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Discussion papers

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ASSET STRUCTURE, INDEBTEDNESS, AND THE RATE OF RETURN ON CAPITAL IN A SAMPLE OF FINNISH MANUFACTURING FIRMS IN 1961 - 1983

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I Introduction

In the analysis of capital investment and real saving the key variables are the rate of profitability, or the rate of return on capital, and the rate of return on saving. Their relationship, however, is the outcome of a highly complex economic mechanism including functioning of the capital markets and the distortionary incentives created by the tax system's treatment of capital income. The latter phenomena make up the institutional setting, in which life-cycle savers supply their excess funds to those units which take up the task of investing in productive capital.

It is very obvious that the functioning of capital markets and the details of the taxes on capital income may differ substantially between different countries. For this reason alone, it is necessary to produce empirical data on the operations of the participants of the capital markets. Here, however, one seems to face an almost unsolvable problem, i.e. one tries to measure something which seems to be almost immeasurable. This is, for example, the case with the problem of measuring "the stock of capital". For decades, the validity of explaining movements in real output by means of an aggregate production function has been seriously questioned. Still, to find a meaningful way of measuring the effects of investment incentives and the outcome of the investment process, one needs a measure for capital. Moreover, any problems associated with measuring capital are imbedded in the attempts to measure the rate of profitability. Yet, there are some additional problems in the latter attempt. One has to define the concept of "economic income". And it is quite obvious that the available figures, say reported in balance sheets and income

statements of firms, can at best be only the starting point in this endeavour. This is due to the conceptual issues in business accounting and the distortions created, for example, inflation in these measures.

In spite of these problems there are legitimate reasons for an attempt to find measures or indexes on the phenomena in capital markets, capital formation, and their interaction with taxes on capital income. The prolonged decline in the stock market in the 1970's turned the attention to the issues of capital income taxation. One conclusion from this line of research seemed to indicate that by creating a tax wedge between the rate of return on investment and the rate of return on saving, taxes introduce an intertemporal inefficiency with unavoidable welfare losses to the society. Though this welfare loss may be reduced by the risk-shifting implications of the income tax between the government and the investors, the reasonableness of the prevailing tax systems has been questioned and there have been frequent suggestions for tax reforms both at the personal and corporate level.

With these issues in mind. this study reports the results of empirical work based on data for 29 large manufacturing firms in Finland starting in the early 1960's and now extending up to 1983.[1)] In section II our problems is to find measures for the true operating income. Section III describes our choices in measuring firms' capital and in section IV the asset and liability structure of firms is presented. Using the figures of these sections, the annual rates of return on capital are created in the next section both on a pre-tax and after-tax basis. Section VI is devoted to distribution of corporate earnings between labor and capital and the final section focuses on the role of internal financing for investment purposes.

II Estimation of True Operating Income

From the perspective of profit sharing, it is useful to calculate an aggregate, the true operating income of firms, and to study the way in which it is divided between the various participants of profit-sharing, i.e. the debt-holders, the state and the local tax collectors, and the owners of firms. The operating income can be defined as the difference between the current earnings (including the interest on financial assets) and the current costs.[2)] There are two major problems why it is not easy to arrive at a satisfactory measure of the true operating income using the annual information provided by firms in their income statements.

The first problem is associated with the question of the estimation of the true cost of depreciation as contrasted with the tax depreciation applied by firms. Actually, the tax depreciation rates used by Finnish firms are of minor help here for several reasons. First, due to the combination of historical cost depreciation and accelerated depreciation rates, the tax depreciation charges may underestimate or overestimate the true cost of depreciation in early or later years of an asset's life. But the interpretation of the depreciation allowances reported by firms is further complicated by the fact that they are actually freely chosen by firms within the maximum rate specified by the tax laws.

Our choice to arrive at some defensible measure of economic depreciation (abstracted from price effects) was to apply the rates of depreciation estimated earlier by the Research Institute of the

Finnish Economy (and reported in Appendix 2) to our own estimates of the current value of the fixed capital of each firm reported in the next section of this study. Of course, this measure may deviate considerably from the tax depreciation rates used by firms.

The second serious problem is prevalent in the data prior to 1977 due to other tax allowances for which firms are eligible. The most important of these has been the inventory allowance, which the firms were not required to make public, though many did so, before 1979.[3)]

The details of the principles used in producing our figures are given in Appendix 1. Note that in this report we do not include in our measure of operating profit adjustments for net monetary gains due to inflation. This is because we aim at studying the rate of return on capital and the net monetary gains represent redistribution between lenders and shareholders. We also disregard real capital gains due to changes in relative prices of capital goods, which represent redistributions between shareholders.[4)]

III Estimation of the Stock of Capital

The task of measuring capital has been a tricky one in economics. This not only arises because the same term is often used to serve different purposes, but also because in construction of an appropriate measure some additional practical problems arise. First, the heterogeneity of capital provides a particularly thorny aggregation problem, which is aggravated by the fact that some forms of capital are, actually, intangible. If it is not easy, for these reasons alone, to find a quantitative index for "real" capital, the problems of finding a value index for capital are not smaller due to lack of market quotations. Though the heterogenous capital assets have different lifetimes and their relative values would adjust in face of changes in the market rates of interest or costs of other productive inputs, the problems could be dealt with provided that sufficient and frequent market quotations would be available. But capital investments tend to be irreversible in the sense that the second-hand markets simply do not exist, or if they do, they only provide information of the value of capital goods in isolation of the know-how imbedded in a firm as a whole.

The accounting practices add to these problems by providing information of the underpreciated part of capital of firms at historical costs only. Given the inflationary experience of the 1970's, it is obvious that these figures ought to be revalued.

What we wanted to find here was a measure for the (real and nominal) value of fixed assets (durable and tangible) of firms as if they would

be valued by the market for capital goods at each point in time (or annually). We limited our task to the case of assets which are both durable and tangible. This is, in principle, what is meant by the replacement value of capital goods. Since the depreciation cost has been netted out to arrive at the replacement value, our measure will be close to what Ward (1976) calls a "net capital stock" measure.

