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Päivi Mattila-Wiro

**CHANGES IN THE DISTRIBUTION OF
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Abstract: This research study consists of four self-contained essays on 1. intra-household inequality, 2. the value of household production and consumption possibilities, 3. the income inequality effects of A Finnish Work Incentive Trap Reform and 4. the children's wellbeing. All the essays focus on changes in the distribution of economic wellbeing in Finland during the past decades. More precisely, they concentrate on the development of income inequality and poverty and those many factors that cause changes in income distribution within and between households. The essays also include the era of strong economic and structural turns in Finland, the 1990s. This is the period during which Finland experienced a severe depression, drastic cuts in social security, a time of recovery, and fast growing income inequality. We have a lot to learn from all the reforms and amendments made during that time and the effects that all the changes that were made had on economic wellbeing.

Key words: Economic wellbeing, income inequality, poverty, household bargaining

Tiivistelmä: Tutkimus koostuu neljästä itsenäisestä artikkelista ja johdanto-osasta. Työn keskeinen tavoite on kuvata tulojen ja hyvinvoinnin jakaumien muutosta Suomessa pääasiassa 1990-luvulla. Tämä on ajanjakso, jolloin Suomi koki vakavan taloudellisen laman sekä laman jälkeisen nousukauden. Siten kyseinen ajanjakso on erittäin mielenkiintoinen tulonjaon näkökulmasta; sosiaaliturvan leikkaukset, työllisyyden vaihtelut ja kotitalouksien tulojen muutokset näkyvät tuloeroja ja köyhyyttä kuvaavissa mittareissa. Kaikki artikkelit liittyvät kotitalouksien toimintaan tavalla tai toisella. Tutkimus kuvaa mm. kotitalouden sisäisiä tuloeroja sekä liittyy palkattoman kotitaloustyön arvon perinteiseen tulo-käsitteeseen. Artikkelissa, joka käsittelee kannustinloukku uudistuksia, käytetään mikrosimulointimenetelmää laskemaan tehtyjen muutosten työtarjontavaikutuksia. Menetelmää sovelletaan Suomessa harvoin käyttäytymismuutosten selvittämiseen. Artikkeleissa käytetään yhteensä neljää Suomen Tilastokeskuksen keräämää empiiristä aineistoa: Kulutustutkimusta, Ajankäyttöaineistoa, Tuloaineistoa sekä Tulonjakotilastoa.

Asiasanat: Hyvinvointi, tuloerot, köyhyys, kotitalouden neuvottelumallit

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Chapter 1

Introduction and Summary

1.1 Introduction

This doctoral thesis consists of four self-contained essays on 1. intra-household inequality, 2. the value of household production and consumption possibilities, 3. income inequality effects of A Finnish Work Incentive Trap Reform and 4. children's wellbeing. The academic area covered is wide indeed but there is one principal point of view binding these four essays together. This is the focus on changes in the distribution of economic wellbeing in Finland during the past decades. More precisely, the thesis concentrates on the development of income inequality and poverty and those many factors that cause changes in income distribution within and between households.

All the papers include the era of strong economic and structural turns in Finland, the 1990s. This is the period during which Finland experienced a severe depression, drastic cuts in social security, a time of recovery, and fast growing income inequality. We have a lot to learn from all the reforms and amendments made in the 1990s and the effects that all the changes that were made had on economic wellbeing.

Another element combining the separate studies together is the emphasis on households. I look at the intra-household behavior and inter-household relations as well as the impact of the wider economy and society on households. Everyone belongs to at least one household and we have all seen how this important institution has been changing over the years. Our society has now a greater number of small households and single-parent households than before and households that have children from more than one family are becoming increasingly common. Changes in the labor market create challenges of their own. We have to know the behavior of households, otherwise it is not possible to be aware how our policies will affect the wellbeing, especially the economic wellbeing, of the population.

The results of the thesis suggest that household production increases the consumption possibilities of all income groups. Consumption possibilities is formed by tradi-

tional monetary income plus the value of household production. The work carried out in households clearly raises an individual's access to consumption goods and services and therefore increases economic wellbeing at all times. The effect of household production is most significant in low income decile groups and therefore household production equalizes income distribution. It is also obvious that women compensate low income by carrying out a greater number of household production activities compared to men who generally earn higher wages than women. Thus, including the value of household production alters our understanding of the distribution of income.

Furthermore, based on the results, it is obvious that the distribution of children's wellbeing in Finland is increasingly unequal in 2000 than what it was in 1988. The most disadvantaged of all are the children belonging to families in the lowest income quintile group. These families are headed by single parents more often than in other quintile groups; parents are low educated and unemployment is concentrated in this group as well. Finnish children have a high risk of being faced with a divided society: those who have it all, and those who are without. However, on the basis of the time use study the total time spent in childcare has increased and the gender differences in time use on childcare has decreased. These facts suggest that the average children's wellbeing has increased as well. On the other hand, the differences in time use between various population categories are extensive and in many cases strengthen the unequal distribution of material wellbeing and thus the unequal distribution of children's wellbeing.

The work incentive trap reforms carried out in Finland in the 1990s did not manage to equalize income distribution or benefit low income earners. When looking at the results without behavioral changes it is obvious that the mean income of the middle and high decile groups increased more than the mean income of the low income decile groups. This indicates that middle and high income earners have benefitted more from the reforms than have low income earners. When including the behavioral response, the labor supply effect, I noticed that at the level of all households the work incentive reforms have not decreased or increased income inequality nor have they notably affected the mean incomes of the lowest income decile groups and therefore the distribution of economic wellbeing has remained almost unaltered. The results, of course, are slightly disappointing since the successful equality effect of the reforms should have resulted in lower income inequality compared to the original situation. Finally, we find little support for the view that intra-household inequality has changed across time. There can be many reasons for this result. However, the fact is that inequality between households increased quite substantially after the depression in the 1990s. We do not find evidence suggesting that observed changes within households account for much of that increase. The reasons for this increase in dispersion thus need to be sought elsewhere.

Despite the fact that all of the essays use Finnish data and explain problems in Finnish society, the results have a potential of being interesting and useful for other countries as well. Countries facing increasing income inequality or large macroeconomic shocks and countries having similar welfare arrangements can learn from Finnish experience.

In the following chapters, I briefly review the development of income inequality and poverty in Finland, go through the data and main theories used in the essays, explain the inequality and poverty measures applied, clarify the method of microsimulation, and finally present a summary of each of the essays.

1.2 Income inequality and poverty in Finland

Income inequality in Finland, measured in disposable income, fell from 1966 to 1976 and changed little until the early 1990s. Aaberge et al. (2000, pp. 77–79) have found that up until the late 1980s Denmark, Finland, Sweden and Norway had the most equal distribution of income among the industrialized countries. This is at least partly due to the welfare state structure in these countries, with high taxes and public expenditure aiming at equalizing economic outcomes.

From 1990 to 1994 inequality rose modestly in Finland even when at the same time the number of the unemployed increased rapidly and GDP (Gross Domestic Product) declined dramatically. This modest increase in inequality is explained by the fact that the depression caused a distinct fall in the real income of all households (real income being at its lowest in 1994) and government income transfers compensated almost proportionately these losses (Aaberge et al., 2000, pp. 79–81; Riihelä et al., 2001*b*).

Gustafsson and Johansson (1999) studied the forces affecting the distribution of income in 16 industrialized countries between 1966 and 1994. They also reported that income inequality remained relatively unchanged in Finland in the 1980s. Changes in the economy, which should have increased inequality, namely decrease in the percentage employed in industry and increase in the percentage of GDP devoted to imports from developing countries, were counterbalanced in Finland by increased public consumption, by increased trade union density and by a lower proportion of the population under 15 years of age.

Since 1994 inequality has risen considerably. After the depression average real incomes grew, although the rise was somewhat slow, and capital income, particularly income from dividends, increased. The growth of real income has been highest in the top income decile group. In fact, the top incomes have risen faster than the average real income. At the bottom of the scale there has been little or no increase at all in real income. Thus, the already well-off households have profited the most from the period following the economic downturn. High income households have benefited

also from the development in income taxation (reductions in progressive taxation). The redistributive effect of transfers and taxes has fallen as well since 1994 (Statistics Finland, 2000*a*; Statistics Finland, 2000*c*; Riihelä et al., 2001*b*, pp. 1–4; Statistics Finland, 2000*b*). Towards the end of the 1990s the trend was obvious; while the average real disposable income of Finnish households increased, so did the income inequality between households. Income inequality continued its rise until the year 2000, had a slight fall from 2000 to 2002 and has increased thereafter.

One of the most interesting recent developments in the literature on income inequality is to study top incomes and long-run changes in the distribution of income. Riihelä et al. (2005) provide new evidence on the development of top incomes in Finland over the period 1966-2002. The results show that the proportion of income earned by the very richest one per cent has a U-shaped pattern over time. The total share of the highest earners fell between the mid 1960s and the beginning of the 1990s and rose after that.

Riihelä et al. (2001*a*) have examined trends in poverty in Finland using the Household Budget Survey and Income Distribution Statistics. Relative income poverty declined until the mid 1990s, when the poverty line is set equal to 50% of the median or mean income of each year, and rose sharply during the latter part of the 1990s. Relative poverty measured as a fraction of mean is greater than that measured as a fraction of median. However, no matter where the poverty line is fixed (either 40, 50 or 60% of the median or mean income) the numbers show a significant increase in income poverty between 1990 and 1998. Similar tendencies in the increase in poverty rates are observed in looking at consumption expenditure. Riihelä et al. (2001*a*) also noticed that income poverty has become more severe and incomes among the poor have been distributed more unequally than earlier. Furthermore, unemployed households are the most vulnerable group of the population. According to Statistics Finland (2005) the proportion of low income recipients, with the low income line at 60% of the median equivalent income, has increased from 1998 (9.8%) to 2000 (10.4%) and is still increasing.

1.3 Theoretical background

There are many theories relating to the topics of the four essays of the thesis. I briefly present here the theories chosen and applied in the essays.

1.3.1 Theory of household decision-making and household production

Economic models (or theories) of the household try to capture the complex structure of households and explain their decision-making behavior and production functions.

Household economic models are generally divided into two: the unitary model of household behavior and collective models of household behavior (Alderman et al., 1995). All these household economic models belong to the tradition of neoclassical economics and consumer choice theory. The unitary model is still the most widely applied model of household behavior and the collective models have arisen as a critique and supplement to the unitary model.

In the simplest model of the neo-classical theory it is not explained how the preferences of a consumer are formed but instead it is explained how the consumer reacts to the changes in prices and income. The reactions are often measured as elasticities. Consumers are expected to receive utility directly from the goods and services consumed. Labor time and income are assumed to be fixed. The utility function is increasing in each of its argument (non-satiation), and strictly concave (decreasing marginal utility), with continuous first- and second-order derivatives. The choice of a rational consumer is

$$\sum_{i=1}^N p_i q_i \leq y, \quad q_i \geq 0 \quad \text{for} \quad i = 1, \dots, N \quad (1.1)$$

where p_i is the price of good i , q is quantity and y is income. Thus the solution to the maximization of the utility function depends on preferences, prices and income¹ (see for example Kooreman and Wunderink, 1997, pp. 11–21).

Allocation of the time of household members becomes important when we realize that leisure time is appreciated by a consumer. Now the utility is derived from the consumption of goods and services and from leisure time. We have to deal with an additional time constraint. This model also allows the study of interaction between the labor market and markets of goods and services. The consumer now maximizes

$$\begin{aligned} U(q_1, \dots, q_N, l) & \quad s.t. & (1.2) \\ T &= t_w + l \\ \sum_{i=1}^N p_i q_i &= \mu + w t_w \\ t_w \geq 0, l \geq 0, q_i &\geq 0 \end{aligned}$$

where l is leisure, t_w is labor time, T is total time available, w is the consumer's wage rate and μ is non-wage income. The opportunity cost of leisure is wl . The optimal amount of leisure is dependent on the shape of the utility function (the preferences), prices of goods, the wage rate and non-wage income (see for example Kooreman and Wunderink, 1997, pp. 25–27).

¹We can furthermore derive consumer demand functions, indirect utility functions as well as expenditure functions.

1.3.2 The unitary model of household behavior

The most frequently quoted and analyzed views of the advanced consumer demand theory were developed independently by Gary Becker and Kevin Lancaster. Hawrylyshyn (1977) even talks about the 'Becker-Lancaster Theory', which clearly indicates the similarities of these two models. However, the two studies concentrate on different aspects of household behavior: Becker emphasizes the time element and Lancaster the production of commodity characteristics. Both criticize the traditional consumer theory for oversimplifying the functional relationship between market goods and utility and suggest an elaboration on this relationship.

