Erik Fjærli and Rolf Aaberge

Tax Reforms, Dividend Policy and Trends in Income Inequality
Empirical Evidence based on Norwegian Data

Abstract:
This paper discusses the degree of intertemporal comparability of national estimates of income inequality when data are based on income tax records. The problem of comparability is particular crucial when major tax reforms have taken place and pre- and post-reform income data are used as basis for comparing trends in income inequality. Particular attention is paid to the definition and measurement of income from shares. The conventional wisdom that the increase in inequality in Norway during the 1990's was caused by a rising disequalizing contribution of capital income is questioned by the present results. The rise in income inequality coincided with the implementation of a major tax reform that affected the financing incentives in the corporate sector and the income shifting incentives in small enterprises. Thus, when tax reported dividends are used as a measurement of returns from shares, changes in the estimated income inequality may be a result of changes in the income reporting behavior rather than factual changes in the distribution of income. Our results suggest that the observed rise in income inequality during the 1990's to some extent can be explained by a change in the dividend policy of the corporations, induced by the tax reform in 1992. When the total return from shares is taken into account, we find less increase in the level of inequality and less increase in the contribution to inequality from share ownership.

Address: Erik Fjærli, Statistics Norway, Research Department. E-mail: erik.fjarli@ssb.no

Rolf Aaberge, Statistisk Norway, Research Department. E-mail: rolf.aaberge@ssb.no

Discussion Papers	comprise research papers intended for international journals or books. As a preprint a Discussion Paper can be longer and more elaborate than a standard journal article by in-cluding intermediate calculation and background material etc.

1. Introduction

It is universally acknowledged that cross-country comparisons of income inequality should be interpreted with caution because major definitions and survey methods may differ substantially between countries. This is also the case for the OECD countries where the survey methods appear to be quite diverse. Some of the surveys are based on administrative and income tax records whereas others collect income data by interviewing a sample of individuals (households). The former method has formed[1] the basis for collecting income data in the Nordic countries. Thus, there may be a better basis for cross-national comparisons in the Nordic area than in the entire OECD area. However, since tax reported incomes may depend both on the tax basis and the structure of the tax system the important question arises whether data from income tax records for different years are comparable. This question is particularly relevant when a major tax reform has taken place and pre- and post-reform income data are used as basis for comparing trends in income inequality[2].

Empirical results for Norway and Sweden suggest that income inequality in the early 1990s increased owing to a rising disequalizing contribution of capital income[3]. The rise in income inequality reported by the national statistical agencies coincided, however, with the implementation of a major tax reform that affected the financing incentives in the corporate sector and the income shifting incentives in small enterprises. Thus, when tax reported dividends are used as a measurement of the returns from shares, changes in the estimated income inequality may be a result of changes in the income reporting behavior rather than factual changes in the distribution of income.

The purpose of the present paper is to provide a critical discussion of the choice of definition and measurement of income from shares and its impact on the estimated trends in income inequality when income data are based on tax records. As an alternative to the standard practice of using tax reported dividends as a measure of the returns from shares we propose to use a measure derived from a Hicksian version of the definition of income. The "Hicksian" measurement of the income from shares appears to be less sensitive to changes in income reporting behavior than the conventional income definition and may thus provide a better basis for analyzing the trend in income inequality and the contribution to income inequality of income from shares. Section 2 describes changes in tax incentives

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[1] For a comprehensive discussion of cross-country comparability of OECD data sets, see Atkinson et al. (1995).

[2] Björklund et al. (1995) reports a jump in inequality in Sweden from 1989 to 1991 due to realized capital gains that possibly can be explained by changes in the tax legislation.

[3] See Epland (1997) and Aaberge et al. (1999).

in Norway during the 1990s. Section 3 is concerned with definition and measurement of income with particular focus on the return to shares whilst the impact of definition and measurement of income from shares on the trend in overall income inequality is examined in Section 4. Section 5 summarizes and concludes the paper.

2. Tax-incentives, financing decisions and income shifting

There is a vast literature dealing with the effect of taxes on firms' dividend policy and choice of financing strategies. Indeed, the financing incentives imposed by the non-integrated and asymmetric taxation of capital was pointed out as one of the major problems in the pre-reform tax system in Norway as well as in many other OECD countries. The 1992 tax reform entailed changes in the taxation of capital income at the personal and corporate level towards a tax regime that was supposed to be neutral across different sources of finance and payback alternatives.