The procedure adopted in this study is the following (for details, see Appendix 2). We collected the fire insurance value of all buildings and machinery of the firms in our sample for 1954 to form an estimate of the value of fixed assets in 1954. Subsequently, this estimate was adjusted for each year by adding annual investment expenditure and subtracting our estimate of the cost of depreciation, both of which were in real terms. This method is usually called the perpetual inventory method. We report in table 1. our estimates for capital in 1961-1983 for the aggregated group of firms in our study.[5)]

The estimates in table 1 reveal that the informational value of the published balance sheets is remarkably distorted due to inflation. On the average, the reported balance sheet figures amount to 41 % of the estimates obtained in this study. The ratio varies from 49 % in 1966 to a low of 29 % in 1974, which was also the year with the top inflation rate. Partly, the figures differ also because we have used a different measure for the cost of depreciation than is used by firms.

Table 1. Estimates of the long-term capital stock (buildings and machinery, KT) aggregated over the total sample of firms of the study, millions of FMK:

(a) = the fixed capital as reported in the published balance sheets

(b) = the estimate of the capital stock obtained in this study

(c) = (a)/(b)

Number of firms: N= 29 for 1961-82, N = 26 for 1983.

	(a)	(b)	(c)
1961	1561207	3296940	.474
1962	1740778	3596630	.484
1963	1810599	3959600	.457
1964	1944119	4254610	.457
1965	1991975	4710240	.423
1966	2576330	5282300	.488
1967	2729050	5628040	.485
1968	3024020	6440120	.470
1969	2565750	6480580	.396
1970	2813090	7621520	.369
1971	3447350	9060420	.380
1972	4318360	11066000	.390
1973	4635860	13721000	.338
1974	5365260	18318000	.293
1975	7125600	21760000	.327
1976	9358850	25397000	.368
1977	10691000	28486000	.375
1978	11015000	28104000	.392
1979	10903000	29410000	.371
1980	11836000	32290000	.367
1981	13701000	37213000	.368
1982	16896000	41174000	.410
1983	15917000	37014000	.430

IV Asset and Liability Structure of firms

Firms' total assets, apart from the stock of capital, include their financial assets and inventories of goods. Their liabilities include their outstanding debts and the claims of the shareholders. This section provides information about these variables.

Typically, the financial assets and liabilities of Finnish firms are only to a minor extent of the variable capital value type. Hence, the book values could be used as reported in Appendix 3. The undervaluation problem of inventory data has been eliminated in our study with the help of the questionnaire we distributed among the firms in our sample. Hence, our data refer to the FIFO values of inventories.

It is clear that the undervaluation of the actual capital stock in business balance sheets has its counterpart in the undervaluation of the claims of the shareholders. The portion of the shareholders' equity with respect to the replacement value of the total assets of firms (broadly defined) was estimated as the difference between the estimated replacement value of capital and the total debt.

According to table 2, the share of financial assets has increased whereas the share of inventory capital has decreased towards the end of the data period. It may be that the former observation is due partly to new money market instruments created in Finland while the latter observation seems to be consistent with the increased rate of inventory turnover.[6)] It is no surprise that the share of

inventories, relative to its mean over time, is by far the most fluctuating assets as measured by the coefficient of variation.

Table 2. The Asset Structure of Firms, % of total assets

N = number of firms
MG = financial assets (gross)
G = inventories
K = capital
W = K + G + MG = total assets of firms

Year	N	$\frac{MG}{W}$	$\frac{G}{W}$	$\frac{K}{W}$
1961	22	.161	.337	.502
1962	22	.167	.323	.510
1963	22	.188	.292	.520
1964	22	.197	.281	.522
1965	22	.220	.253	.527
1966	28	.174	.235	.591
1967	28	.178	.227	.595
1968	28	.179	.220	.601
1969	28	.209	.231	.560
1970	28	.213	.228	.559
1971	28	.219	.214	.567
1972	28	.223	.189	.588
1973	28	.207	.203	.590
1974	29	.184	.213	.603
1975	29	.178	.207	.615
1976	29	.172	.201	.627
1977	29	.181	.180	.640
1978	29	.205	.167	.627
1979	29	.214	.176	.610
1980	29	.219	.192	.590
1981	29	.219	.183	.593
1982	29	.238	.176	.586
1983	26	.272	.174	.554
Mean		.201	.222	.577
Coefficient of variation		.124	.254	.069

Note. In this table, like in many others in this study, the number of firms is not the same in each year due to limitations in data availability. To some extent, this reduces the possibilities for year-by-year comparisons.

In table 3, we have produced estimates for two different concepts of the debt/equity ratio. The first, i.e. $(D/E)_1$, is obtained as the ratio of total debt to the equity capital while the second, i.e. $(D/E)_2$, only includes the long-term debt in the numerator. The latter may be more relevant for financing of investments because short-term debt is more closely linked with liquidity and inventory management than financing of long-term assets. Neither of these ratios is, on the average, as high as it is sometimes claimed to be on the basis of unadjusted balance sheet figures in Finland. But our estimates are consistent with the view that it has increased remarkably even in the period of an increasing real rate of interest on borrowing that started in the latter part of the 1970's. This is an interesting observation indeed and not an easy one to explain. One possibility is that debt is actually heterogenous in the sense that its effective cost is differentiated with respect to the type of debt. For example, the firms have increasingly utilized the possibility of borrowing back part of their contributions to pension funds at subsidized rate. Moreover, firms may have substituted foreign borrowing for domestic borrowing in face of interest rate differentials. As a matter of comparison, it is interesting enough that our estimates of the debt-equity ratio $(D/E)_1$ closely correspond to those obtained by Koskenkylä (1984), who used aggregate national income accounts data on the total Finnish manufacturing section 1960-1980 and who corrected the data on capital according principles similar to those we have adopted. For example, in 1961 his estimate was 0.72 and in 1980 it was 1.47.[7)]

In table 3, we also produce an estimate for what Koskenkylä (1984) calls "hidden reserves", defined as the difference between the actual values of capital and inventories and their undervalued counterparts (the book value of capital and the undervalued inventory).[8] An argument can be put forward that part of these reserves actually represent implicit tax liability to the government because these reserves are created through tax deferral using different kinds of allowances available. However, this argument is valid only for those firms which do not have unclaimed tax allowances, and their share is surprisingly low, at least in our data.[9] Moreover, part of these hidden reserves have been created by inflation and that has nothing to do with implicit tax liabilities.