Gary Becker's model - the New Household Economic Theory - is the most famous unitary model developed so far. A household is taken as a single consumer and one utility function represents all household members' preferences. Becker sees the household not only as a consumer, but also as a producer. In this sense, the household is comparable to a competitive firm in a market economy. Becker (1965, p. 496) explains that at the beginning of the 1960s economists started to look at a household as a small factory. He says

a household is truly a "small factory": it combines capital goods, raw materials and labor to clean, feed, procreate and otherwise produce useful commodities.

Becker thus introduces household production into the model of time allocation (see for example Hallberg, 2002). The household production function and time plus market goods and services are combined to produce the so-called basic commodities, or non-market goods. Basic commodities according to Becker are, for example, children, health, pleasure, sleeping and seeing a play. A household chooses the best combination of these commodities, i.e. the combination that will maximize the household utility function. The household faces two constraints: the budget constraint and the time constraint. (These can be combined in only one constraint.) The time allotment of household members is carried out so that individuals who are relatively efficient at market activities use less of their time in consumption activities than other members.

Gronau develops the household production function even further. In Gronau's household production model a distinction is made between work, leisure and household labor time. Time not spent on working at home or in one's job is considered pure leisure. The household utility depends on consumption goods and leisure time. Either consumption goods can be produced at home or earnings can be used to purchase consumption goods on the market. This makes home-made goods and market goods perfect substitutes.² The model is

²For more detailed information see, for example, Gronau (1986) and Gronau (1977).

$$\begin{aligned}
\text{Max } U &= U(c, l) & \text{s.t.} & & (1.3) \\
z &= f(h) \\
c &= x + z \\
t_w + h + l &= T \\
x &= y_0 + t_w w
\end{aligned}$$

where x is expenditure on market products, z is home products, l leisure time, y_0 unearned income, c consumption, w wage rate, t_w paid labor time $f(\cdot)$ household production function and h household production time. The model predicts, as an example, that for a consumer with a paid job, a rise in the wage rate decreases the amount of time spent on household production. Secondly, an increase in unearned income will leave it unaffected (Kooreman and Wunderink, 1997, p. 29).

The unitary model of household behavior implies that what matters in certain policy initiatives is the total amount of income the household receives, and not the identity of the individual within the household who is the target of the certain policy or whom the income transfer was intended to benefit. This income pooling hypothesis, presented especially in Becker's model, has been widely tested. If the income pooling hypothesis were supported by empirical tests, it would provide a rather straightforward guide to policy design. However, if the income pooling hypothesis is rejected, policy expectations that have been based on the unitary model should be scrutinized. Strauss and Thomas (1995) summarize numerous studies on the different preferences of men and women. Their results suggest that resources in the hands of different individuals within one household have a different impact on the welfare of all household members. It is possible that models that assume a household to behave like a single consumer lead to a failure to understand the long reach of some public interventions (Alderman et al., 1995, p. 2).

1.3.3 Collective models of household behavior

Fortin and Lacroix (1997, p. 933) claim that, with the unitary model, it is impossible to review individual preferences of household members, or the parameters that characterize the internal processes determining the observed outcomes. Consequently, it is also impossible to analyze intra-household inequalities or external transfers to an intra-household resource allocation with this model. As Chiappori (1992, pp. 440–441) points out, traditional models can be inadequate and misleading when considering policy issues like the welfare of individuals. The traditional models only consider the income distribution across households and not within the household, even when the within household distribution is the central one with regard to individual welfare. Due to these important reasons, and many others presented

against the unitary model, it is justified to turn to look at the collective models in more detail.

Collective models of household behavior try to capture the different preferences, conflicts and inequalities evolving among household members. These models prescribe to the individuality of household members rather than the joint decision-making process. Collective models are sometimes divided into two types: cooperative models and non-cooperative models. Cooperative models assume that individuals form a household if this option is more beneficial for each party than remaining unattached. Non-cooperative models imply that individuals have separate economies within one household and they do not enter into enforceable contracts with each other.³

The *efficient cooperative model* views household decisions as efficient in the Pareto sense that none of the household members can gain without cost or disadvantage to another member. There are no assumptions concerning the intra-household resource distribution. The division of resources between household members cannot be described explicitly by using the tools of the model. Chiappori (1992, p. 439), the first to formulate the efficient model, argues that by observing the external behavior (labor supply and aggregate consumption) of the household the internal processes and rules of the same household can be defined.

Efficiency in household operations is achieved by dividing the available income between household members on the basis of a certain sharing rule. Once the income is allocated, each member faces an individual budget constraint; each chooses his or her own consumption and labor supply through a constrained utility maximization process (see for example Chiappori, 1992, p. 443). Since the sharing rule identifies how the resources are distributed within a household, it could be utilized in policy formulation. Providing knowledge on intra-household distribution, it could facilitate the formulation of taxation policy, direct transfers, etc. But definition of the sharing rule is not given.⁴

In a *bargaining framework* there is a unique solution to the household optimization problem and demand functions exist which are continuous and differentiable. The efficiency of decision-making is assumed. The bargaining approach requires a specification of a threat point for each individual, which is a utility level guaranteed for a person if no agreement of bargain is achieved within a marriage. The marriage decision itself is explained by comparison of the utility obtained by each individual from the bargaining solution, if the household is formed, and the single state utility (Manser and Brown, 1980, pp. 31–36).

³Similarly, however, as an increasing number of variables are included in the analysis of collective models, the complexity and number of assumptions are increased as well (see for example Strauss and Thomas, 1995, pp. 1993–1999).

⁴Ruuskanen (1997) has tested the existence of a sharing rule with Finnish data.

One of the principal differences of bargaining models compared to the unitary model is that the decision-making process within the household is explicitly specified. This is also a fundamental difference of bargaining models and Pareto efficient models. Furthermore, in a unitary model, only pooled family income is considered, whereas the emphasis in bargaining models is on who actually controls the various income sources (see for example McElroy, 1990, p. 560).

Non-cooperative models presume that individuals are unable to enter into enforceable contracts with one another. An individual's undertakings are conditional on the undertakings of others (Alderman et al., 1995, p. 5). Some researchers picture a household as consisting largely of separate, gender specific economies: a wife's budget is separate from her husband's. Spouses transfer income, establishing the only link between them (Alderman et al., 1995, p. 5). The threat point is a non-cooperative equilibrium within the marriage, not divorce. This non-cooperative equilibrium is defined in terms of the traditional gender roles and their expectations on traditional gender roles. In a non-cooperative marriage, the division of labor based on traditional gender roles emerges without explicit bargaining. What keeps spouses together (and what distinguishes a non-cooperative marriage from the independently optimizing individuals) is the household public goods, the joint consumption economies. (This is also suggested by Lundberg and Pollak (1993, p. 993).) However, in a non-cooperative equilibrium, public goods are undersupplied and thus there exist potential gains from cooperation.⁵

Deciding the labor supply is an essential part of the behavior of households and largely determines the household's economic status. It is also well known that various social security systems and taxation have a significant effect on the labor supply and the number of hours supplied by workers. It follows that important welfare reforms are almost without exception related to the labor supply behavior (Kuismanen, 1997, pp. 8–9). This is the case in work incentive trap reforms as well. (See the essay on "Income Distribution Effects of a Finnish Work Incentive Trap Reform".)

The standard labor supply model of a consumer is an application of the consumer choice theory and it is closely related to household production models. In the simplest case of the labor supply model the time is divided only into two: work time (consumption) and free time (see for example Becker, 1965). However, many tax and benefit policies that are designed to affect labor supply behavior can only be understood within a family labor supply framework (Blundell and MaCurdy, 1999).

⁵Even when collective models may bring wider insights to the behavior of households compared to the unitary model there are difficulties in testing the collective models. Ruuskanen (1997, pp. 30–36) has listed some of the additional data requirements that would be needed for testing the models: price information, household-level income information, non-labor income information, information about extra-environmental parameters (for example, government taxes, divorce laws). The data should also provide accurate information concerning women's contribution and division of tasks within the household.

In the case of collective models it is not reasonable to model household (or family) labor supply only for one member of the household.

1.4 The data

Altogether, the essays use four extensive data provided by Statistics Finland: the Household Expenditure Survey, the Time Use Data, the Income Data and the Income Distribution Statistics.

1.4.1 Household Expenditure Survey

The Household Expenditure Survey is used in the essay "Economic Conditions, Institutions and Income Distribution: Can Changes in Intra-Household Inequality Account for Changes in Income Distribution in Finland in the 1990s?". The Household Expenditure Surveys (or equivalently, Household Budget Surveys) of Statistics Finland are cross-section sampling surveys primarily aiming to estimate the structure of consumption and livelihood of Finnish households. In addition to this, data on income, the use of social welfare services, the structural characteristics of households etc. are gathered.

The surveys used in the present thesis are from the years 1990, 1994-1996, 1998 and they differ slightly from each other. The basics of the surveys, however, have remained the same throughout the years. Due to small sample sizes, the surveys of the years 1994, 1995, and 1996 are normally combined and taken to represent one survey. The first Household Expenditure Survey in Finland was made in 1966 and the 1998 survey was the first in Finland where new COICOP (Classification of Individual Consumption by Purpose) was applied.⁶

The households for the Surveys are picked from the population register. The target population contains resident households in Finland. The population living permanently in institutions, in hospitals for example, are not included. The actual research unit is a household. However, the sampling unit is an individual (at least 15 years of age). Based on an interview, a household is formed for the target individual. Children are those members of a household who are under 18 years of age and unmarried and who are neither the reference person nor a spouse. The reference person is generally the one earning the highest income in a household.⁷

⁶COICOP is included in the recommendations of ESA (European System of Accounts). In COICOP goods and services are allocated to final or intermediate consumption or to fixed assets on the basis of their use in household production (Eurostat, 1999).

⁷The Finnish Household Expenditure Surveys define a household as composing all the individuals who live and eat together or who otherwise jointly use same income.

Data of the Surveys are collected by interviews, diaries and by administrative records. All household members fill in their own consumption diaries. The non-response rate in every survey is approximately 30% . One-person households had the highest rate for non-response. The non-response rate starts to grow again when the family size reaches 5 or more members. It also seems that low income households have higher non-response rates than other households. The data includes sample weights which are applied in the calculations.⁸

The questions in the interviews have altered slightly from survey to survey. However, the intention is to determine the structure of the household, some background information, major purchases, the amount of debt etc. The major deficiency of the 1990 survey is that it does not include hours of work nor wage rates, which means that labor supply decisions cannot be analyzed. However, the survey of the year 1990 already includes data on some individual consumption (see for example Ruuskanen, 1997, pp. 59–62).

Most of the consumption data are household level information, altogether about 65% of household total consumption expenditure. These include goods like food, housing costs and furniture. Around 23% of consumption expenditure is individually targeted: for example, clothes, education and health services and travel abroad (Sauli, 1998, p. 54). Furthermore, most of the figures from official registers are individual specific. Statistics Finland has formed separate individual level datasets, which are central for the study concerning intra-household inequality. If households have not provided information concerning the target individual of specific consumption item, this targeting is done by Statistics Finland at the time of recording the results of the survey.

What makes the data analysis and especially the analysis of intra-household relations very difficult is the optional possibility to record the recipient of a particular consumer good. Around 12% of consumption expenditure belongs to this group of optional targeting (Sauli, 1998, p. 54). These are goods and services that other households target to individuals and other households consider as a household's common consumption.

1.4.2 Time Use Data

The Time Use Data, collected by Statistics Finland, is used in two of the essays: "Value of Housework Time and Changes in Traditional Economic Wellbeing in Finland in 1979-2000" and "Children's Wellbeing: An Examination of Income and Time Use in Finnish Families in the 1990s". Altogether three waves of the Time Use Data are used. These are from the years 1979, 1987-1988 and 1999-2000. The data

⁸The weights are formed to correspond the distribution of population by province, household size, socioeconomic position, income, assets etc. The non-response is also corrected.

cover the time period during which Finland experienced radical social and economic changes and developments.

The surveys are time-diary surveys which are supplemented with interviews and register information. The income information is also added at the person level. The datasets are representative sample surveys and are considered to be of high quality, while the income information that is linked to the data is similar to that available in the typical income distribution surveys in Finland that rely heavily on register information. The surveys cover persons of the age 10 and over who are not living in institutions. The response interval is 10 minutes and the diary method allows recording of both primary and secondary activities.⁹ The data from the year 1979 includes so called diary weights which sum up to the level of the original population (those between 10 and 64 years of age). The data from years 1987-1988 and 1999-2000 also include so called personal weights which are based on the probability of an individual to be included in the data and are corrected for non-response. The weights are applied in the analysis whenever it is appropriate.

