The Beginning of the Trend: Interest Rates, Profits, and Markups*

Anton Bobrov and James Traina

Federal Reserve Bank of San Francisco

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Abstract

Recent research argues the decline in real interest rates led to an economically large rise in aggregate markups over the past several decades. We show the magnitude of these estimates is highly sensitive to the sample start date: The change in markups from 1981 to 2014 is about 30% lower than from 1984 to 2014, a common reference period in the literature and a central target for model calibration. Measured from 1981, the average growth in the profit rate is 0.38% per year. Likewise, the linear trend in the cost of capital is over one-third smaller than commonly cited, with no absolute change between 1981 and 2014. We observe that the measurement sensitivity of markups, the required rate of return, and economic profit is due to the peak in real interest rates observed in 1984. These results have significant implications for model calibration and welfare estimation.

JEL Codes: E22, E25, E43, G32, L11

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1 Introduction

Expanding literature documents a small rise in corporate profits and a large decline in the labor share of gross value added. Barkai (2020) delineates these trends, finding that over the last 30 years, the capital share declined by 22% while the labor share declined by 11%. Offsetting the declines in labor and capital shares is a increase in the profit share. This change translates into an increase in economic profits of over $1.2 trillion from 1984-2014, or $14.6 per U.S. worker.

We carefully examine the long-term trend of declining capital costs and increasing profits. We demonstrate that the dramatic decline in the capital share of production and the increase in the profit share is significantly smaller than reported in the literature and extremely sensitive to the start date. A small extension of the sample period explains over 30% of the linear trend on the required return on capital, 20% of the trend in the profit share, and reduces the value of implied markups by one-third. In dollar terms, a more representative sample period suggests that the increase in economic profits over the last 30 years is smaller by almost $300 billion or nearly $3 thousand for each of the approximately 80 million employees of the non-financial corporate sector. This measurement point has important implications for model calibration, welfare quantification, and secular trend analysis.

Our findings contribute to the ongoing research agenda of documenting and understanding secular trends in the US economy. The trend of rising corporate profits has several implications for the economy. One of these is the rise of "super-star" firms (Autor et al., 2020). These highly successful companies dominate their respective markets and contribute to increased industrial concentration and potentially reduce competition (Grullon et al., 2019), however, the prevailing theory stops short of making conclusions regarding the welfare effects of larger firms and increased industry concentration. The trend of rising corporate profits may also be associated with declining business dynamism (Covarrubias et al., 2020; Akcigit and Ates, 2021). Declining new firm entry and competitiveness can lead to decreasing competition and increasing markups. Since 1980, De Loecker et al. (2020) found that firm-level measured markups have increased from 21% to 41% above marginal cost. Some have provided alternative explanations for the discrepancy between total income, labor income, and capital income. In a model with multiple sectors, Rognlie (2016) finds that the unexplained share of residual income and the higher role of net capital income is largely from the housing sector. Karabarbounis and Neiman (2019) find that economic profits are unlikely to explain the magnitude of the difference between US domestic GDP, payments to labor, and imputed rental rates of capital; They argue other sources likely contribute to rising residual income, including potential mismeasurement. Most recently, Davis et al. (2021) answer the puzzle of residual income to explain the divergence between public and private profits suggesting that public-firm profit rates halved, while non-financial domestic private-firm profit rates have doubled, indicating biases in extrapolating public-firm trends to the aggregate economy. Our estimates suggest the negative welfare implications of increasing firm size and concentration are muted relative to literature benchmarks.

Our findings also help reconcile the starkly different estimates of the magnitudes of these trends, including the decline of financial market rates and the rise of market power. We clarify one reason: start date. Quantifying the increases in profits and markups is essential to reconciliation in antitrust, monetary, fiscal, and welfare-relevant policy. A long-term trend points to individual industries becoming more concentrated at the national level, with some showing increased margins and markups (Grullon et al., 2019; Hall, 2018; De Loecker et al., 2020). A review by Basu (2019) reconciles the current estimates of markups and profits from three existing approaches in the literature. Basu (2019) finds that economic profit rates estimated from an aggregate level (Barkai, 2020), from production functions for a variety of inputs (Hall, 2018), and from production functions for a single input (De Loecker et al., 2020) produce a wide range of estimates. While production function approaches offer more convincing evidence of increasing markups, the magnitudes remain unclear (Berry et al., 2019). In a review, Syverson (2019) suggests that current models and empirical approaches to measuring aggregate market power require more concrete evidence to make conclusions about rising market power. Most recently, new productions function approaches show the increases in markups – and by extension profits – over the last 40 years is substantially dampened for most industries (Kirov and Traina, 2021), which Foster et al. (2022) attribute to an observable change in technology.