Table 3. The Liability Structure of Firms, "Hidden Reserves", and the Debt/Equity Ratio

D = debt

OC = own capital, shareholders' equity (broadly defined) (= W - D)

HR = "hidden reserves"

D/OC = debt/equity ratio

Year	N	$\frac{D}{W}$	$\frac{OC}{W}$	$\frac{HR}{W}$	$(D/OC)_1$	$(D/OC)_2$
1961	22	.403	.597	.472	.706	.237
1962	22	.424	.576	.463	.764	.269
1963	22	.425	.575	.464	.765	.272
1964	22	.443	.557	.450	.817	.311
1965	22	.464	.536	.453	.880	.341
1966	28	.385	.615	.446	.630	.341
1967	28	.412	.588	.443	.702	.383
1968	28	.406	.594	.450	.690	.383
1969	28	.437	.563	.421	.779	.435
1970	28	.455	.545	.416	.863	.485
1971	28	.510	.490	.388	1.044	.588
1972	28	.520	.480	.386	1.082	.673
1973	28	.509	.491	.409	1.034	.583
1974	29	.480	.520	.436	.922	.480
1975	29	.507	.493	.414	1.027	.550
1976	29	.535	.465	.390	1.152	.522
1977	29	.547	.453	.396	1.206	.659
1978	29	.562	.438	.380	1.283	.736
1979	29	.547	.453	.383	1.206	.694
1980	29	.556	.444	.372	1.251	.696
1981	29	.563	.437	.364	1.289	.735
1982	29	.600	.400	.335	1.498	.880
1983	26	.613	.387	.317	1.585	.914
Mean		.491	.509	.394		
Coefficient of variation		.110	.171	.237		

V Rates of Return on Capital

By using our estimates for the true operating income and the stock of capital, we are now in a position to calculate the rates of return on capital firm by firm up to 1983 (Y/W in symbols). There are several reasons which motivate this calculation. First, the rate of return on capital is a widely used measure for corporate profitability and the one which, over the long run, has to adjust to reflect the potential distortionary effects of corporate taxation. Second, and for the reason mentioned above the estimates for the rates of return can be used in the analysis of the effects of inflation on the cost of capital and their interaction with taxes on capital income. Third, there have been intensive discussions in many western countries on the long-term trends in the rate of profitability. Though this discussion is partly related to the effects of the oil crisis in 1973, it has older roots starting with Nordhaus (1974) and extending to Holland and Myers (1980) in the U.S.A. and King (1975) in the U.K. Finally, given that we have own estimates both for the operating income and the stock of capital, we can study the connection between our rates of return and the ones obtainable when using published balance sheet information.

Most of the aspects mentioned above remain areas for future research. But even here it is worth cautioning against superficial interpretation of the figures presented. Given that each firm usually has several simultaneous projects and activities differing widely by characteristics and having been started in different years, the rate of return calculated as over all activities of each firm does not provide information about each single project. In addition to being an

aggregate measure in this sense, the rate of return may fluctuate dramatically in calendar time due to the time profile of cash flows associated with each sub-project. This is not quite what one wants if one desires to judge whether some project has been profitable or not. Hence, short-term fluctuations in the rate of return may actually be an indication of variability of this measure of profitability rather than of the variability of the profitability itself. Moreover, we only have information about the rates of return ex post, but the actual decisions are based on the rates of return ex ante. Due to random events, there is no way of telling whether the rate of return is unexpectedly low due to bad decisions or simply due to bad luck.

But the list of problems associated with the interpretation of the figures on the rates of return is not exhausted by these aspects. The economic reasons for systematically high rates of return in different industries may be quite diverse. The literatur of industrial organization emphasizes the conditions of competition and concentration and the effects of their persistency on the rate of return. Hence, rather than reflecting bad managerial skills, a permanently low rate of profitability may be an indication of relatively strong competition (like in the open sector). But there are other reasons. The degree of risk obviously varies from one project to another and this difference has to be reflected in persistent differences in the measures or profitability. Moreover, it is quite plausible that the distortionary effects of taxes on capital income vary depending on the size and kind of the projects. Finally, due to innovations, changes in tastes, and other conditions, capital tends to be continuosly reallocated between different industries and this

adjustment tends to be guided by the temporary deviations of the rates of return from their long-run levels.[10)]

With these reservations in mind, we present our estimates for the real rates of return both on a before-tax and after-tax basis in table 4 and 5. Casual comparison with other studies in Finland at once reveals large discrepancies due to definitional differences. Hence, we will limit ourselves to the following summary of our calculations without more detailed comparisons:

a) The pre-tax real rate of return is somewhat larger than 6 % while the after-tax return is somewhat above 5 %. Hence, on the average, the tax wedge associated with the corporate tax is about 1 %.

b) It is no surprise that there are relatively large and persistent discrepancies in the rates of return between different firms. Speculative ideas for these differences were given above. It is no surprise, either, that the rates of return in, forest industry are at the lower tail of the distribution.

c) The year-by-year fluctuations in the rates of return are substantial, providing information about the business cycle sensitivity of the Finnish economy. Part of this well-known picture is the observation that the time pattern of the average annual rate of return is closely associated with the exchange rate movements of the Finnish mark.

