

Human Capitalists

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Summary

- ▶ This paper: study pattern of equity compensation for high-skill workers (human capitalists).
- ▶ Approach:
 - Construct new dataset that measures equity compensation at the industry level.
 - Combine new data with model to estimate elasticity of substitution between factors.
- ▶ Main findings:
 - Equity has growth rapidly to become large share of compensation for high-skill workers (completely undoes drop in high-skill wage share).
 - Estimation: human and physical capital are strong complements, while both forms of capital and unskilled labor are highly substitutable.

Evaluation

- ▶ Great point with important implications for study of factor shares.
- ▶ Data work super clear and convincing.
 - Highly robust to many alternative measures.
 - My only suggestion: try to control for potential correlation between investment prices and depreciation (e.g., ICT).
- ▶ Modeling approach is promising but may need some tweaks.
 - Assumes share of equity owned by human capitalists fixed, all variation through wage share.
 - If misspecified, may affect estimates of vary strong elasticities between factors.
- ▶ Deferred compensation may resolve tension bet. investment prices and stock values.
 - Typical model: inv prices $\downarrow \implies$ stock values \downarrow , but stocks have boomed over this period.
 - Equity compensation rewards workers while keeping resources inside firm, might resolve puzzle.

Main Mechanism

- ▶ Estimation (in quantities):

$$\frac{s_{k,t}}{s_{h,t}} = \left(\frac{\alpha_k}{1 - \alpha_k} \right) \left(\frac{k_t}{h_t} \right)^\rho \omega_{R,t}$$
$$s_{n,t} = (1 - \alpha_c) \left(\frac{n_t}{y_t/z_t} \right)^\sigma$$

- ▶ Driving force: price of investment falls, k_t rises relative to other factors.
- ▶ Identifying ρ : $s_{k,t}/s_{h,t}$ falls (correctly measured) more than $\omega_{R,t}$.
 - Implies $\rho < 0$, high-skill wage share rising as $k \uparrow$.
- ▶ Identifying σ : $s_{n,t}$ falls.
 - Implies $\sigma > 0$, low-skill wage share falling as $k \uparrow$.

High-Skill Wage Share in the Model

- ▶ Share of high skill pay in the form of wages:

$$\omega_{R,t} = \frac{w_t^h h_t}{w_t^h h_t + (1 - \lambda)(1 - \mu^{-1})Y_t}.$$

- ▶ With some algebra, can express as

$$\frac{w_t^h h_t}{Y_t} \propto \frac{\omega_{R,t}}{1 - \omega_{R,t}}.$$

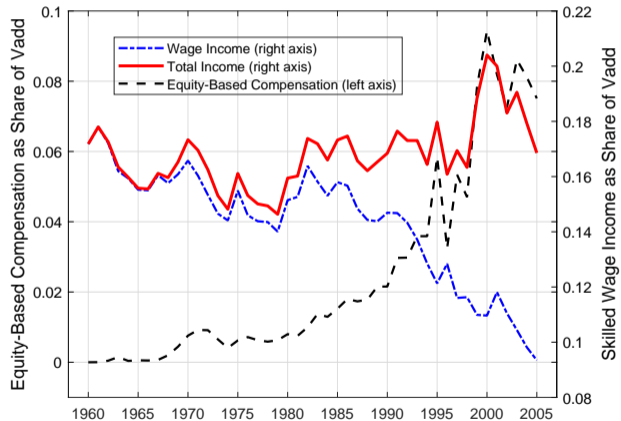
- ▶ For $\omega_{R,t}$ to move from 0.96 to 0.86, high-skill wage share of output needs to drop by 74%!
- ▶ But estimation implies that high-skill wage share is rising. How is this possible?
 - $\omega_{R,t}$ taken directly from the data, not computed in model.

