

MEMORANDUM

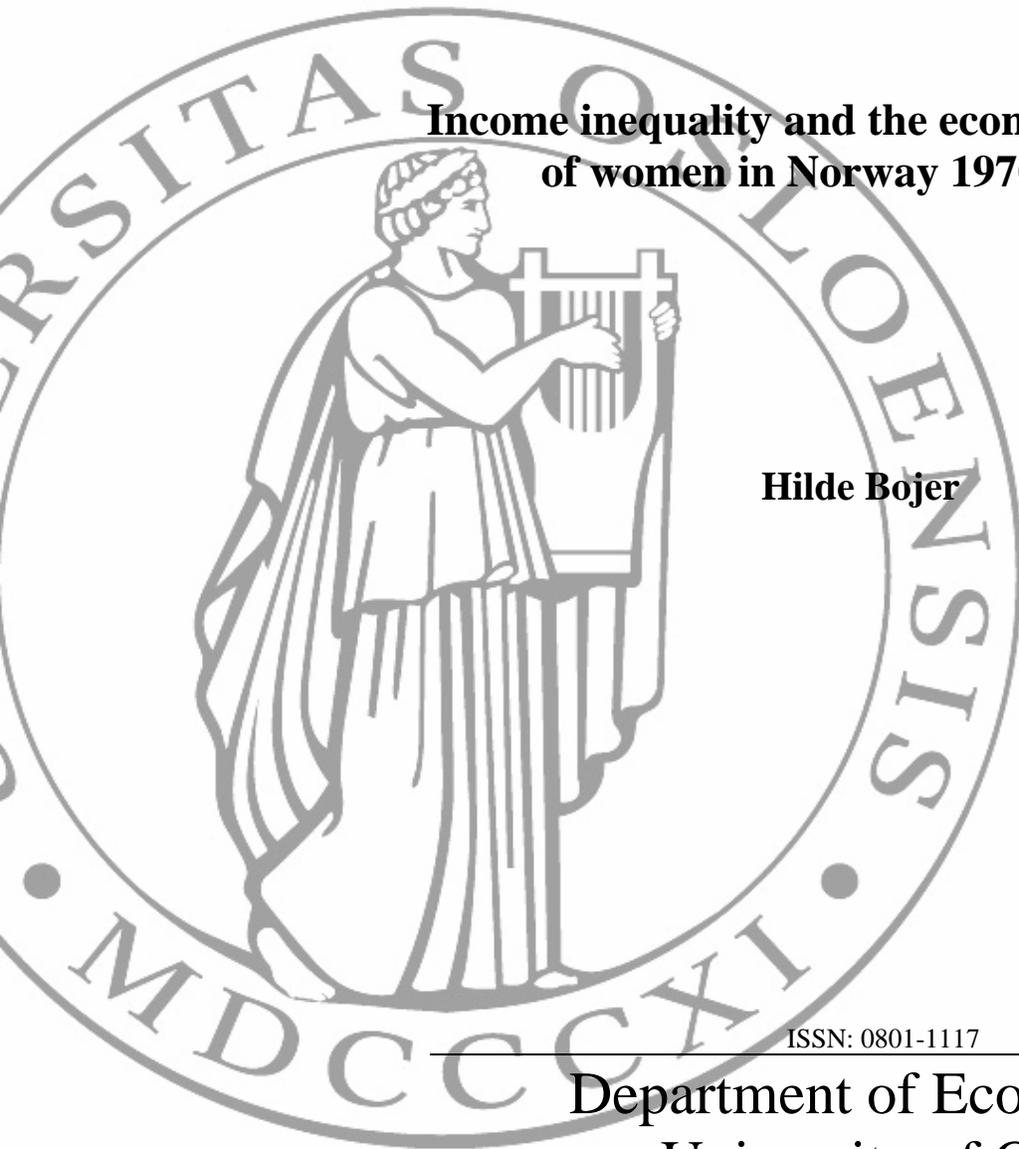
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of women in Norway 1970 - 2002**

Hilde Bojer

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Department of Economics
University of Oslo



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P. O.Box 1095 Blindern
N-0317 OSLO Norway
Telephone: + 47 22855127
Fax: + 47 22855035
Internet: <http://www.oekonomi.uio.no/>
e-mail: econdep@econ.uio.no

In co-operation with
**The Frisch Centre for Economic
Research**

Gaustadalleén 21
N-0371 OSLO Norway
Telephone: +47 22 95 88 20
Fax: +47 22 95 88 25
Internet: <http://www.frisch.uio.no/>
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Income inequality and the economic position of women in Norway 1970 – 2002¹

Hilde Bojer²

April 5, 2005

¹The tables and graphs for the years 1982 – 2002 are based on the author's computations using data from the Surveys of Income and Wealth of Statistics Norway. The data were obtained through the Norwegian Social Sciences Data service (NSD). Results for the years 1970 to 1979 were computed by Statistics Norway to the author's specifications. Neither Statistics Norway nor NSD is in any way responsible for my use of the data.

²I am grateful to Tony Atkinson and Erik Biorn for friendly and useful comments.

Abstract

In the period from 1970 to 2002, Norwegian women moved out of the home and into the paid labour market. The paper investigates the effect of this social change on women's economic position and on individual income inequality. It argues that the distribution of individual incomes is of equal interest to household incomes as targets of public policy. Inequality is measured by the generalised entropy measure. The data are taken from the triennial, later annual, surveys of income carried out by Statistics Norway in the period, giving reliable data on income for samples varying from 6000 to 30 000 women and men. Women's average income relative to that of men increased from 27 percent to 60 per cent. Total individual income inequality decreased strongly from 1970 to 1990, and decreased very slightly from 1990 to 2002. But this total covers very different developments for women and men. Women's internal inequality decreased up to about 1990; the later trend is unclear. Men's internal inequality increased during the 1990s. However, the increase in men's inequality is shown to be mostly due to fluctuations in capital income. Inequality of employees remained unchanged during the whole period, both for women and men, when capital income is disregarded.

1 Why individual income?

Traditionally, income is regarded as a measure of possible consumption. Consumption, in its turn, determines the welfare of the individual. Hence, a welfarist approach to income distribution concentrates on household income per equivalent adult as the best empirical approximation to a measure of welfare. Several weaknesses of this approach are well known. From a consumption/welfarist point of view the two most important are that leisure is not included in consumption, and that there may be inequalities in the distribution within the household.

But income is more than a means to acquire consumption goods. Income is power, prestige, status and - above all, from a woman's point of view - economic independence. Writing 'from a woman's point of view' does not imply that economic independence is assumed to be of no importance to men. On the contrary, most men take as a matter of course the independence that follows from earning their own income. For women, on the other hand, even the legal right to economic autonomy is historically quite recent in modern economies, and is far from being acquired globally.

In fact, if we take modern ethical individualism seriously, the only variable of interest for distributional policy is individual income as far as adults are concerned. In modern, advanced economies, marriage and cohabiting are free choices for both women and men.

