s - net present value of depreciation allowances of capital s

National Accounting

Model of accounting for the U.S. non-financial corporate sector in current dollars

$$P_t^Y Y_t = w_t L_t + R_t P_{t-1}^K K_t + \Pi_t \tag{9}$$

Shares of gross value added

$$1 = S_t^L + S_t^K + S_t^\Pi \tag{10}$$

Data

1. National Income and Capital
   - National Income and Productivity Accounts (**NIPA**) Table 1.14 (lines 17, 20, 23) - Nominal gross value added, compensation of employees, and taxes on production
   - Bureau of Economic Analysis (**BEA**) Fixed Asset Table 4.1 - Capital stock, the depreciation rate of capital, and inflation for three categories of capital (non-residential structures, equipment, and intellectual property products)
2. Debt, Equity, and Taxes

Data

1. National Income and Capital
2. Debt, Equity, and Taxes
   - Integrated Macroeconomic Accounts for the United States Table S.5.a - market value of debt and equity for the U.S. non-financial corporate sector
   - Jorgenson and Yun (1991) - corporate tax rate for the period 1946–1986
   - OECD tax database - corporate tax rate for the period 1987–2015
   - Tax Foundation - corporate tax rate for the period 1981–2012
   - Jorgenson and Sullivan (1981) - investment tax credit
   - Federal Reserve Economic Data (**FRED**)- debt cost of capital

$$i^E = R_{ten-yearU.S.treasury} + 5\% \tag{11}$$

Findings

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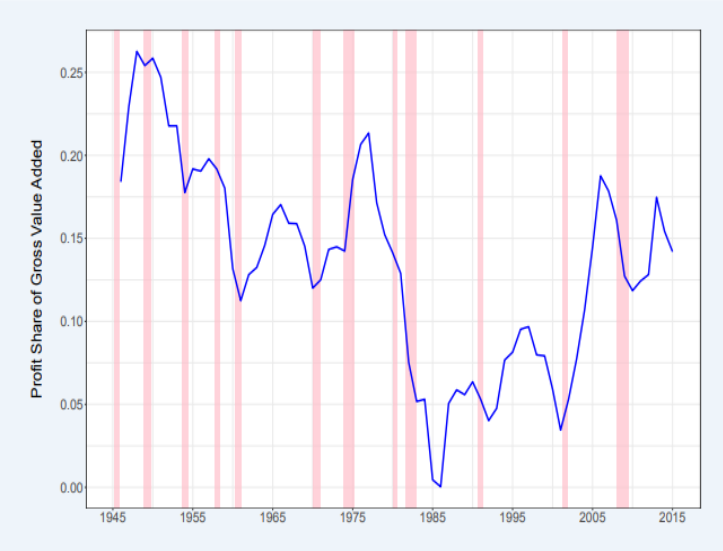


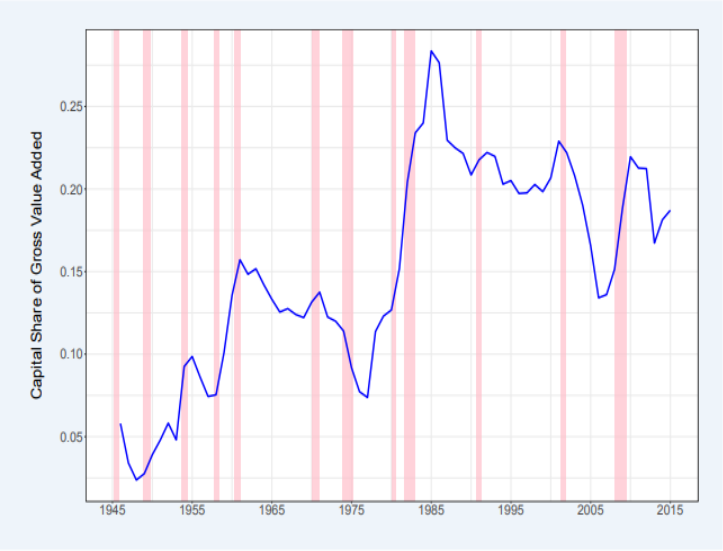
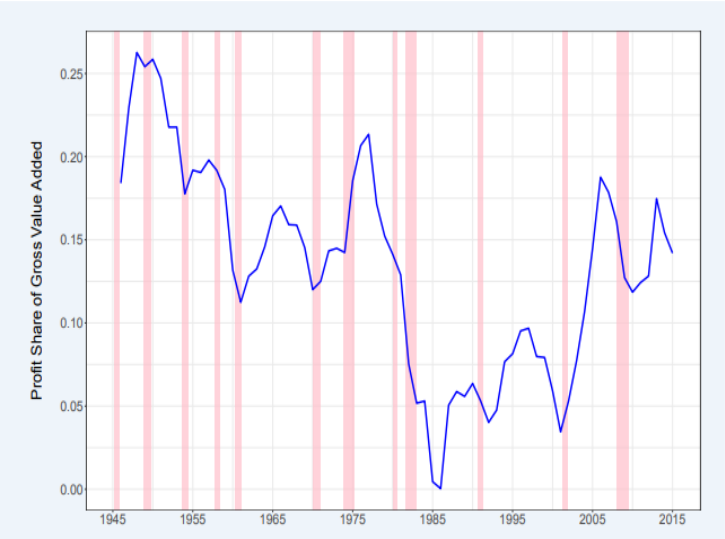