Alternative Stories

- ▶ Problem: model assumes that high-skill workers always own **fixed share** of equity, all adjustments must come through wage share.
- ▶ $\omega_{R,t}$ could be falling due to rise in λ (human cap. profit share) or μ (markups).
 - This would potentially be fine for the authors' story + estimates.
 - But may be difficult to reconcile with factor and profit shares.
- ▶ Alternatively, high-skill compensation could **shift** from wages to equity.
 - Total compensation is $w_h h_t$, but we observe $\tilde{w}_h h_t = (1 - \gamma_t) w_h h_t$.
 - Supplemented by $\gamma_t w_h h_t$ in equity.
 - Could observe similar patterns with no change in high-skill share $s_{h,t}$.

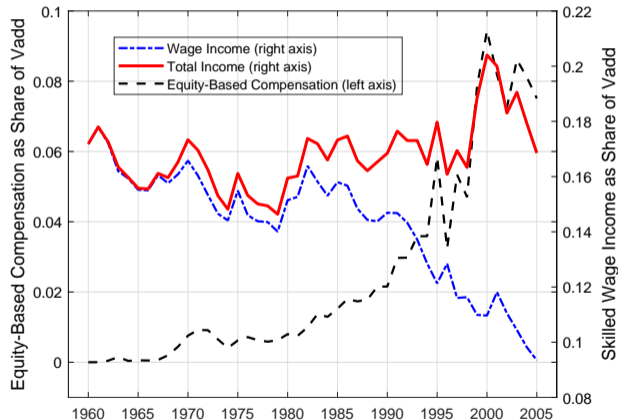
Alternative Stories

- ▶ Data look consistent with a **substitution** from wages to equity, but stable factor share.



Alternative Stories

- ▶ Model assumes that worker wage and equity compensation are unlinked, strongly rejects Cobb-Douglas (constant share). Are we sure this is right?



Model Suggestions

- ▶ Link model more tightly to data and empirical patterns.
 - Require $\omega_{R,t}$ to be consistent with model implications.
 - Allow for shifts in equity compensation, markups over time.
- ▶ Check/match implied stocks of k, h, n in addition to prices.

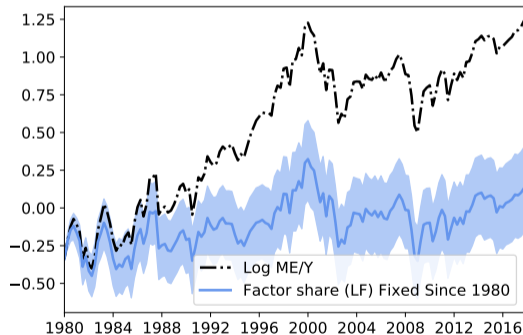
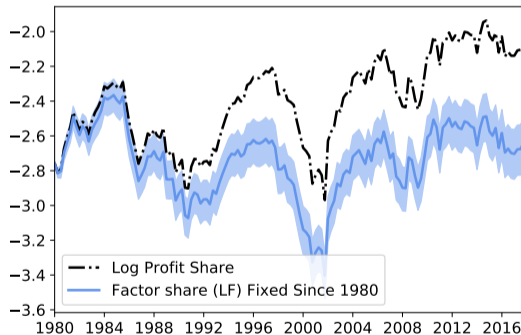
- Important example: capital condition

$$f_{k,t+1} = \mu \left[\tilde{p}_t(1 + R_f) - \tilde{p}_{t+1}(1 - \delta_k) \right]$$

- No frictions, or time variation in markup or interest rate \implies all movements in investment prices translate directly into size of capital stock.
- Is the implied investment is actually occurring?