Children are another matter. Studies of children's welfare have to include the income of the household they live in since they do not have a free choice of parents, and neither can nor ought to provide for themselves.

This paper studies individual income in equality in Norway during the period when the majority of Norwegian women acquired some degree of economic independence.

2 Data sources, income concept and inequality measure

The data are collected from income tax returns supplemented by information from register data. Details are given in section 4.4. The income concept used is individual gross income, which equals all taxable income before deductions and before taxes. It consist of the components capital income, entrepreneurial income, wage income and transfers. This income concept broadened to a certain extent during the eighties as more transfers became taxable and fringe benefits were included in taxable income. After a tax reform in 1992, both registration and definition of capital income changed with fairly noticeable

effects, as we shall see. In addition to Gross Income (GI), I have made some analyses using Gross income less capital income (GILC).¹

The inequality measure used is the Generalised Entropy Measure with parameters 0.5 and 2.

$$I(\alpha) = \frac{1}{\alpha(\alpha - 1)} \left[\frac{1}{n} \sum_j \left(\frac{Y_j}{m} \right)^\alpha - 1 \right] \quad (1)$$

Here, Y_j stands for the income of person j , while m is the mean income

$I(2)$ is ordinally equivalent to the coefficient of variation, v : the measure shown in the figures is $v/2$. $I(0.5)$ weights the lower/middle end of the distribution while $v/2$ weights the top of the distribution to an extreme degree.

The generalised entropy measure is additively decomposable by group, (Shorrocks 1984):

Let the population consist of groups such that m_g is the mean income of group g , p_g is its share of the population and $\mu_g = m_g/m$

$$I(\alpha) = \sum_g p_g \mu_g^\alpha I_g(\alpha) + I_B(\alpha) \quad (2)$$

$I_g(\alpha)$ is the within-group inequality of group g .

$I_B(\alpha)$ is the between-groups inequality, calculated as if all individuals in a group had the same income:

$$I_B(\alpha) = \frac{1}{\alpha(\alpha - 1)} \left[\sum_g p_g \left(\frac{m_g}{m} \right)^\alpha - 1 \right] \quad (3)$$

An advantage of using the additively decomposable inequality measures (1) is the transparency of the relationship between trends in inequality in each group and relative mean incomes on the one hand, and total inequality on the other hand. As it turned out, the chief influence on overall inequality has been the size of the groups, in particular for women.

Equation 2 can also be used to calculate the ‘contribution to inequality’ of each group as

$$C_g = p_g \mu_g^\alpha I_g(\alpha) \quad (4)$$

¹For further details about data and income concepts see SSB 2004.

3 Structure

The population is divided into eight groups, by sex and occupational status. I have computed inequality for each group, and between group inequalities. Ideally, the grouping by occupational status should have been according to employment and hours worked, as in labour market surveys. No such information is, however, obtainable from income tax returns. Statistics Norway instead groups individuals according to size and composition of income. Persons with entrepreneurial income, work income and/or taxable transfers above a certain limit are grouped as Self-employed, Employees or Pensioners according to the dominant income component. Others are grouped as Others. The majority of these have very low incomes, but may still be economically active. Quite a few women with short part time work belong to this group. The income limit is set equal to the minimum old age pension each year.

The occupational status groups show great internal stability. This is obviously true as concerns size and composition of income. But there are characteristic and stable differences between the groups also with regard to internal inequality. (See figure 2.)

Figure 1: Income by sex and occupational status 2002

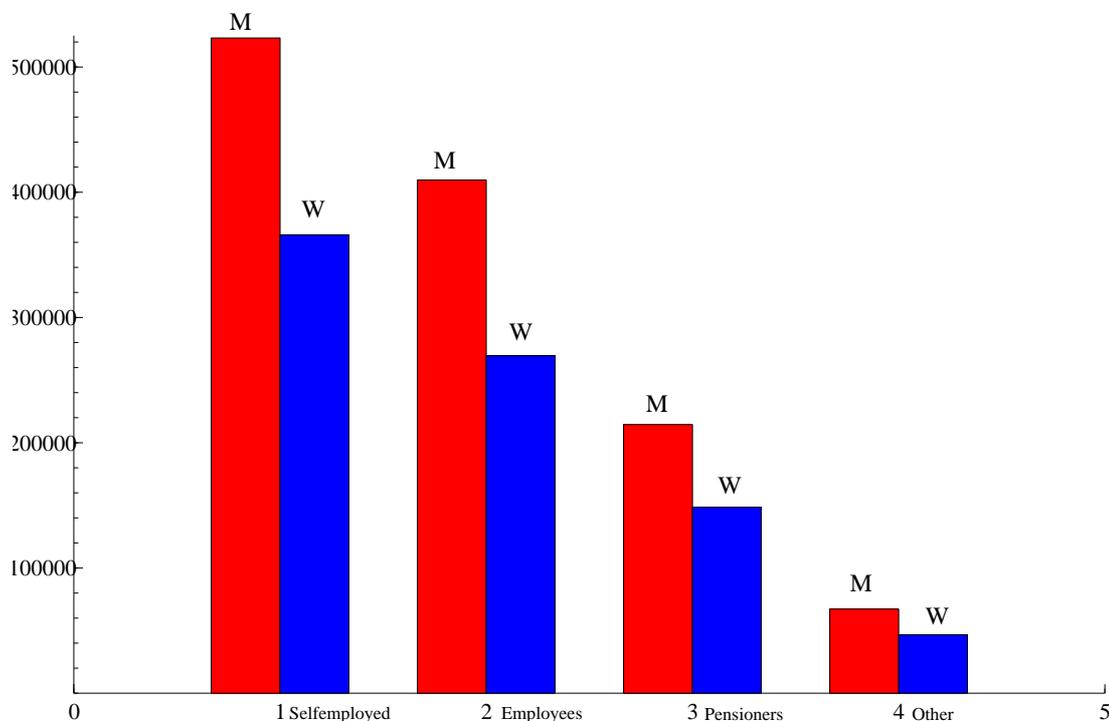
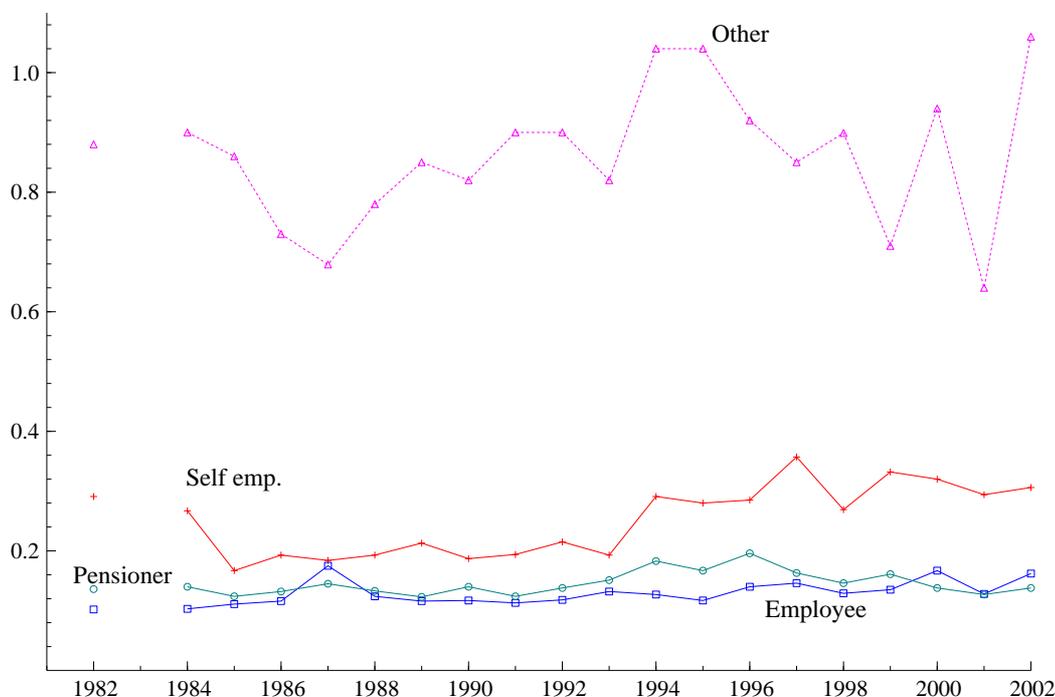