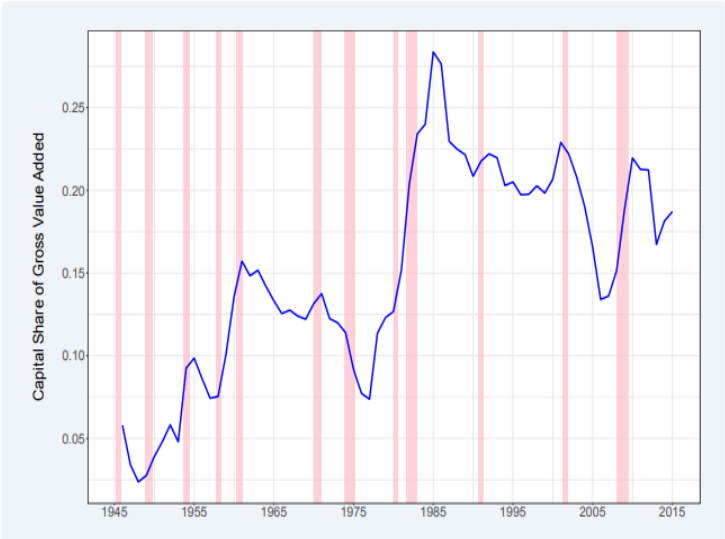
Figure 2: Profit Share VS Capital Share

Baseline Measure of Capital and Profit Shares

Three additional noticeable features

1. High Volatility - The standard deviation of our baseline measure of the profit share is nearly three times greater than the standard deviation of the labor share.
2. Negatively Correlation (-94%)
3. Large movements over a short time horizon - Short-term reversal of trends during the early 1970s followed by large movements over the period 1977–1985





Robustness - Comparison to Alternative Specifications of the Required Rate of Return