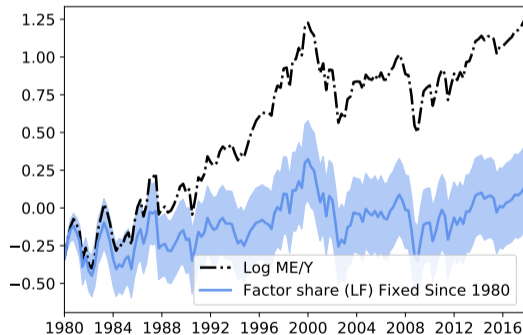
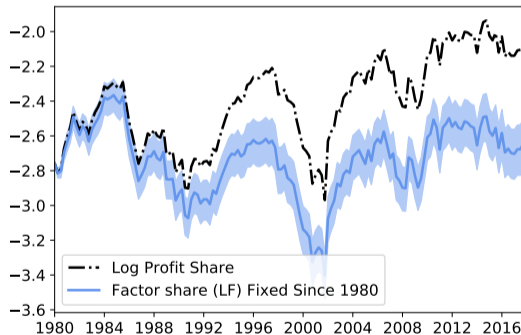
Factor Shares and Stock Prices

- ▶ Greenwald, Lettau, Ludvigson (2019): estimate role of factor shares on stock prices.
 - Blue lines: counterfactual **removing** persistent factor share component.



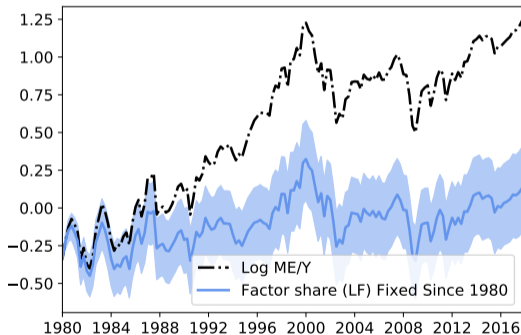
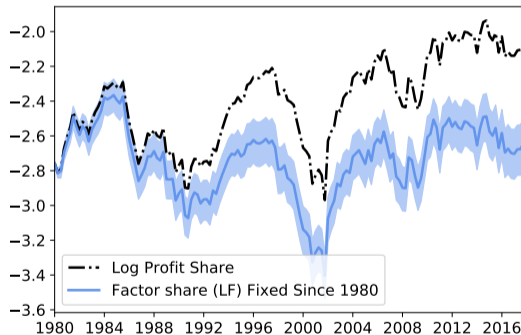
Factor Shares and Stock Prices

- ▶ Left panel: after-tax profit share doubles since 1980 (6.35% to 12.71%).



Factor Shares and Stock Prices

- ▶ Right panel: ratio of market equity to value added increases by 386% over this period.
 - Our estimates: fall in labor share accounts for 70% of this (271% growth).



Investment Shocks and Stock Prices

- ▶ Falling labor share linked to declining investment prices (Karabarbounis + Nieman, 2013).
- ▶ Typical model: shocks that lower the relative price of investment tend to **lower** stock values (at least relative to value added).
 - See e.g., Christiano, Motto, Rostagno (2014).
- ▶ This paper makes two contributions to resolving this puzzle.
- ▶ Contribution #1: shift in compensation toward equity offers an alternative story.
 - By keeping resources inside firm (with claims owned by workers), mechanically increases stock values while reducing wage share.
 - But doesn't explain correlation with investment prices.

Investment Shocks and Stock Prices

- ▶ Contribution #2: equity compensation **combined** with falling investment prices can potentially tie everything together!
 - When physical and human capital are strong complements, increased investment can increase human capitalist share of output.
 - By itself, this wouldn't help with stock prices, since more high-skill wages need to be paid out of the firm.
 - But if that compensation is deferred and held inside the firm then this could lead to a rise in equity values.
- ▶ Change in investment goods price is correlated with equity compensation share.
 - If some force leads firms to tilt increased HS compensation especially toward equity, this effect could be strong!

Conclusion

- ▶ Great documentation of underappreciated source of labor compensation.
- ▶ My recommendation: update model to take shifts in compensation structure seriously.
- ▶ Deferred compensation may reevaluate links between factor shares and stock values.