The personal and the corporate tax rates on income from capital are the two key parameters in the tax discrimination formulas (see for example King, 1977 and Sinn, 1991). The personal tax rate determines the opportunity cost of equity (share issues and retained profits), relative to the corporations' after-tax borrowing cost. In most countries it also affects the taxation of dividends, through the net dividends received by the shareholder per unit of gross dividends[4]. Lower personal tax rates will in general increase the cost of equity financing relative to borrowing and increase the cost of retained earnings relative to new share issues. Thus, one would expect that a reduction in personal tax rates may cause dividends to increase. As indicated by Table 1 below, this appears to have been the case in Norway, where the tax reform was followed by an immediate increase in dividends. Note that dividends emerge in the households' tax returns the year *after* the accounting year. Hence, the corporations' responses to the tax reform in 1992 might at earliest affect the households' capital incomes in 1993.

The bottom row of Table 1 displays the average value of the Oslo Stock Exchange index. As indicated by the index, 1992 was not only a milestone with respect to taxes, this year was also the turning point for the Norwegian economy after several years of recession. This fact can to a certain extent explain some of the increase in dividends after 1992.

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[4] The Norwegian split-rate system, which prevailed before the 1992 tax-reform is described in Lund (1986). Here, the tax rate on dividend receipts is a function of, but not similar to the personal tax rate of other capital income.

Table 1. Statutory tax rates on interest and the income share of dividends, 1986-1996.

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Maximum statutory personal tax rate	0.62	0.56	0.48	0.46	0.43	0.41	0.28	0.28	0.28	0.28	0.28
Statutory corporate tax rate	0.39[1]	0.39[1]	0.39[1]	0.39[1]	0.39[1]	0.39[1]	0.28	0.28	0.28	0.28	0.28
Cost of retained profits relative to borrowing[2]	0.63	0.73	0.87	0.91	0.95	0.99	1.00	1.00	1.00	1.00	1.00
Average dividend receipts, households, 1986 NOK[3]	552	733	521	367	439	486	432	1780	2532	2879	3149
Dividends' share of disposable income (percent)[3] All	0.55	0.7	0.5	0.36	0.43	0.45	0.39	1.61	2.16	2.62	2.80
10th decile	1.09	1.12	1.38	0.93	1.40	1.54	1.38	7.19	9.54	11.43	11.55
Average index value, Oslo stock Exchange	284	326	287	477	579	475	391	510	633	686	830

[1] Under the assumption of full allocations to the "consolidation fund".
[2] Based on the customary expression $(1-m)/(1-\tau)$, where m denotes the maximum personal tax rate on interest (from row 1) and τ denotes the statutory corporate tax rate (from row 2).
[3] Dividends are reported in the personal tax-returns one year after the accounting year, i.e., the 1993 dividends were paid out of the 1992 profits and so on.

Table 1 shows that most of the changes in the relative tax rates took place in the 1980s. Thus, the resulting change in financing incentives can hardly explain the sharp increase in dividends that followed the tax reform. However, another important characteristic of the pre-reform tax system was the existence of loopholes, generous depreciation schedules and deductions for allocations to various funds such as the "consolidation fund". The consolidation fund offered a tax-exempt allocation of maximum 23 percent of pre-tax profits and was the most important general deduction in the corporate tax base. Another similar deduction was allocations to the "district development fund". After the reform, these two funds were abolished whilst the rates of depreciation were reduced.

Due to the generous deductions in taxable business income, the effective tax rate was much lower than the statutory rate. Furthermore, the consolidation fund and district development fund led to a lock-in of capital. Before the reform, the accumulated allocations to funds were reported in the balance sheet as tax-exempt reserves (tax-exempt as long as the means stayed in the firm). After the reform, the accumulated tax-exempt funds were released, increasing the firms' ability to pay dividends. The potential for reversed lock-in effects is demonstrated by Table 2, where the aggregate composition of the corporate assets from the balance sheets of 1986 to 1992 in the manufacturing industry and wholesale and retail trade are displayed. Table 2 shows that the tax-exempt allocations constituted a significant part of corporate savings prior to the tax reform. After the reform, the tax-exempt reserves

emerged as equity, in particular "free"[5] equity, which in turn made it possible for the firms to increase their dividend payments[6].

Table 2. Equity and tax-exempt reserves by economic sectors. In mill NOK.