Figure 2: Inequality 1982–2002 by occupational status.



Gross income. Inequality measure $I(0.5)$

The structural changes with respect to occupational groups in the period are shown in table 1. The structure of the adult population has changed very little as far as men are concerned, while the structural changes have been dramatic for women, as seen by table 1.

Among men, there has been a steady decrease in the share of self-employed and increase in that of pensioners. The increase in pensioners is mostly demographic, reflecting an ageing population. The percentage of ‘Other’ first increased, and then started decreasing, the increase probably reflecting lengthening periods of education.

For women, there is a dramatic decrease in the share of ‘Other’, increasing the share of pensioners as well as employees. Again, the increase in pensioners is mainly demographic. But it is worth noting that for many women in the seventies and beginning of the eighties, income increased when they became old age pensioners.² The minimum old age pension is fixed by the Norwegian Parliament (Storting) every year, and may therefore be regarded

²In Norway, every person is entitled to a minimum old age pension on reaching 67 years.

Table 1: Men and women by occupational status 1970–2002. Per cent.

	1970	1982	1992	2002
Men				
Selfempl	14*	10	8	6
Employee	64*	64	58	60
Pensioner	15*	17	22	24
Other	7*	8	12	9
All	100	100	100	100
Women				
Selfempl	1*	2	3	2
Employee	25*	41	46	51
Pensioner	17*	25	33	33
Other	57*	32	19	14
All	100	100	100	100

*rough estimates in 1970

Persons 18 years and over

as an unofficial, administratively fixed poverty line. With this interpretation, the proportion of women earning less than the poverty line has sunk from around 57 per cent in 1970 to 14 per cent in 2002, not all that different from the corresponding proportion for men, 9 per cent.

This fact alone marks a social revolution in the economic position of women, and has more than doubled their income relative to men. (See figure 3 below.)

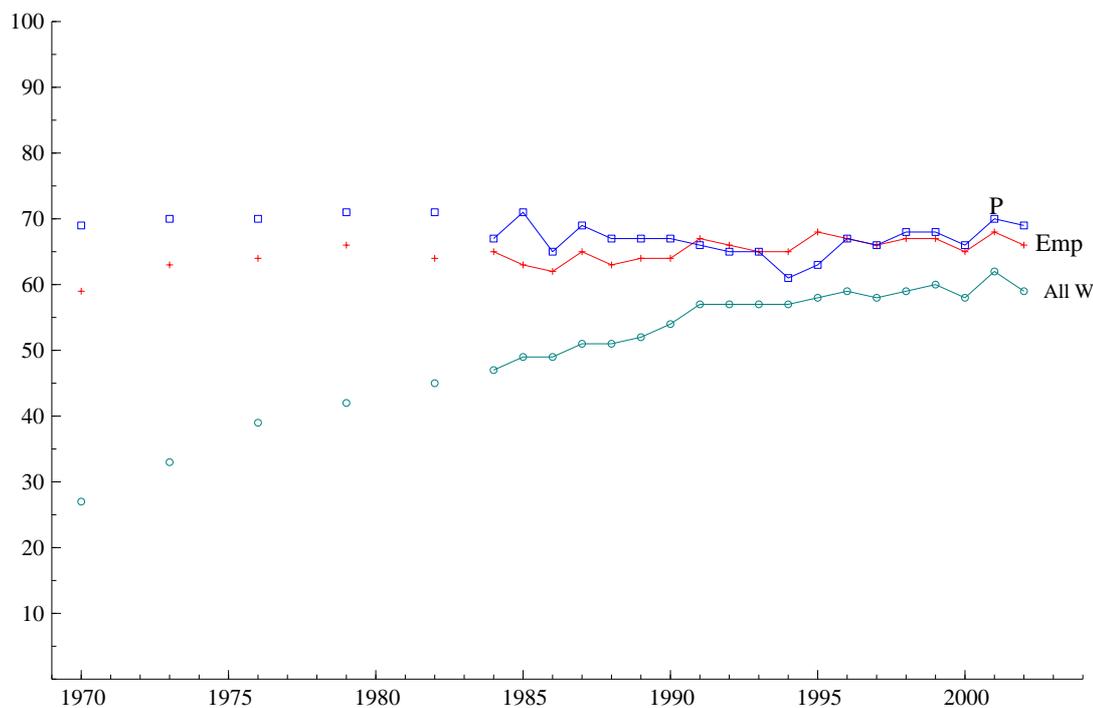
4 Results

The main results are presented in the figures below.³ The data from the seventies are more sparse and less reliable than those from later years. Therefore, only a few of the graphs cover the whole period.

The two inequality measures used give the same ordering of years and groups in most cases. I therefore show computations with both only when there are what I judge to be interesting differences.

