

ASSET INTENSITY AND LABOR'S SHARE OF NATIONAL INCOME

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ABSTRACT

This study uses National Income and Product Account data to measure the operating returns of U.S. non-financial corporations from 1959 to 1999 and links the decline in labor's share of national income to increased asset intensity. This study finds that while operating returns vary cyclically but without a trend factor, asset turnover, a component of operating returns, exhibits a strong trend component. From 1959 to 1978 asset turnover increased steadily, and from 1979-1999 asset turnover decreased steadily. The trend in asset turnover partially explains the trend in labor compensation as a share of corporate GDP. From 1959 through 1978, labor's share increased; from 1979 through 1999, labor's share has decreased. Increasing asset intensity results in a greater portion of sales revenue flowing to the providers of capital. This may be one reason why wages constitute a smaller share of national income relative to profits.

INTRODUCTION

From 1981-1999, profits began to constitute a larger share of national income relative to wages. In addition, during this period, equity investors received historically high average returns. Does this growth in corporate profitability and equity returns indicate that corporations have greater power over labor or does it indicate that investors are being rewarded for efficiencies generated through a period of extraordinary innovation? This paper argues that growth in asset intensity contributes to the increase in capital's share of national income.

Sales revenue flows to resource providers, either in the form of wages, interest, rent or profits. The share of revenue flowing to each provider depends upon the amount of the factor used and the factor's average per unit compensation. So for example, the relative share of national income flowing to capital depends upon the amount of capital used in production and its rate of return. If more capital is used to produce a dollar of output, and if the return on capital stays unchanged, then a larger proportion of sales revenue will flow to the providers of capital. Using the National Income and

Product Accounts (NIPA) data from 1959-1999, I show that changes in capital intensity explain a large portion of the change in the labor's share of national income. Decreases in capital intensity from 1959 to 1978 contributed to labor gaining an increasing share of national income. As capital intensity increased from 1979 to 1999, labor's share began to decline.

EQUITY RETURNS, PRODUCTIVITY GROWTH, AND NATIONAL INCOME SHARES

Historically high equity returns in the U.S during the 1980-1999 period were driven both by increased corporate profitability, decreased equity risk premiums, and investor expectations of windfalls due to technological innovation. Some economists believe that information technology fundamentally altered U.S. economic growth prospects, although the recent weakness in the technology sector creates doubts to this claim. Ironically, the increases in productivity and corporate profitability have not been accompanied by the same increase in labor income. Porteba (1999), using National Income and Product Account (NIPA) data from 1959 to 1996, shows that the national income share of employee compensation increased steadily from 1950 to 1980 before stabilizing near 68 percent. During the 1990s, the employee compensation share of national income decreased as corporate profitability increased. However, Porteba (1999) concludes that the decline in labor's share is explained by cyclical factors. As unemployment decreases, labor's share of national income also decreases. Porteba finds that the decrease in labor's share is less than that predicted by cyclical regression models.

The decrease in labor's share of national income has been accompanied with an increase in U.S. income inequality. Bernstein, Mishel and Brocht (2000) blame structural changes in the economy for a growth in income inequality. Using Congressional Budget Office (CBO) data, they note that during the 1977-99 period, constant dollar income growth for the top 1% was 84.8% and 44.6% for the top 10%, while the entire bottom 60% of the income scale lost ground during that

20 year period. The income of the lowest fifth of U.S. households fell by 12.5% over the two decades. I show that increasing asset intensity caused labor's share of national income to fall, which may have caused income inequality to increase.