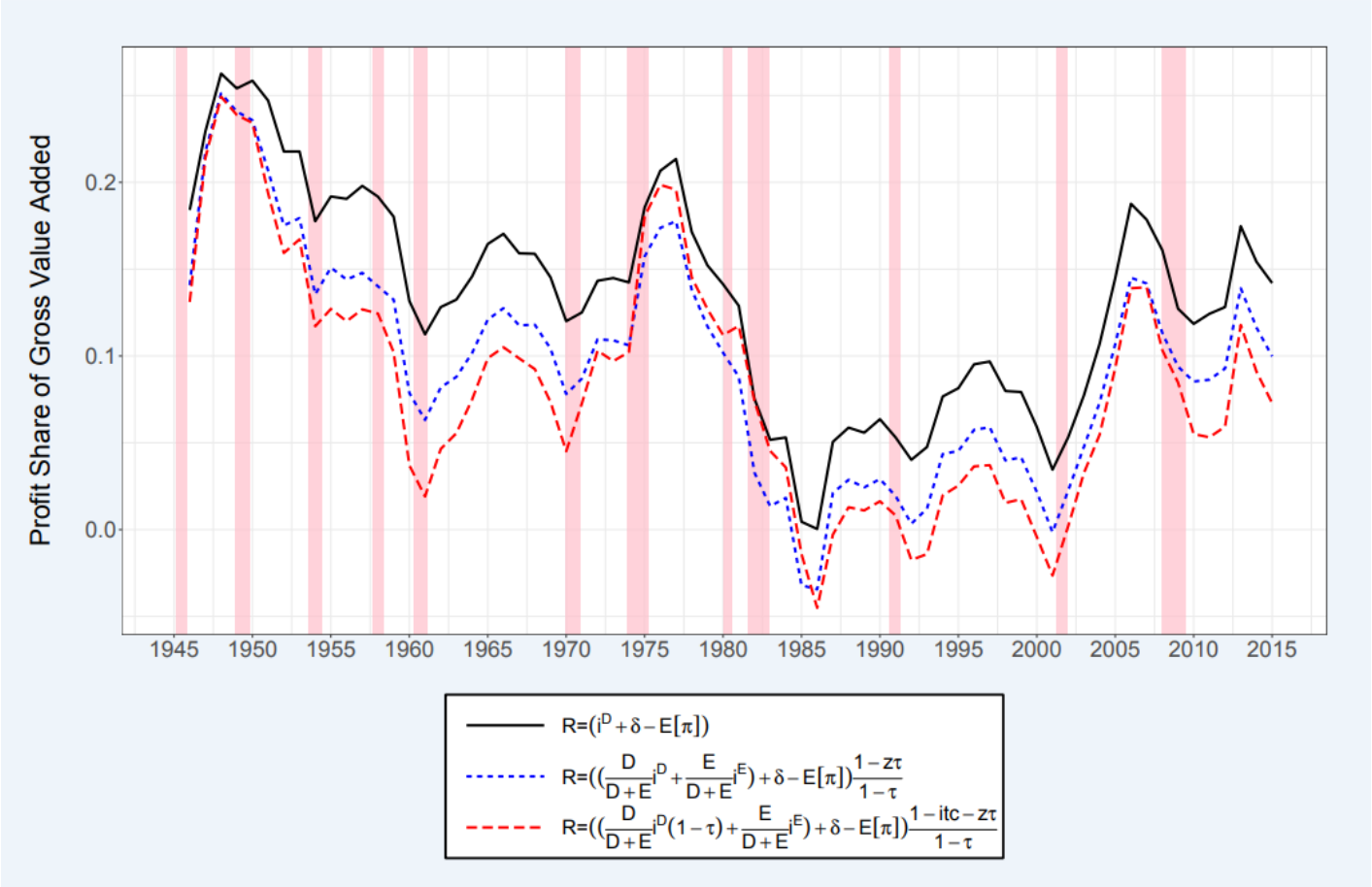


Figure 3: Robustness Check: Profit Share by Required Rate of Return

Robustness - Comparison to Alternative Measures of Expected Inflation

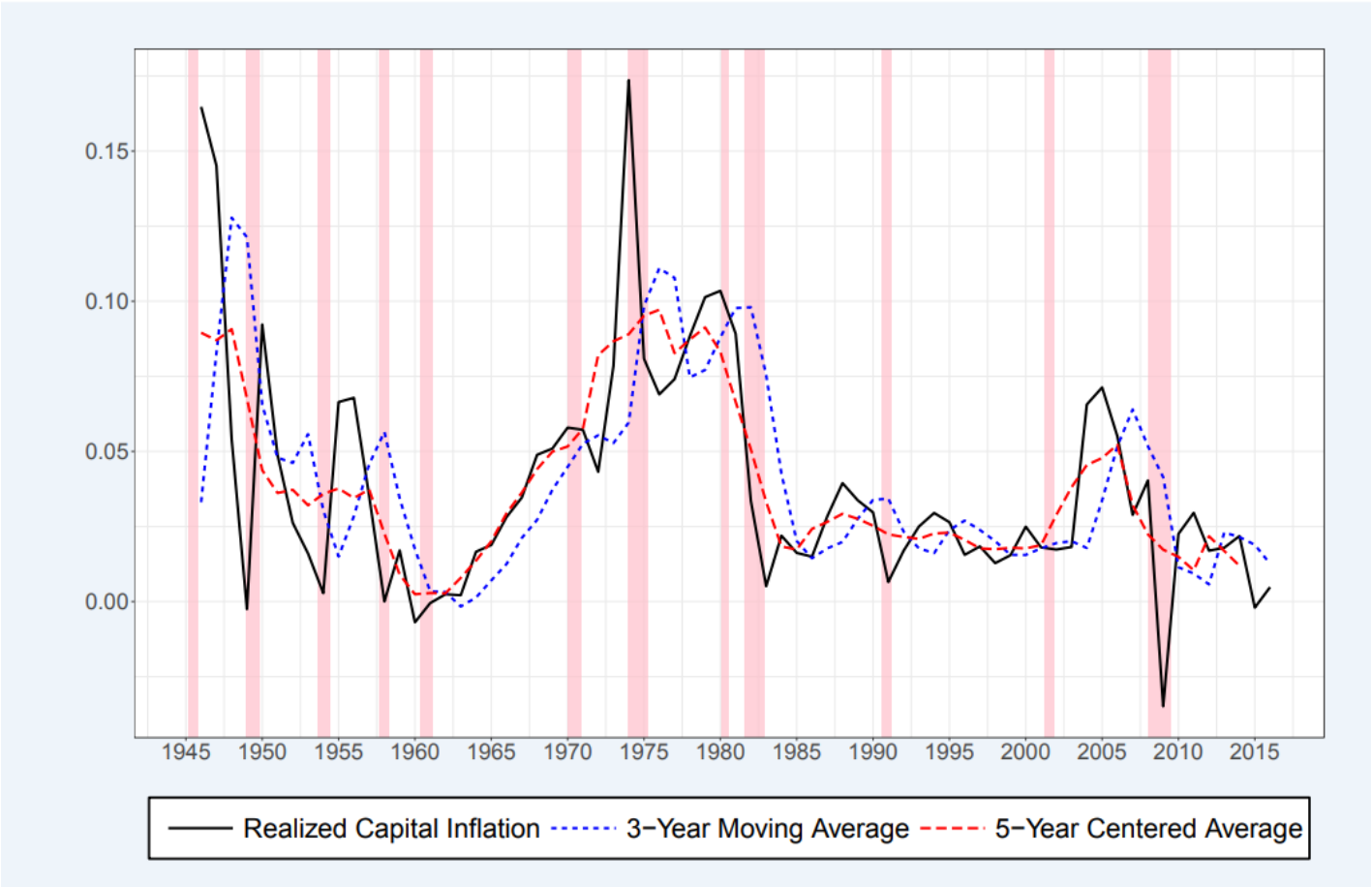