In the Time Use Study of 1979 the size of the original random sample was 7355 and the net non-response rate was 17.6%. The survey is based on an individual sample, which means that not all the members of the same household are included. The data cover a total of 12057 days. The data were gathered September through November 1979. The respondents kept a diary for two successive days, the first of which was selected randomly and the background information was filled in by interviews. Each day of the week is equally represented in the data (Niemi et al., 1981).

The Time use Study in 1987-1988 included the full year, not just the fall like in 1979. The data were gathered between April 1987 and March 1988. The non-response rate in the 1987-1988 survey was 22.1% and the size of the original random sample was 9900. The data include 15 000 days. The survey is based on individual samples and the respondents kept a diary for two successive days, the first of which was selected randomly. The background information was filled in by interviews. Each day of the week is equally represented in the data. Individuals over 10 years of age are included in the 1987-1988 survey (Niemi and Pääkkönen, 1989).

The third data applied in the essay was carried out between March 1999 and March 2000. The data were collected at both the household and individual level by using interviews and diaries, as with the two other time use studies. Thus both households and individuals are survey units. The survey was implemented according to the Eurostat guidelines for harmonized European Time Use Surveys. The respondents kept a diary for two days, one being a weekday and the other either a Saturday or a Sunday. All the respondents were household members of ten years of age or over. Household and personal interviews were used to gather background information on

⁹The main problems with the Time Use Data are omitted variables, measurement errors and simultaneity (Ruuskanen, 2004, pp. 2-3).

the respondents. The final data included 5300 individuals and 2600 households. A total of 10 561 days is included in the final data (Väisänen, 2002).

1.4.3 Income Data

Finnish Income Data are used together with the Time Use Data in the paper "Children's Wellbeing: An Examination of Income and Time Use in Finnish Families in the 1990s". The Income Data originate from a longitudinal dataset compiled from the quinquennial censuses in Finland from 1970 to 2000. Furthermore, labor market statistics from 1987 to 2001 are linked to this dataset. The data have been collected by Statistics Finland (Österbacka, 2004).

The data contain information on about 6.4 million people. In 1970 the original data were constructed by a simple random sample of 58 207 individuals. All individuals who lived in the same household as the initial sample members were also included in the sample. These individuals are followed, and new household members are taken into the sample every fifth year. New sample members are either born into a family or move in with a sample member. The total sample size was 889 241 individuals in 2000. The information in the data comes from various registers. In the estimates of the Gini coefficient and mean equivalent income measures in the Chapter 5, number of family members are used as weights in the calculations.

1.4.4 Income Distribution Statistics

The Income Distribution Statistics from the years 1996 and 1998 are used in the essay "Income Distribution Effects of A Finnish Work Incentive Trap Reform". The Income Distribution Statistics of Statistics Finland is yearly interview and administrative records based rotating-panel data. The data describe the level, formation, and distribution of income among households and the economically active population. It includes information on earnings and income transfers associated with background information. The population of the survey is formed by household whose members live permanently in Finland (Statistics Finland, 2004, p. 39).

The sample size is about 10 000 households each year, which makes around 25 000 individuals. Half of the sample alters each year and the same households appear in two succeeding years. The data include sample weights which help in calculating results at the level of the population.¹⁰ The data have around 700 variables which cover all income items affecting disposable income and received income transfers. Since 1993 the interviews have been computer based. The interviews are nowadays mainly carried out as telephone interviews.

¹⁰The weights correct the effect of non-response and take into account the demographic information of the distribution of the population.

1.5 Income inequality and poverty measures

Inequality is the dispersion of a distribution, whether it be income, consumption or some other welfare indicator or even attribute of a population. Inequality measurement is an attempt to give meaning to comparisons of income distributions in terms of criteria which may be derived from a mathematical construct or ethical principles or even intuition (Cowell, 2000, p. 89). Inequality is a broader concept than poverty and inequality is a narrower concept than welfare. However, these three concepts are closely related.

Alongside with the income inequality measures poverty measures are calculated in some of the essays. The Eurostat defines the risk of poverty as living in a household with an income that is less than 60% of the median income in the country in question (relative poverty). Finland has no official poverty line or definition of low income. Low income households can be taken, as an example, to be those households belonging to the lowest income decile group or lowest income quintile group (Statistics Finland, 2003, pp. 17–18).¹¹

1.5.1 The Gini coefficient

The Gini coefficient, or the relative mean difference, is a very direct measure of income inequality that takes note of differences between every pair of incomes. It is usually viewed by using the Lorenz curve. The Lorenz curve is a graph of cumulative income shares against cumulative population shares. The Gini coefficient is the ratio of the difference between the diagonal, the absolute equality, and the Lorenz curve to the triangular region underneath the diagonal (Foster and Sen, 1997).

The Gini coefficient ranges from a maximum of 1.0, which depicts perfect inequality, to 0.0, which depicts perfect equality. The formula for the Gini is as follows (as an example) (Jenkins, 1991, pp. 15–16):

$$G = [1/(2n^2\mu)] \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j| \quad (1.4)$$

which means that the Gini coefficient is the average of the absolute values of the differences between all pairs of incomes.

The Gini coefficient belongs to the summary measures of concentration and it describes the extent of inequality.¹² The Gini coefficient is not affected if all incomes

¹¹Poverty measure based on the proportion of median income is less sensitive to very high incomes than is measure based on mean income. Mean may be skewed upwards as a result of some exceptionally high incomes. Median, on the other hand, is at the middle of the distribution. It must be noticed that the measures of poverty obtained each year are instantaneous, meaning that the individual or household included is poor in a given year but not necessarily in the next one (Riihelä et al., 2003, p. 3).

¹²Other summary measures of concentration are the variance, the variance of logarithms and the

are multiplied by the same number. It is also most sensitive to inequality changes around the median. One of the properties (advantages) of the Gini coefficient is that it is not sensitive to observations on the edge (Atkinson et al., 1995, p. 23; Atkinson, 1983, pp. 53–54).

For the Gini coefficient the response to transfers depends on the rank orderings of the two persons. The change is the larger the closer the pair is to the middle (crowded middle) of the distribution rather than to the upper and lower tails. Even when the Gini coefficient satisfies the Principal of Transfers¹³, the measure is not transfer sensitive¹⁴ because of the dependence on ranks rather than income (Jenkins, 1991, p. 18).

1.5.2 Generalized Entropy Indices

The Generalized Entropy $GE(\alpha)$ inequality indices are the only indices that are additively decomposable by population subgroups, and several members can also be decomposed by income sources. Thus, they are very useful measures in studying the level, the trend and the structure of inequality. The Generalized Entropy $GE(\alpha)$ inequality indices have the general formula of

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha} \left[\frac{1}{n} \sum_{i=1}^n \left(\frac{y_i}{\bar{y}} \right)^\alpha - 1 \right] \quad \alpha \neq 0, 1 \quad (1.5)$$

where n is the number of individual in the sample, y_i is the income of individual i , $i \in (1, 2, \dots, n)$ and $\bar{y} = (1/n) \sum y_i$, the arithmetic mean income (Litchfield, 1999). The $GE(\alpha)$ can have values ranging from 0 to ∞ . Zero represents an equal distribution (all incomes identical) and higher values representing higher levels of inequality. The parameter α represents the weight given to distances between incomes at different parts of the income distribution. It can take any given real value. For low values of the α the GE measure is more sensitive to changes in the lower tail of the distribution and for higher values it is more sensitive to changes in the upper tail of the distribution. When α is 1 the GE measure is called the Theil index and when α is 2 the GE is called half the squared coefficient of variation.

The Theil index $GE(1)$ is of the form

$$GE(1) = \frac{1}{n} \sum_{i=1}^n \frac{y_i}{\bar{y}} \log \frac{y_i}{\bar{y}} \quad (1.6)$$

relative mean deviation.

¹³Principle of Transfers roughly means that transfers from the wealthiest persons in society to the poorest persons in the same society should decrease inequality.

¹⁴The inequality from a progressive transfer must be greater the lower the income of the recipient is (Jenkins, 1991, p. 17).

Jenkins (1995, pp. 37–38) formulates the half the squared coefficient of variation $GE(2)$ as follows:

$$GE(2) = \left(\frac{1}{n}\right) \frac{\sum_i \left[\left(\frac{y_i}{\mu}\right)^2 - 1 \right]}{2} = \frac{\sigma^2}{2\mu^2} \quad (1.7)$$

where n is the income units with μ as their mean income, y_i is the income (coming from several sources) of unit i , and σ^2 is the variance.

Decomposition

The idea of many inequality studies is to find out who are the individuals or households in each income group. Decomposition of inequality measures is regarded as being a useful method of analysis in answering these questions. The decomposition method summarizes changes in the distributional structure (Jenkins, 1995, p. 37). The method breaks down the temporal evolution of income inequality into readily analyzable within and between group components. The latter is calculated by using the group means and the former by adapting the within group values of measure¹⁵ (Suoniemi, 2000, p. 3).

Decomposition can be formed with respect to population subgroups (Shorrocks, 1984), various income sources (Shorrocks, 1982) or both (Jäntti, 1997; Jenkins, 1995). Different divisions can be made within each decomposition. As an example, Jenkins (1995) uses subgroup decomposition by age of household head, household type, region of residence, household earning status and employment status of household head. Income sources may include earnings, transfer payments, capital income and pension. By sub-group decomposition we can find income recipient influences on total inequality or poverty (see for example Jenkins, 1995).

An additively decomposable inequality measure can be expressed as a weighted sum of the inequality values calculated for population subgroups plus the effect arising from differences between subgroup means (Shorrocks, 1980, p. 613). As an example, the additive decomposability of $GE(2)$ is illustrated by rewriting the $GE(2)$ equation (Jenkins, 1995, p. 38):

$$GE(2) = \sum_k v_k (\lambda_k)^2 GE(2)_k + \sum_k v_k [(\lambda_k)^2 - 1] \quad (1.8)$$

where k is a population sub-group, v_k is the population share of group k , and λ_k is the group k 's mean income relative to the population mean (Jenkins, 1995, p. 38). For each index the total inequality equals the sum of two terms. The first term is the within-group component, which is the weighted sum of the inequalities within each sub-group; the second term is the between-group component, the inequality

¹⁵For more information see (Riihelä et al., 2001b, pp. 6–7).

remaining where each individual's income is equal to her or his sub-group's mean income (Jenkins, 1995, p. 38). The square of the coefficient of variation may also include zero-valued observations, unlike some other additively decomposable measures (Suoniemi, 1999, p. 13).

1.5.3 Head count ratio, H , FGT(0)

The head count ratio, the most common measure of poverty, is the fraction of income-receiving units below the predetermined poverty line. The head count ratio ignores how poor the poor are (the severity of poverty) and is completely insensitive to the distribution of income among the poor. However, this index is acceptable when we, as an example, assess overall progress in reducing poverty. As Atkinson (1998) defends the head count measure, if a minimum income is a basic right, then the head count measures the number deprived of that right. It is an either/or condition (Riihelä et al., 2001*a*, pp. 3–4; Riihelä et al., 2003, pp. 5, 20; Sen, 1976, p. 219). Sen (1976, pp. 219–220) also writes that the head count ratio does not satisfy the monotonicity axiom (given other things; a reduction in the income of a person below the poverty line must increase the poverty measure) nor the transfer axiom (given other things; a pure transfer of income from a person below the poverty line to anyone who is richer must increase the poverty measure).

The head count ratio, H , is expressed as follows:

$$H = \frac{1}{n} \sum_{i=1}^n 1(y_i \leq z) \quad (1.9)$$

where $1(\cdot)$ is an indicator function that is 1 if its argument is true and 0 if its argument is false. n is the number of income receiving units, the income of unit i is y_i , and z is the poverty line (Riihelä et al., 2003, p. 20).