Table 4. The Pre-tax Real Rate of Return on Capital in Firms included in the Study, 1961-1983

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Mean over the Years
Ahlström Oy	8.1	5.7	6.1	5.6	5.1	4.7	5.4	5.6	0.8	4.2	5.8	5.0	4.4	9.0	7.9	5.0	8.2	18.2	10.9	9.1	6.6	6.8	10.8	6.91
Enso-Gutzeit Oy	..	..	..	..	..	..	-1.9	3.2	-3.6	2.9	-3.2	-1.0	3.8	5.5	1.7	-3.5	-1.7	-0.2	4.1	3.4	3.7	2.4	5.0	1.21
Oy Finlayson Ab	2.5	3.2	1.2	4.7	1.5	2.8	4.3	4.0	-8.3	4.5	-2.5	3.5	1.2	0.8	-1.7	-0.3	-4.1	3.5	9.0	8.7	6.5	-0.2	2.6	2.06
Oy Fiskars Ab	5.6	4.3	-1.2	8.1	3.6	-4.5	0.1	-1.1	10.1	10.6	5.2	6.3	11.4	18.7	8.6	5.4	1.7	2.2	13.7	4.2	4.4	1.3	-2.0	5.07
Huhtamäki Oy	15.7	11.7	10.9	13.5	10.2	4.5	4.1	3.6	3.1	8.1	6.6	6.1	7.7	7.3	7.4	6.0	7.1	8.4	13.3	11.0	14.2	10.6	..	8.69
Kajaani Oy	..	..	..	..	..	..	2.2	5.9	-14.4	10.4	2.5	-0.6	3.2	14.2	1.9	-1.5	-1.8	-2.2	4.8	9.4	3.8	0.8	5.1	2.57
Oy Kaukas Ab	6.9	5.6	1.9	5.9	4.7	-1.0	-0.5	6.1	9.4	12.5	2.6	0.6	8.2	8.3	-1.4	1.6	0.3	0.6	9.9	9.0	2.5	1.1	4.6	4.32
Kemi Oy	..	0.6	4.8	7.9	-0.2	-0.8	1.1	4.1	10.5	16.1	2.9	0.8	3.7	13.3	3.0	-2.5	-8.4	-9.5	1.8	5.7	5.9	-2.7	0.2	2.65
Kone Osakeyhtiö	7.1	9.1	2.1	4.6	7.4	1.0	6.9	1.8	9.4	7.4	8.3	14.5	15.8	14.6	10.3	21.8	17.0	13.9	12.9	16.5	18.0	20.4	20.2	11.35
Kymi Kymmene Oy	7.9	9.5	5.4	3.0	2.4	3.3	1.6	7.3	-4.6	3.5	0.5	2.8	5.5	10.5	1.7	-2.0	0.1	1.1	6.0	7.6	5.7	6.4	..	3.87
Lassila & Tikanoja Oy	..	..	..	..	..	..	7.4	13.1	-11.6	11.9	18.3	9.4	15.6	14.8	7.9	8.4	12.4	14.9	11.4	6.1	11.3	11.3	11.8	10.26
Oy Lohja Ab	12.6	6.1	14.9	8.9	17.4	13.6	8.9	8.7	5.6	0.9	10.2	7.2	10.3	9.5	8.5	7.5	8.2	6.6	20.0	12.0	8.0	10.6	13.7	10.00
Metsäliiton Teoll. Oy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	-0.1	-3.2	2.1	4.8	11.6	10.7	5.1	2.3	8.2	4.61
Oy Nokia Ab	3.2	5.2	7.0	4.5	4.8	7.3	21.8	18.5	3.3	20.3	15.0	5.3	11.7	11.4	8.1	4.5	4.7	4.6	8.2	11.4	15.5	12.0	15.9	9.75
Oulu Oy	..	..	..	..	..	..	1.5	7.1	-15.0	13.6	4.0	2.6	5.1	7.8	2.5	-1.7	-3.2	-4.7	2.0	9.3	5.2	-4.3	-0.4	1.85
Kust.osakeyht. Otava	7.9	6.3	9.1	9.2	12.1	10.8	0.4	5.6	-4.9	10.9	11.1	12.5	16.4	13.3	14.2	13.0	13.5	20.5	26.6	10.6	16.3	15.2	9.7	11.32
Outokumpu Oy	10.1	12.3	12.9	14.9	14.4	11.3	6.4	6.5	8.6	9.2	-3.7	-1.2	5.0	2.8	-3.1	-1.1	-1.2	2.0	3.6	4.1	4.1	-0.7	6.7	5.39
Oy Partek Ab	19.3	9.4	10.7	14.2	11.9	10.1	9.2	2.3	6.9	6.4	7.1	7.7	5.9	7.6	2.5	5.6	6.6	5.3	10.4	7.2	7.8	8.7	10.6	8.41
Rauma-Repola Oy	..	6.6	5.6	7.3	10.1	8.4	4.2	7.3	10.2	14.4	3.2	4.4	6.5	10.8	4.2	5.8	11.0	11.1	8.7	1.7	3.1	2.4	7.8	7.04
Oy W. Rosenlew Ab	..	4.9	4.0	4.9	3.0	-2.1	0.6	2.7	-0.3	8.1	8.5	6.2	6.3	13.0	5.4	4.1	1.1	4.4	5.4	10.3	11.2	4.7	7.1	5.16
Oy Wilh. Schauman Ab	..	..	..	..	..	..	4.2	6.5	0.6	8.3	8.3	8.6	11.4	11.4	-1.3	-1.7	-3.6	-0.5	5.8	10.9	7.6	1.6	2.7	4.75
G.A. Serlachius Oy	..	..	..	..	..	..	7.5	10.7	12.0	13.5	11.3	8.7	12.1	17.2	11.6	2.1	7.2	10.8	16.7	16.7	9.6	10.2	15.3	11.36
Oy Strömberg Ab	7.5	7.3	-2.7	5.6	4.6	1.5	2.2	3.8	10.3	5.8	4.8	6.1	3.2	6.4	11.1	13.5	12.7	7.0	4.3	7.8	11.7	14.0	..	6.75
Suomen Sokeri Oy	12.8	10.1	5.0	22.1	-1.1	8.8	3.7	3.5	7.9	5.9	4.9	-2.4	12.9	0.0	11.2	12.3	12.2	8.8	28.6	6.6	11.4	11.1	10.7	9.00
Suomen Trikoo Oy Ab	3.0	7.8	8.3	6.5	-2.8	4.6	0.7	0.5	-2.0	4.1	-3.0	2.2	2.8	3.6	2.8	1.4	-0.8	-3.4	1.9	3.6	2.8	12.0	-0.6	2.43
Tamfelt Oy	2.3	6.4	9.4	2.8	3.7	12.7	9.8	6.0	6.6	-2.3	6.0	5.5	7.3	8.1	0.0	1.4	2.7	3.0	17.6	5.1	4.9	0.8	2.3	5.31
Tervakoski Oy	..	16.9	14.1	0.9	9.9	7.6	10.2	1.2	-1.0	7.0	1.1	-1.6	-3.9	6.2	-0.6	-7.5	-7.5	-5.8	-0.6	-1.6	-1.6	-8.0	..	1.68
Oy Wärtsilä Ab	5.5	5.2	4.4	0.9	5.2	6.6	8.8	9.9	8.9	11.1	5.4	6.5	7.1	9.6	12.6	0.9	6.0	9.7	4.4	7.1	12.0	12.5	15.9	7.66
Yhtyneet Paperiteht.Oy	6.6	5.1	5.3	2.0	-1.2	-0.4	0.0	1.4	2.9	7.8	2.8	4.9	0.8	6.7	3.8	-1.5	-0.8	3.4	12.8	14.2	11.3	5.6	8.6	4.44
Annual Unweighted Mean over Firms	8.03	7.24	6.33	7.18	5.76	5.04	4.67	5.56	2.19	8.47	5.14	4.66	7.19	9.37	4.85	3.23	3.51	4.78	9.86	8.22	7.88	5.82	7.70	6.20 / 6.06