	1986	1987	1988	1989	1990	1991	1992	pct. change 1986-1991	pct. change 1991-1992
Mining and Manufacturing									
Total equity	29394	28816	31837	34274	34761	35459	60171	21	70
Free equity	4205	4738	3500	4928	5973	5651	23509	34	316
Tax-exempt reserves	11118	23552	25339	28987	30749	26283	-	136	-
Wholesale trade									
Total equity	8645	9612	10353	11717	11220	14196	23969	64	69
Free equity	2472	2797	2778	2273	2259	2017	9297	-18	361
Tax-exempt reserves	6027	8837	9290	9939	10993	9091	-	51	-
Retail trade									
Total equity	2507	2447	2315	2364	2797	3309	5552	32	68
Free equity	783	456	141	8	97	297	1957	-62	559
Tax-exempt reserves	1960	2961	2725	2716	2897	1588	-	-19	-

Source: Statistics of Accounts. Manufacturing, Wholesale and Retail Trade (Statistics Norway).

Another important issue that has been at focus in the economic literature is the problem of income shifting. Income shifting can be defined as actions taken by taxpayers to reclassify income. There is some international evidence on income shifting responses to tax reforms. Slemrod (1990) and Gordon and Mackie-Mason (1995) found timing and income shifting responses to the 1986 US tax reform. In Norway, the Ministry of Finance found evidence of income shifting through changes in organizational form (Ministry of Finance, 1997), as well as through income reporting (Ministry of Finance, 1998 Aarbu and Thoresen, 1997).

One example of income shifting is to reclassify wages to dividends (this is of course a possibility that is particularly relevant for the owner-managers of closely held firms). Before the tax reform, it would not always be profitable for owner-managers to receive all cash as dividends. Normally, a tax-

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[5] To protect creditors, there are limitations in the Norwegian corporate law to the maximum dividend pay out, or more precisely, to the minimum equity. Only equity in excess of these minimum requirements - free equity - can be distributed.

[6] As a consequence of the tax reform the accounting rules were changed, from the German inspired "uniform reporting convention" to the Anglo-Saxon "separate reporting convention". Separate reporting allows for higher dividends than uniform reporting at least as long as the firm grows, because the deductions for tax purposes are not deducted in the financial statement; see Birch-Sørensen (1994) and Cummins et al. (1995) for discussions of these conventions.

minimizing strategy would imply a mix of both wages and dividends. After the reform, payment of dividends is unquestionably the most favorable form of pay out.

3. The definition and measurement of income from shares

Since tax-incentives might play an important role for financial decisions in the corporate sector, the treatment of capital income in empirical analyses of the income distribution may be crucial for the results. Accounting for biases that may arise from changes in the income reporting behavior appears particularly important in periods where major tax reforms have taken place. This calls for a definition of income that is more robust with respect to changes in the reporting of income than the conventional definitions used in empirical analyses.

A natural point of departure for our discussion is the well-known Shanz-Haig-Simons (SHS) income definition.

> "Personal income may be defined as the algebraic sum of (i) the market value of rights exercised in consumption and (ii) the change in the value of the store of property rights between the beginning and the end of the period in question." (Simons, 1938).

The SHS definition of income includes capital gains and losses, irrespective of whether they are realized or not[7]. The inclusion of gains and losses upon accrual may be appropriate for the deriving of a theoretically correct tax base, but are not easy to implement in practice. Thus, taxable income is often based on realized capital gains, and will in general underestimate the true return.

Even though the SHS income definition can form a relevant basis for taxation, the treatment of gains and losses under SHS may have rather peculiar effects on estimates of income inequality. Firstly, empirical estimates of income inequality may be heavily affected of business cycles. However, since peoples' consumption possibilities in most cases largely remain unaffected by normal business cycle fluctuations, a relevant definition of income ought to be robust with respect to yearly fluctuations in non-realized capital gains and losses. Second, measuring capital losses upon accrual can cause an *increase* in the estimated income inequality in periods of recession, because relatively rich people with large wealth but moderate cash incomes will look "poor" in terms of current income. As a matter of fact, the accrued losses during a year can be so high that net income becomes negative. This, in turn, makes inequality measures like the Gini-coefficient hard to interpret. Figure 1 displays the trend in

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[7] Fisher (1906, 1937) defined income basically as consumption and, thus, viewed income as the utility stream from consumption, regardless of whether spending was financed out of current earnings or wealth. However, according to Goode (1977) Fisher more or less gave up his definition and conceded that enrichment or accretion of capital is a part of an individual's total real income.

inequality during the period 1986-96 under two definitions of SHS income; SHS1 which include estimates of the period's accrued losses and allows negative net income, and SHS2, where the return to shares is restricted to non-negative magnitudes. The estimated Gini-coefficients show to have a rather erratic pattern with an extreme range. Moreover, Figure 1 demonstrates that income inequality is larger under SHS1 than under SHS2 in 1988 and in 1991, when the Oslo stock exchange fell significantly.

