

THE EQUALIZING EFFECT OF WIVES' EARNINGS ON INEQUALITIES IN EARNINGS AMONG HOUSEHOLDS

Norway 1974–2004

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ABSTRACT: Since the 1970s, inequalities in earnings among men have risen in many countries. In the same period, married women's labour force participation has increased. This may affect inequality in household earnings in three ways, related to (a) the degree of inequality in women's earnings, (b) the share of women's earnings of total household earnings, and (c) the correlation of wife's and husband's earnings. Using Annual Norwegian Labour Force Surveys 1974–2004, with added register data on earnings, we find an equalizing effect of wives' earnings over time. Empirical analysis and simulations of hypothetical developments in household earnings inequality show that women's labour supply is the main explanation for these trends.

Key words: economic inequality; women's labour supply; decomposition of inequality

1. Introduction

The last 30 years has been a period of sizeable changes in the degree of inequality in wages or earnings. In the US and the UK in particular, but also in many continental European countries like Portugal, Italy and Sweden (Atkinson 2008: chapter 5; cf. OECD 2008), inequality has increased considerably. In the UK, for instance, inequality in men's earnings increased by 64 percent from 1975 to 2001 (Dolton and Marcenaro-Gutierrez 2005: Table 3). There are also examples of declining inequality, with France as a prime example (Atkinson 2008). The empirical picture for Norway is not entirely clear. Atkinson (2008: 312) concludes that 'there is nothing in the data assembled here to disprove the hypothesis that there have been only limited changes since 1970'. There seems,

however, to have been an increase in earnings inequality at least since the end of the 1990s. Cholezas and Tsakloglou (2009: Table 6.7) found a quite strong increase in earnings inequality in the period 1997–2000, although there was considerable stability in the period 1980–1997. Data presented in Aslaksen *et al.* (2005), however, suggest a gradual, if not very strong, increase even in the 1973–1997 period.

The subject of this paper is how such changes at the individual level have translated into changes in inequality between families or households, with Norway 1974–2004 as the empirical case. From the 1960s onwards, married women have increasingly entered the labour market, and several authors have suggested that this could be a major source of growing economic inequality between households (Thurow 1975; Esping-Andersen 2007). This could happen because highly educated women tend to be married to highly educated men, and lowly educated women to lowly educated men (assortative mating). Thus, increased female labour force participation could lead to an increasing correlation between husband's and wife's earnings. A number of studies have found, however, that increased labour force participation by married women has instead dampened the impact of growing inequality among husbands. Most of these studies use American data (e.g., Reed and Cancian 2001; Gottschalk and Danziger 2005), but there are also studies from other countries such as the UK (e.g., Harkness *et al.* 1997), Sweden (Björklund 1992), Malaysia (Amin and DaVanzo 2004), Taiwan (Bourguignon *et al.* 2001), Hong Kong (Pong 1991), and Israel (Gronau 1982). Despite the overall inequality reducing effect of married women's increased labour force participation, it has nevertheless been noted that household level inequality in the US would have increased substantially less than what has actually happened if educational homogamy had not increased (Schwartz 2010).

The present paper contributes to the literature in several ways. For one thing, most previous studies of European countries are now quite old and do not cover changes that have taken place since the early 1990s. Moreover, they often only compare two selected years or periods and do not provide detailed accounts of how the relationship between individual level and household level inequality has developed over time. This is unfortunate since many of the underlying factors – individual level earnings inequality, married women's labour force participation, and the husband–wife earnings correlation – have probably changed over time in highly nonlinear and perhaps even non-monotonic ways. In particular, the strong increase in women's labour force participation came primarily in the 1970s and 1980s in most countries, and has clearly levelled off since the 1990s. A further contribution in relation to most previous European studies is that we consider in detail how each of these underlying factors contributes to changes in household level inequality. Finally, we believe

that Norway, with traditionally very low economic inequality, provides an interesting comparative case, not least in relation to high-inequality countries like the UK and the US.

2. Previous research

The standard design for studies of the impact of wives' earnings on inequalities in earnings among households is to compare the distribution of household earnings (or income) with and without women's earnings.¹ Thus, the case of married women not working is treated as the reference distribution or counterfactual to which the actual household earnings distribution is compared. Another related comparison is between the actual distribution and the distribution that would have existed if wives' share of household earnings had remained constant over time. Following Cancian and Reed (1998) we believe a meaningful interpretation of how the wives' (or for that matter, the husbands') earnings affect the distribution of household earnings requires an explicit counterfactual or reference distribution. The decompositions of the Gini index suggested by Fei *et al.* (1978) or Rao (1969) do not satisfy this requirement, however, and would typically lead to the conclusion that wives' earnings 'contribute' to inequality between households even if the Gini index (or other inequality measures) declines when wives earnings are added to men's earnings (for examples of studies using these decompositions, see Karoly and Burtless 1995 or Aslaksen *et al.* 2005).