Figure 4: Robustness Check: Measures of Expected Capital Inflation

Robustness - Comparison to Alternative Measures of Expected Inflation

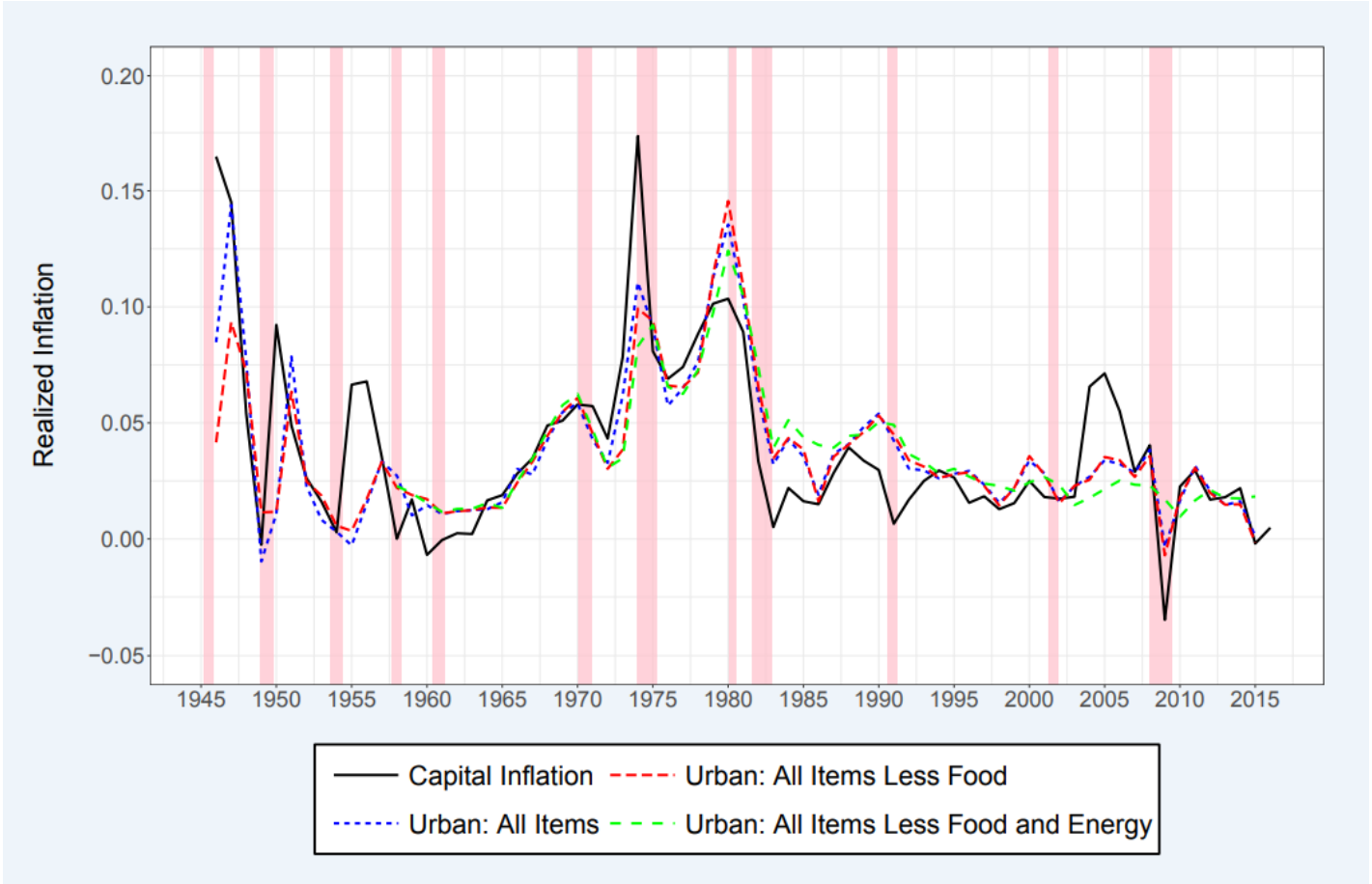


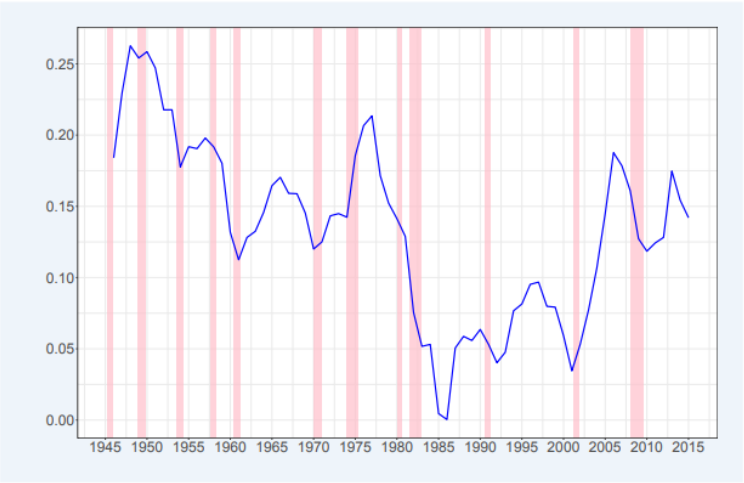
Figure 5: Robustness Check: Capital and Consumption Inflation