Figure 1. The trend in the Gini coefficient under two SHS-type income definitions
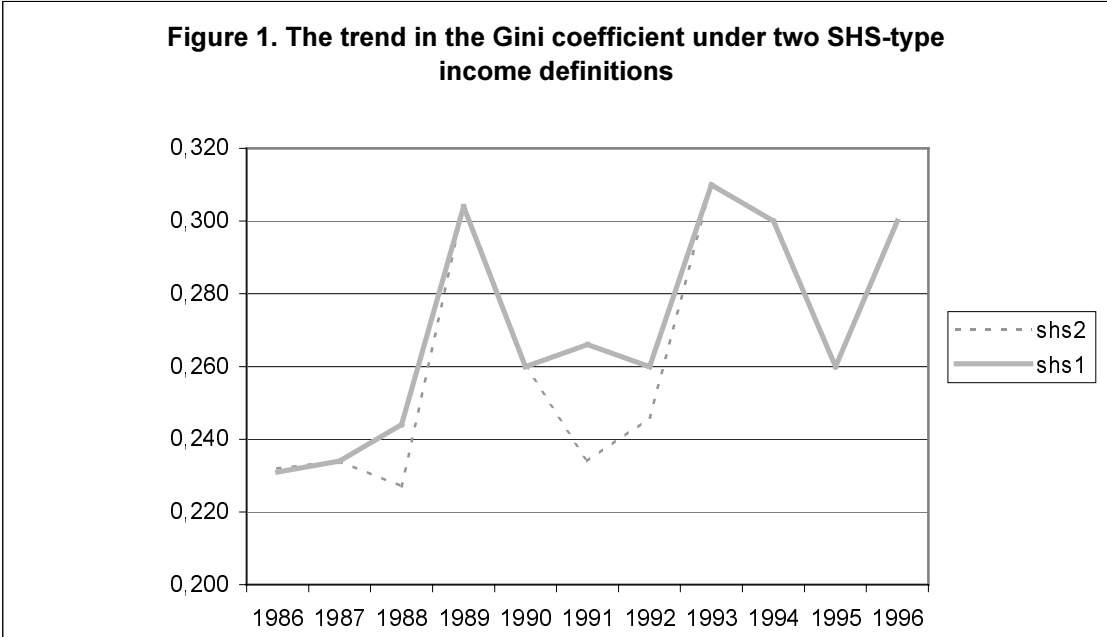
The fluctuations in income inequality that arise from short-run business cycles make the SHS income definition inappropriate as basis for analyzing income inequality. By contrast, the standard income definition based on taxable income normally includes gains and losses upon realization. Thus, the standard income definition used by national statistical agencies will in general underestimate the true return to shares. An alternative approach is to introduce an income definition that captures the contribution from investments in stocks to the households' long-term consumption possibilities. To this end the income definition proposed by Hicks (1939) appears appropriate. Hicks defined income as the maximum amount that an individual can spend during a period and still expect to be as well of at the end of the period as at the beginning (in real terms). The Hicksian income definition depends on the notion of *expectation* and *permanence*, and has for that reason only in exceptional cases been considered appealing as a basis for practical tax policy[8]. For example, in Norway business income from self-employment is divided into (low-taxed) capital income and labor income by an imputation rule where a normal rate of return is applied to the book value of real assets. Furthermore, the tax base

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[8] Actually, Hicks (1939) introduces three alternative versions of his general definition.

for the resource rent tax on hydropower plants is also calculated by imputation in a similar way. The use of administratively determined rates of return in the Norwegian tax system is justified on the basis of suppositions regarding the expected return to certain real assets and represents a "Hicksian" element in the definition of the tax base.

Our Hicksian definition of income, which subsequently will be denoted the extended definition of income, is obtained by imputation. The estimated market value of the households' stocks is multiplied by the long-run average rate of return on the Oslo Stock Exchange. Siegel (1998) reports an average total rate of return on U.S. stocks of 9 percent in the entire post-war period 1946-1997 (arithmetic average of real annual returns). In the period of 1982-1997 the rate was 13.6 percent. Based on the index of Oslo Stock Exchange[9], the annual average real rate of return of quoted shares proves to be 8.6 per cent for the period of 1986-1996. This estimate should capture the long-term expected rate of return of the entire market portfolio fairly well. Accordingly, this fraction of their stock is what the households could consume during the period (together with other incomes, of course) and still expect to have their capital intact, provided that they hold a diversified portfolio[10].