Apart from the studies using the Gini decomposition approach, nearly all studies have found an equalizing effect of wives' earnings on inequality in household earnings across a number of different countries (see references above). The exact magnitude of the equalizing effect is, however, very difficult to compare from one study to another, because of differences in choice of inequality measures (Coefficient of Variation, Gini index, decile ratios), and because some studies report absolute levels of these measures, whereas others report percentage changes in the measures over time. For the UK, Harkness *et al.* (1997: Table 8) report that wives' earnings reduced the level of Gini index among all households consisting of

1. There is a plethora of income concepts: An individual's earnings is her or his income from gainful employment over some period, typically a year. The wage is defined as payment per unit of labour input, e.g., per hour worked. Household earnings is the sum of the earnings of the household members, although often earnings by household members other than the husband and wife are not included (this is the case in this paper). Household (gross) income is the sum of household earnings and income from other sources like capital income and private and public transfers. Household net income is household gross income net of taxes paid.

married or cohabiting couples by 18 percent in 1979–1981, whereas this figure had increased to 34 percent in 1989–1991. We performed some calculations to obtain comparable numbers based on the published results for the US in Cancian and Reed (1999); these indicate that in 1967 wives' earnings had no equalizing impact at all, whereas the equalizing impact in 1994 was slightly below 20 percent. Even these numbers are not strictly comparable as Harkness *et al.* used the Gini index, whereas Cancian and Reed used the Coefficient of Variation.

Cross-national studies have also documented different patterns across countries. Looking at 15 European countries, Pasqua (2008) found a correlation between women's labour market participation and lower income inequality among households, indicating that where dual-earner families dominate, inequality is lower. Decomposing his results by sources of income, Pasqua (2008) found an employment effect, showing that inequality in women's earnings distribution is greater where fewer women work. Esping-Andersen (2007) found an equalizing effect of wives' earnings in Denmark, Sweden and the US, whereas wives' earnings contributed to greater household inequalities in France, Germany, Italy, Spain and the UK.

3. Trends in earnings inequality in Norway

Together with Sweden and Denmark, Norway has traditionally been characterized by very low economic inequality. A main factor behind low inequality in wages and earnings at the individual level has been a relatively high degree of unionization and centralized wage setting (Kahn 1998; Esping-Andersen 2000). As noted above, some research suggests that earnings inequality among individuals has increased, at least in the last decade. A recent white paper from the Ministry of Finance (NOU 2009: 12) points out that the wage growth has been particularly strong near the top of the wage distribution. Even the study showing the largest increase in inequality notes, however, that earnings inequality in Norway is still very low by international standards (Cholezas and Tsakoglou 2009).

With regard to inequality in earnings between households, the Norwegian evidence is not entirely clear. Results presented in OECD (2008: Figure 1.4) suggest a 20 percent increase in the Gini coefficient from the mid-1980s to the mid-1990s. A slightly lower increase is reported for net disposable (after tax) income. As a result of these changes, Norway now appears to have slightly higher (net disposable) income inequality than its Scandinavian neighbours, Denmark and Sweden.

In seeming contrast to these OECD figures, Aslaksen *et al.* (2005) found that earnings inequality between households was virtually unchanged during the period 1973–1997. A possible explanation for these differences is that the OECD figures apply to all households, whereas Aslaksen *et al.* analyzed only households consisting of married couples (with or without children).

4. Women's labour supply and household inequalities in earnings

In general, the inequality in household (husband plus wife) earnings will be a function of the inequality in each spouse's earnings taken separately and of the association between the two spouses' earnings. As noted above, several different inequality measures have been used in previous research on the relationship between individual and household earnings inequality, primarily the Coefficient of Variation, the Gini index, and various decile ratios. We have chosen to rely mainly on the Coefficient of Variation, although we will also often report Gini indexes. Our main reason for choosing the Coefficient of Variation is that this measure can be decomposed by source in an intuitively appealing way (Cancian and Reed 1998):

$$CV_f^2 = (1 - S)^2 \cdot CV_h^2 + S^2 \cdot CV_w^2 + 2 \cdot \rho \cdot (1 - S) \cdot S \cdot CV_h \cdot CV_w$$

In this decomposition, the subscript f refers to the household, h to the husband and w to the wife. CV is the coefficient of variation, ρ the correlation of husband's and wife's earnings, and S is the (population) mean share of the wife's earnings of total household earnings.