Finally, we contribute to macroeconomic modeling by offering a significant improvement to calibration targets. Precise measurements of profit rates and markups are necessary for welfare estimation and model calibration. For example, increased profit rates can affect debt sustainability. In the 2019 AEA presidential address, Blanchard (2019) argues the average marginal product of capital has declined, implying a lower welfare cost of debt. This assertion is based on Barkai (2020) finding that consistent with the magnitude of the increase in economic profits, the value of intangible capital would need to be much larger than is currently measured by the BEA. Edmond et al. (2018) find aggregate markups account for two-thirds of welfare costs in their benchmark model calibrated to aggregate markups from Barkai (2020). Similarly, Eggertsson et al. (2021) explain the recent US increase in Tobin's Q and divergence in marginal and average return on capital using a model calibrated to the current prevailing estimates of economic profits and markups in the US economy. Furthermore, Baqaee et al. (2021) show a procyclical response in TFP, calibrating their model with prevailing aggregate markup measures.

2 Methodology

The data on nominal gross value added and compensation of employees are originally from the National Income and Productivity Accounts Table 1.14 and the capital data are originally from the BEA Fixed Asset Table 4.1. Data for the risk-free rate of return is sourced from the market return on 10-year U.S.treasuries. We access the data through the replication package for Barkai (2020) and run the author's replication code which includes data to 1981, but only reports data to 1984 in the paper. We then compare the output of our results with those reported in the literature and conduct an accounting exercise to calculate the change in implied markups on gross value added and gross output. Lastly, we conclude our findings.

3 Results

Figure 1 displays the time series of the risk-free rate of return or market-priced real interest rate over the last 30 years. The red line portion shows the data extended to the maximum sample available in the replication package. The right panel of figure 1 plots the linear time trend of the real interest rate varied by sample. Moving across the x-axis removes years cumulatively from the beginning of the sample. Red points indicate the inclusion of the last year in the sample. A quadratic function is then fitted over these points. The linear trend for the real interest rate is steepest when starting the series in 1984 and ending it in 2014. Data from the beginning of the sample are highly influential. Extending the data on the required rate of return in the sample decreases the start of the time series by 4 pp.

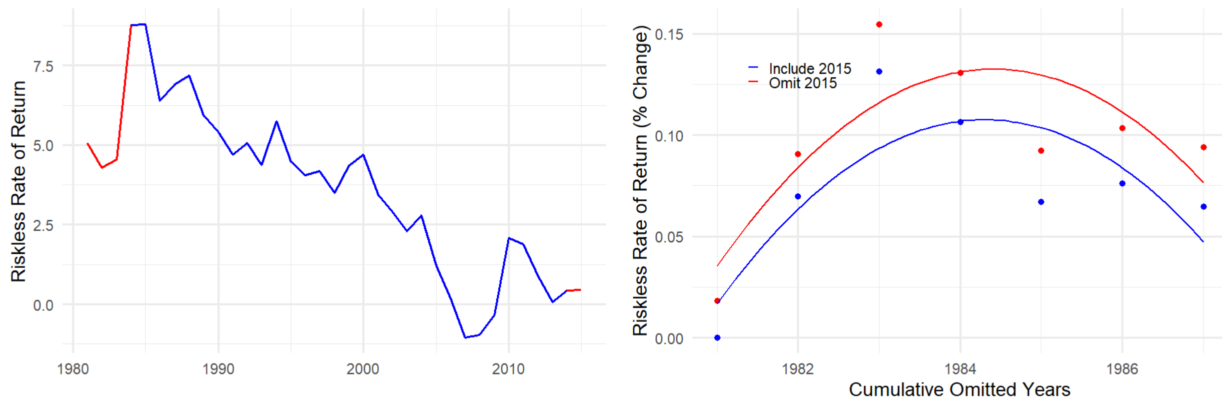

Figure 1: Risk-Free Rate of Return – R

Figure 2 displays the time series of the cost of capital or the required rate of return – R_c over the last 30 years. The red line portion shows the data extended to the maximum sample available in the replication package. The right panel of figure 2 plots the linear time trend of the required rate of return varied by sample. Moving across the x-axis removes years cumulatively from the beginning of the sample. Red points indicate the inclusion of the last year in the sample. A quadratic function is then fitted over these points. The linear time trend for the required rate of return is steepest when starting the series in 1984 and ending it in 2014. The years from the beginning and end of the sample are highly influential. Extending the data on the capital share in the sample decreases the start of the time series of the rate by 6 pp and increases the end of the time series by 2 pp. The capital or the required rate of return is measured with the equation below from Hall and Jorgenson (1967).