Table 5. The After-Tax Real Rate of Return on Capital in Firms included in the Study, 1961-1983

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Mean over the Years
Ahlström Oy	6.5	4.3	4.8	4.3	3.5	3.0	3.7	3.8	-1.1	2.8	4.0	3.8	3.8	8.1	7.1	4.6	7.6	17.6	10.5	8.8	6.5	6.7	10.6	5.88
Enso-Gutzeit Oy	..	..	..	..	..	..	-2.6	2.7	-4.0	2.5	-3.6	-1.4	3.4	5.1	1.4	-4.2	-2.1	-0.4	3.9	3.2	3.2	1.9	4.4	0.79
Oy Finlayson Ab	1.0	1.7	-0.3	3.4	-0.1	1.4	2.5	2.3	-10.2	2.8	-3.5	2.6	0.5	0.5	-2.0	-1.2	-4.1	3.2	8.7	8.6	6.4	-0.1	2.3	1.15
Oy Fiskars Ab	4.5	3.1	-2.2	7.1	2.9	-5.0	-0.3	-1.3	10.1	10.2	4.7	5.7	10.8	18.1	7.7	4.8	1.0	1.5	13.0	3.5	3.7	0.5	-2.8	4.40
Huhtamäki Oy	11.9	8.7	7.8	10.3	7.9	4.0	3.4	3.2	2.6	7.7	6.2	5.8	7.4	6.7	7.1	5.3	6.6	8.1	12.8	10.5	12.3	8.7	..	7.50
Kajaani Oy	..	..	..	..	..	..	2.2	5.7	-14.3	10.4	1.6	-0.1	2.8	13.8	1.6	-2.2	-2.5	-2.8	4.1	8.6	3.2	0.5	4.6	2.19
Oy Kaukas Ab	5.8	4.1	0.9	5.2	3.6	-2.3	-1.2	5.5	9.4	12.1	1.0	0.1	7.7	7.9	-1.6	0.9	-0.2	0.2	9.4	8.4	2.0	0.6	4.1	3.63
Kemi Oy	..	-0.2	4.1	7.5	-0.9	-1.4	1.1	4.3	9.8	15.5	2.7	0.3	3.5	13.1	2.8	-2.8	-8.6	-9.7	1.6	5.7	5.9	-2.6	0.1	2.35
Kone Osakeyhtiö	4.9	6.8	0.7	4.0	7.0	1.0	6.8	1.8	9.2	7.1	7.9	13.9	15.5	14.4	9.9	21.3	16.7	12.9	13.1	16.4	17.6	20.2	19.9	10.83
Kymi Kymmene Oy	5.8	7.4	3.8	2.4	1.8	2.1	1.2	6.7	-4.7	3.0	-0.6	1.8	5.0	9.8	1.1	-3.3	-0.5	0.6	5.4	6.9	5.0	5.7	..	3.02
Lassila & Tikanoja Oy	..	..	..	..	..	..	6.9	12.0	-13.2	11.4	17.1	8.6	15.1	14.1	6.9	7.6	11.0	14.0	11.0	5.9	10.8	11.2	11.3	9.51
Oy Lohja Ab	8.2	2.0	11.3	6.5	14.6	11.3	5.9	6.5	3.3	-0.1	9.1	6.3	9.3	7.9	7.4	6.4	7.5	5.8	18.6	11.1	7.4	10.0	12.9	8.23
Metsäliiton Teoll. Oy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	-0.8	-4.2	1.9	4.3	10.6	10.0	4.1	1.9	7.9	3.97
Oy Nokia Ab	1.7	3.7	5.5	3.0	3.4	0.3	16.0	14.5	0.1	16.6	11.9	3.9	10.1	10.6	7.3	3.6	4.2	4.1	6.8	10.0	14.3	10.4	15.5	7.72
Oulu Oy	..	..	..	..	..	..	0.6	6.1	-16.4	11.7	2.0	2.1	4.2	7.2	1.9	-2.4	-3.6	-4.9	1.6	8.8	4.5	-4.6	-0.9	1.05
Kust.osakeyht. Otava	5.1	5.2	8.7	7.7	9.1	7.9	-0.1	4.7	-5.4	10.5	10.7	11.9	15.8	11.1	12.2	11.4	11.9	17.8	23.9	8.4	15.3	14.0	9.6	9.89
Outokumpu Oy	4.2	8.4	8.8	10.1	10.4	7.7	4.8	4.5	6.3	7.6	-3.8	-1.4	5.0	2.7	-3.4	-1.2	-1.5	1.9	3.4	3.9	4.0	-0.7	6.7	3.84
Oy Partek Ab	15.4	6.3	5.7	10.3	8.2	7.1	7.3	-0.1	4.8	4.3	5.2	5.6	5.1	6.8	1.5	4.7	5.8	4.4	9.4	6.1	6.7	7.4	9.5	6.41
Rauma-Repola Oy	..	5.2	4.8	6.8	9.7	7.9	3.9	7.0	9.8	13.9	2.7	3.9	6.2	10.5	3.8	5.4	10.4	10.5	8.3	1.7	2.9	2.3	7.4	6.59
Oy W. Rosenlew Ab	..	2.6	2.1	3.4	1.5	-3.5	-0.8	1.2	-0.7	7.6	7.0	5.5	5.7	12.2	4.9	3.3	0.5	3.7	4.7	10.0	10.6	4.3	6.4	4.19
Oy Wilh. Schauman Ab	..	..	..	..	..	..	2.7	5.8	-0.3	7.3	6.5	7.0	10.6	11.2	-1.5	-2.1	-3.7	-0.7	5.7	10.5	7.0	1.2	2.2	4.08
G.A. Serlachius Oy	..	..	..	..	..	..	6.5	9.3	10.7	12.1	9.0	7.9	11.6	16.3	10.4	0.7	6.2	9.3	14.7	15.6	8.6	9.0	14.0	10.11
Oy Strömberg Ab	5.3	5.0	-4.6	3.8	2.1	-0.4	0.9	3.5	9.7	5.0	3.7	5.1	2.3	5.6	10.0	12.0	11.5	6.8	4.2	7.6	11.6	14.0	..	5.67
Suomen Sokeri Oy	8.9	9.0	3.6	20.4	-2.6	7.6	2.2	3.1	6.9	5.1	4.0	-3.8	11.9	-1.0	10.3	10.8	10.8	7.8	28.0	6.3	10.4	10.0	9.9	7.81
Suomen Trikoo Oy Ab	1.6	6.6	6.4	4.6	-4.0	2.8	0.7	0.5	-2.0	3.8	-3.2	2.1	2.5	3.4	2.6	0.7	-1.1	-3.5	1.5	3.2	2.3	10.9	-1.2	1.79
Tamfelt Oy	1.5	5.6	7.5	1.0	1.4	10.0	6.6	2.6	4.7	-2.9	5.6	3.3	3.5	6.0	-0.2	0.9	1.8	1.1	15.9	3.3	3.9	-0.1	1.3	3.66
Tervakoski Oy	..	14.8	11.5	-1.8	6.3	2.9	7.4	0.7	-2.8	5.3	-0.1	-1.9	-4.1	5.7	-0.9	-8.1	-8.1	-6.0	-1.0	-2.0	-1.9	-8.1	..	0.37
Oy Wärtsilä Ab	4.1	3.4	3.4	-0.1	4.3	6.0	8.4	9.6	8.7	10.9	5.3	6.3	7.0	9.5	12.3	0.8	5.8	9.3	4.1	6.8	11.7	12.4	15.6	7.20
Yhtyneet Paperiteht.Oy	4.8	2.8	3.2	0.7	-2.1	-1.2	-0.8	0.8	2.1	7.6	2.4	4.5	0.4	6.2	3.4	-2.1	-1.2	2.6	12.2	13.9	11.1	5.3	8.2	3.69
Annual Unweighted Mean over Firms	5.62	5.30	4.43	5.48	4.00	3.14	3.42	4.54	1.18	7.56	4.12	3.91	6.52	8.70	4.25	2.46	2.90	4.12	9.18	7.64	7.28	5.27	7.18	5.14 / 5.08