It follows from this equation that the impact of wives' earnings on household earnings inequality depends on three factors: (1) the degree of inequality in wives' earnings, (2) the share of wives' earnings of household earnings, and (3) the correlation of wife's and husband's earnings. More specifically, the marginal effects of these components are as follows:

$$\frac{\delta(CV_f^2)}{\delta(CV_w)} = 2 \cdot S^2 \cdot CV_w + 2 \cdot \rho \cdot (1 - S) \cdot S \cdot CV_h$$

$$\frac{\delta(CV_f^2)}{\delta(S)} = 2 \cdot CV_h^2 \cdot (S - 1) + 2 \cdot CV_w^2 \cdot S + 2 \cdot \rho \cdot CV_h \cdot CV_w \cdot (1 - 2 \cdot S)$$

$$\frac{\delta(CV_f^2)}{\delta(\rho)} = 2 \cdot (1 - S) \cdot S \cdot CV_h \cdot CV_w$$

As these partial derivatives show, the direction and shape of the impact of CV_w , S and ρ are complicated. The impact of the husband–wife correlation (ρ) is the most simple, since an increase in this factor will always lead to increased inequality at the household level. Increasing inequality in wives’ earnings (CV_w) will also generally lead to increased household level inequality as long as the husband–wife earnings correlation is zero or positive.² The impact of increase in wives’ share of earnings (S) is complicated, and the direction of the effect is not evident from the equation. We therefore illustrate the potential impact of this factor in Figure 1, which shows the impact of wives’ share of household earnings on household earnings inequality for different values of inequality of wives’ earnings and of the husband–wife earnings correlation. Husbands’ earnings inequality is fixed at 0.5 in all examples. The values for the various parameters are chosen to represent as much as possible the international variation shown by Esping-Andersen (2007) and Pasqua (2008).

A perhaps somewhat counterintuitive result in Figure 1 is that even when wives’ earnings are twice as unequally distributed as men’s, wives’ earnings may contribute to considerably less inequality between households. If wives’ earnings inequality is 1.00, for instance, increase in wives’

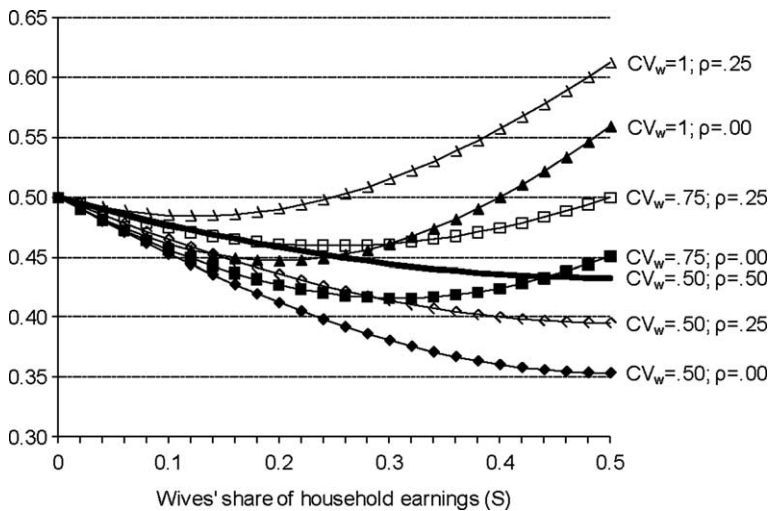


Figure 1. Household CV as a function of wives’ share of household earnings (S), wives’ earnings inequality (CV_w), and the husband–wife earnings correlation (ρ). Earnings inequality for husbands (CV_h) set at .5.

2. If the correlation is negative, however, an increasing CV_w may, up to a given point and for given values of the other factors, lead to *less* inequality at the household level.

share of household earnings in the 0.00–0.20 range reduces household inequality, if the husband–wife earnings correlation is zero. Moreover, wives' contribution has an equalizing effect on household earnings inequality as long as their average contribution to household earnings is less than 40 percent. If wives' earnings inequality is 0.75 (50 percent higher than husbands' earnings inequality), women's earnings will still have an equalizing impact for all values of wives' share of household earnings up to 0.5, even if the husband–wife earnings correlation is as high as 0.25. We should keep in mind here that there was only one instance of this correlation exceeding 0.25 is Pasqua's (2008) data and none in Esping-Andersen (2007).

With increasing labour market participation by married women over time, we may expect the degree of inequality in wives' earnings to approach that of (married) men. Figure 1 shows that if both husbands and wives have a coefficient of variation of 0.5, household earnings will be considerably more equally distributed than husbands' earnings even when the correlation between the spouses' earnings is as high as 0.5. In fact, it is easily shown that the Coefficient of Variation for a sum of two variables (e.g., husbands' and wives' earnings) can never be higher than the coefficient of variation for the one of these variables that is most unequally distributed. This holds even under perfect homogamy (a correlation between husband's and wife's earnings equal to one); in this extreme case the *CV* would be identical for husband's and household earnings.