1.5.4 Poverty gap ratio, PGR, FGT(1)

The poverty gap ratio (or income gap ratio), HI , where $I = 1 - m^z z$, and m^z is the mean income or consumption of the poor, expresses the average distances of the poor below the poverty line and thus provides a better picture of the extent of poverty than does the head count ratio. It measures the actual amount of income necessary to bring all households below the poverty line up to the poverty line. The poverty gap ratio, measuring the severity of poverty and being additively decomposable, is defined as (Riihelä et al., 2001*a*, pp. 3–4; Riihelä et al., 2003, p. 21):

$$HI = \frac{1}{n} \sum_{i=1}^n (1 - y_i/z) 1(y_i \leq z). \quad (1.10)$$

which means that *HI* is sensitive to both the numbers of the poor and to how poor they are. The poverty gap ratio satisfies the monotonicity axiom but violates the transfer axiom (Sen, 1976, pp. 219–220).

The poverty gap is the sum (integral) of the shortfall from the poverty line. It may be criticized for evaluating equally all transfers to the household below the poverty line, irrespective of the seriousness of their poverty. The measure is insensitive to transfers between two households on the same side of the poverty line (Riihelä et al., 2003, p. 5). (See Appendix 1 in the Chapter 1.8 for more information on the FGT indices.)

1.6 The method and process of microsimulation

Due to development in computer technology, it is nowadays possible to apply the method of simulation as a tool in economic and social research - to understand and explain social phenomena (Gilbert, 1995, pp. 1, 17). Simulation models can roughly be divided into three: macromodels, fictitious models, and micromodels.

Macromodels are applied to analyze and forecast the developments of the national economy and the long-term effect on the whole economy. Fictitious models augment the macromodels by incorporating individual level processes. Micromodels, or microsimulation models, use micro level data and tend to maintain as detailed and as diverse information concerning the sample data as possible. Therefore, microsimulation models are very suitable for analyzing individual behavior and the behavior of households. Furthermore, these models have the potential to answer questions on heterogeneity in behavior and differences in the outcome of policy. By using the microsimulation method it is not necessary to rely on hypothetical individual or family examples but, instead, we have real world data, real world individuals and households with real world legislation (see for example Haataja, 1994; Gilbert, 1995, p. 5; Klevmarken, 2001, p. 17).

The history of microsimulation is traced back to increased interest among policy makers in distributional studies, in who is losing and who is winning as a result of changes in taxes and benefit systems. Microsimulation is an attempt to model and simulate the whole distribution of target policy variables, and not only the mean values of these variables. This is an advantage of microsimulation compared to traditional econometric modelling. Another advantage of simulation is that one is not confined to functions with nice properties. Simulation can accommodate nonlinear functional forms or functions with discontinuous jumps. Microsimulation is especially useful for policy analysis, since it is possible to include true policy parameters in the models and rules that govern these parameters (like tax rate scales) (Klevmarken, 2001, pp. 3–6; Klevmarken, 1997, p. 2). We can find answers to such questions as these: What are the costs of different social policy models? What are

the income distribution effects of a certain policy in various population groups or the effect of different policies on the same population group etc.? Microsimulation brings transparency to political decision-making (Haataja, 1998, p. 55, 70).

As Harding (1996, p. 1) writes,

Microsimulation models have become very powerful tools in many countries, being used routinely within government to analyze the distributional impact of policy changes to tax and cash transfer programs (such as unemployment benefits). Such models have frequently played a decisive role in determining whether or not particular policies are implemented.

In the most simple form, a microsimulation model contains micro-data representing the population plus tax and benefit system-rules describing existing policy and *what if* changes to it. These are combined by the model to calculate the effects of the changes in policy on the income of each household (or individual). The results are assembled to demonstrate the distributional and public finance implications of the change. The used data frequently require amendments before use, as an example ageing¹⁶ (Harding, 1996, pp. 2–4).

Microsimulation is a demanding technique in terms of modelling effort, data requirements and computer capacity (Klevmarken, 2001). Any microsimulation model is only as good as is the underlying data. It is not possible to simulate any of the transfers or taxes not included in the database. If the data represent only a part of the population in a certain country it is not advisable to draw any national level aggregate results (see for example Sutherland, 1991).¹⁷

Many countries nowadays have so-called tax-benefit models. EUROMOD (European tax-benefit model) is a tax-benefit model at the EU level. MICROHUS (A Microsimulation Model for the Swedish Household Sector) is a dynamic microsimulation model to study the effect of changes in the tax/benefit system on the income distribution (see for example O'Donoghue, 2001). The Social Policy Simulation Database and Model (SPSD/M) is an analytical tool used to analyze tax and social policy changes in Canada. TUJA and SOMA are microsimulation models used in Finland.

¹⁶The changes that make the adjustments necessary are inflation, population characteristics, changed income distribution, rates of unemployment etc.

¹⁷Time use data would be an excellent enhancement to simulation data since time use data show at the individual level how available time is divided between competing ends. However, time use data should be gathered from the same sample at the same time as is gathered the income or consumption information that is used in the simulation.

1.7 Summaries of the essays

1.7.1 Summary of essay 1. **Economic Conditions, Institutions and Income Distribution: Can Changes in Intra-Household Inequality Account for Changes in Income Distribution in Finland in the 1990s?**

The increased inequality in Finland towards the end of 1990s must at least in part be accounted for by something else than increases in the incomes that are generated by the market. Many social institutions were scaled back during the 1990s. While a general scaling back may affect the distribution of income by lowering public transfers to those with low market incomes, we are also interested in understanding to what extent changes to social institutions may have had an impact on intra-household inequality. Intra-household inequality suggests variation in individual level economic wellbeing and this should have implications for our understanding of poverty and income inequality.

The purpose of the paper is twofold. First, we measure the level and change in income inequality and poverty, taking into account the possibility that incomes within the household are unevenly distributed (generating intra-household inequality using information on personal consumption levels). Secondly, we examine the role of changes in intra-household inequality in light of changes that should affect the distribution of resources within the household.

Looking at the levels and changes in inequality we found that the change in inequality across the three years does depend on which income concept we are studying. For the equivalent household income, inequality increased across the 1990s as shown by the fact that the Lorenz curves of the later year always lies under that of the previous one. For personal income, however, the Lorenz curves for 1990 and 1995 cross. In 1995, those with income at or below approximately the 40th percentile had a greater income share than those in 1990. On the other hand, both 1990 and 1995 Lorenz dominate 1998, suggesting that toward the end of the decade, inequality had unequivocally increased.

While the changes between 1990 and 1995 in personal income inequality are not large, the difference in that change and the change in inequality in household income might be interpreted to lend some support to our speculation that the household-bargained outcomes may have shifted in favor of women in the early 1990s and against them thereafter. This tentative conclusion is called into question by the decomposition of overall inequality as measured by the GE(1) into within-household and between-household components.

When looking at the level and changes in poverty the results show that when using personal income the year 1995 has less poverty than either of the years 1990 or

1998. Thus, in stark contrast to what we find for inequality, relative poverty has decreased between 1990 and 1998 (although it was even lower in 1995). Thus, we do find that the trend in poverty depends on whether or not one corrects the within-household distribution. The direction of change, however, is not what we expected. Our priors were that, given the institutional changes that have occurred, taking into account within-household disparities would have led to a greater increase rather than a decrease in poverty.

1.7.2 Summary of essay 2. Value of Housework Time and Changes in Traditional Economic Wellbeing in Finland in 1979-2000

The Finnish economy was growing and economic wellbeing increased rather steadily in all population sub-groups until the end of the 1980s. The economic depression of the early 1990s led to a large decline in gross domestic product and a steep increase in unemployment, and, as a consequence, to substantial declines in household incomes. Gross domestic product continued its considerable downturn until 1994 and unemployment remained high through 1995. Furthermore, income inequality rose rapidly between 1994-2000 and the relative poverty rate grew towards the end of the 1990s.

These findings are based primarily on trends in inequality in money income alone. Because a substantial part of individual wellbeing depends on activities undertaken within households, in particular household production, focusing on money income alone in the presence of huge structural changes may over- or underestimate changes in economic wellbeing. One way to take this into account is to compare money income and information on household production activities valued in monetary terms using shadow or market prices. This allows us to study the distribution and changes in economic wellbeing in terms of *consumption possibilities*.

The paper looks at the change, the level and structure of income distribution and distribution of consumption possibilities at the individual and household level as well as in various sub-groups between the years 1979 and 2000. Another interest is to look at the changes in low incomes when the concept of income is expanded to include a monetary measurement of household production.

The data used are the Time Use Data, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000 covering the time period of interest. The Time Use Data, gathered through detailed time-diary surveys, is combined with money income that has been linked at the person level to the Time Use Data. The levels and changes in inequality are analyzed by using half the squared coefficient of variation, GE(2), and the Gini coefficient. Decomposition by income sources and by subgroups provides a picture of inequality profiles. In order to examine levels and changes in low incomes

the head count ratio, H, and the poverty ratio, PGR, are used.

The results of the study suggest that household production increases the consumption possibilities of all income groups but is proportionately more important for those with low incomes. Time spent in household production thus equalizes consumption possibilities. Consumption possibilities are also more equally distributed than money income is. Similarly, the number of individuals below the low income line drops considerably when moving from money income to consumption possibilities. This means that by looking at consumption possibilities we can observe a different distribution of economic wellbeing compared to the distribution offered by money measurement alone.

1.7.3 Summary of essay 3. Income Distribution Effects of A Finnish Work Incentive Trap Reform

The economic depression in Finland in the 1990s with serious unemployment, the financial problems of the public sector and complications of the labor market raised an effort to remove work incentive traps. The number of people employed needed to be increased and the number of people living on social security needed to be cut. In 1995 Lipponen's first government appointed the so-called Incentive Trap Task Force to discuss how the compatibility of taxes, social security transfers and public service payments could be improved to cut down incentive traps and increase the profitability of working. Basically the Task Force was trying to consolidate the aims of efficiency and equality: efficiency in the sense that people would prefer working to living on social security and equality in the sense that one of the principal objectives of the social security system is equal distribution of income (Prime Minister's Office, 1996, p. 11; Laine and Uusitalo, 2001, p. 1).

Efficiency of the reforms has already been explored in detail but the equality of the reforms has received much less attention. The present study concentrates on the equality of the work incentive trap reforms by estimating how the reforms have affected the distribution of economic wellbeing and especially income levels and income inequality. One aim of the paper is to analyze the effect of the reforms on the raised income inequality of the latter part of the 1990s. The study concentrates on the main work incentive trap reforms and those tax reforms that were implemented at the same time as the work incentive trap reforms. There are no previous studies emphasizing the distributional effects of the Finnish work incentive trap reforms and covering the same time period as the present paper does.

The data used are the Income Distribution Statistics of Statistics Finland from 1996 and 1998. The empirical part of the study is based on a microsimulation model developed by and explained in Laine and Uusitalo (2001). However, to meet the requirements of the study the microsimulation model has been put together from

separate parts, modified and partly rewritten. The paper first looks at the changes in income distribution without behavioral response and then moves on to analyze the effects of behavioral response, meaning the labor supply effect.

When looking at the changes without behavioral response I noticed that the 1998 legislation produced higher mean and median decile group income levels and had a tendency to result in more equal income distribution than the 1996 legislation. However, the changes are small. When the behavioral response, the labor supply effect, is included the results show that at the level of all households the work incentive trap reforms have not decreased or increased income inequality nor have they notably affected the mean incomes of the lowest income decile groups. There is hardly any change in the Gini coefficient or in the mean income of any income decile group. Therefore the distribution of economic wellbeing has remained almost unaltered.

1.7.4 Summary of essay 4. Children's Wellbeing: An Examination of Income and Time Use in Finnish Families in the 1990s

Finnish society faced many social and economic changes during the period from the end of the 1980s to the end of the 1990s. As an example, dual earner families increased, as well as single parent families, and at the same time market work required higher demands than before. Furthermore, the economic development in Finland in the 1990s caused an increase in unemployment and alterations in the household income structure and the economic situation of families.

All these facts create a juxtaposition between family needs, including childcare needs, and needs of market work (see for example Bradbury, 2004). There is a tension between responsibilities for both home production and market work. This paper clarifies how these changes and tensions have affected children's wellbeing. We concentrate on the two most important elements: the family's economic resources and the time parents allocate to childcare. For the empirical analyzes, we use two Finnish datasets, before and after the depression in the 1990s: Income Data and Time Use Data. We study the economic situation of families in 1987-1988 and in 1999-2000, measured by family income. Equally importantly, we count the amount of time Finnish parents spend with their children in various kinds of families and population groups during the same time period. We end up having an analysis of the changes in the distribution of economic wellbeing from the point of view of children. We find that the lowest quintile group is disadvantaged in many ways compared to the highest quintile group. The income level in the lowest quintile group has been stagnant over the years while income has increased considerably in the highest quintile group. In the year 2000, there are slightly more families headed by a single

parent than in 1988. In the highest quintile group, the two-parent family is the norm, where both parents are well educated and have a job. In the lowest quintile group, two families out of five are headed by a single parent (mainly by a single mother). Furthermore, parents in low quintile groups (especially in the lowest quintile group) have low education and a high risk of unemployment. All these results suggest that the material wellbeing of children is divided unequally between families and the trend from 1988 to 2000 shows that this inequality has increased.