DATA

The NIPA separate national income into payments to employees, corporate profits, net interest, rental income and proprietors' income. NIPA provides a category for employee compensation, which includes wages, salaries and supplemental benefits. Payments to the providers of equity and debt capital are the sum of corporate profits and net interest to bondholders. However, there are difficulties in using NIPA data because of the confounding of two or more categories. For example, the categories of rental income and proprietors' income can include payments to labor and to capital. For instance, rental income can include payments to labor if the owner performs maintenance on the property herself. A portion of the rent covers maintenance, which is compensation earned by the owner. If the owner hires someone to perform the maintenance, the value of the maintenance services will be included in labor income. Likewise, proprietors' income includes payments to labor and capital. The effort of the proprietor should reflect labor income, while the capital contributed by the proprietor should be apportioned to capital income. Some researchers allocate 66 percent of the proprietor's income to labor income and 33 percent to capital income. Others, citing the difficulty of justifying the split, ignore proprietor's income and only examine labor compensation and payments to capital (Porteba, 1999). This study does not consider proprietor's income or rent in calculating factor shares.

The NIPA have income data detail by industry and corporate form of organization, including GDP and income for both financial and non-financial corporations (NFC). Because of the difficulties in measuring the rate of return to tangible assets in the financial sector (Porteba, 1999), this study examines the income components of NFCs only. One major difference between the aggregate account and the NFC account is the measurement of net interest. The aggregate account includes net interest payments made by proprietorships, partnerships, and mortgage payments by households. The NFC account includes net interest payments only by non-financial corporations. When calculating the payment to corporate capital providers, this study adds the after-tax NFC profit to the net interest payments by NFCs. Income attributable to the providers of capital

include interest payments to holders of debt and profits accruing to the stockholders.

As expressed by the well known Dupont relationship, return on assets consists of the product of two components: asset turnover, the sales dollars generated by one dollar in assets, and profit margin, the conversion of sales dollars into net income. As Selling and Stickney (1990) indicate, return on assets commingles operational and financial determinants. Operational performance is better measured by the operating return on assets which is asset turnover times the operating profit margin. This study uses NIPA data to calculate aggregate NFC operating return on assets and its components. Operating profit margin is calculated as after tax profit plus net interest payments divided by the NFC GDP. Asset turnover is NFC GDP divided by total NFC assets. The product of operating profit margin and asset turnover yields return on assets: after tax profits plus net interest payments divided by total assets. Given constant shares for rent and proprietor's income, labor's share of national income will shrink if capital's share increases, which will occur if either the asset intensity (turnover) increases (decreases) or operating margin increases.

RESULTS

Table 1 lists the relevant aggregate and NFC national income data for selected years. Table 2 provides the summary statistics for labor's share of NFC GDP, capital's share of NFC GDP (net interest plus profits), rate of return of NFC assets (net interest plus profits divided by assets), NFC asset turnover (NFC GDP divided by assets), and NFC operating margin (net interest plus profits divided by NFC GDP). Figure 1 depicts operating return and operating margin and Figure 2 shows asset turnover.

From Table 2 and Figures 1 and 2, several stylized facts emerge. First, return on assets varies substantially over the 40-year period, but the variation appears to be due to cyclical, not trend, factors. Although operating return tracks operating margin, it has more variation than margin, due to the effect of asset turnover trends. Asset turnover has less apparent cyclical variation, but seems to be subject to two noteworthy trends: an increasing trend from 1959-1978 and a decreasing trend from 1979-1999. Operating return and operating margin differ by the largest amount in the 1976-1982 period, corresponding to the highest levels of asset turnover.

Using the following equation, operating return, operating margin and asset turnover were regressed against time to indicate whether statistically significant trends exist.

$$Y_t = \beta_0 + \beta_1 (t)$$

Table 3 lists the results of three regressions that were performed for each variable, one for the entire 1959-1999 period, the other two for the 1959-1978 and 1979-1999 sub-periods.

None of the variables exhibit a statistically significant trend coefficient in the 1959-1999 period. In the 1959-1979 subperiod, the coefficients for return and turnover are positive and statistically significant at 1% level and the margin coefficient is positive and significant at the 2% level, which indicates that increasing margin and turnover led to higher return. The turnover coefficient is negative and statistically significant at the 1% level for the 1979-1999 period. The negative turnover coefficient indicates a decreasing turnover (increasing capital intensity) over the period.