4.1. Why should we expect to find changing household differences in earnings over time?

The mechanisms determining wives' contribution to earnings inequality between households are likely to change over time: inequality in wives' earnings, wives' share of household earnings, and the correlation between the spouses' earnings.

Inequality in wives' earnings (CV_w) would change over time as more married women enter the labour market and receive earnings for their work. Intuitively, we might expect inequality among women to rise when this occurs, but since we here also include married women with zero earnings (i.e., housewives), the Coefficient of Variation for married women might decrease as more and more women enter the labour market (fewer women with zero earnings).

Changes over time in married women's labour market participation would also imply that *wives' share of total household earnings* (S) would increase. Since many women work part-time, their earnings will make a smaller contribution to the household economy than if they had worked fulltime.

There are two main mechanisms determining *the husband–wife earnings correlation* (ρ). The first is related to marriage patterns and the second to couple's allocation of time. Looking at marriage patterns first, if men with high earnings potentials (such as high levels of education) marry women with high earnings potentials (and men with low earnings potentials marry women with low earnings potentials), married women's labour force participation could increase household inequalities in earnings. Given changes over time in women's educational attainment and employment, partners are more likely to meet in educational institutions or at work places, and we would expect a stronger tendency of educational homogamy or *assortative mating* over time (Blossfeld and Timms 2003). Thus, an increasing husband–wife correlation in earnings over time is expected.

The second mechanism determining the husband–wife earnings correlation is related to the spouses' allocation of time. If men are regarded as the main breadwinners and women adjust their labour force participation to the financial needs of the family, women married to low-earning men would work more than other women, to *compensate* their husbands' earnings. They thereby raise the earnings of households located at the bottom of the earnings distribution, and contribute to reduced inequality in household earnings. The compensation effect could also vary over time; it might for instance be stronger in periods with high unemployment or otherwise difficult economic conditions.

Thus, whereas the assortative mating effect predicts a positive husband–wife correlation in earnings, the compensation effect predicts a negative husband–wife correlation in earnings; as these two effects work in different directions, it is difficult to predict trends over time in husband–wife correlation in earnings.

5. Data and measurements

We use data produced by merging the annual Norwegian labour force surveys 1974–2004 with administrative register data on earnings (as reported by employers and the self-employed to the compulsory national health and pension insurance scheme administered by the Norwegian Labour and Welfare Administration, NAV).

We include all married couples in which the husband is in the 26–65 age range and is occupationally active (defined by non-zero earnings).³ We thus exclude young people who are often students as well as age groups in which pensioners dominate. The sample size varies over years from a

3. We do not have information on cohabiting couples in our data. See Birkelund and Mastekaasa (2010) for a study of cohabiting and married couples.

minimum of 2,050 to a maximum of 4,662. The total sample size over all years is 90,090.

Annual earnings (all income from gainful employment) are measured by register based information provided by employers (including the self-employed) to the national pension scheme. This means that we measure earnings (from employment or self-employment) before tax and before public or private transfers.

The Coefficient of Variation (CV) is quite sensitive to extreme values, and even in fairly large samples like ours a few observations with incomes of tens or even hundreds of millions may have a strong impact on the results. We therefore exclude the households with the top 0.5 percent of earnings (cf. Pasqua 2008: 167).

6. Trends in earnings inequalities among married couples 1974–2004

Figure 2 shows trends in earnings inequality among households, as well as trends in earnings inequality among husbands taken separately, for the period 1974–2004. It is immediately clear that the development over time is very similar for the CV and the Gini index. We therefore comment mainly on the former.

Contrary to some other research, but consistent with the study by Aslaksen *et al.* (2005), Figure 2 shows increasing earnings inequality among Norwegian husbands over the time period considered. The inequality in husbands' earnings was stable with a CV of about 0.4 in the 1970s, yet since the early 1980s inequality in married men's earnings increased to 0.57 in 2004, with some fluctuations.⁴ The line showing the CV for total household earnings is comparatively flat, indicating considerable stability over time in household inequalities in earnings. We also note that the levels of inequality in husbands' earnings and in household earnings are very close in the earliest part of the period. From about 1983, however, inequality in earnings among husbands increased substantially, whereas economic inequalities between households remained at the same level, at least until the end of the 1990s. Thus, wives' earnings did not have a noticeable effect on the economic inequalities among households until the early 1980s. From about 1983 wives' earnings have

4. Although this paper is concerned with inequality among households including both husband and wife, it may be of interest to note that the degree of inequality among gainfully employed husbands aged 26–65 is very similar to that among all gainfully employed men in the same age bracket: The CV for husbands in Figure 2 varies between 0.39 (1979) and 0.57 (2004), while the corresponding variation for *all* men is 0.42 (1979) to 0.57 (2004).