From the Time Use Data we can conclude that the total time parents spend with their children has increased from 1987-1988 to 1999-2000. Even when mothers still spend considerably more time on childcare activities than men do, gender differences have balanced out not only during weekends but also in time. Thus, based on the Time Use Data, the wellbeing of children has increased. On the other hand, the differences in time use between various population categories are extensive and in many cases strengthen the unequal distribution of material wellbeing and therefore also the unequal distribution of children's wellbeing.

1.8 Appendix 1. FGT indices

The so-called Foster, Greer and Thorbecke FGT(a) class of poverty indices include H and HI as special cases. These measures can be written as

$$FGT_a = \frac{1}{n} \sum_{i=1}^n [1 - y_i/z]^a \mathbf{1}(y_i \leq z) \quad (1.11)$$

Parameter a measures how sensitive the index is to transfers between the poor units. When $a > 1$ transfer from low to high incomes will increase poverty. FGT(0) is the head count ratio and FGT(1) is the average normalized poverty gap. This class of indices is very useful for policy analysis (Riihelä et al., 2001*a*, pp. 3–6; Riihelä et al., 2003, pp. 21–22).

A important usefulness of FGT(a) measures lies in its additively decomposability. FGT(a) indices are decomposable by population sub groups:

$$FGT_a = \sum_{j=1}^m x_j P_{j,a} \quad (1.12)$$

where m is the number of population subgroups (mutually exclusive and exhaustive), group j has a fraction x_j of the population, $\sum_{j=1}^m x_j = 1$, and the poverty index in subgroup j is $P_{j,a}$. Thus, overall poverty is a weighted sum of subgroup poverty indices (Riihelä et al., 2001*a*, p. 6; Riihelä et al., 2003, pp. 22–23).

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Chapter 2

Economic Conditions, Institutions and Income Distribution: Can Changes in Intra-Household Inequality Account for Changes in Income Distribution in Finland in the 1990s?

by Päivi Mattila-Wiro and Markus Jäntti

Abstract

The paper analyzes to what extent changes made to social policy and social institutions in the 1990s have had an effect on intra-household inequality in Finland. If intra-household inequality exists, it also suggests variation in individual level economic wellbeing. This should again have an impact on our understanding of poverty and income inequality. The data used is the Household Expenditure Survey from the years 1990, 1994-1996 and 1998. The data includes not only household level information but also individual level information, which makes the analysis of intra-household inequality possible. The results show that we find little support for the view that intra-household inequality has changed across time. And therefore, we have to find the reasons for increased dispersion elsewhere.

2.1 Introduction

Income inequality in Finland in the late 1980s was by international standards exceptionally low, having declined substantially from 1966 to 1981 and stayed fairly constant since then (Atkinson et al., 1995; Uusitalo, 1989). In the first half of the 1990s, Finland experienced a deep depression, driven by a collapse of the financial and real estate markets, aggravated by the collapse of trade with the Soviet Union and the failure of aggregate demand management, which in part was explained by the need to maintain external balances. Income inequality first declined but, once economic recovery started in the exporting industries around 1994, income inequality started to increase rapidly.

These developments are summarized in Figure 2.1, which shows the Gini coefficient of (equivalent) factor, gross and disposable income from 1987 to 2000. One important thing to note about the Gini coefficients is that, while the rapid increase in income inequality occurs as economic growth surges in the late 1990s, the inequality of factor income does not increase nearly as steeply as that of disposable income. Thus, the increase in inequality must at least in part be accounted for by something else than increases in the incomes that are generated by the market.

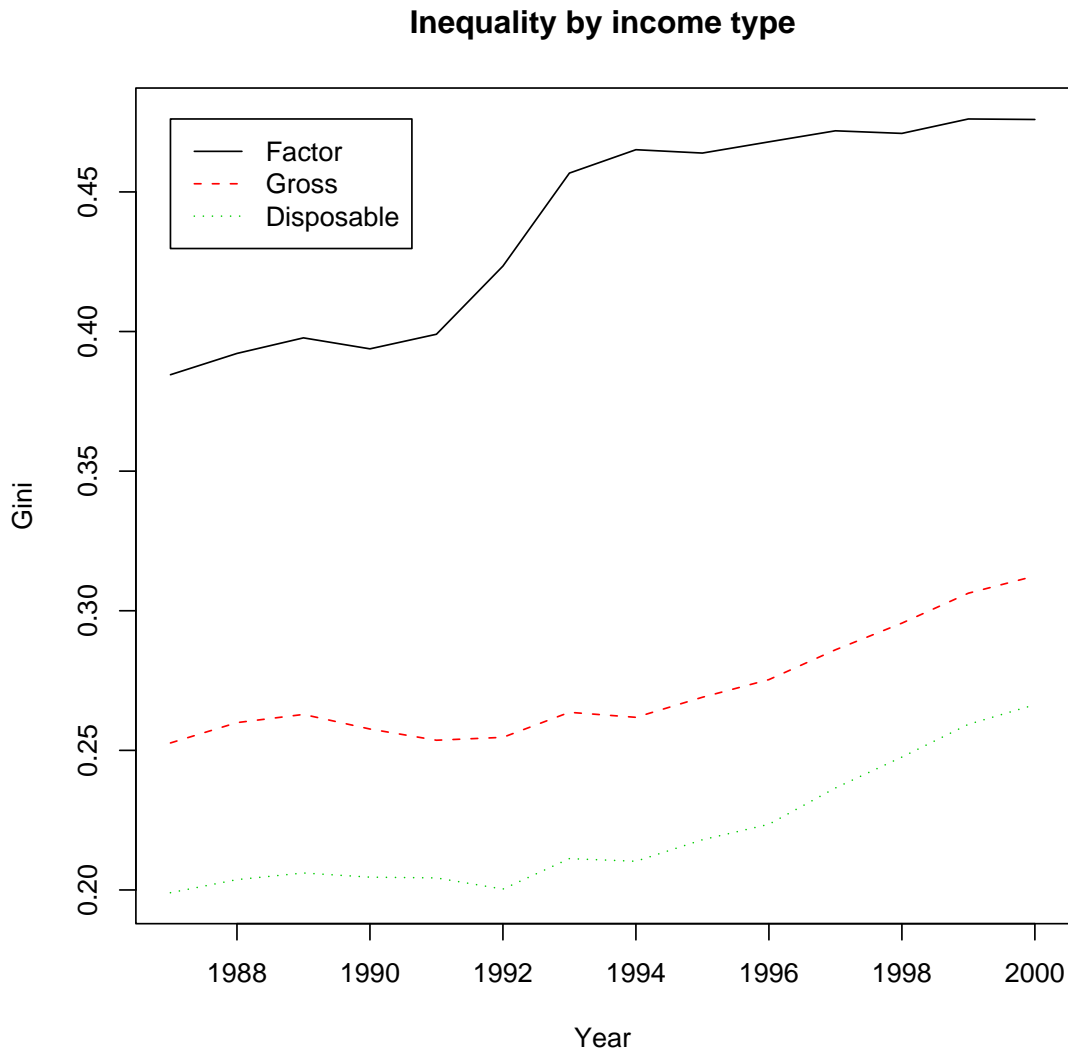
Many social institutions were scaled back during the 1990s, in part as a response to the fiscal problems that were driven by the depression—decreased public revenues due to declines in the tax base and increased outlays driven by ballooning unemployment. While a general scaling back may affect the distribution of income by lowering public transfers to those with low market incomes, we are also interested in understanding to what extent changes to social institutions may have had an impact on intra-household inequality. Intra-household inequality suggests variation in individual level economic wellbeing and this should have implications for our understanding of poverty and income inequality.

In general, intra-household decisions depend on the spouse's wage rates, their non-labor income and other factors that affect their outside option. While often non-specific, it is widely assumed that social institutions designed to facilitate market work, such as the availability of public day care, and differential access to market work, reflected for example in differential unemployment rates for women and men, can affect the bargained solution of couples. (See Sorensen and McLanahan (1987) for a study on married women's economic dependency).

In the presence of intra-household inequality, income inequality can be shown to increase unambiguously (see Haddad and Kanbur, 1990). While the impact on poverty depends on how, exactly, poverty is measured, more sophisticated poverty indices should register an increase as a result of intra-household inequality (see Jenkins, 1991, pp. 458–461).

Moreover, if intra-household inequality does play a role in the general increase in inequality, effective anti-poverty and equalizing policies need to take this into account.

Figure 2.1: Income inequality – Gini coefficients 1987–2000



Source: Authors' calculations from the Income distribution survey micro-data

The purpose of this paper is twofold. First, we measure the level and change in income inequality and poverty, taking into account the possibility that incomes within the household are unevenly distributed (generating intra-household inequality using information on personal consumption levels). Secondly, we examine the role of changes in intra-household inequality in the light of changes that, according to

the typical bargaining model of intra-household decision-making, should affect the distribution of resources within the household.

The paper is organized as follows. We briefly review relevant models of intra-household decision-making and look at some empirical evidence in Section 2.2. In Section 2.3, we look at macroeconomic conditions and institutional changes in the 1990s, with a focus on factors that may affect intra-household inequality. In Section 2.4, we describe the data and methods we use. We start the Section 2.5 by re-examining changes in (traditionally measured) income inequality and proceed to examine the role of intra-household inequality. We present some concluding remarks in Section 2.6.

2.2 Intra-household inequality in theory and practice

Income distribution analysis typically examines the income (or other economic resource, such as wealth or consumption expenditure) of individuals aggregated within some sharing unit, such as the household or the family. On the assumption that there are economies of scale and income needs vary systematically according to some observable characteristics, such as age, aggregate household family income is modified by a equivalence scale before it is allocated to each individual. The typical equivalence scale is concave in household size (taking economies of scale into account) and assigns children lower needs than adults. There is a very large literature on equivalence scales, which we do not intend to discuss here (see for example Coulter et al., 1992*b,a*; National Research Council, 1995). What is common to most analysts is that the *same* household equivalent income is allocated to each household member, that is, every household member is assumed to enjoy the same standard of living (for exceptions, see for example Jenkins, 1991; Findlay and Wright, 1996).

There are many reasons for making this strong assumption, including the fact that little is generally known about the within-household distribution.¹ Theories of consumer demand or, more generally, of family decision-making, model the behavior of households as if they were single individuals – for example, the *household* has preferences or a utility function and so on – or they reduce the multi-person decision-making problem to that of a single family member who cares for the well-being of the others. The New Household Economic Theory of Gary Becker (see for exam-

¹While this assumption is often necessitated by the data – which are rarely collected individually – there are reasons to believe resources may well be allocated unequally exactly to achieve similar levels of well-being within the household. For instance, some household members may require special attention and special resources, such as wheelchairs. This is a question of needs (special needs). As suggested for example by Atkinson (1983, p. 17). differences in income may reflect differences in needs. Needs of individuals vary according to their age, health, social norms, etc.

ple Becker, 1991) is the most extensively quoted theory belonging to this group of so-called unitary models. According to Becker, 'caring' solves the problem of distribution within a household. We have, however, plenty of evidence to suggest there may be considerable differences in well-being within households and that this may in part be a consequence of unequal sharing of resources.

Fortin and Lacroix (1997, p. 933) argue that it is impossible to analyze intra-household inequalities or external transfers to intra-household resource allocation within the unitary model. Chiappori (1992, pp. 440–441) also points out that traditional models can be inadequate and misleading when considering policy issues like the welfare of individuals. The traditional models only consider the income distribution across households and not within the household, even though the within household distribution is important in determining individual wellbeing.

Schultz (1990) examined whether the non-earned income of a husband and wife had a similar effect on the labor supply of the family. The test is based on the 1981 Socioeconomic Survey of Thailand. The evidence suggests that, contrary to the unitary model family members are motivated by self-interest in family resource allocation. Furthermore, Lise and Seitz (2004) found that measures of consumption inequality that ignore intra-household inequality may underestimate individual-level inequality by 30%. Difference in earnings across husbands and wives generates substantial within household inequality. There is no doubt a very long list of critics of the unitary model.