$$R_c = (\rho - E[\pi_c] + \delta_c)\,\frac{1 - z_c\tau}{1-\tau}$$

Here, ρ is the weighted average cost of capital[1], π_c is capital inflation, z_c is the net present value of depreciation allowances for capital, τ is the corporate income tax rate, and δ_c is the depreciation rate of capital. Crucially the decline in the required rate of return on capital is driven by the real interest rate. Note that the

[1] ρ is decomposed as $\left(\frac{D}{D+E}e^D(1-\tau)+\frac{E}{D+E}i^E\right)$ where D is the market value of debt, i^D is the debt cost of capital, E is the market value of equity, and i^E is the equity cost of capital.

peak in the risk-free rate of return occurred in 1984. Simply looking at the end points of the sample, the cost of capital is lower in 1981 than it is in 2014.

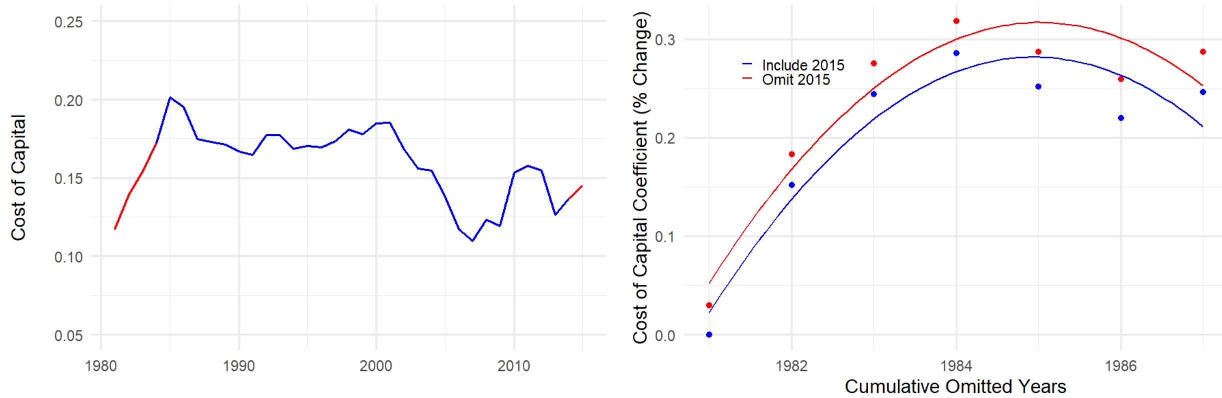

Figure 2: Cost of Capital (Required Rate of Return) – R_c

Figure 3 displays the time series of economic profit over the last 30 years using the estimation technique from Barkai (2020). The red line portion shows the data extended to the maximum sample available in the replication package. The right panel of figure 3 plots the linear time trend of economic profits varied by sample. Moving across the x-axis removes years cumulatively from the beginning of the sample. Red points indicate the inclusion of the last year in the sample. A quadratic function is then fitted over these points. The linear time trend for profit is steepest when starting the series in 1984 and ending it in 2014. The years from the beginning and end of the sample are highly influential. Extending the data in the sample increases economic profits at the start of the time series 8 pp and decreases the end of the time series by 5 pp. The share of economic profit in 1981 is the same as in 2014.