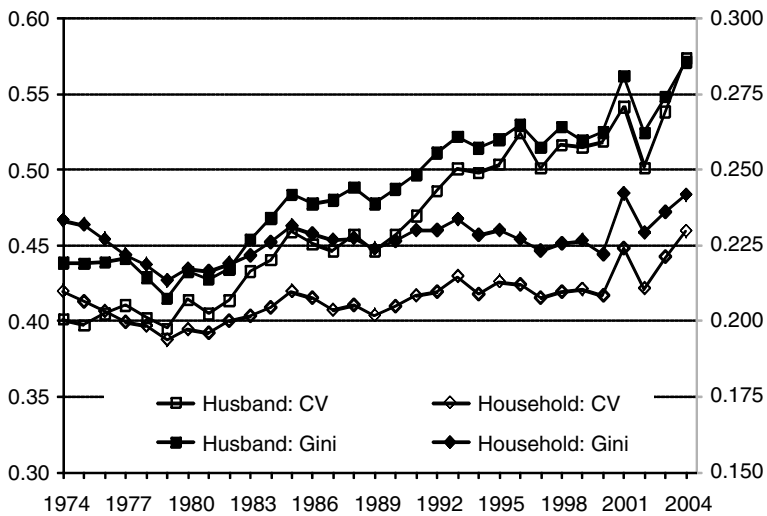


Figure 2. Coefficient of variation (left axis) and Gini index (right axis) for husband's earnings and household (husband plus wife) earnings 1974–2004.

had an equalizing effect on households' earnings; in fact, as inequality among husbands increased, women's earnings have had an increasingly equalizing effect on household inequality, as can be seen in the growing gap between the lines for inequality among husbands and among households. Yet from 1996 onwards, the difference between the *CV* for households and for husbands has changed very little, indicating that the equalizing impact of wives' earnings may have reached its maximum.

Thus, for the period 1974 to 2004 we find three patterns regarding the impact of wives' earnings on household's inequalities: In the first period, from 1974 to about 1983, married women's labour force participation was increasing, yet we find very little effect of wives' earnings on household inequalities. In the second period, from 1984 to about 1996 we find an increasingly equalizing effect of wives' earnings on household inequalities. In this period, in our data, married women's labour force participation rose from 74 percent in 1984 to nearly 87 percent in 1996. Third, after 1996 wives' labour supply has remained stable at about 87–88 percent and their earnings have had a strong equalizing effect on inequality in earnings among households in this period. We note, however, the sharper increase in the *CV* for husbands at the end of the period, and the corresponding increase in the *CV* for households, yet at a lower level; both patterns reflecting changes in the inequality observed for the whole population (cf. OECD 2008: Figure 1.4).

We may compare these results with published results for the UK and the US. We noted above that for the UK Harkness *et al.* (1997: Table 8) found that wives' earnings reduced the level of the Gini index by 18 percent in 1979–1981 and by 34 percent in 1989–1991. A similar comparison of the Ginis for husbands and households in Figure 1 shows that the equalizing impact of wives' earnings was zero in 1980 and 7 percent in 1990, thus substantially less than in the UK. As noted above, Cancian and Reed's (1999) results for the US (using the Coefficient of Variation) suggest that wives' earnings had zero equalizing impact in 1967, and an equalizing impact slightly below 20 percent in 1994. The first year in our data is 1974, and our results imply that women's earnings had a negative (disequalizing) impact of 5 percent in 1974, whereas the equalizing impact in 1994 was 16 percent (and this increased further to 20 percent in 2004). Thus, in the early 1990s, wives' earnings seemed to have had a fairly similar equalizing impact in Norway and the US, and both these countries differ from the UK, where wives' earnings clearly have had a higher equalizing impact. The available evidence is not sufficient to sort out how these differences came about. We may at least suggest, however, that they are probably not due to differences in marital homogamy; in the early 1990s the husband–wife earnings correlations were quite similar in the three countries (Esping-Andersen 2007: Table 1).

As noted above, the impact of wives' earnings on household earnings inequality depends on three factors: the degree of inequality in wives' earnings, the average share of wives' earnings of total household earnings, and the correlation between husbands' and wives' earnings.