The extended measure of income is defined as the sum of the following income components:

1) Earnings
2) Self-employment income
3) Pensions and transfers
4) Interest receipts (net of the inflation component)
5) Imputed total real return to shares (equal to 0.086 times the estimated market value of shares) minus taxes (net of childcare allowances).

Thus, the extended definition of income differs from the standard income definition by using a measure of expected total return rather than tax reported dividends as a basis for the measurement of shares returns. The measurement of income and income inequality will to a certain extent capture the short-run fluctuations in the market values. However, this definition of income should be less sensitive to business cycles and changes in income-reporting behavior than the SHS-type of definitions.

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[9] The OSE index is a total return-index that includes dividends.

[10] Of course, our approach represents a simplification since it implies one risk free asset earning its observed "risk free" rate of return (interest net of inflation loss) and one risky asset earning the average real rate of return of the entire stock market, implying that households have well diversified portfolios with a CAPM-beta of 1.

The purpose of the next section is to compare the trend in inequality in Norway when income is measured according to the standard and the extended definition of income, respectively, and examine whether the contribution from shares returns to income inequality depends on the choice of income definition.

4. Trend and decomposition of income inequality in Norway 1986-1996

Empirical evidence from national studies of income distribution based on the standard definition of income demonstrates that share ownership without exception is strongly concentrated in the upper part of the income distribution. Thus, the increase in dividends reported in Section 2 does, as expected, first and foremost concern the upper decile of the income distribution. The results reported in Table 3 show that the 10th decile had a real growth in disposable income of about 5 percent from 1992 to 1993, largely due to the increase in dividend receipts, whereas the average real income did almost not change. Dividends have continued to increase in 1994-1996. This fact has been considered to be the major cause of the observed increase in income inequality in Norway during the 1990s.

Table 3. Mean decile equivalent incomes* based on the standard income definition in 1992 and 1993 decomposed with respect to (1) Wage earnings, (2) Self-employment earnings, (3) Pensions and transfers, (4) Interest receipts, (5) Dividend receipts and (6) Taxes (net of child support).

			Corresponding Decile Specific Mean Income factor. Percent					
Decile Group / Year		Disposable Income (100)	1	2	3	4	5	6
1	1992	35724	27.83	5.13	59.19	5.64	0.31	1.90
	1993	35331	30.50	2.86	55.90	4.62	0.07	6.05
2	1992	61527	34.94	5.71	60.77	7.82	0.02	-9.26
	1993	60676	38.17	5.32	59.91	6.66	0.02	-10.07
3	1992	76748	13.22	6.85	35.29	6.09	0.20	-13.77
	1993	75676	60.81	7.00	41.81	4.68	0.09	-14.39
4	1992	89158	77.78	9.06	25.34	5.39	0.12	-17.69
	1993	88918	84.62	8.05	22.60	3.30	0.05	-18.64
5	1992	100847	89.48	9.21	17.89	3.54	0.10	-20.21
	1993	99936	94.09	6.81	17.94	3.25	0.07	-22.15
6	1992	110078	100.52	9.04	11.35	3.83	0.14	-23.96
	1993	110311	100.14	7.54	14.08	2.99	0.21	-24.96
7	1992	122850	100.36	9.61	12.74	4.13	0.06	-26.90
	1993	122076	102.67	8.76	13.26	3.28	0.17	-28.14
8	1992	136375	105.59	10.39	10.02	3.55	0.13	-29.68
	1993	135739	108.15	8.73	11.23	3.27	0.40	-31.78
9	1992	155909	109.09	12.47	8.05	3.88	0.32	-33.82
	1993	154972	110.00	12.22	9.65	2.80	0.36	-35.03
10	1992	213508	102.52	25.99	5.92	6.10	1.38	-41.91
	1993	223019	97.36	26.50	6.48	4.84	7.19	-42.37
All	1992	110372	91.33	12.58	17.51	4.81	0.39	-26.62
	1993	110666	92.12	11.96	18.26	3.82	1.61	-27.77