4.1 Women's relative incomes

Figure 3: Women's relative income 1970 – 2002

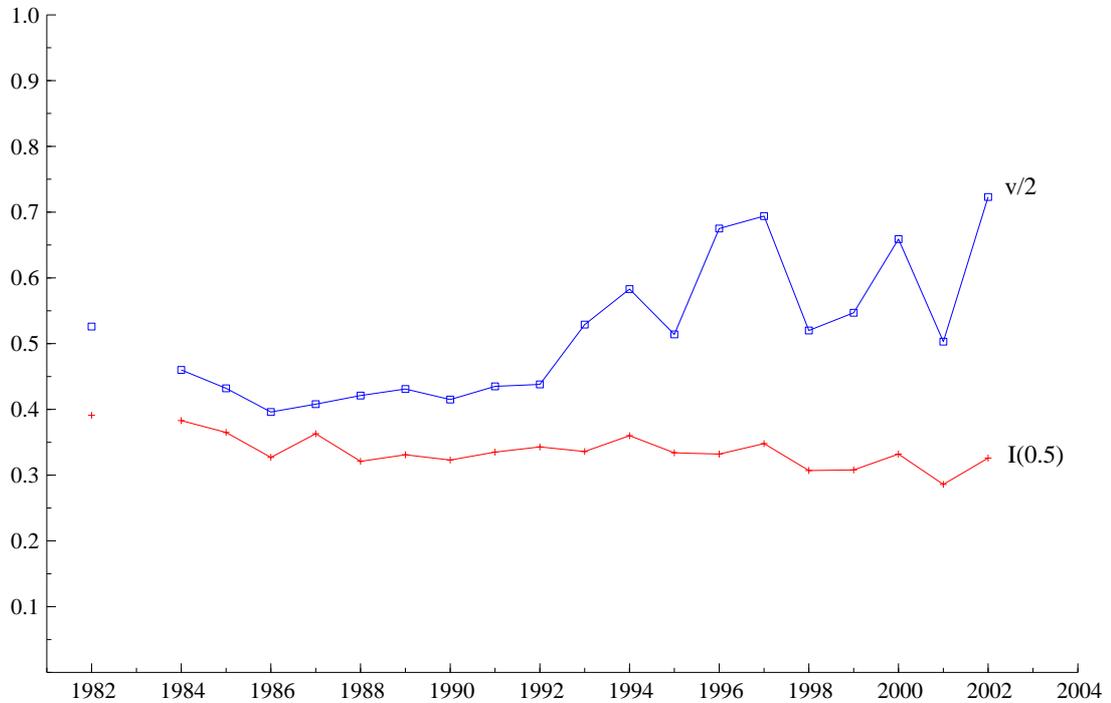


Gross income

Figure 3 shows women's average income as a percentage of men's average income, overall and for the two large occupational status groups. With some fluctuations, the group relative incomes have been fairly constant in the period, with no discernible long term trend. Note that pensioners are better

³Detailed numerical results are found in Bojer 2005.

Figure 4: Inequality 1982 – 2002



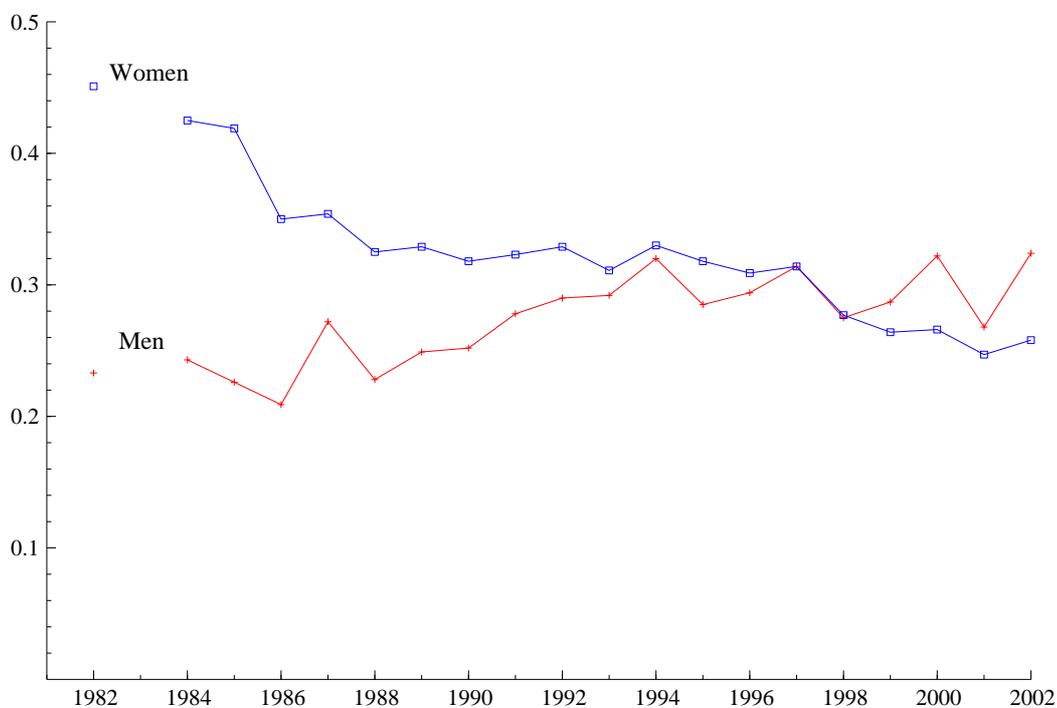
All adults. Gross income

off relative to men than employees. Overall, women's relative average income has more than doubled: from 27 per cent in 1970 to 60 per cent in 2002. The increase is entirely due to changes in occupational status.

4.2 Inequality

Figure 4 shows total inequality 1982 to 2002 using both inequality measures. They show the same development: decrease up to the end of the eighties, then some years of stability, and greater fluctuations, but no clear trend after 1992.

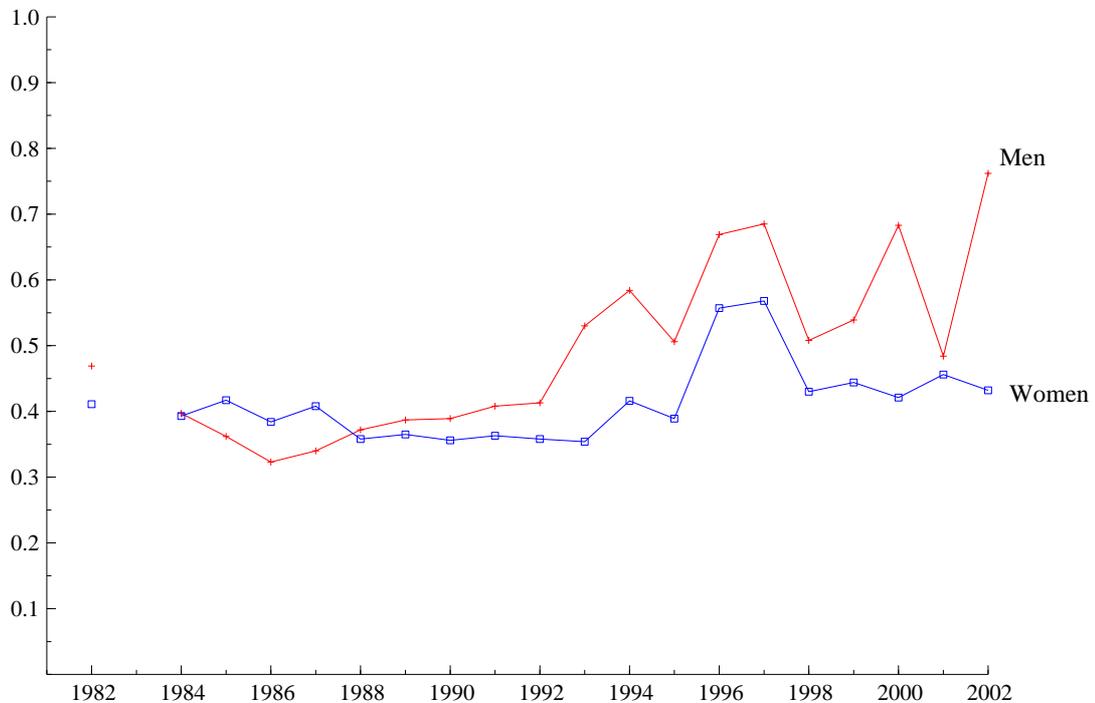
Figure 5: Inequality 1982–2002. Women and Men