Table 1 shows the development between 1974 and 2004 in wives' labour force participation, the earnings inequality among wives, their share of household earnings and the correlation between husband's and wife's earnings. As noted earlier, wives' labour force participation increased from 54 percent in 1974 to 88 percent in 2004. The increase was strongest in the 1970s and 1980s. Wives' earnings inequality declines over the entire period, although at a decreasing rate, from a high level in 1974 ($CV = 1.41$) to a lower level in 2004 ($CV = 0.62$). Thus, even in 2004, when 88 percent of all wives were gainfully employed, wives' earnings were more unequally distributed than men's earnings ($CV = 0.57$). The higher earnings inequality among women than among men is entirely due to greater variability in labour input. Table 1 also shows that if women with zero income (not occupationally active) are excluded, wives' CV s are considerably lower and lower than the corresponding numbers for men by the end of the 1974–2004 period (0.52 for wives and 0.57 for husbands in 2004). But even among the occupationally active, labour input (number of hours worked) is much more unequally distributed among women than among men, who typically work full time. If one looks at *wage rates*, and

TABLE 1. Wives' labour force participation and earnings and the correlation between husband's and wife's earnings 1974–2004

	<i>Wives' labour force participation</i>	<i>Wives' earnings inequality (CV)</i>	<i>Earnings inequality, occ. active wives (CV)</i>	<i>Wives' share of household earnings</i>	<i>Husband–wife earnings correlation</i>
1974	54.2%	1.41	0.80	17.5%	0.04
1975	57.8%	1.34	0.65	18.9%	0.04
1976	61.5%	1.24	0.63	20.2%	0.03
1977	65.7%	1.18	0.63	21.2%	–0.02
1978	67.5%	1.10	0.59	22.0%	0.03
1979	71.1%	1.04	0.59	23.2%	0.01
1980	71.5%	0.99	0.56	23.6%	0.01
1981	73.7%	0.95	0.56	24.9%	0.04
1982	74.0%	0.96	0.57	25.3%	0.09
1983	76.2%	0.90	0.55	26.5%	0.05
1984	74.0%	0.91	0.55	27.5%	0.09
1985	76.4%	0.88	0.56	27.5%	0.10
1986	78.8%	0.82	0.53	29.1%	0.13
1987	81.1%	0.78	0.53	30.1%	0.12
1988	81.6%	0.79	0.55	29.8%	0.09
1989	82.6%	0.75	0.52	31.1%	0.15
1990	83.7%	0.73	0.52	31.5%	0.13
1991	83.1%	0.73	0.51	31.9%	0.16
1992	83.3%	0.71	0.50	32.6%	0.14
1993	83.6%	0.69	0.50	32.8%	0.15
1994	85.0%	0.68	0.50	32.5%	0.10
1995	85.1%	0.68	0.49	32.9%	0.13
1996	86.6%	0.62	0.47	33.6%	0.15
1997	88.1%	0.63	0.51	34.0%	0.12
1998	86.1%	0.65	0.51	34.0%	0.07
1999	87.5%	0.63	0.49	34.5%	0.11
2000	88.3%	0.61	0.48	35.2%	0.12
2001	86.0%	0.65	0.51	34.6%	0.18
2002	88.1%	0.64	0.51	35.7%	0.15
2003	88.3%	0.62	0.50	35.8%	0.16
2004	88.1%	0.62	0.52	36.0%	0.13

thus removes the impact of differences in labour supply, inequality is higher among men than among women.⁵

The development in wives' share of household earnings is almost a mirror image of the inequality trend, with a monotonic but slightly weakening increase over the period, from 17.5 percent in 1974 to 36 percent in 2004. The increase over time in wives' labour supply has made

5. According to the white paper on distribution issues (NOU 2009: 10: 183), Gini for women's wages is about 0.14 in 2004 as compared to 0.18 for men.

the distribution of labour supply among wives less unequal and more similar to that of men.

Table 1 also shows that the correlations between husbands' earnings and wives' earnings were close to zero in the 1970s, when about half (45.8 percent) of all married women were still housewives. As more married women entered the labour market, the correlation increased somewhat during the 1980s, but since about 1990 there has been no clear trend. This is in line with the earlier studies mentioned above, that also report generally weak correlations between husbands and wives' earnings. Even when most women are occupationally active, as in the last period described here, the correlation is weak (about 0.15).