VI Labor Income, Profits, and Profit Sharing

It is of some interest to consider the relationship between capital income and labor income and their time pattern in our data. Define w = total wage bill (per year per firm) and c = Y - T similarly as the capital income after corporate taxes T. Their shares are reported in tables 6.

Table 6. Relative shares of labor income and capital income in 1961-1983

w/(w+c) = share of labor income

c/(w+c) = share of capital income

Year	w/(w+c)	c/(w+c)
1961	.755	.245
1962	.781	.219
1963	.817	.183
1964	.750	.250
1965	.835	.165
1966	.864	.136
1967	.835	.165
1968	.766	.234
1969	.890	.110
1970	.682	.318
1971	.842	.158
1972	.847	.153
1973	.737	.263
1974	.637	.363
1975	.802	.198
1976	.917	.083
1977	.844	.156
1978	.779	.221
1979	.675	.325
1980	.685	.315
1981	.694	.306
1982	.751	.249
1983	.655	.345
Mean	.776	.224

Note that relative to the standard procedure of calculating the share of profits and wages of the value added, table 6 gives figures for the share of profits that are "too low" because we have deducted the cost of depreciation and corporate taxes. Hence, table 6 relates the wage bill to the after-tax operating income.

It is in accordance with the common understanding that capital income reveals a much higher variability than labor income over the years. In good years, the ratio of capital income exceeds its mean value of 0.224 and falls short of this in bad years. The coefficient of variation (not reported in table 6) is 1.20 for labor income and 1.49 for capital income over the years 1961-1983.

The various groups which have claims on the total return on capital, i.e. the operating income Y, are the debt-holders, the tax authorities (both state and local), and the equity-owners of the firms. Profit sharing, summed over the firms in our sample, is presented in table 7 below.

As our analysis in earlier sections reveals, our sample includes both firms with an abnormally high rate of return on capital and firms with a rate of return which is barely positive on the average. In other words, we have both firms with expansionary prospects and firms which obviously are in a later stage of their "life-cycle". Since some of those in the latter group are relatively large, the net operating profit, aggregated over the sample, remains quite low in table 7. On the average, the interest on debt takes the bulk of the operating profit and even the share of corporate taxes is larger than the share of net operating profits. However, due the high share of interest

expenses, the effective tax rates on coporate income remain fairly low though highly variable. It is again of interest to compare our results with those reported in Koskenkylä (1984) and note that the general picture is surprisingly similar as regards the effective tax rates.[11] However, the average share of net profits calculated by Koskenkylä (1984) is much higher than in our data while the share of the interest on debt is much lower in his study. This obviously points to the weights obtained by the low profitability, on the one hand, and high profitability firms, on the other hand, in our sample.

Also note the variability of corporate income in table 7, measured by the coefficient of variation. In profit sharing, the residual net operating profit shows a much higher variability than corporate taxes and the interest expenses. But note the effect of the various allowances in the tax law on the reported accounting profits, which are actually quite stable.