Gross income. Inequality measure $I(0.5)$

Figure 5 shows that the development in total inequality is the net result of two very different trends. Women's internal inequality consistently decreases, apart from a few small fluctuations. Men's internal inequality increases after about 1985, and fluctuations during the nineties are larger than in the eighties. Also, women's internal inequality was greater than men's until the late nineties, but is now smaller. But here, the situation is depicted differently by the coefficient of variation.

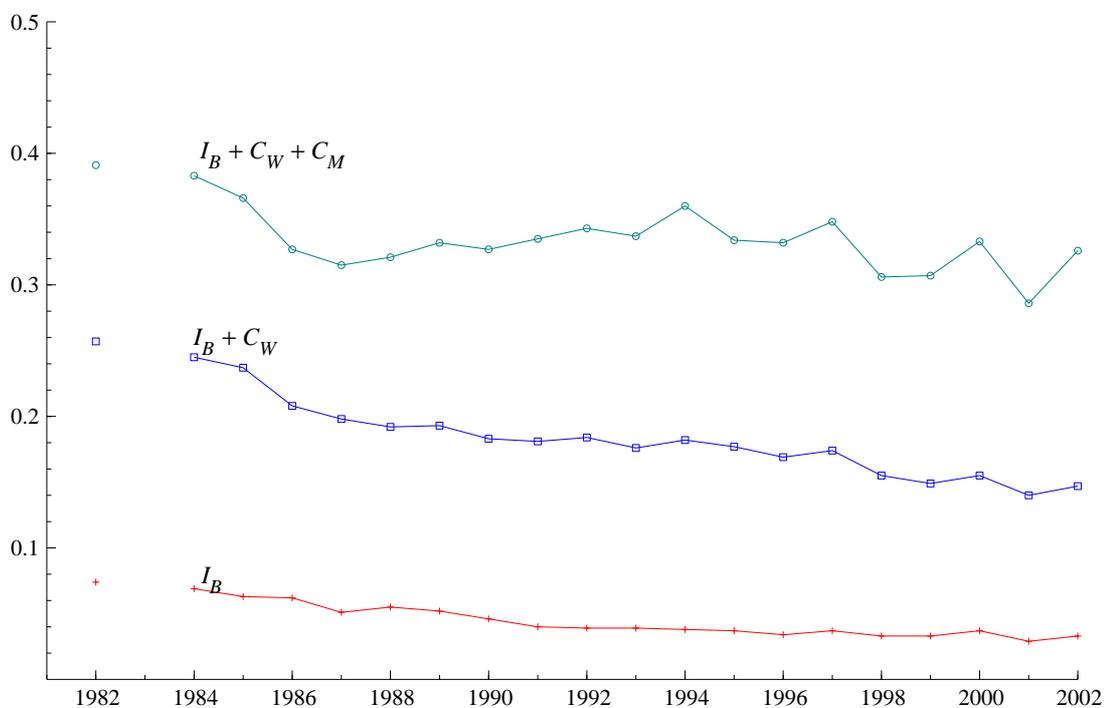
Figure 6: Inequality 1982–2002. Women and men



Gross income. Inequality measure $v/2$.

When inequality is measured by the coefficient of variation, men's internal inequality is larger than women's for most of the period. Also, women's inequality seems to increase in 1995 and then reach a permanently higher level than in the preceding ten years. The reason for the change in ordering of women and men is clear: women's inequality is dominated by many very small incomes. Men's inequality is more influenced by a few very high incomes. (Lorenz curves supporting this statement are found in Bojer 2003).

Figure 7: Decomposition of inequality by sex 1982–2002

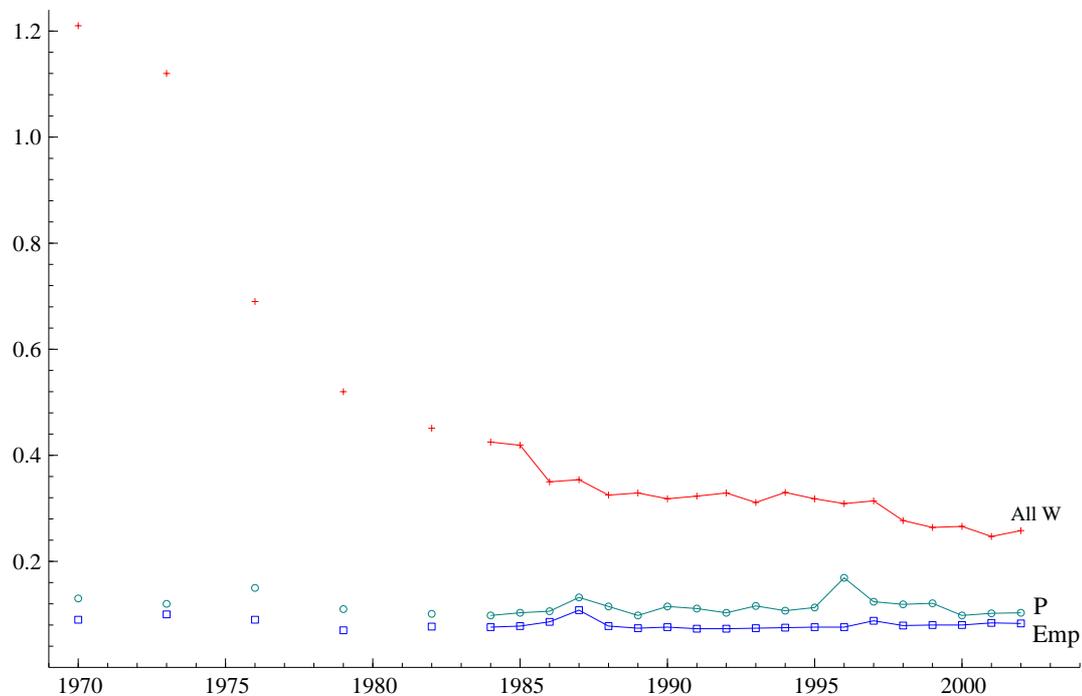


Gross income. Inequality measure $I(0.5)$.

4.3 Decomposition of Inequality

Figure 7 shows contributions to inequality for men, women and between-group inequality as described by equations 2 and 4. The lowest line shows between-group inequality (I_B). The contributions to inequality of men and women respectively are written $C_g = p_g \mu_g^{0.5} I_g$ for $g = M, W$.