Robustness - Comparison to Alternative Measures of Expected Inflation

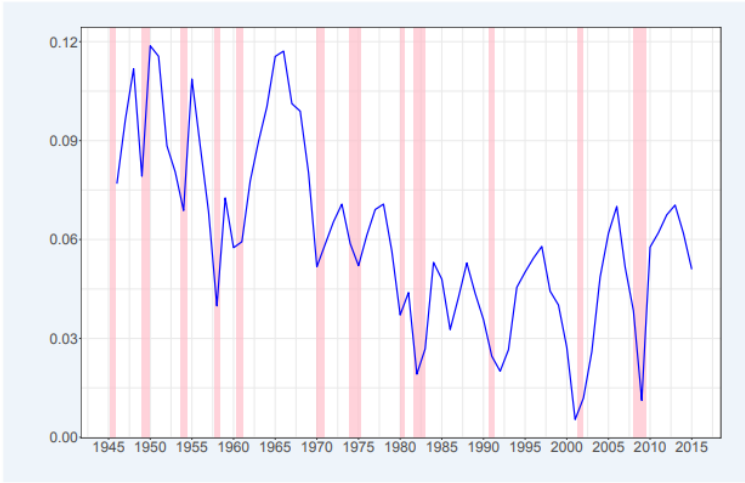
- Robust - overall trends for the capital and profit shares
- Not Robust - the level of profits in the late 1970s the timing and magnitude of the large decline in the required rate of return that occurs in the years around 1980

Robustness - Comparison to Alternative Measures of Profits

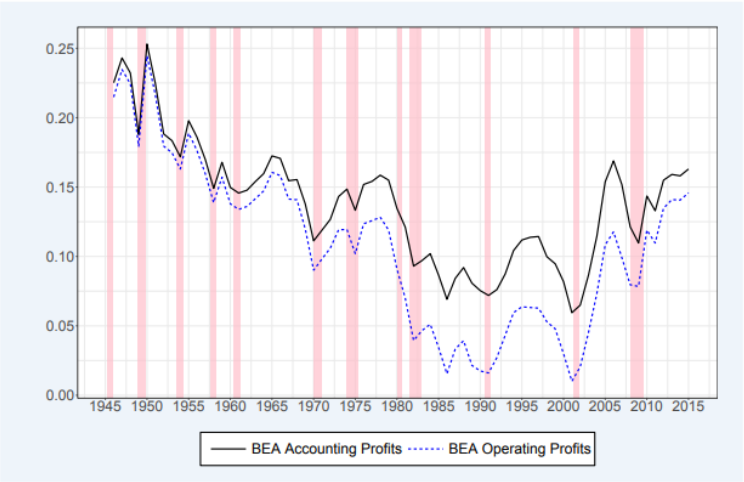
(a) Baseline



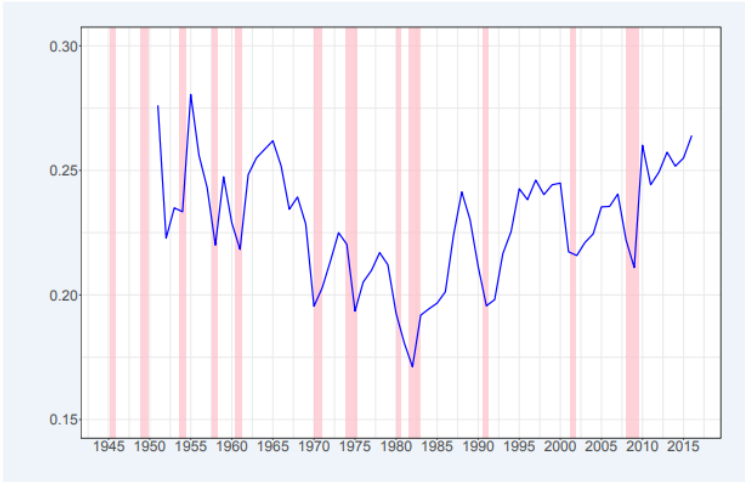
(b) Constant Cost of Capital and Expected Inflation



(c) BEA Accounting Profits



(d) Profits Implied by Production-Based Markups



Robustness - Comparison to Alternative Measures of Profits

Measure	sd(S^{Π})	sd(HP-Filtered S^{Π})	Implied cor(S^{Π}, S^{K})	Fitted Change 1946–1984	Fitted Change 1984–2015
Baseline	6.26	1.51	-0.94	-12.03	13.63
Fixed Real Rate	2.72	1.13	-0.75	-5.31	1.65
BEA Accounting Profits	4.42	1.21	-0.89	-10.73	8.02
BEA Operating Profits	5.94	1.23	-0.94	-14.85	11.38
Markup Implied Profits	2.33	1.14	-0.58	-7.85	4.11
Labor Share	2.14	0.64			

table 1: Comparison of Measures of Profit Share

Robustness - Comparison to Alternative Measures of Profits

- Fixed real rate Rognlie (2015) - We pick the constant cost of capital that makes the level of profits in 1984 equal to our baseline