Table 7. Profit Sharing in the Data Sample in 1961-1983

Operating Income (Y) = Interest on Debt (I) + Taxes (T) + Net Operating Profit (NY)

Effective Tax Rate = Ratio of Taxes to Operating Income

Year	Accounting profit	Net Operating Profit (NY)	Taxes (T)	Interest on Debt (I)	Operating Income (Y)	Effective Tax Rate
1961	51282	97708	58815	42591	201962	.291
1962	48874	99904	70830	70847	241581	.293
1963	53150	67253	68684	78225	214162	.321
1964	60273	106093	61237	94123	261453	.234
1965	64525	45262	66048	109625	220935	.299
1966	63284	16107	88231	129202	233540	.378
1967	73176	-9190	89151	209424	289385	.308
1968	93078	181375	89570	236517	507462	.177
1969	123209	-167713	89101	287838	209226	.426
1970	136162	488067	99463	332925	920455	.108
1971	92362	-178564	127423	469058	417917	.305
1972	119396	-189705	95981	576925	483201	.199
1973	173448	339727	97281	676659	1113670	.087
1974	232502	1149150	132274	909340	2190760	.060
1975	182983	-107117	155186	1164260	1212320	.128
1976	37368	-1241000	228403	1468290	455695	.501
1977	16170	-946888	181760	1705700	940575	.193
1978	164329	-527861	179797	1953320	1605260	.112
1979	314303	943224	210368	1945440	3099030	.068
1980	416684	829298	195366	2377530	3402190	.057
1981	445443	384066	261532	3110980	3756580	.070
1982	297702	-764148	260860	3572480	3069190	.085
1983	571568	710650	235101	3574450	4520200	.052
Coefficient of variation	1.28	12.09	0.92	1.46	1.45	.64

VII Some Aspects of Investment Financing

Some aspects of the role of internal financing can be mentioned on the basis of our data. One could perhaps say that the main target of the current corporate tax system in Finland, including the various allowances, has been to guarantee some level of internal financing of corporate investment. The aggregate figures in table 7 give quite a pessimistic view of the role of internal financing in 1961-83, i.e. on the average the actual net operating profits fall short of the accounting profits reported by firms. And it is the latter variable which apparently gives at least a rough measure of distributed profits in the case of Finland.[12)] However, the aggregated figures hide the actual differences between the firms.

Note first that there are two basic differences between the accounting profits in table 7 and our estimate for the net operating profit. First, the latter includes our correction for the inventory allowance and some other allowances which tends to raise the figures for operating profit. The second differences is due the our estimate of the cost of depreciation which, of course, is subtracted from the net operating profit. Suppose for a moment that our estimate for the rate of depreciation is too large. This would imply that our estimate for the capital stock is too low. But because the cost of depreciation is estimated as a product of these two, it is not obvious whether the potential bias in the cost of depreciation is upwards or downwards. The same conclusion is obtained if the rate of depreciation used is too small. However, we have some reasons to believe that our estimates can be regarded as "reasonable". We calculated, year-by-year and

firm-by-firm, the ratio of the accounting depreciation used by firms according to our estimate of the depreciation cost. For those firms which show average profitability in table 4, this ratio is, on the average, close to one. It is less than one, on the average, in the case of those firms which could be classified as low-profitability firms. And it was, again on the average, higher than one in the case of the high-profitability firms.

Coming back to the role of internal financing, the figures in table 7 aggregated over firms hide the fact that for high-profitability firms, the operating profits clearly exceed profits reported and distributed. They are hence in a much better position with respect to the internal financing than the figures in table would suggest.

Finally, note that when discussing the problem of internal financing, we have had in mind the question of to what extent current operating profits can back net capital formation. More often it seems to be the case that the cost of depreciation is added to the source of the internal financing while the use of the financing is adjusted for the replacement investment.

Footnotes:

1) The starting point for this work has been the balance sheet and income statement data collected by Professor Ilari Tyrni with his study group (see Tyrni et.al. (1982)) which deals with 30 large manufacturing firms in Finland extending up to 1978. Their work, in turn, was based on the earlier data sample of Professor Reijo Ruuhela. (The firms included in the sample are presented in section V of our study). Note that we study data on parent companies only and not the consolidated data on concern groups.

2) As to the profit sharing, we come back in section VI.

3) Moreover, the accounting practices have been revised from time to time. Consequently, we had to work with different kinds of data for 1961-73 as compared with the data starting at the beginning of 1974. For example, in calculation of the operating income we had to add on the earnings the increase in the inventory allowance and the net increase in other allowances in 1961-73. Thereafter, we had to add to corporate earnings the increase in actual inventories together with the net increase in other allowances. Our data on the inventory allowance prior to 1977 is partly based on earlier figures of the Research Institute of the Finnish Economy and on an augmented questionnaire we distributed among the firms included in the study.

4) As King (1975) has pointed out, the profit figures ought to be adjusted for the nominal appreciation of inventories. In our present estimates, this adjustment has not been made, however, and to the extent it is relevant our estimates overstate the real operating profits.

5) It should be noted that land is not included in our calculation due to lack of reliable data. This is a standard procedure, see Holland (1984). Second, if the insurance value is a biased measure of the replacement value of capital, this source of error becomes quite insignificant in the latter part of our data period.

6) The increased rate of inventory turnover has been documented, e.g. in Hernesniemi (1985) pp. 74-78.

7) As a final note on table 3, we should point out that for those firms like those in the forest industry that own land, which is not included in our measure of capital, the debt-equity ratio tends to be overestimated. This problem common in most interntional studies tends, consequently, to bias the rates of return, reported in the next section, upwards. This source of measurement error is partly eliminated by the fact that neither is the appreciation of the value of land included in the estimates of the rate of return.

8) With respect to inventories, the rate of undervaluation has of course not been "hidden" since the end of the 1970's.

9) The existence of unclaimed tax allowances over prolonged periods of times is a challenging task for theoretical work. This is an important problem because the implications of the corporate tax structure on corporate policy are fundamentally different in the presence of unclaimed tax allowances than they are in the traditional theory of corporate finance. For these implications in the Swedish case, the reader is referred to the work of Bergström and Södersten (1984).