*Disposable income is divided by the square root of the household size

To assess the contribution of dividend receipts on income inequality we will employ the decomposition method of the Gini coefficient that was originally introduced by Rao (1969). Assume that X is the sum of s income components

$$(1) \qquad X = \sum_{i=1}^{s} X_i.$$

Let G be the Gini coefficient of the distribution of disposable (equivalent) income X. Then G admits the following decomposition

$$(2) \qquad G \; = \; \sum_{i=1}^{s} \frac{\mu_i}{\mu} \gamma_i,$$

where μ_i/μ is the ratio between the means of X_i and X, and the concentration component γ_i is the conditional Gini coefficient of component i given the units' rank order in X and provides information about the interaction between component i and total income. Note that μ_i/μ is equal to the income share of X_i. If every unit receives an equal amount of component i then the corresponding concentration coefficient (γ_i) is equal to zero which suggests that component i's contribution to overall inequality is neutral rather than equalizing. Income component i has a positive (disequalizing) contribution to inequality if $\gamma_i > 0$ and a negative (equalizing) contribution to inequality if $\gamma_i < 0$, provided that the income share is positive. For $\mu_i < 0$, for example when X_i denotes taxes, a positive value of γ_i expresses an equalizing contribution to overall inequality. In the subsequent discussion the contribution of component i to overall income inequality is defined by $\gamma_i \cdot \mu_i/\mu$ which means that components i's share of inequality is given by $(\gamma_i \cdot \mu_i/\mu)/G$.

Table 4. Contribution of dividends to the Gini coefficient for the distribution of income (standard definition of income). Average over pre- and post tax reform periods

	Average of 1986-92	Average of 1993-96
Gini coefficient	0.238	0.26
Dividends' share in disposable income	0.48%	2.3%
Concentration coefficient of dividends	0.594	0.901
Dividends' share of inequality (Gini)	1.22%	7.92%
Elasticity of Gini coefficient with respect to dividends	0.007	0.056

Table 4 demonstrates that dividends' share of disposable income has increased from 0.5 percent to 2,3 percent at the same time as dividends has become even more concentrated in the upper part of the distribution of disposable income. Both changes led to a reinforced disequalizing effect of dividends on overall income inequality. These changes have altogether led to a substantial rise in dividends' share of the standard reported income inequality, from an average of 1.2 percent before the tax reform to 7.9 percent after the reform. As a consequence, the elasticity of the Gini coefficient with respect to dividends has increased from .007 to .056, which means that further increases in dividends have a considerably stronger disequalizing effect on income inequality after than before the tax reform.

As indicated above the standard reported estimates of income inequality rely on an income definition that is closely related to taxable income and thus might be rather sensitive to changes in the tax reporting behavior. However, by employing the Hicksian type of income definition suggested above,

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where observed dividends are replaced with imputed total return to shares, we escape the referred problems related to change in income reporting behavior. Table 5 below displays the mean tax reported dividends and imputed return to shares. Before the 1992 tax reform the estimated total return

Table 5. Mean tax reported dividend receipts and total return to shares by imputation in equivalent amounts*. 1986 NOK

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Mean dividend receipts	552	733	521	367	439	486	432	1780	2532	2879	3149
Mean imputed total return to shares	1401	1230	1336	1311	1446	1558	1218	2342	2329	2496	3212

*Incomes are divided by the square root of the household size

is about 2 -3 times higher than the dividend receipts reported for taxation. This result indicates that only 30 - 50 percent of the total return to shares were reported as taxable income in the period before the tax reform whereas reported dividends and imputed return to shares are of the same magnitude after the tax reform. Thus, relying on the extended definition of income the results in Table 5 suggest a less steep rise in overall income inequality than the standard reported estimates where tax reported dividend receipts are used as a measure of the return to shares. The estimates of the Gini coefficient and two closely related alternative measures of inequality, C_1 and C_2, reported in Table 6 are consistent with this hypothesis. Note that the essential difference between these three measures of inequality is that the Gini coefficient in general focuses on changes in the central part of the income distribution, C_1 focuses on changes in the lower part of the distribution and C_2 on the upper part of the distribution[11]. Based on the standard definition of income, comparison of the means of the inequality measures after and before the tax reform demonstrates that C_2 increased more than G and C_1. This result reflects the fact that changes in the tax reported dividends are the primary factor behind the changes in the standard reported inequality estimates and moreover that dividends primarily concern the upper part of the income distribution. However, turning to the results based on the extended income definition the pattern is completely different; the low-income sensitive inequality measure C_1 clearly shows to increase more than G and C_2. On the other hand are G and C_2 exhibiting

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[11] See Aaberge (1999) for a justification of employing G, C_1, and C_2 to summarize inequality in income distributions. Note that C_1 is identical to a measure of inequality that was introduced by Bonferroni (1930) as an alternative to the Gini coefficient.