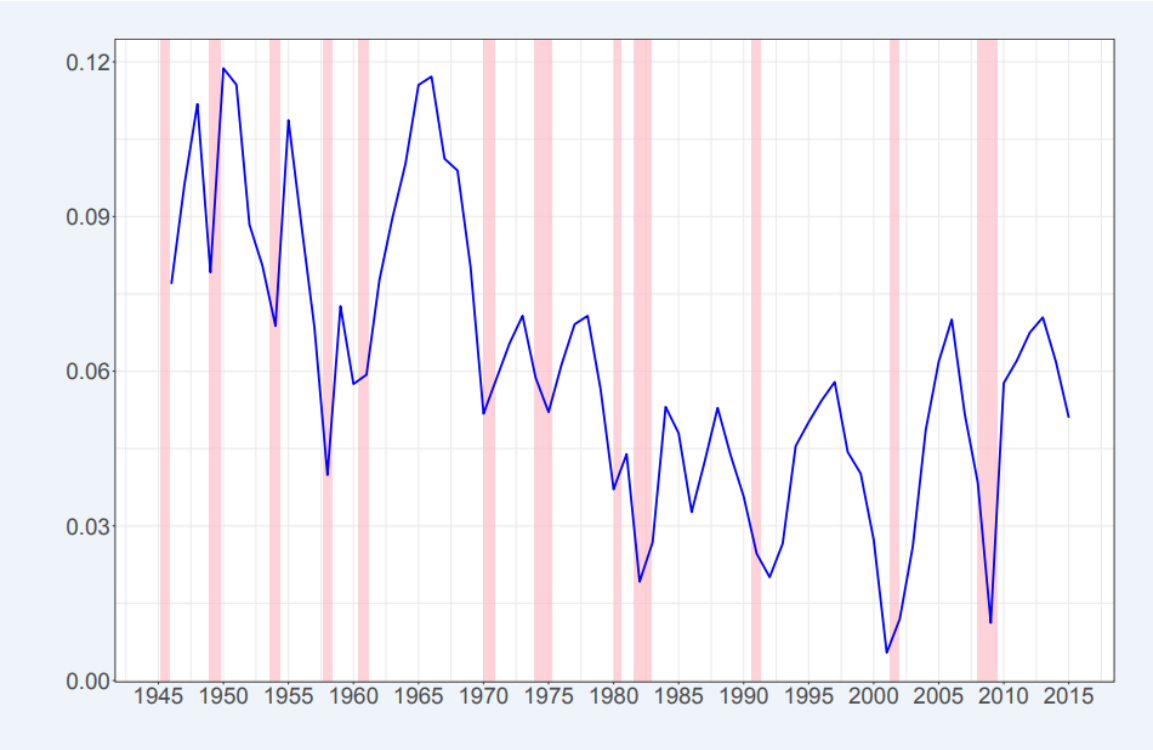


Figure 7: Constant Cost of Capital and Expected Inflation

Robustness - Comparison to Alternative Measures of Profits

Fixed real rate Rognlie (2015) - We pick the constant cost of capital that makes the level of profits in 1984 equal to our baseline

Disadvantage

- It misses large variation in the cost of capital over time (in excess of expected inflation)

Robustness - Comparison to Alternative Measures of Profits

- BEA measures of accounting profits
  - accounting profits = operating profits + financial profits
  - operating profits