2.2.1 Nash-bargaining framework of household decision-making

Bargaining models of household decision-making depart from the traditional approach and apply the tools of the game theory to the decision-making process within the household. Decisions are typically modelled as co-operative games, for which Nash bargaining is assumed to provide the solution. In the simplest form of a bargaining problem, two people cooperate in order to improve the position of each compared to a situation in which these individuals fail to cooperate altogether (Sen, 1985, p. 200). The two parties have their own interests, their own preferences and thus also their own utility functions. The opportunity cost of family membership matters for the intrafamily distribution of income and therefore for the household demands (McElroy, 1990, p. 560).

The bargaining problem can be resolved in different ways, but the solution always depends on the bargaining power of each participant and the value of their outside options. If individuals fail to cooperate, the outcome is called 'the status quo position', 'the fallback position' or the 'breakdown point', terms which indicate that termination of the marriage is the threat point of the model. However, any ar-

rangement is presumed to be better for both parties than the fallback position. The greater one member's threat point is, the stronger the member's relative valuation of goods can be seen in the household demands (McElroy, 1990, p. 560). Fear of the fallback position tends to govern the bargaining processes and to influence the outcome (Sen, 1985, pp. 17, 200–203). Furthermore, the winners of one round of a bargaining problem seem to gain greater bargaining power in the next round.

The resources each person controls within and beyond the household affect bargaining power. Better education, 'productive' employment, working outside home, all contribute to an individual's wellbeing, toward greater acquired skills and a better fallback position in the future (Sen, 1985, pp. 205–207). Outside earnings have also been claimed to have a role in creating a difference within a family.²

McElroy and Horney (1981, pp. 334–337) and McElroy (1990, pp. 562–566) explain the gain from being married as opposed to being single as follows. If m and f are unmarried, their utility functions are

$$U_0^m(x_0, x_1, x_3) \quad \text{and} \quad U_0^f(x_0, x_2, x_4) \quad (2.1)$$

where $x = (x_0, x_1, x_2, x_3, x_4)'$ with $p = (p_0, p_1, p_2, p_3, p_4)'$ as the corresponding market prices. Here x_1 is a market good consumed by m ; x_2 is a market good consumed by f ; x_3 is the quantity of 'leisure' of m (all time not spent at market work); x_4 is the quantity of 'leisure' of f ; and finally, x_0 is a so called household good (pure public good) which in the case of individual utility functions can be defined as additional market good.³

Each individual maximizes her/his utility function subject to income constraints, which leads to the indirect utility functions

$$V_0^m(p_0, p_1, p_3, I_m; \alpha_m) \quad \text{and} \quad V_0^f(p_0, p_2, p_4, I_f; \alpha_f) \quad (2.2)$$

where I_k is a non-wage income and α_k 's are the shift parameters or extra environ-

²Pollak (2005) argues that it is the wage rate, not earnings, that determines well-being at the threat point and hence determines bargaining power.

³A household, in neoclassical orientation, is understood to produce both private goods and public goods (sometimes also referred to as joint goods) for its members. A member cannot consume the private goods consumed by another member of the household. But public goods are jointly consumed and they enter simultaneously into the utility function of all household members. Characteristic of such goods is that they are not 'used up' in the process of consumption or utilization as an input in a production process (Oakland, 1987, p. 485). Public goods are, for example, house heating, joint automobile trips, and living space (Bergstrom, 1997, pp. 23–24). According to Bergstrom (1997, p. 40) even child health and fertility are household public goods jointly 'consumed' by both husband and wife. The feeling of security, love and care are also household public goods, provided to be consumed by all household members. These public goods do not require financing but are actually necessities for the wellbeing of all household members and for children particularly to have a good life in the future. This is, in fact, investment in the human capital of household members.

mental parameters. McElroy and Horney (1981, pp. 334–337) and McElroy (1990, pp. 562–566) further present the “utility-gain product function”:

$$N = [U^m(x) - V_0^m(p'_m, I_m; \alpha_m)] \times [U^f(x) - V_0^f(p'_f, I_f; \alpha_f)] \quad (2.3)$$

Each term in brackets is the gain from marriage over the next best alternative. Now $U^k(x)$ are the nonnegative utility functions within marriage, where the utility of each is assumed to depend not only on their own goods, and leisure and the household good but also upon the nonmarket time and the consumption of the spouse as well. The Nash-bargained solution to the allocation problem of m and f suggests that the players jointly choose x to maximize the product of their gains from marriage. V_0^k is the threat point of either m or f individual and shows the best they could expect in the case of withdrawal from the household. The threat points may shift due to changes in opportunities outside marriage. The α_k 's are parameters that shift the threat points but do not affect the prices and nonwage incomes. However, α_k 's can represent an additional nonwage income received in the form of welfare when unmarried (transfers that are not portable into and out of the married state) (McElroy, 1990, p. 566).

One of the disadvantages of the bargaining models is that they are very complicated and thus difficult to test empirically. The complexity and the number of assumptions required increases with the addition of new variables (see for example Strauss and Thomas, 1995, pp. 1993–1999). Some researchers have argued that it is not feasible to imply that spouses threaten each other with divorce each time they have a disagreement (Phipps and Burton, 1995, pp. 154–155). Thus, while the abandoning of the unitary model of household decisions in favor of one in which household members may have conflicting interests, or at least their own, private interests is an improvement, it is not clear that bargaining must be the correct solution. We next review some of the empirical work that has attempted to investigate this issue.

2.2.2 Empirical evidence on intra-household inequality

Inequality within a household can arise in various situations: in the division of household tasks, in consumption, in the choice of education, in the division of food etc. Intra-household inequality of income can be a result of the general nonpooling of household resources, the unequal distribution of household tasks and responsibilities, which means that some members are left with limited possibilities like time, to earn their own income. Furthermore, household monetary resources may be unequally distributed, for example, paying for child care or child education, paying for a household public good. Public transfers and taxes may also create inequalities between household members.

Numerous studies indicate that resources, like income, and consumption may, indeed, be unequally distributed within households.⁴ Strauss and Thomas (1995, pp. 1996–1999) suggest that resources in the hands of different individuals within one household have different impact on the wellbeing of all household members, including health of the children. For example, Thomas (1990) utilizes data from Brazilian Expenditure Survey collected in 1974–75 to test whether the composition of unearned income (for example social security, pensions) has an effect on child health indicators. The results show that unearned income controlled by a mother has a bigger effect on her family’s health than income controlled by a father. In the case of child survival probabilities, the effect is almost twenty times bigger. Furthermore, Thomas (1990, pp. 653–657) has found evidence of significant gender preference: mothers devote more resources to daughters than sons and fathers devote more resources to sons than daughters. In many cases these differences were statistically significant. Bourguignon et al. (1993) provide additional evidence that, at a given level of income, the share of the husband’s and wife’s own income significantly affects the structure of consumption.

Nordberg (1998) studied inequality, poverty and intra-household distribution of income in Finland. He allocated household income between particular household members and indicated how the rejection of the equal sharing assumption affects measures of inequality and poverty. The data stem from the Finnish Household Expenditure Survey 1994–96. The data allow the division of private and common goods according to the type of household and position within the household. The Gini coefficient and the Atkinson inequality index are applied for inequality measures and the Foster-Greer-Thorbecke index is chosen for the poverty measure. The disposable equivalent household income is calculated by using the OECD equivalence scale, and individual equivalent incomes are determined by adjusting the mean income according to the observed differences in the ‘corrected’ total consumption of each individual.

Nordberg (1998) found that the use of individual equivalent incomes does not affect greatly the estimated overall levels of the inequality and poverty indices. It seems that consumption is quite equally distributed within the Finnish households. Thus, his conclusion is that the hypothesis of equal sharing of resources within the households may be a reasonably good approximation, at least for Finnish households.

Browning et al. (1994) applies expenditure data to examine whether the relative incomes of household members affect allocation decisions. The study centers on the clothing expenditures of women and men. The principle finding of the paper is that the final allocation of expenditures depends on the relative incomes and ages of each

⁴Kanbur and Haddad (1994, p. 456) found especially interesting results concerning intra-household inequality. They found theoretical support for the ‘Kuznets effect’, i.e., that inequality depends on total resources. At the micro level, this would mean that a general improvement in household resources leads to first an increase and then a decrease in intra-household inequality.

partner and on the level of lifetime wealth.

However, Woolley and Marshall (1994, p. 417) argue that studies of labor supply and expenditure provide only a partial picture of intra-household inequality. Woolley and Marshall (1994, p. 421) themselves compared inequality, using the Winnipeg Area Study, measured by assuming equal sharing within a household, and by concentrating on individual incomes. They noticed that shifting the focus from household to individual incomes results in a dramatic increase in inequality and the increase is due to an intra-household inequality. The authors present alternative ways to measure intra-household inequality: access to financial resources, control of the household's expenditures or decision-making, or perception. The results of the alternative measures affirm that the standard approach understates actual inequality in households (Woolley and Marshall, 1994, pp. 419–430).

Haddad and Kanbur (1990) developed an analytical framework for the assessment of the impact of intra-household inequality on the levels of inequality and poverty. They then apply this framework to a particular dataset from the rural southern Philippines. The calorie adequacy of food intake is used as a measure of individual wellbeing, since food consumption is a variable on which intra-household data can be collected. They noticed, among other things, that the understatement of inequality, when intra-household inequality is not considered, could be very large. However, the extent of rank changes between population groups is not dramatic when there is a switch from individual to household level data. As a summary, they note that serious errors can be made when analyzing the levels of inequality and poverty if intra-household inequality is ignored. Instead, the changes in the patterns of inequality when intra-household inequality is ignored are not dramatic.

2.3 Changes in economic conditions and institutions

We are interested in those institutional changes in Finland which can reasonably be thought to affect the bargaining outcomes of the household, i.e. changes that affect the relative bargaining powers of women and men, and the values of the threat-points, as such changes will affect the bargaining outcomes and therefore intra-household inequality. During the 1990s, many economic and institutional changes did, indeed, take place. Numerous cuts in social transfers, unemployment, the State debt, and finally the economic recovery have altered the economic wellbeing of Finnish individuals and households. The study does not try to test empirically any of the changes in social and institutional factors.⁵

⁵There are very few studies concentrated on the effects of social and institutional factors on household power relations.

An important change in fairly recent Finnish economic history is the large increase in the participation of women on formal labor markets outside the household. This change can be assumed to be associated with an increase in bargaining power and the value of the outside option for women. Better and increased opportunities to obtain employment in the market sector, outside marriage, have created a situation where women can be independent income earners and breadwinners for their families. Furthermore, the increased number of single person households has made attitudes more tolerant towards those living alone. This has led to an increase in the value of the outside option for both sexes, so its effect on the bargained outcome is probably ambiguous.

The economic depression of the 1990s caused changes in the income structure of households. Many of the changes were a result of cuts in social spending. Unemployment benefits and family benefits have undergone the most severe cuts in relative terms. Working households lost about 4% of their real income as a result of the cuts. The more numerous were the social benefits received by a family; the more irregular and uncertain was the family's flow of income (Heikkilä and Uusitalo, 1997, pp. 7–8). Looking at the total income of households, in 1995 Finnish households received 32% of their gross income as income transfers. The analogous figure in 1990 was 21%. This means that the depression meant growing dependence on the state (Heikkilä and Uusitalo, 1997, pp. 8, 71). The growing dependence on social transfers is interesting since the one who receives this income (uncertain and irregular) matters for bargaining power relations within the household. The one losing regular income and having growing dependence on uncertain social transfers also loses bargaining power relative to a member of a household who has regular and certain income.

By definition, even without assessing individual incomes, the premise is that the one working outside home owns greater bargaining power than the one working at home. When we add the low compensation received from work at home and an anticipated higher wage received from market work, it is evident that the bargaining power of those taking care of households is much less than the bargaining power of those working at the market sector. Since it is mainly women who stay at home to take care of the household and the family's children, it is particularly women whose bargaining power has been reduced as a result of cuts in family benefits.⁶

It is also obvious that when women stay at home, for several years, to take care of their children their labor market position weakens compared to men. This is seen as an example in lower wages paid to women than men in the labor market. This again

⁶Referring to many studies on different spending patterns between women and men within a household, Duggan (1995, p. 179) claims with good reason that child allowances and other government subsidies for child rearing have a different effect on the family, depending on whether these are paid to the mother or to the father.

leads to women's smaller bargaining power within the household. The more they stay at home, the fewer opportunities they have to enter a good job in the labor market and the less they earn. This phenomenon is not even a short-term matter but the loss of regular wages due to child care time spent at home can be expected to decrease women's bargaining position within the household in long term as well.⁷ The ratio of female to male earnings is one measure of women's relative market opportunities. An increase in that ratio can be assumed to be associated with an increase in the bargaining power of women. It has been suggested that if women and men are treated equally in the labor market, they are also equal within the household. The same social norms are dominant both in the labor market and in homes (see for example Phipps and Burton, 1995, p. 162). As women's labor market earnings are in general lower than those of men, we can also expect that household outcomes will reflect that inequality.