Figure 8: Inequality 1970–2002. All women and by occupational status.



Gross income. Inequality measure $I(0.5)$

Figure 8 demonstrates clearly the structural reasons for women’s decreasing inequality. Internal inequality, like relative income in figure 3, has been stable in both the two large occupational groups, with pensioners’ inequality slightly larger than that of employees during the whole period. The steady disappearance, year after year, of women with incomes below the poverty line has also removed income inequalities among women; unambiguously up to the middle of the nineties, less certainly for the last ten years.

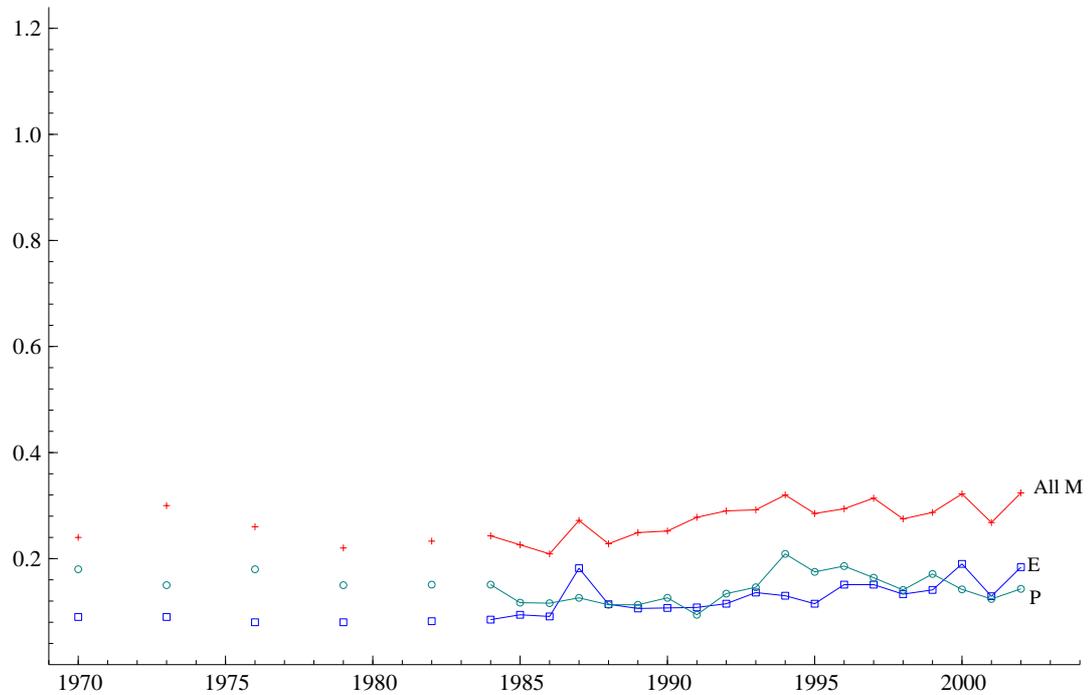
Figure 9: Decomposition of women's inequality 1982–2002



Gross income. Inequality measure $I(0.5)$.

In figures 9 and 11, the groups are numbered as follow: Self-employed = 1, Employees = 2, Pensioners = 3 and Other = 4.

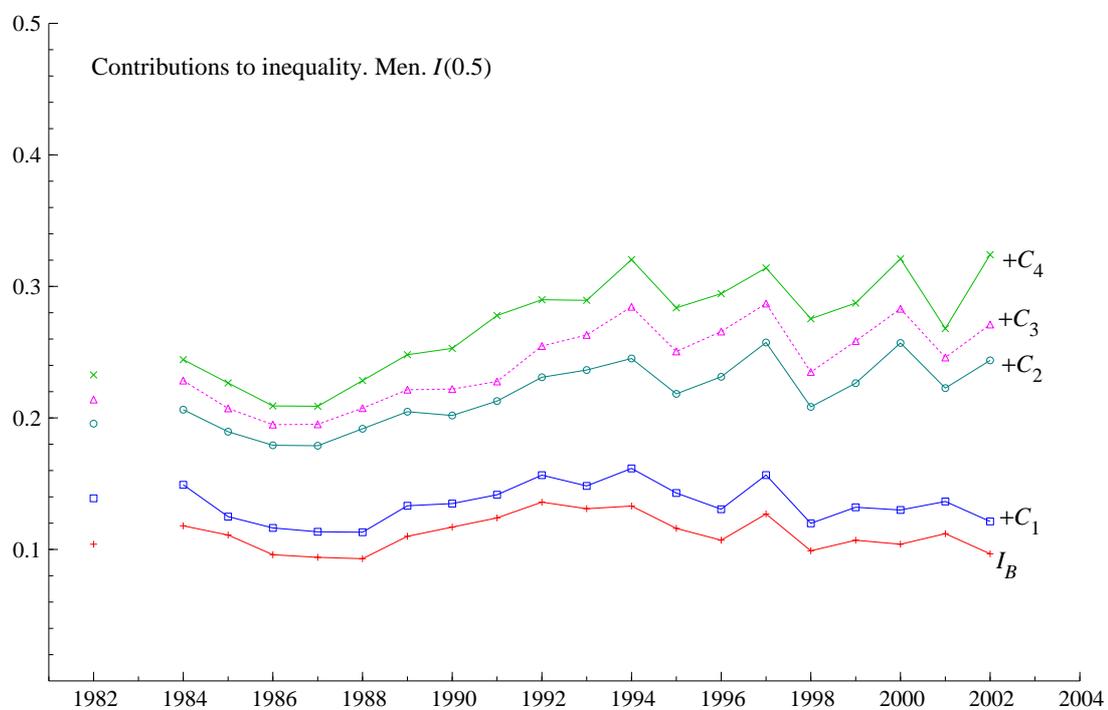
Figure 10: Internal inequality 1970 –2002. All men and by occupational status