Although the data indicate that asset requirements for sales increased during the 1979-1999 period, anecdotal evidence show that asset requirements are subject to opposing forces. On one hand, capital deepening would contribute to increased asset intensity. While on the other hand, capital productivity increases should reduce asset requirements. As Oliner and Sichel (2000) indicate, capital deepening from 1970 to 1999 has resulted in an annual percent increase in labor productivity ranging from 0.62 to 1.10. Using NIPA data, Jorgenson (2001) measures the growth rate of output, labor input and capital input for the 1948-1999 period. Although GDP increased at an annual 3.46 percent, capital input increased at an annual rate of 4.12 percent, resulting in capital deepening. American workers, from physicians to retail clerks to teachers, have more tools available to them. Capital deepening increases the assets required to generate sales, resulting in a decrease in asset turnover. Capital productivity increases, which can take the form of improved equipment or improved processes that increase the utilization of assets, offset capital deepening. The 1979-1999 period witnessed a cornucopia of both types of innovations. Advances in computer circuitry reduced the cost of information technology, which led to improvements in a variety of equipment. Information technology advances also supported improved processes, which changed the way that firms conducted their business (Brynjolfsson & Hitt 2000). Examples include just in time production (JIT) and consolidated zero-balance accounts, both decrease current asset requirements: JIT through inventory and consolidated zero-balance accounts through cash and equivalents. A study of individual industries, which would be possible with NIPA data, may reveal that some industries have increased capital requirements, while others have lower

capital requirements, depending upon the relative strength of capital deepening versus capital productivity. We proceed by testing the impact of capital deepening upon labor's share by regressing labor's share of corporate compensation against asset turnover. Decreasing turnover, which corresponds to greater capital intensity, should result, *ceteris paribus*, in a greater share of sales dollars flowing to capital providers. The following regression, where L refers to labor's share and AT to asset turnover, was run for the entire 1959-1999 period and the two sub-periods, with the results listed in Table 4.

$$L_t = \beta_0 + \beta_1 AT_t + \epsilon_t$$

Over the entire 1959-1999 period, there is a significant positive relationship between asset turnover and labor's share of NFC GDP. The adjusted R² of 0.2573 indicates that approximately one quarter of the variation in labor share of compensation is due to the variation in asset turnover. The relationship is weaker in the first half of the period and stronger in the second half. During 1979-1999, the period that has been noted for a decreasing share accruing to labor, the adjusted R² is 0.481; approximately 50% of the variation in labor's share is due to decreasing turnover. As production becomes increasingly asset intensive, labor's share of national income decreases.

Hyslop (2001), using Current Population Survey (CPS) data, finds that income inequality increased between 1979 and 1985 with the 1979-1982 period registering the largest increases in inequality. From Figure 2, I see that NFC asset turnover declined significantly from 1979-1985, with the steepest fall at the beginning of the period. As corporations became more capital intensive, more income flowed to capital, and less to labor. Income inequality may have increased because the providers of capital, stock and bondholders, generally have above average incomes. Another factor leading to increased income inequality may be that low skilled workers were displaced proportionally more than high-skilled workers by the capital enhancements.

CONCLUSION

This study found that asset turnover increased almost steadily from 1959 to 1978 and then almost steadily decreased from 1979 to 1999. Although operating margin exhibited cyclical variation, it did not exhibit the same trend as turnover. Increased asset requirements resulted in a higher proportion of sales dollars flowing to the providers of capital, subsequently less flowed to labor and labor's share of income decreased. The

employee compensation share of NFC follows NFC asset turnover very closely, especially in the 1979 to 1999 period. Increasing capital intensity may also be responsible for the increased wage inequality if the low skilled, low wage labor was more likely to be augmented by capital. Further research should link the change in asset turnover to the extensive productivity literature.