Table 6. Trend* in income inequality based on the standard income definition and the extensive income definition, 1986-1996

Year	Income inequality, standard income definition			Income inequality, extended income definition		
	C_1	G	C_2	C_1	G	C_2
1986	0.359	0.237	0.185	0.362	0.241	0.189
	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
1987	0.356	0.235	0.183	0.357	0.236	0.184
	(0.004)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
1988	0.351	0.232	0.182	0.347	0.233	0.183
	(0.005)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
1989	0.364	0.235	0.183	0.362	0.237	0.185
	(0.006)	(0.003)	(0.002)	(0.005)	(0.003)	(0.002)
1990	0.366	0.24	0.187	0.367	0.242	0.19
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
1991	0.359	0.237	0.185	0.359	0.24	0.188
	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
1992	0.372	0.247	0.192	0.374	0.25	0.196
	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
1993	0.379	0.255	0.201	0.379	0.256	0.202
	(0.006)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
1994	0.397	0.262	0.206	0.392	0.259	0.202
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
1995	0.389	0.26	0.205	0.383	0.253	0.198
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
1996	0.413	0.264	0.207	0.409	0.26	0.204
	(0.011)	(0.003)	(0.003)	(0.01)	(0.003)	(0.002)
Average of (1986-92)	0.361	0.238	0.185	0.361	0.240	0.188
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Average of (1993-96)	0.395	0.260	0.205	0.391	0.257	0.202
	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)
Percentage change, (1986-92) - (1993-1996)	9.28	9.55	10.51	8.20	7.15	7.26

*Standard deviation in parentheses

approximately the same increase. This means that the changes in the post-reform income inequality were due to changes in the lower as well as the upper part of the income distribution.

By decomposing the Gini coefficient with respect to income components the changes in income inequality can be explored more carefully. Table 7 shows the results of the decomposition for each year and for both definitions of income. Owing to the very high concentration coefficients, the income from shares contributed much more to overall income inequality than to total disposable income.

Dividends' share of inequality is negligible before 1993, but increases sharply from 1993. Adjusting for the effect of changes in income reporting behavior, the contribution to inequality from shares shows to be considerably less important than what has been suggested by the standard reported estimates based on observed dividend receipts. While the standard income definition underestimates the importance of share ownership for inequality under the pre-reform tax regime by approximately 1/3, the two income concepts give a more similar picture of the contribution to inequality after the tax reform.

As seen from Table 7 the contribution from returns to shares to the change in overall inequality between and after the tax reform is less significant when we replace tax reported dividends with imputed returns to shares. It appears that all income components apart from taxes show increased contributions to inequality. The contribution from pensions and transfers increased by the same magnitude as the contribution from total returns while the contributions from earnings and self-employment income increased slightly less. By contrast, the contribution from dividends to the standard income inequality increases more than the joint contribution of all the other income components. Table 8 reports the contributions from respectively return to equity, taxes and other income components to changes in average inequality.

Table. 7. Contribution to mean income and income inequality (Gini coefficient) of income from shares when income is measured according to standard income and extended income

year	Share in total income (pct)		Concentration coefficient		Contribution to inequality		Share of inequality (pct)	
	Standard	Extended	Standard	Extended	Standard	Extended	Standard	Extended
1986	0.55	1.37	0.540	0.687	0.003	0.009	1.25	3.91
1987	0.70	1.70	0.687	0.588	0.005	0.010	2.05	4.23
1988	0.50	1.27	0.555	0.658	0.003	0.008	1.20	3.58
1989	0.36	1.27	0.433	0.644	0.002	0.008	0.66	3.45
1990	0.43	1.39	0.574	0.763	0.002	0.011	1.03	4.38
1991	0.45	1.44	0.661	0.711	0.003	0.010	1.26	4.27
1992	0.39	1.10	0.706	0.723	0.003	0.008	1.11	3.18
1993	1.61	2.11	0.923	0.807	0.015	0.017	5.83	6.65
1994	2.16	2.14	0.897	0.756	0.019	0.016	7.39	6.25
1995	2.62	2.28	0.919	0.773	0.024	0.018	9.26	6.97
1996	2.80	2.86	0.867	0.751	0.024	0.021	9.20	8.26
Average of (1986-92)	0.48	1.36	0.594	0.682	0.003	0.009	1.223	3.858
Average of (1993-96)	2.30	2.35	0.901	0.772	0.021	0.018	7.918	7.033
Difference in averages	1.82	0.99	0.307	0.090	0.018	0.009	6.695	3.175