Gross income. Inequality measure $I(0.5)$

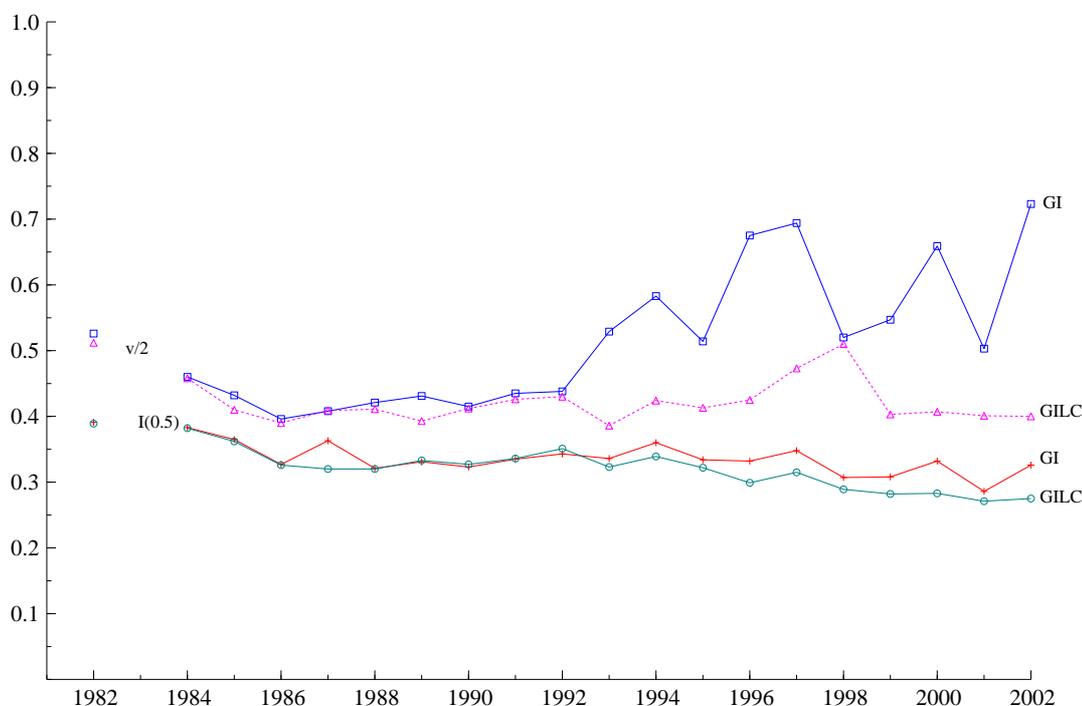
We see no such clear pattern in the equivalent curves for men's inequality.

Figure 11: Decomposition of men's inequality 1982–2002



Gross income. Inequality measure $I(0.5)$.

Figure 12: Inequality 1982–2002. All adults



Gross income (GI) and gross income less capital income (LCI). Inequality measure ($I(0.5)$).

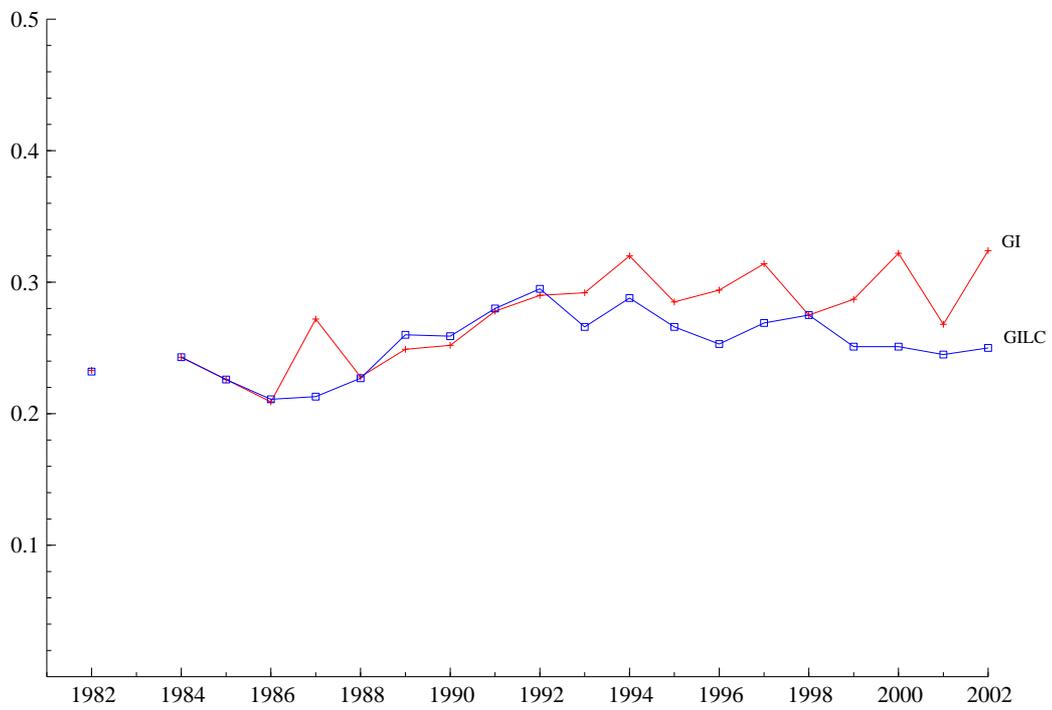
4.4 Impact of increased capital income

The last six figures demonstrate the impact of increased capital incomes during the nineties. The increase has two very different causes. One is a tax reform in 1992 which made more types of capital income taxable, and is therefore purely a matter of better registration. The other cause is an economic boom which increased capital income in reality. They show that capital income makes a considerable larger difference to men than to women, overall and within the two big groups.

Of particular interest, I think, is figure 15 which shows that internal inequality of employees has been as good as constant for the last 20 years when capital income is ‘cleansed’ out.

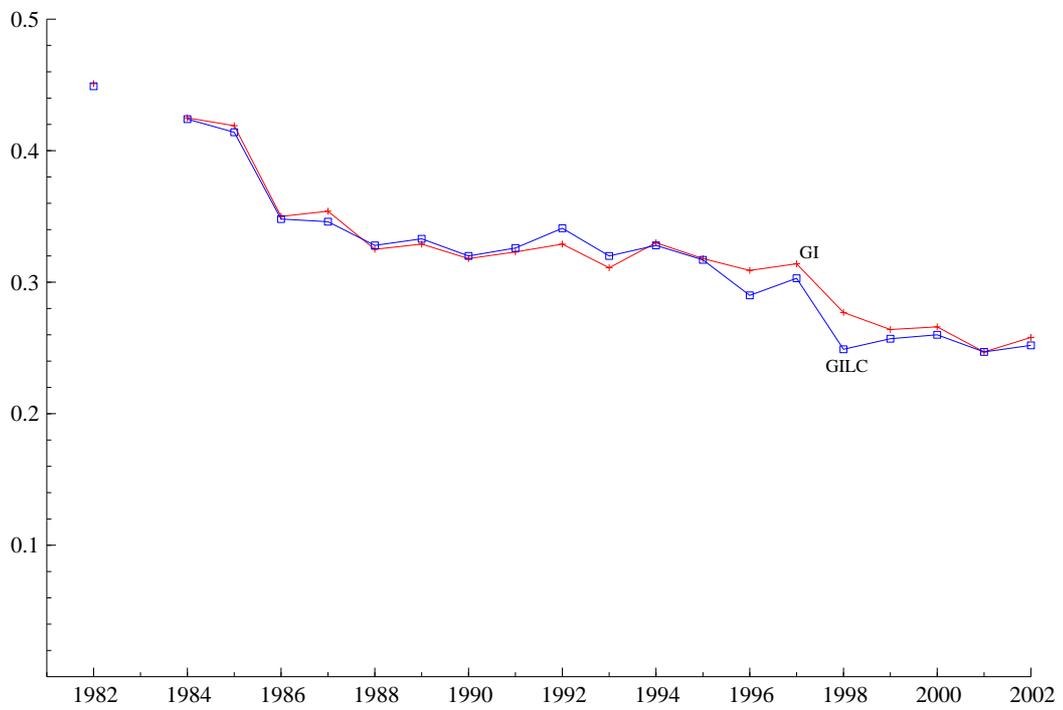
It should be stressed, perhaps, that capital income here and in the following is *gross* capital income, that is, losses and capital expenditures are not deducted.