Table 1, NIPA data for selected years (Billion \$)	1959	1969	1979	1989	1999
Gross product of corporate business	281.9	575.2	1530.6	3241.3	5667.6
Consumption of fixed capital	23.7	45.6	156.4	370.6	669.2
Net product	258.1	529.6	1374.1	2870.6	4998.4
Indirect business tax and nontax liability plus business transfer payments less subsidies	27.4	57.9	131.1	300.4	518.5
Domestic income	230.8	471.7	1243.1	2570.2	4479.8
Compensation of employees	180.3	378.6	1023.1	2101.4	3594.3
Wage and salary accruals	165.6	338	857	1756	3082.8
Supplements to wages and salaries	14.7	40.6	166.2	345.4	511.5
Corporate profits with inventory valuation and capital consumption adjustments	51	87.1	187.9	331.4	710.5
Profits before tax	51	84.5	235.5	312.5	661.7
Profits tax liability	23.6	39.7	88	141.5	253
Profits after tax	27.3	44.8	147.5	171	408.7
Dividends	10.7	20.4	41.5	126.5	304.3
Undistributed profits	16.6	24.4	106	44.5	104.4
Inventory valuation adjustment	-0.3	-5.9	-40.1	-16.3	-2.9
Capital consumption adjustment	0.3	8.5	-7.4	35.3	51.7
Net interest	-0.5	6	32	137.4	175
Gross product of financial corporate business	14.5	31.3	99	279.9	661.5
Gross product of nonfinancial corporate business	267.3	543.9	1431.5	2961.4	5006.1
Consumption of fixed capital	23.1	43.9	147	322.8	560.7
Net product	244.2	500	1284.6	2638.6	4445.4
Indirect business tax and nontax liability plus business transfer payments less subsidies	26.1	54.8	123.3	275.9	479.2
Domestic income	218.2	445.2	1161.3	2362.7	3966.1
Compensation of employees	171.3	358.5	966.2	1946.6	3272.2
Wage and salary accruals	157.4	320.2	809.5	1623.5	2805.4
Supplements to wages and salaries	13.9	38.4	156.7	323.1	466.9
Corporate profits with inventory valuation and capital consumption adjustments	43.7	73.5	150.1	264.2	530.3
Profits before tax	43.6	71.1	197.1	235.6	470.7
Profits tax liability	20.7	33.3	69.6	98.9	170.9
Profits after tax	22.9	37.8	127.5	136.7	299.8
Dividends	10	19.1	38.1	104.2	240
Undistributed profits	12.9	18.7	89.4	32.6	59.8
Inventory valuation adjustment	-0.3	-5.9	-40.1	-16.3	-2.9
Capital consumption adjustment	0.4	8.2	-6.9	45	62.5
Net interest	3.1	13.2	45	151.8	163.6
Net Stock	253,228	493,627	1,216,345	2,703,513	4,951,579