Even when there are no strong differences between various household types in the effects of a depression, it is still plausible that single parent families have suffered the most downturns in their economic wellbeing. This again means that since most of the single parents are women, women's bargaining power has decreased as a result of cuts in family allowances during and after the economic downturn.

It is possible that a high unemployment rate discourages women's participation in the labor market more than that of men. Higher unemployment rates put divorced/separated women at greater risk of economic deprivation and thus reduce the value of women's outside option. This may reduce women's bargaining power within marriage (Phipps and Burton, 1995, p. 161). On the other hand, increases in the male relative risk of unemployment should reduce the value of the outside option for men. Between 1990 and 1995, male unemployment rates were higher than those of women, since which women's unemployment rates have been slightly higher than those of men. Thus, we would assume that bargaining outcomes changed in favor of women between 1990 and 1995 and worked against women thereafter.

2.4 Data and methods

We use three separate Household Expenditure Surveys (or equivalently, Household Budget Surveys) of Statistics Finland that collected individual level consumption, in 1990, 1994-1996, 1998. While there are some differences across the surveys, their basic structure is quite similar.⁸ Due to small sample sizes, the surveys of the years

⁷The fact that time spent at home taking care of children and conducting household tasks is not considered to increase the bargaining power of women illustrates the weakness of the bargaining power model. The skills and knowledge acquired within the household and conducting household tasks should increase bargaining power equally to market work.

⁸The 1998 survey was the first in Finland where the new COICOP (Classification of Individual Consumption by Purpose) was applied. COICOP is included in the recommendations of ESA (Eu-

1994, 1995, and 1996 are normally combined and taken to represent one survey. We center these surveys on 1995.

The Household Expenditure Surveys are cross-sectional sample surveys, primarily aimed at estimating the structure and level of the consumption of Finnish households. In addition to this, data on income, the use of social welfare services, structural characteristics of households etc. are gathered. The sample frame consists of the population register of resident, non-institutional persons, and the research unit is the sample person's household, defined through an interview. A household consists of all the individuals who live and eat together or who otherwise jointly use the same income. The reference person is determined at the time of an interview and she/he is generally the one earning the highest income in a household. Typically, population breakdowns are done with respect to the characteristics of the reference person. The reference person specifies the socioeconomic position of the household and the level of education.

The data are collected by interviews, budget diaries and using administrative records. First, every household is interviewed and second, a diary is kept of all purchases for 14 days. Finally, the information obtained is supplemented with official records. For the two-week diary term the whole year is divided into 26 two-week periods. All household members fill in their own consumption diaries. The diary information (as well as interview information) from the period of two weeks is enlarged to consist of a whole year, which means that the data does not describe the actual yearly purchases. This further means that the yearly figures can over or underestimate some of the household purchases or incomes, and households in the surveys should not be studied separately.

Between 1990 and 1994 the number of interviews for each household dropped from two to one. In addition to this, there has been, since 1995, a gradual change towards the use of an electronic interview form. The non-response rate in every survey is approximately 30% – see Table 2.1. Refusing to be interviewed is the chief reason for non-response. One-person households had the highest rate for non-response. The non-response rate starts to grow again when the family size reaches 5 or more members. It also seems that low income households have higher non-response rates than other households.

The questions in the interviews have changed somewhat from survey to survey. However, the intention is to determine the structure of the household, some background information, major purchases, amount of debt etc. The diaries include all the purchases of household members as accurately as possible. Every purchase includes information: what has been bought, for whom, how much it cost, the purchased amount in detail (not in the survey of 1994–1996), the method of payment, whether

ropean System of Accounts). In COICOP goods and services are allocated to final or intermediate consumption or to fixed assets on the basis of their use in household production (Eurostat, 1999).

Table 2.1: The net sample size and total non-response rates of the Household Expenditure Surveys in the 1990s

Year	Sample size	Non-response rate
1990	11756	29.8
1994	3464	37.1
1995	3450	33.0
1996	3457	34.9
1998	6870	36.6

Source: Statistics Finland (1993, 2001)

gifts are given or received, and possible compensation from an employee. In the surveys of 1994–1996 only in the case of ‘products for own use’ are the purchased amounts marked down. The 1994–1996 and 1998 surveys specify in detail the meals eaten either outside the home or at the place of work. The 1994 survey also requires information about the waste management of the household. This is not required separately in the other surveys. Furthermore, the 1996 survey asks information of the changes in the livelihood of the household compared to the earlier year.

The major deficiency of the 1990 survey is that it does not include hours of work nor wage rates, which means that labor supply decisions cannot be analyzed. However, the survey of the year 1990 includes already data on some individual consumption (see for example Ruuskanen, 1997, pp. 59–62). Instead, data from 1998 includes, as an exception to earlier expenditure surveys, the average hours of work of household reference person and her/his spouse. These figures are available in hours/week.

A detailed composition of consumption expenditures and disposable income is described in Appendix 1 in the Chapter 2.7. As can be seen, the definition of consumption expenditures has altered slightly between 1996 and 1998. It should also be noted that consumption expenditures have been expressed, since 1990, as gross figures.

The three data sets are especially appropriate for studying the changes that have taken place in the intra-household resource allocation in the 1990s, since the first survey in 1990 was made at the end of a period of fast economic growth and at the start of a serious depression. Nevertheless, the 1990 figures do not yet show the effects of the depression. The survey of the years 1994–1996 describes the period of economic downturn and a recovery from it and finally the after depression survey was made in 1998. The latest survey was made during the time when the economic inequality was already recorded in Finland.

2.4.1 Individual level data

The Household Expenditure Surveys have processed the data obtained from households (interviews and diary entries) in a way that

1. Goods and services are not specifically targeted to a certain member of the household. This category forms so called household public goods;
2. The recipient of goods and services is targeted to a certain individual, which allows the formation of individual level consumption data;
3. The recording of the recipient is optional (see for example Ruuskanen, 1997, p. 64).

Most of the consumption data is household level information, altogether about 65% of the household total consumption expenditure (Sauli, 1998, p. 54).⁹ Goods like food, housing costs and furniture are so-called household's common consumption meaning household public goods. Around 23% of consumption expenditures are individually targeted (Sauli, 1998, p. 54). Goods and services that are possible to target to one individual in a household are, for example, clothes, education and health services and travel abroad. Furthermore, most of the figures from official registers are individual specific. Thus, Statistics Finland has formed separate individual level data sets, which are central for the present research. The individual data sets provide an opportunity to study the allocation of consumption within a household. If households have not provided information concerning the target individual of specific consumption items, this targeting is done by Statistics Finland at the time of recording the results of the survey. At this stage, individual consumption goods are either targeted to one individual or shared between several individuals. The process of targeting at the recording stage may have a balancing out effect on consumption within a household.¹⁰

What makes the data analysis, and especially the analysis of intra-household relations, very difficult is the optional possibility to record the recipient of a particular consumer good. Around 12% of consumption expenditures belong to this group of optional targeting (Sauli, 1998, p. 54). These are goods and services that other households target to individuals and other households consider as a household's common consumption. Certain goods are either targeted to individuals or not and the practice varies considerably between households. Ruuskanen (1997, p. 65) has noticed that there is little consistence across or within the consumption categories that had either an optional or required consumer within a household.

⁹Sauli (1998) has used, in particular, studies for the years 1994–1996 in her analysis.

¹⁰This information was provided by Kirsti Ahlqvist at Statistics Finland.

2.4.2 Personal incomes

The standard method for comparing incomes in households with different structures is to use a household equivalence scale. The study on intra-household inequality, however, needs estimates for the amount of individual income. The use of an individual as a study unit requires income to be adjusted if we assume that all individuals within a household do not receive an equal amount of a household's total disposable income. An individual's equivalent disposable income can be thought of as being some fraction of total income (Nordberg, 1998, pp. 2–3):

$$Y_{ij} = k_{ij}Y_i, \quad (2.4)$$

where Y_i is the equivalent disposable income of a household i , members of a household are $j = 1, \dots, n$ and $\sum_{j=1}^n k_{ij} = n, k_{ij} > 0$. Equivalent disposable income is taken to represent income that is comparable with other households and that can operate as an indicator for the mean level of economic wellbeing within the household. The most demanding task is to specify the coefficient k_{ij} according to which the division is carried out. This is because we do not know for certain what the resource allocation mechanism is within each household. Equal sharing is the most common assumption but, as explained earlier, this assumption is very strong and has been proved incorrect in many cases. If the intra-household resource distribution mechanism and, for example, sharing rule were known, the coefficient would be easy to find. At the moment, however, we can only expect that the data will provide some guidance for the value of k_{ij} .

Since the present study also concentrates to explain economic inequality through consumption we need to find the individual consumption levels as well. Household consumption is divided between private goods and public goods. Normally the private goods are much easier to determine but since the public goods are critical for the wellbeing of household members they should be included in the analysis. It is assumed here that some amount of various public goods always has to be provided within every household.

Total household consumption, normally per year is

$$C_i = C_{pg} + \sum C_{ij} \quad (2.5)$$

which means that household total consumption is composed of public goods consumption plus the sum of all the individual consumptions (see for example Nordberg, 1998, p. 3). Similarly with the division of household disposable income, the level of individual consumption is not known, but data analysis can give some general guidance on this. Egoistic individual preferences are assumed, meaning that a person's individual consumption is that part of the household's consumption that contributes

only to his or her welfare. Households are also assumed to be homogenous in the sense that the household public goods are of equal benefit to all members of the household (Nordberg, 1998, pp. 3–4).

Nordberg (1998, pp. 3–4) applies the individual consumption level to find the coefficient k_{ij} (how income is allocated between household members). Consumption and economic wellbeing are often considered comparable and since income measures economic wellbeing it is assumed that observed differences in the consumption level of individuals are as such transferable to corresponding differences in their equivalent disposable incomes. However, due to differences in needs, the observed variation in consumption has to be adjusted accordingly. We do not know the needs of individuals but we can assume that children are equally well off as their parents. This leads us to the coefficient d

$$d_{h,y} = \frac{\bar{C}_p^{h,a}}{\bar{C}_p^{h,c,y}} \quad (2.6)$$

where h is the type of a household and $\bar{C}_p^{h,a}$ is the mean individual consumption of adults, and $\bar{C}_p^{h,c,y}$ is the mean individual consumption of children of age y . The coefficient d allows us to compare, for example, the individual consumption of a child of a certain age in a certain type of a household and the individual consumption of the adults. This follows that we can now express the income correlation coefficient as

$$k_{ij} = C'_{ij}/\bar{C}'_i, \text{ where } \bar{C}'_i = \frac{1}{n \sum_{j=1}^n \bar{C}'_{ij}} \quad (2.7)$$

where \bar{C}'_{ij} is the adult-child-corrected consumption level.

2.5 Changes in inequality and poverty

We wish to assess whether changes in within-household inequality causes us to revise our assessment of the change in inequality and poverty in Finland during the 1990s. We therefore start by looking at the change in inequality and poverty in disposable income, using the Household Budget Survey data. We next proceed to examine the trend in income adjusted for within-household inequality. We then compare inequality and poverty measured by the standard income concept that assumes no within-household dispersion with our adjusted measures, which does. Finally, we examine some breakdowns of the population by what we believe are interesting and relevant characteristics.

Table 2.2: Overall income inequality – Gini and GE(1) coefficients

	1990	1995	1998
GE(1)			
Disposable income	0.077	0.090	0.098
Disposable personal income	0.111	0.115	0.125
Gini			
Disposable income	0.208	0.217	0.236
Disposable personal income	0.254	0.249	0.268

2.5.1 Levels and changes in inequality

We begin our comparison of inequality based on the standard measure of income, equivalent disposable household income, and that based on personal disposable income, by examining the Lorenz curves for both income concepts in 1990 and 1998. To facilitate the visual comparison, we plot the difference between the 45 degree line and the Lorenz curve (in effect, we have “rotated” the Lorenz curve diagram by 45 degrees). The Lorenz curves for 1990 and 1998 in Figure 2.2 both suggest that personal income is more widely dispersed than the equivalent household income, as is to be expected.