Figure 13: Inequality 1982–2002. Men



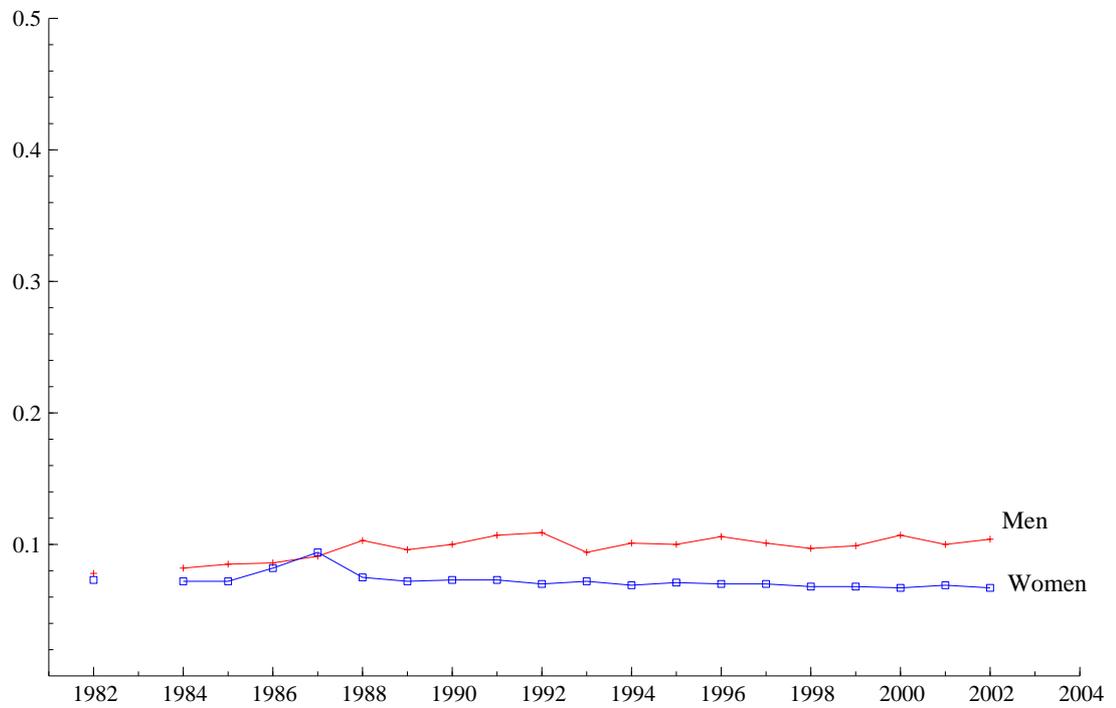
Gross income (GI) and gross income less capital income (GILC). Inequality measure ($I(0.5)$).

Figure 14: Inequality 1982–2002. Women



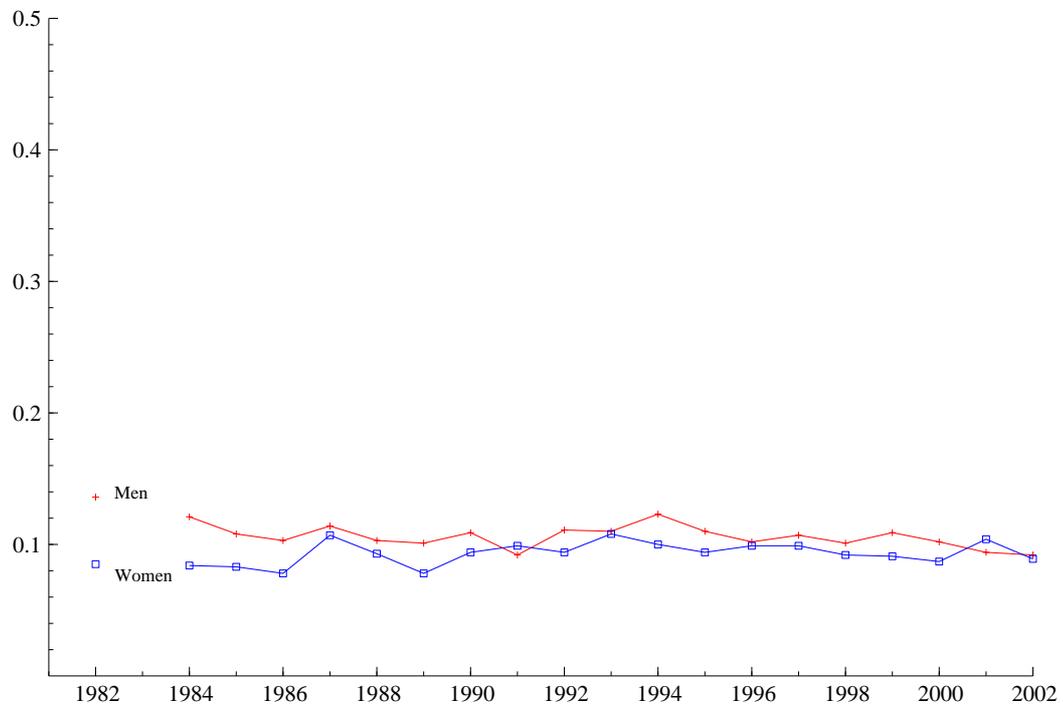
Gross income (GI) and gross income less capital income (GILC). Inequality measure ($I(0.5)$).

Figure 15: Inequality of employees 1982 -2002. Women and men.



Gross income less capital income (GILC). Inequality measure ($I(0.5)$).

Figure 16: Inequality of pensioners 1982 -2002. Women and men.



Gross income less capital income (GILC). Inequality measure ($I(0.5)$).

Data

The data are from Surveys of Income and Wealth produced by Statistics Norway. There are two different types of data. In 1970, 1973, 1976 and 1979 they were samples from income tax returns, so persons without taxable income were not included. I have made rough estimates of the number of men and women without income by comparing Income survey estimates of persons with income with population statistics.

From 1982 on, the Surveys are stratified probability samples of Norwegian households, organised with both households and individuals as units, and comprising the whole population, adults as well as children. I have retained adults 18 years and over only. From 1984 on the surveys are annual. The sample sizes are varying: 18 000 adults in 1982, 5 000 in 1984 and 1985, 7000 in 1986, 1987, 1988 and 1989, 12 000 in 1990 and from then on increasing every year up to over 50 000 in 2002, except for 1993, when the sample was 7 000 adults.

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