6.1. Decomposition of wives' earnings

The inequality in wives' earnings distribution is the result of two different causes: the number of zero values in the distribution (due to wives without earnings) and the inequality in the distribution of earnings among women in the labour market. In order to isolate the two effects, we may decompose the overall earnings inequality among wives into (1) variation among wives with earnings, i.e., occupationally active wives, and (2) the variation due to the difference in mean earnings between this group and the group of wives with zero earnings. This can be obtained by using the standard method for decomposition by subgroup suggested by Shorrocks (1984; also see Jenkins 1995).⁶

Figure 3 shows that both variation within the group of wives with earnings and variation between wives with and without earnings contribute considerably to the inequality among all wives, although the former component is somewhat more important than the latter. There is also some tendency for inequality within the group of occupationally

6. The squared Coefficient of Variation divided by two for the entire population under study, $(CV)^2/2$, can be decomposed as:

$$\frac{(CV)^2}{2} = \sum_k v_k \cdot \lambda_k \cdot \frac{(CV_k)^2}{2} + \sum_k v_k \cdot (\lambda_k^2 - 1)$$

(= *within group variation* + *between group variation*)

In this equation, the subscript k refers to the two subgroups (wives with and without earnings), v_k is the proportion of the population belonging to subgroup k , and λ_k is the ratio of the mean earnings in subgroup k to the mean earnings in the population as a whole. In the present case, the within group variation is reduced to variation within the group of wives with earnings, as there is of course no variation in the group without earnings.

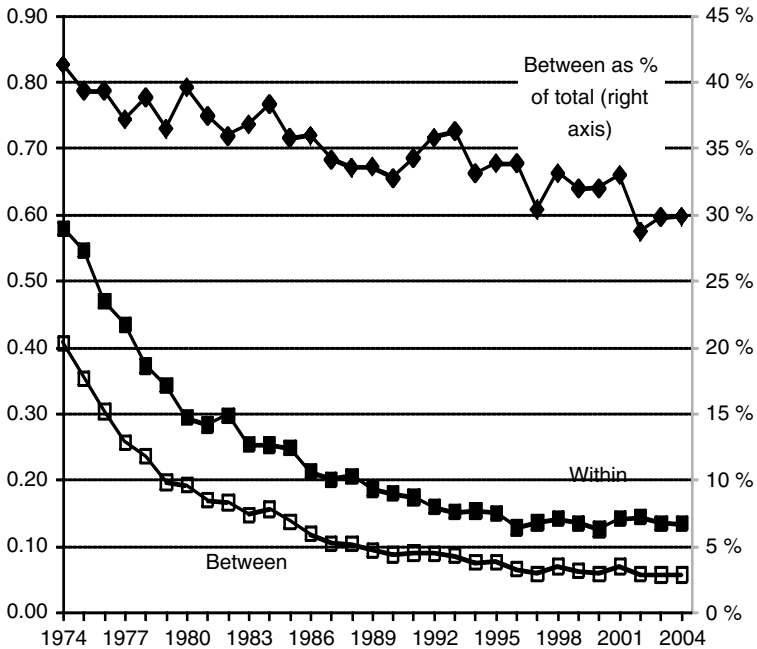


Figure 3. Decomposition of earnings inequality ($CV^2/2$) among all married women into contributions due to variation (1) within the subgroup of the occupationally active and (2) between the active and non-active subgroups.

active wives to become more important over time. It is noteworthy, however, that even in 2004, when only 12 percent of married women have zero earnings (Table 1), the difference between this group on the one hand and occupationally active women on the other accounts for nearly 30 percent of the total inequality in earnings among married women (cf. the right axis in Figure 3). Thus, the crucial importance of married women’s labour force participation in accounting for earnings inequality among married women is underscored.

6.2. Changes in women’s employment

There are (at least) two arguments related to changes in wives’ employment: one individual, and one family oriented. We would expect education to predict employment, and additional analyses (not shown here) reveal a clear pattern: Married women with higher education are more likely to be gainfully employed than other married women. In 1975, 41 percent of married women with low education, 48 percent of married women with medium education, and 65 percent of married women with high education

were gainfully employed. In 2004, these figures had risen to 52, 75 and 89 percent, respectively. Thus, education clearly matters for women's labour market participation.⁷

The family argument expects wives of low-earning men to *compensate* for low family income by working more. In our data this is clearly not the case. Wives of medium and high-earning men have very similar employment rates, increasing from 44–49 percent in 1975 to 80–83 percent in 2004, whereas wives of husbands with low earnings have interesting changes over time in their employment rates, ranging from 43 percent in 1975 (i.e., close to the other groups), via 57 percent in the early 1980s, then down to 45–47 in the mid-1980s (when the two other groups continued to increase their employment), and then rising again and stabilizing at 60–64 percent after 1997. Thus, the labour market participation for wives of men with low earnings has increased over time, yet not gradually. In particular, we see a drop in their labour supply in the period 1983–1993 (results available on request).

7. Hypothetical development in household earnings inequality

To gain further insight into the relative importance of changes in women's earnings inequality, wives' share of household earnings, and husband–wife earnings correlations for the trends observed in Figure 2, we have computed hypothetical developments in household earnings inequality holding constant each of them in turn. More specifically, the graph for Constant CV_m in Figure 4 shows how household earnings inequality would have developed if women's earnings inequality (CV_m) had remained in all subsequent years at its average value in the years 1974–1976 (for all other factors affecting household earnings inequality we use the actually observed values in the period 1974–2004). Similarly, we have computed a graph assuming constant correlation between husbands' and wives' earnings, and a third graph assuming a constant share of wives earnings of total household earnings.