Table 2, Summary Statistics for Non-Financial Corporation NIPA Ratios					
	Labor's Share of Corporate GDP	Capital's Share of Corporate GDP	Rate of Return	Asset Turnover	Operating Margin
1959	0.640	0.116	0.106	1.056	0.095
1960	0.649	0.105	0.094	1.034	0.086
1961	0.648	0.103	0.089	1.009	0.084
1962	0.642	0.109	0.098	1.045	0.089
1963	0.638	0.110	0.100	1.055	0.090
1964	0.634	0.118	0.110	1.073	0.097
1965	0.628	0.132	0.125	1.094	0.109
1966	0.635	0.132	0.128	1.102	0.110
1967	0.644	0.123	0.116	1.076	0.102
1968	0.646	0.115	0.110	1.100	0.095
1969	0.658	0.108	0.103	1.102	0.088
1970	0.671	0.100	0.091	1.058	0.081
1971	0.659	0.107	0.098	1.069	0.086
1972	0.660	0.110	0.105	1.101	0.090
1973	0.666	0.123	0.120	1.130	0.100
1974	0.678	0.134	0.127	1.111	0.108
1975	0.656	0.128	0.121	1.105	0.103
1976	0.658	0.129	0.126	1.145	0.104
1977	0.654	0.135	0.137	1.173	0.110
1978	0.657	0.143	0.148	1.193	0.116
1979	0.668	0.144	0.148	1.177	0.117
1980	0.675	0.135	0.132	1.141	0.108
1981	0.660	0.129	0.125	1.155	0.102
1982	0.666	0.110	0.100	1.087	0.087
1983	0.654	0.112	0.102	1.075	0.088
1984	0.646	0.115	0.109	1.106	0.091
1985	0.649	0.102	0.094	1.080	0.081
1986	0.658	0.088	0.080	1.051	0.069
1987	0.653	0.109	0.102	1.072	0.087
1988	0.648	0.122	0.118	1.102	0.098
1989	0.648	0.120	0.114	1.095	0.095
1990	0.653	0.120	0.113	1.083	0.095
1991	0.648	0.118	0.108	1.049	0.093
1992	0.653	0.115	0.105	1.045	0.090
1993	0.649	0.117	0.106	1.043	0.092
1994	0.640	0.124	0.115	1.066	0.097
1995	0.632	0.133	0.123	1.056	0.104
1996	0.626	0.135	0.124	1.042	0.106
1997	0.619	0.146	0.135	1.038	0.115
1998	0.630	0.133	0.123	1.026	0.105
1999	0.634	0.130	0.118	1.011	0.103

Table 3: Time Trend Regressions

	1959-1999			1959-1978			1979-1999		
	Return	Margin	Turnover	Return	Margin	Turnover	Return	Margin	Turnover
Coefficient	0.00028	0.00013	-0.00058	0.00179	0.00089	0.00657	0.00019	0.00041	-0.00582
Standard Error	0.00020	0.00014	0.00058	0.00048	0.00035	0.00093	0.00056	0.00041	0.00082
t Stat	1.41503	0.94834	-1.00395	3.74567	2.54183	7.03002	0.33602	1.00636	-7.07890
P-value	0.16500	0.34880	0.32159	0.00148	0.02045	0.00000	0.74054	0.32689	0.00000
R Square	0.04883	0.02254	0.02519	0.43803	0.26413	0.73302	0.00591	0.05061	0.72508
Adjusted R Square	0.02445	-0.00252	0.00020	0.40681	0.22325	0.71819	-0.04641	0.00064	0.71061
Standard Error	0.01518	0.01070	0.04404	0.01235	0.00902	0.02410	0.01541	0.01134	0.02282

Table 4: Regression of Labor's Share versus Asset Turnover

	1959-1999	1959-1978	1979-1999
Coefficient	0.16048	0.09066	0.23470
Standard Error	0.04164	0.06439	0.05315
t Stat	3.85438	1.40794	4.41584
P-value	0.00042	0.17619	0.00030
R Square	0.27585	0.09920	0.50649
Adjusted R Square	0.25728	0.04916	0.48051
Standard Error	0.01160	0.01274	0.01008