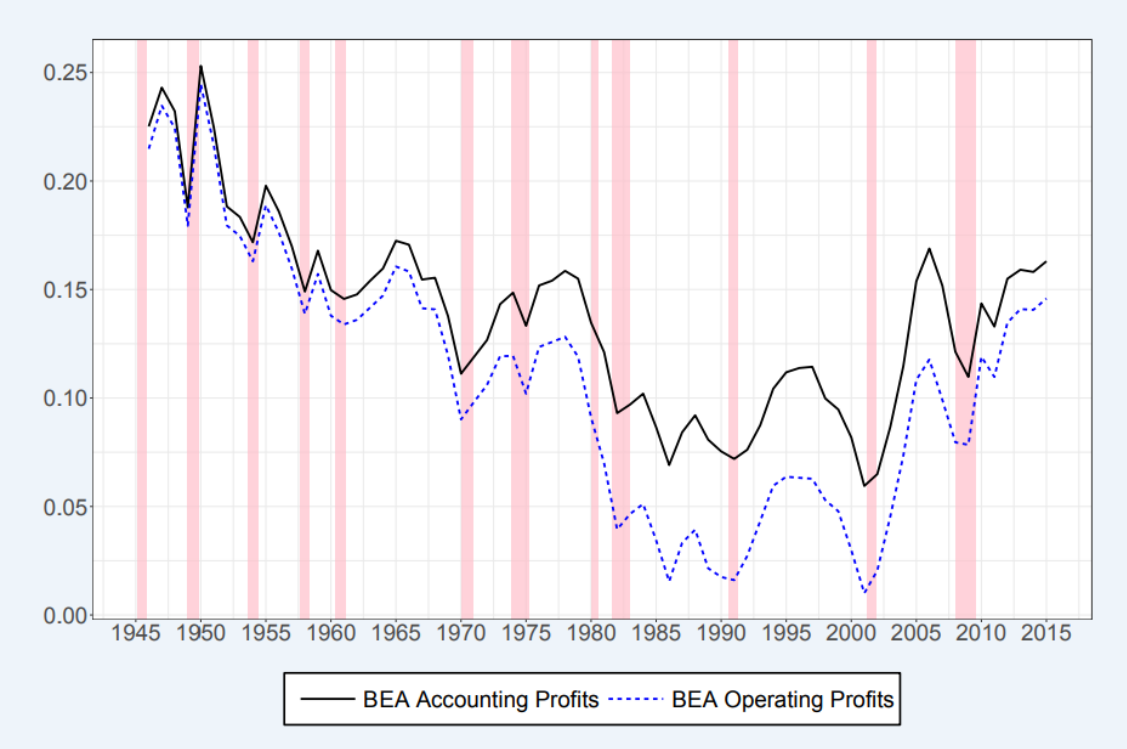


Figure 8: BEA Accounting and Operating Profits

Robustness - Comparison to Alternative Measures of Profits

accounting profits VS economic profits

1. Use interest payment on debt as cost of financing, rather than the product of the cost of capital and the value of the capital stock.
2. Calculate the depreciation of assets based on a legal schedule rather than on an economic schedule.
3. Ignore the revaluation of the capital stock

Advantage: These differences ensure that the measurement of accounting profits does not depend on the revaluation of capital or on the method of measurement of the capital stock.

Robustness - Comparison to Alternative Measures of Profits

- Profits inferred from markups

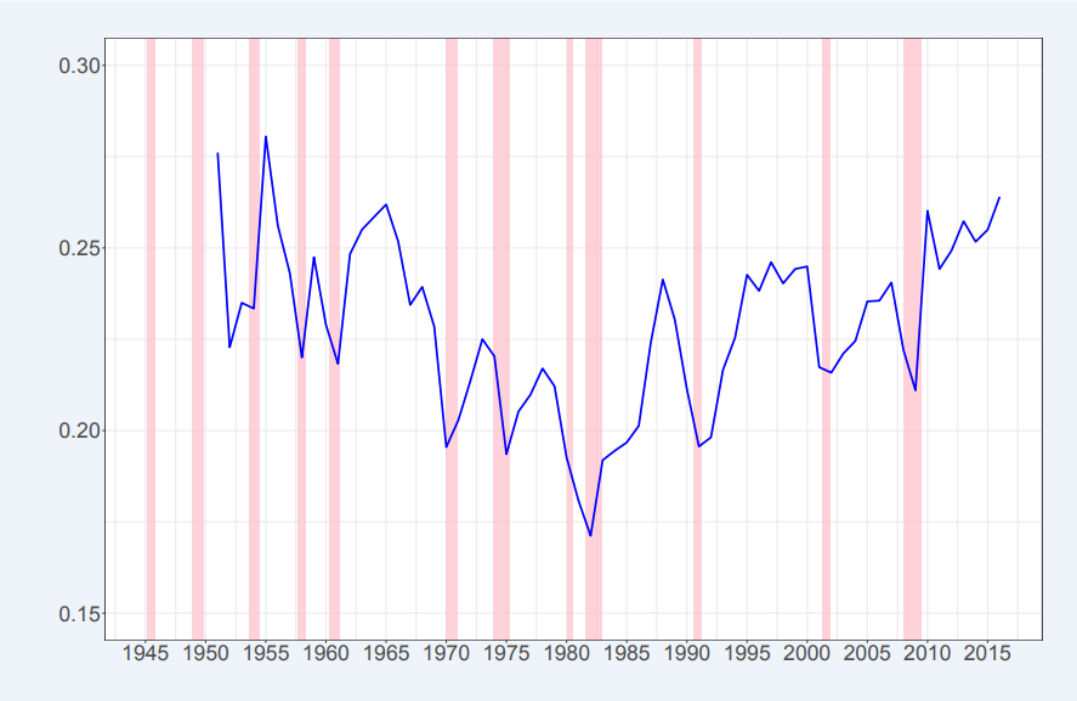


Figure 9: Profits Implied by Production-Based Markups

Robustness - Comparison to Alternative Measures of Profits

Profits inferred from markups

$$\frac{\Pi_t}{sales_t} = 1 - \mu_t^{-1} \tag{12}$$

$$ProfitShare_t = \Pi_t * \frac{sales_t}{GrossValueAdded_t} \tag{13}$$

Assumptions

- Firm level production technology displays constant returns to scale
- publicly traded non-financial U.S. firms are representative of the non-financial corporate sector

Discussion

Three possible explanations for the trend of profit share

1. Adjustment Costs
2. Missing Intangible Capital
3. Competition

Explanation 1 - Adjustment Costs

Theory

- Model - In periods of growth:

$$investment \uparrow \longrightarrow profits \downarrow \longrightarrow profits \uparrow$$

- Prediction - An increase in profits should be accompanied by an increase in the ratio of investment to capital.