Figure 4 clearly indicates that the major factor keeping household earnings inequality down in the 1974–2004 period is the decline in inequality in wives' earnings. As more and more married women entered the labour market, the number of housewives with zero earnings declined, and the inequality in earnings among wives decreased. If wives' inequality had stayed at its high 1974–1976 value, household earnings inequality would have been about 0.65 instead of about 0.45 in 2004. Wives'

7. These analysis are based on married female respondents in the LFSs, as we do not have information on the education of respondents' spouses. There is no reason, however, to expect these groups to differ (beyond sampling error).

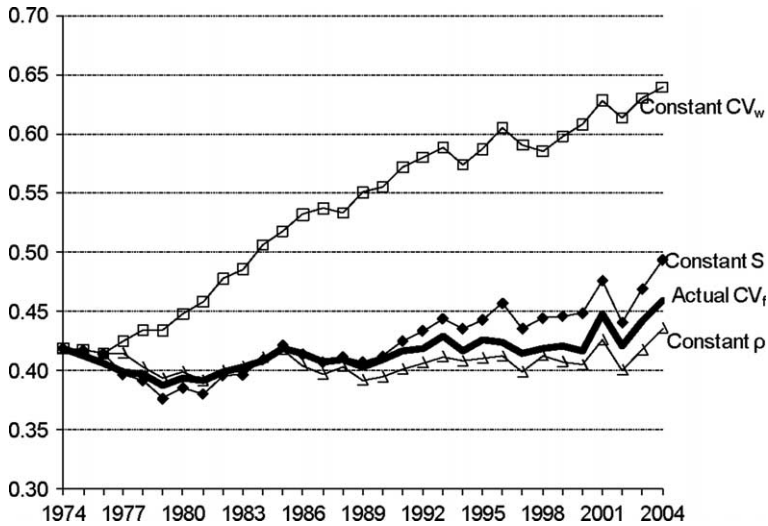


Figure 4. Hypothetical developments in household earnings inequality under different parameter values.

increasing share of earnings also seems to make a small contribution to keeping household earnings inequality down. A slight increase in husband–wife earnings correlations, on the other hand, makes only a small contribution toward higher inequality.

It should be added that Figure 4 is a simplification since it does not take into consideration simultaneous changes in more than one of the factors determining the impact of wives' earnings distribution. As noted above, changes in the inequality of wives' earnings distribution and in wives' share of household earnings are in fact closely related, since the decline in inequality is primarily a result of women's increased labour supply. What seems clear at any rate is that the increasing equalizing impact of wives' earnings between 1984 and 2004 is almost entirely due to women's increased labour supply, and that changes in assortative mating seem to be of little importance.

8. Concluding remarks

It is well documented that earnings inequality has increased strongly in many countries since the 1970s or 1980s, and we have also, with some fluctuations, found increasing earnings inequality among Norwegian men. At the same time gender relations have changed, from a male breadwinner model, where men earned money and women were housewives, to a dual earner family model, where both spouses are gainfully employed. Contrary

to some early concerns in the literature, a number of studies have shown that wives' earnings typically reduce inequality in earnings at the household level. With regard to Norway, we have shown in this paper that in the mid-1970s wives' earnings had a small *dis-equalizing* impact on household earnings inequality, but that by 2004 this had changed to an equalizing impact of about 20 percent. These results suggest that the equalizing impact of wives' earnings is of approximately the same magnitude in Norway in 2004 as it was in the US in the mid 1990s, whereas wives' earnings have a considerably stronger equalizing impact in the UK. Comparative analyses are needed to sort out the underlying factors of these differences.

Theoretically the impact of women's earnings on household earnings inequality depends on three factors: the degree of inequality in women's earnings, the share of women's earnings of total household earnings, and the correlations of wife's and husband's earnings. Despite their intuitive and theoretical appeal, the assortative mating argument, expecting a positive correlation between spouses' earnings, and the compensation argument, expecting a negative correlation between spouses' earnings, is of less interest for a better understanding of the impact of married women's earnings on inequality in earnings among households.

Our data cover changes in inequality until 2004. Inclusion of the later years is of particular interest, for two reasons: Firstly, the increase in married women's labour force participation has levelled out, and, secondly, individual level earnings inequality in Norway has increased more strongly in this period than in previous years. Our findings indicate the equalizing impact of wives' earnings grew quite steadily until the mid-1990, but that it is no longer sufficient to prevent increased inequality between households.

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