Figure 1. Rate of Return on NF Corporate Assets

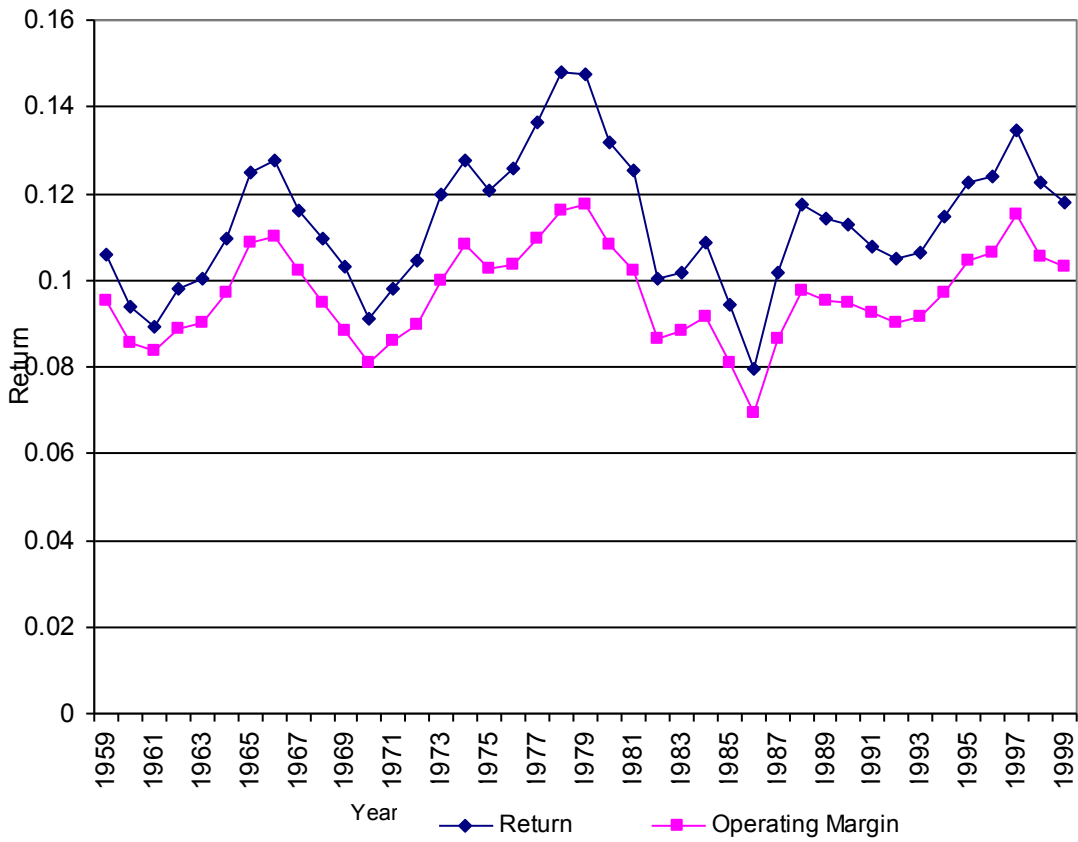
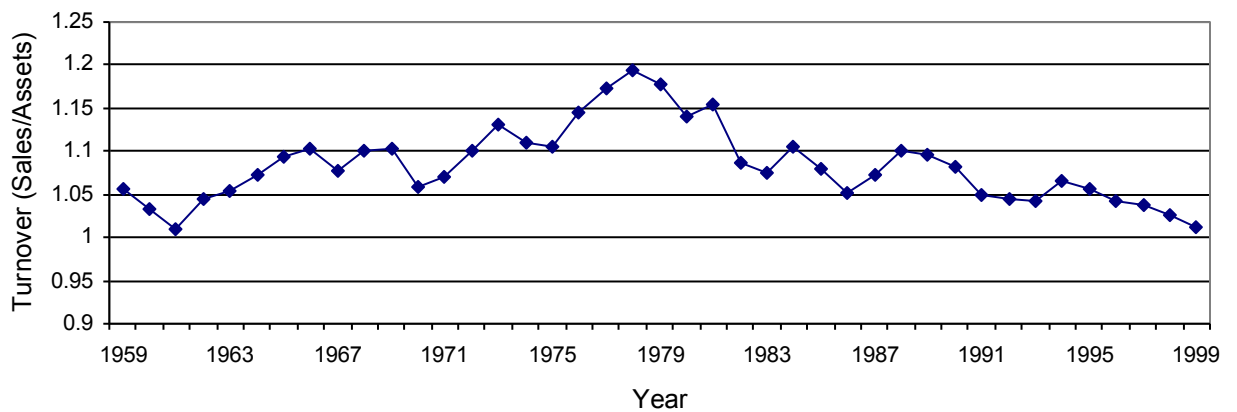


Figure 2. Asset Turnover for NF Corporations



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