Explanation 1 - Adjustment Costs

No evidence

- We find suggestive evidence that adjustment costs may have contributed to variation in profits during some periods, e.g., 1960s
- Other periods do not easily fit the adjustment cost story, e.g., 1950s and 2000s

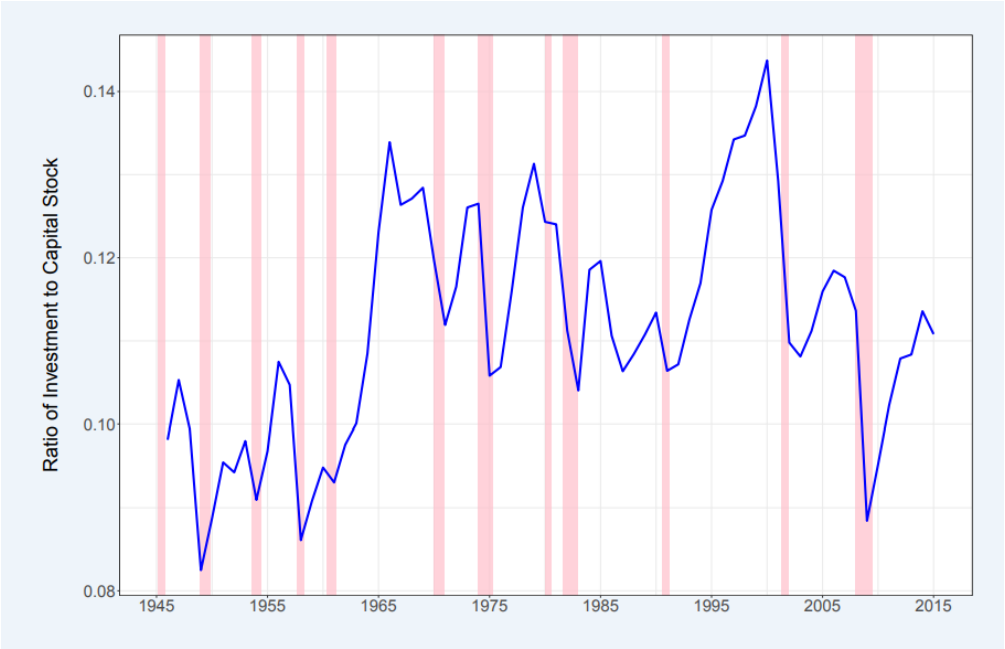


Figure 10: Ratio of Investment to Capital

Explanation 2 - Intangible Capital

Theory

$$\textit{intangible capital missing} \longrightarrow \textit{understate capital costs \& overstate profits}$$

A large literature has considered several forms of intangible capital that are NOT currently capitalized by the BEA and has argued that these are IMPORTANT for explaining asset valuations and cash flows.

Explanation 2 - Intangible Capital

Implausible

- Evidence that there is a large increase in the importance of intangible capital over the past 30 years, yet NO evidence that suggests a sharp decline in the importance of intangible capital over the period 1946–1984
- Measured intangible capital are an increasing share of total investment as well as total value of the capital stock and this increase is relatively stable over the entire sample period.

Explanation 3 - Competition

Theory

- Model

$$competition \uparrow \longrightarrow profits \downarrow \longrightarrow labor\ share \uparrow$$

- Prediction - Profit share is nearly perfectly negatively correlated with both capital and labor shares
- Data - Profit share
  - nearly perfectly negative correlation with the capital share (-94%)
  - little correlation with the labor share (-19%) - inconsistency with the model

Explanation 3 - Competition

Explanation for the inconsistency - profit sharing

- Union force - Blanchard and Giavazzi (2003)
- Industry Concentration - Barkai (2016a) and Autor et al. (2017)

Explanation 3 - Competition

Explanation for the **inconsistency** - profit sharing

- Union force - Blanchard and Giavazzi (2003)
  - 1946–1984

$$\textit{union force strong} \longrightarrow \textit{firms share profit with employees}$$

$$\longrightarrow \textit{weak correlation between profit \& labor shares}$$

  - 1984–2015

$$\textit{union force decline} \longrightarrow \textit{firms share little profit with employees}$$

$$\longrightarrow \textit{strong correlation between profit \& labor shares} \quad \text{Data: } -83\%$$

- Industry Concentration

Explanation 3 - Competition

Explanation for the inconsistency - profit sharing

- Union force
- Industry Concentration - Barkai (2016a) and Autor et al. (2017)

$$\textit{industry concentration} \uparrow \longrightarrow \textit{labor share} \downarrow$$

Explanation 3 - Competition

Explanation for the inconsistency - profit sharing

- Union force
- Industry Concentration - Two notable policy changes point to the early 1980s as a possible break in the trends.
  - Antitrust enforcement - increased from mid-1940s to mid-1970s, declined from mid-1970s to present (Posner (1970), Gallo et al. (2000))
  - A more lenient merger guideline adopted by the Department of Justice in 1982. Industry concentration began rising after this change to the merger guideline (Peltzman (2014))