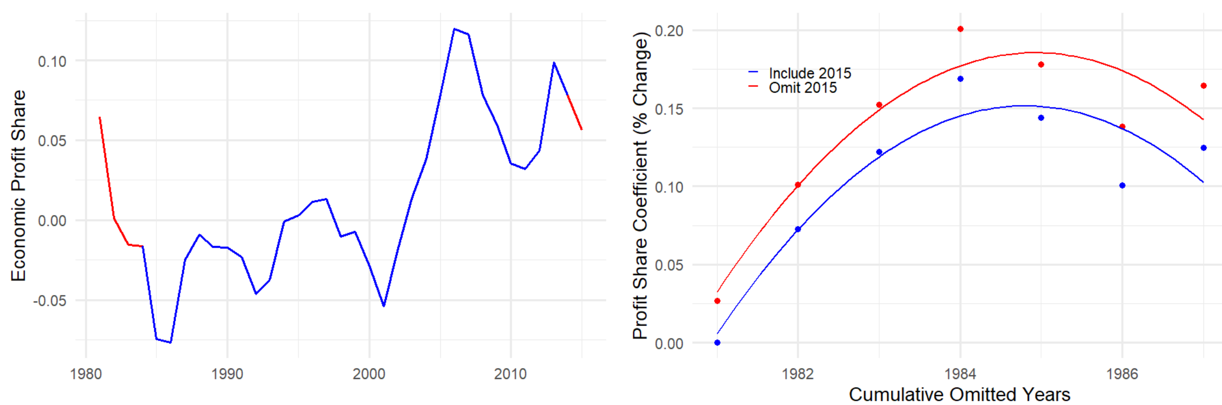

Figure 3: Economic Profit (Economic Profit Share of Output) – Π

To determine the effect of varying our sample on linear time trend lines, we exclude data from the beginning or end of the sample period for the risk-free rate of return – R, for the required rate of return on capital – R_c, and for the profit rate – Π, Table 1 summarizes the results of time series behavior on the coefficients of the linear time trends the risk-free rate of return, the required rate of return, and the economic profit share from the right-hand panel of figures 1, 2, and 3. The final column summarizes the implied change in firm markups on value-added – *mu* and gross output – μ^G . The values listed in table 1 are the fractional changes in the slopes of the linear trends. The changes are calculated by subtracting the ratio of the slope of the largest available data within the replication package (1981 - 2015) from the slope of each reduced sample. We find that the trend is steepest when examining the period from 1984 to 2014. Shorter or longer variations yield weaker results. We see that extending the data sample by a few years has a large effect on the long-term trend in profits. Profit rates also have an implication for markups as a measurement of pricing power. We next examine the impacts of our extrapolated profit rates on aggregate markups.

sample	ΔR	ΔR_c	$\Delta \Pi$	μ^G
1981 – 2014	0.020	0.030	0.030	0.94 – 1.15
1982 – 2014	0.090	0.180	0.100	0.92 – 1.17
1983 – 2014	0.150	0.280	0.150	0.91 – 1.18
1984 – 2014	0.130	0.320	0.200	0.90 – 1.19
1985 – 2014	0.090	0.290	0.180	0.89 – 1.20
1986 – 2014	0.100	0.260	0.140	0.89 – 1.19
1987 – 2014	0.090	0.290	0.160	0.90 – 1.19

Table 1: Time Series Effect

Following the example of Basu (2019), we extend our analysis with a back-of-the-envelope calculation to determine the change in firm markups on value-added and gross output to extract a measure of market power. The two markup concepts are related through $\mu = \frac{\mu^G(1-s^M)}{1-\mu^G s^M}$, where μ is the markup on value added, μ^G is the markup on gross output, and s^M is the intermediate input share of revenue. s^M is assumed to be 0.5, approximately the average value for the US economy in the long run. The corporate profits literature using a national accounting approach finds the profit -5.6 percent in 1984 and 7.9 percent in 2014, an increase of 13.5 pp. The implied markup ratio μ rises from 0.95 to 1.09 over this period. The markup on gross output, μ^G, rises from 0.91 to 1.22. Using the full sample, we find the profit rate at -3.25 percent in 1984 and 6.5 percent in 2014, an increase of 9.5 pp. μ then rises less from 0.97 to 1.07. The markup on gross output, μ^G, rises less from 0.94 to 1.15. Specific year samples are detailed in table 1. The implications for the revised estimates of markups are significant. The estimated markup for gross value added in 2014 is one-fourth smaller than currently implied and the estimated markup for gross output is one-third smaller than frequently referenced in the literature.

4 Conclusion

The exact quantification of the cost of capital and economic profits are sensitive to when you start measurement. A peak in the real interest rate in 1984 contributes to temporary high returns on capital and low-profit rates. Start date effects can explain up to one-third of the increase in profit over the last 30 years or up to $3 thousand per person. Likewise, the increase in markups on gross value added and gross output over the last 30 years is one-third and one-fourth smaller respectively than previously estimated. It is important to carefully consider the timing of data collection to help mitigate the impact of temporal sensitivity on the results.

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