10) For thorough studies of this question see Englund (1979) in Sweden and Ylä-Anttila (1985) in Finland.

11) The international comparisons are often highly problematic, for example, due to different accounting practices. The comparison produced by Holland (1984) suggests that the effective corporate tax rate in Finland is low relative to the estimates describing other economies.

12) There is no logical inconsistency involved in the observation that the profits reported temporarily exceed actual profits. Stock-holders seem to have a strong preference for cash dividens, but dividends can only be paid from reported profits.

Appendix 1. Estimation of the True Operating Income (Y)

a) Period 1961-1973:

Operating income = earnings (TLH) + interest income (korkotuotot, KORT) + other earnings (muut varsinaiset tuotot, MUTU) + extra earnings (ylimääräiset tuotot, YLTU) + returned tax payments (veronpalautukset, VPAL)- wages (palkat, PALK) - rental expenses (vuokrat, VUOK) - other expenses (muut varsinaiset kulut, MUKU) - extra expenses (ylimääräiset kulut, YLKU) - depreciation cost (our own estimate) - increase in the inventory allowance (minus, if a decrease), (varastovarauksen lisäys) + net increase in other allowances (muiden varausten nettolisäys).

b) Period 1974-1983:

Operating income = turnover (liikevaihto, LIVA) + interest income + other earnings + extra earnings + returned tax payments - material costs (aineet ja tarvikkeet, AITA) - variable wages (muuttuvat palkat, MPAL) - other variable expenses (muut muuttuvat kulut, MKU) + production for own use (valmistus omaan käyttöön, VAOK) - fixed wages (kiinteät palkat, KPAL) - rental expenses (vuokrat, VUOK) - other fixed expenses (muut kiinteät kulut, KKU) - other expenses (muut kulut, MUUK) - depreciation in inventories (varastojen lisäys), (minus if decrease) + net increase in other allowances.

Note Production for own use (VAOK) and material expenses (AITA) are included in the other variable expenses (MKU) if variable and fixed costs have not been separated.

Appendix 2. Estimation of the capital stock

We collected from the central statistical bureau of Finland the insurance value of all buildings and machinery of the firms in our sample for the year 1954. To estimate the annual gross investment we used the following formula, see Yli-Olli (1978) s. 78:

$$\begin{aligned} INVEST = {} & RAKE + KONE - RAKE_{-1} - KONE_{-1} + RAKP + KONP \\ & + IRAH_{-1} - IRAH + HANKV_{-1} - HANKV \\ & + KERP_{-1} - KERP \end{aligned}$$

where RAKE = buildings
KONE = machinery
RAKP = depreciation of buildings
KONP = depreciation of machines
IRAH = investment funds
HANKV = special investment allowance
KERP = accumulated depreciation charges

Note 1. After 1964, KERP = 0.

Note 2. If RAKP = 0 or KONP = 0 in the data available, the variables RAKP and KONP have been replaced by the variable POIS (total depreciation). But because the POIS variable includes also depreciation based on land and securities, only that part of the POIS variable will be used which can be assumed to correspond to the depreciation related to machinery and buildings. This part was estimated by relating the POIS-variable to the sum of RAKP and KONP during the years observations were available.

Note 3. A reduction in the special investment allowance is to be regarded as investment in the year in question. Hence if

$IRAH_{-1} - IRAH < 0$ or $HANKV_{-1} - HANKV <= 0$,

they are not included in the equation, i.e. an increase in

these allowances is not regarded as reducing investment in that year.

The investment outlays were deflated using the price index on investment goods, calculated by the Research Institute of the Finnish Economy, with 1975 as the base year. Only the price indexes for different industries were available. Consequently, we had to classify the firms according to the major branch of industry they represent. A firm was attacted to a specific industry if more than 50 % of its personnel belonged to this branch of industry.

To calculate the annual depreciation of buildings and machinery, the following depreciation coefficients, estimated by the Research Institute of the Finnish Economy, were used

industry	depreciation rate
IN 2	0.0822
IN 3	0.0792
IN 31	0.0656
IN 32	0.0686
IN 36	0.0743
IN 331	0.0760
IN 332	0.0760
IN 341	0.0911
IN 342	0.0737
IN 37	0.0802
IN 38	0.0708

A firm's capital KT/P (buildings and machinery), in 1975 prices could be calculated as follows

$$KT/P = INVEST/P + (1 - d)(KT/P)_{-1}$$

where P = price deflator and d = the depreciation percentage. Of course, capital can be expressed in nominal terms by multiplying KT/P by the price index.

To obtain a more comprehensive measure of the stock of capital, we still wanted to add some variables to our KT-estimates. Thus we obtained for the capital stock (still excluding land):

$$K = KT + UUDI + AINE + MUKO + KENN + MUPM$$

where UUDI = fixed capital under construction
AINE = share ownership, etc.
MUKO = other types of fixed capital
KENN = prepayments for long-term capital
MUPM = other long-term investment

It should be noted that our concept K is hence somewhat more comprehensive than is the variable used in the study by Koskenkylä (1984).

Appendix 3. Short-term Assets of Firms

The (gross) financial assets were constructed as

MG = RAHA + TISA + YLIO + SISA + VESA + ENSA + ARVO + TOLU + MUSA + VENN + KENN

where RAHA = cash and bank deposits
TISA = accounts receivable
YLIO = other assets
SISA = trensferred receivables
VESA = bills of claim
ENSA = prepayments
ARVO = stocks, bonds
TOLY = credits associated with deliveries
MUSA = other financial assets
VENN = prepayments associated with inventories
KENN = prepayments associated with machines

We defined the short-term (SL) and long-term debts (LL) as

SL = VEVE + TIVE + MULY + LVVE + VERV + SIVE + ENVE
LL = LAIN + ELSA + TELL

where

VEVE = bills of claim
TIVE = accounts payable
MULY = other short-term debts
LVVE = excise and sales tax to be paid
VERV = tax liability
SIVE = transferred debts
ENVE = prepayments obtained
LAIN = long-term debts (apart from ELSA and TELL)
ELSA = debts to pension funds
TELL = TEL and LEL debts

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