Table. 8 Contributions to change in average pre- and post-reform income inequality (Gini) when income is measured according to standard income and extended income

Income component	Standard income	Extended income
Return to shares	0.018	0.009
Taxes	-0.011	-0.010
Others	0.016	0.018
Total change (ΔG)	0.023	0.017

5. Conclusions

The present study based on Norwegian data is consistent with the conventional wisdom that dividend receipts increased significantly among high-income earners in the early 1990s. It appears that the increase in dividends is strongly related to the 1992 tax reform. However, dividend is not a complete measure of the total returns from shares. Corporate financial policy and tax-motivated shifting of income between tax bases represent a possible bias in the standard estimates of income inequality that call for an alternative measurement of income. The significance of capital gains is particular important

before the tax reform. Due to rather high personal tax-rates, combined with special provisions that entailed incentives to keep capital within the corporations, a major part of the return to equity accrued as capital gains, rarely reported in the tax-returns and not taken into account in analyses of income inequality.

The SHS income concept is often referred to as the ideal theoretical definition of comprehensive income that should form the basis of empirical income studies. This concept of income includes the periods accrued gains and losses and might thus create large fluctuations in measured income from one period to another. However, since peoples' consumption possibilities in most cases largely remain unaffected by normal business cycle fluctuations, the SHS income concept appears inappropriate as a basis for analyzing income inequality. By contrast, the present study uses an alternative definition of capital income that relies on the Hicksian expected income concept.

On the basis of rather detailed household data and information about aggregate market values vs. tax-valuations, we have employed an imputation method to capture the long run total return to shares. Our more comprehensive measure of income reveals the element of "hidden" incomes before the tax reform. We find that the use of dividends in the traditional income concept underestimates the shareholders' income from their investments and its effect on inequality under the pre-reform tax-system.

While our widening of the income definition strongly affects the growth in the *contribution* to inequality from the return to shareholders, its effect on overall inequality growth is less dramatic. This result indicates that the role of capital income has been exaggerated when dividend receipts have been used as a measure of the return to shareholders. The present results demonstrate that the contributions from other income sources have an equally strong effect on the changes in overall income inequality as capital income. Some of these income components, like pensions and transfers, have a stronger effect on the lower (where share ownership is relatively rare) rather than on the upper part of the income distribution.

As demonstrated by the present results, the choice of income definition can affect the results from analyses of income inequality. The problem of income reporting behavior should therefore be born in mind when interpreting analyses of trends in income inequality - especially when major tax reforms have taken place.

The data

We use data from the Survey of Income and Wealth (Statistics Norway). The sample size varies from more than 9000 persons in the 1980's, increasing to an average of almost 28.000 in the 1990's (see table A1 below).

Table A1. Sample size by year

Year:	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
N:	14271	9582	9366	9324	22349	24451	24010	18404	41112	26305	37980

 The data contains detailed information from the personal tax returns, including ratable values on securities. Quoted shares are reported in the tax returns at their true market value before 1992 and at 70 percent of the true market value from 1992 on. Non-quoted shares are reported at 50 percent (1990 and before) or 30 percent (after 1990) of the book value of the firm.

A problem related to the calculation of market values arises because the value of quoted and non-quoted shares is not reported separately in the tax returns. We have used an approximation of the market value of the households' shares in a given year by defining a fraction (A) of the total reported shares in each household as non-quoted shares, and multiply this fraction by the factor 2, respective 3.3 after 1990. The fraction defined as quoted shares is corrected in a similar way, by multiplying the remaining fraction (1-A) by the factor 1/0.7 from 1992 on. The fraction held as non-quoted shares is calculated each year by the ratio of the aggregate tax-value of non-quoted shares to the tax-value of all (quoted plus non-quoted) shares, from the Statistics of Shares[12]. This approximation implies that the expected fraction of shares held as non-quoted shares is assumed to be equal for all households.

The use of book values in the tax-valuation will probably underestimate the market value of the non-quoted shares somewhat, due to the favorable way of defining the non-quoted firms' book values for tax purposes (in particular before the tax reform). However this is the best one can do within the limits of the existing data.

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[12] Statistical Yearbook of Norway (1993, 1998).

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