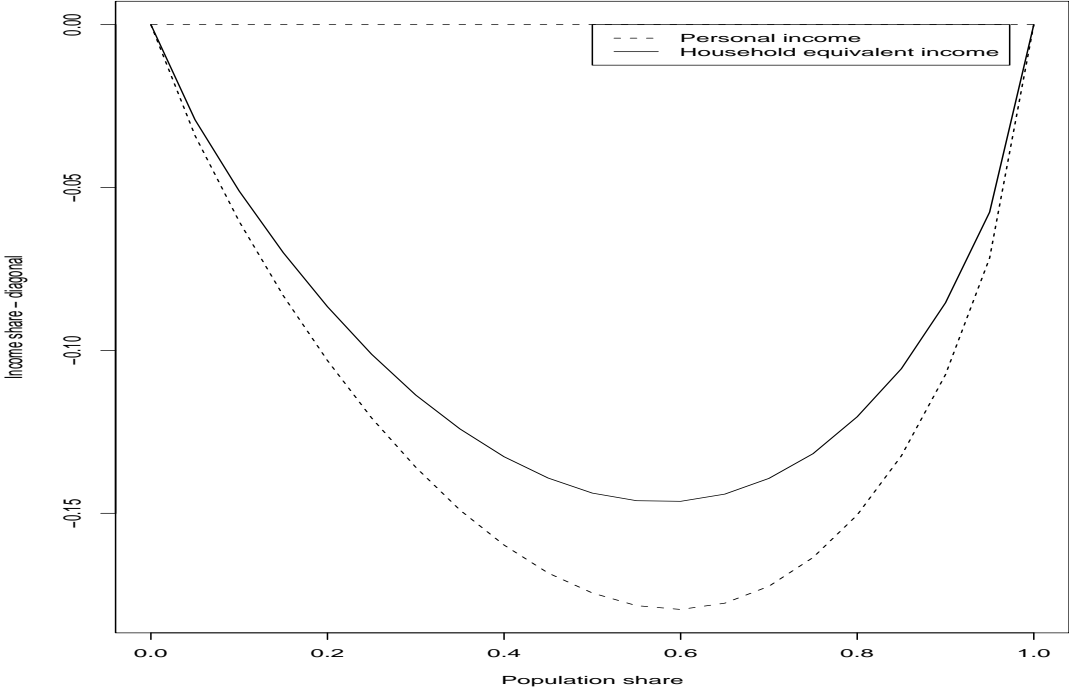
The change in inequality across the three years does depend on which income concept we are studying. For the equivalent household income, inequality increased across the 1990s as shown by the fact that the Lorenz curve of the later year always lies under that of the previous one. For personal income, however, the Lorenz curves for 1990 and 1995 cross. In 1995, those with income at or below approximately the 40th percentile had a greater income share than those in 1990. On the other hand, both 1990 and 1995 Lorenz dominate 1998, suggesting that, toward the end of the decade, inequality had unequivocally increased.

The evidence on trends in inequality based on inequality indices is mixed (see Table 2.2). There is no doubt inequality is higher in 1998 than in either 1995 or 1990, as follows directly from the Lorenz curve comparisons above. However, it is also the case that for disposable personal income, the changes are not monotonic. That is, inequality *decreased* slightly, as measured by the Gini coefficient of disposable personal income from 0.254 to 0.249. Based on the GE(1) index, however, it increased in the same period. The reason for this conflicting story is that the Lorenz curves for those two years cross. For the change between 1990 and 1998, however, all indicators suggest inequality increased, as one would expect based on the Lorenz curves.

While the changes between 1990 and 1995 in personal income inequality are not large, the difference in that change and the change in inequality in household income

Figure 2.2: Levels of inequality based on standard income concepts and personal income – Lorenz curves

A. “Standard” equivalent disposable household income



B. Personal equivalent disposable household income

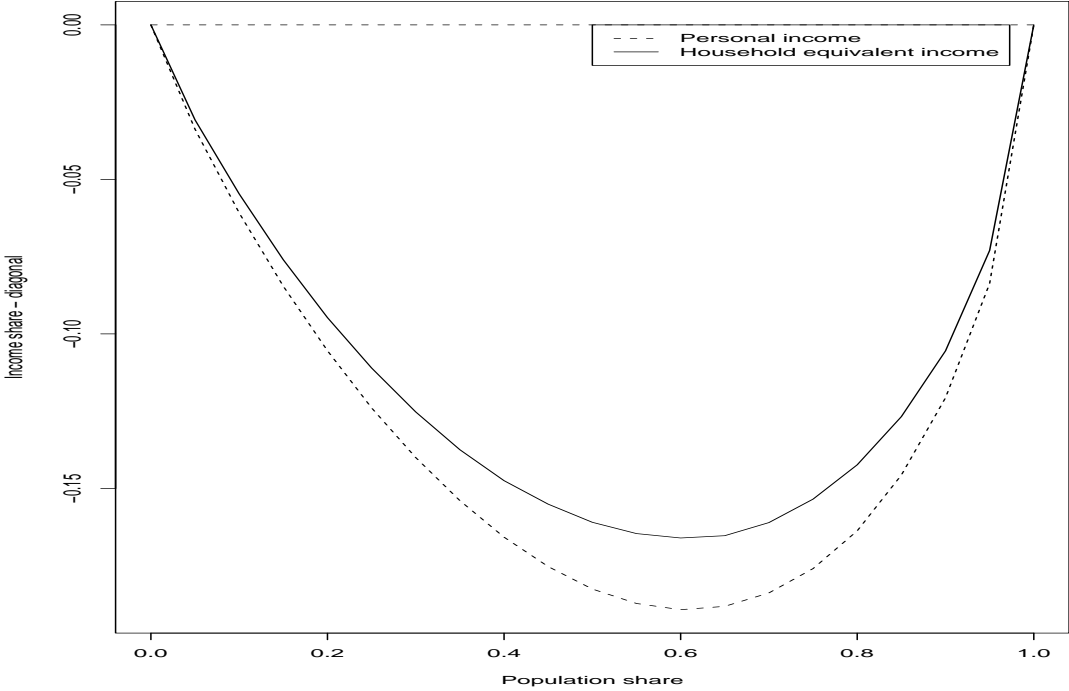
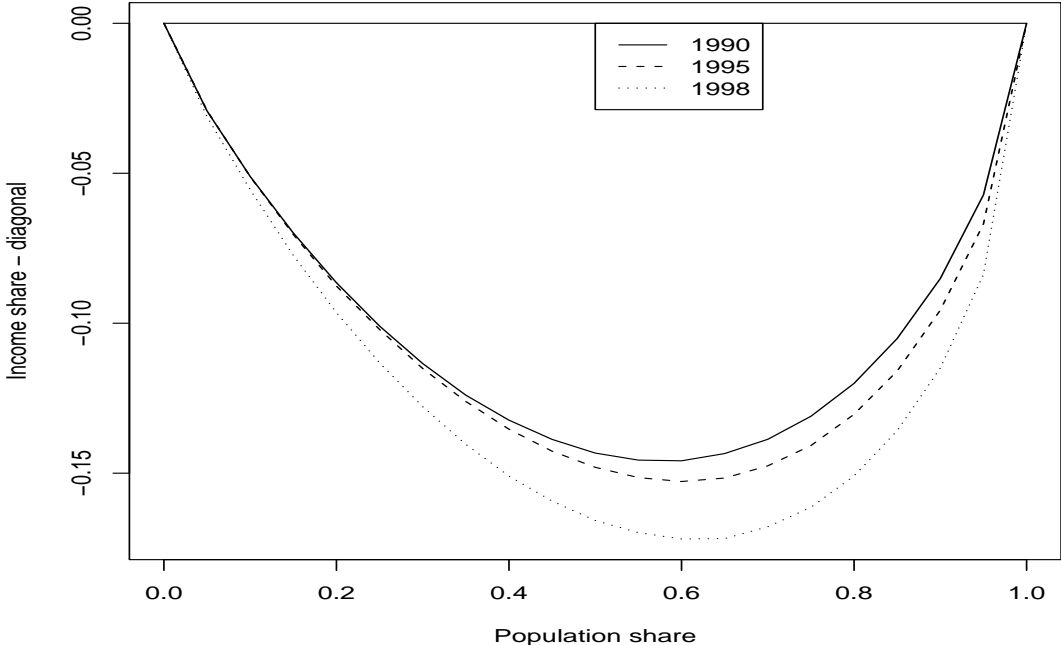


Figure 2.3: Trends in income inequality – Lorenz curves of standard and personal disposable income

A. “Standard” equivalent disposable household income



B. Personal equivalent disposable household income

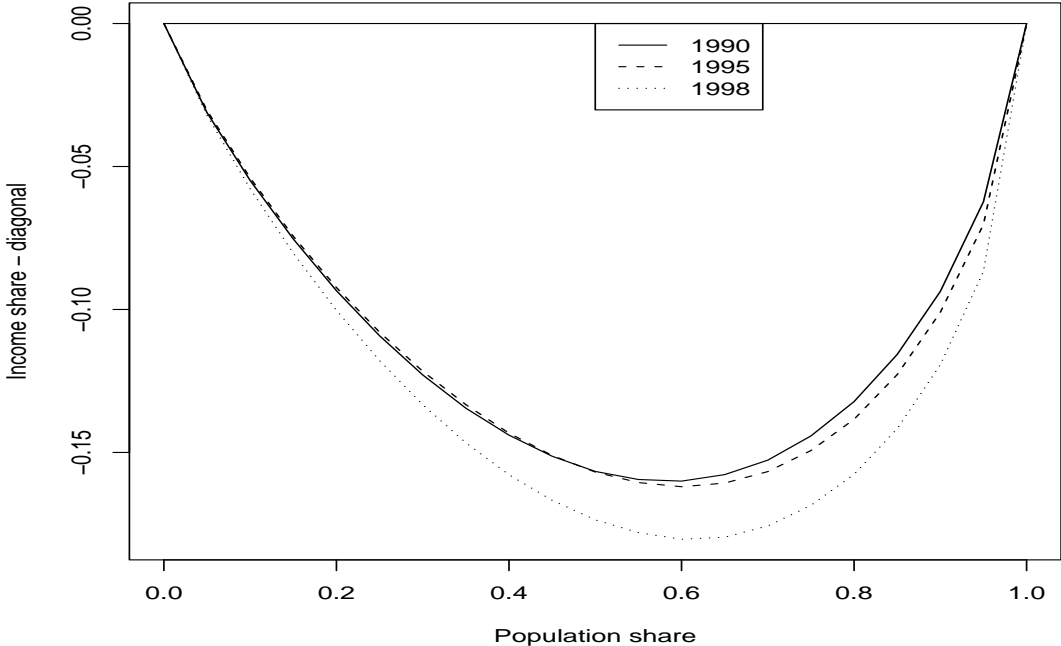


Table 2.3: Decomposition of overall income inequality (GE(1)) into a within- and between families component

	1990	1995	1998
GE(1) components			
Overall	0.111	0.115	0.125
Within	0.035	0.024	0.026
Between	0.076	0.091	0.099
Relative contribution			
Overall	1.000	1.000	1.000
Within	0.317	0.210	0.210
Between	0.683	0.790	0.790

might be interpreted to lend some support to our speculation that the household-bargained outcomes may have shifted in favor of women in the early 1990s and against them thereafter.

This tentative conclusion is called into question, however, by the decomposition of overall inequality as measured by the GE(1) into within-household and between-household components, shown in Table 2.3. It is true that the share of inequality that can be attributed to within-household inequality decreased between 1990 and 1995 – its share of overall GE(1) decreased from 0.317 to 0.210. However, this share did not change between 1995 and 1998. The value of the within-household part did increase slightly, of course, as overall inequality increase between the years.

To gain some further insight into differences in the distributions of conventionally defined disposable income and disposable personal income, we look at the incomes of lone-parent and two-parent households. Specifically, in Table 2.4 we show the incomes of these household types in the lowest, middle and highest quintile groups relative to the quintile group means in the overall population. We focus here on households with children and contrast changes in two-parent families – where changes in bargaining may have taken place – with what happened in lone-parent households. The category “Childless couples” may also have experienced changes in the bargained solution, but being very heterogeneous – there are couples that have not yet had children, those whose children have moved out and those who have remained childless – we do not examine it here.

The results suggest that the income of households with children relative to the overall population declines across the income distribution. For instance, lone-parent income relative to the overall is 0.861 in 1998 for conventional dpi in the lowest quintile group, but 0.640 in the highest. These patterns look quite stable across income definitions, which suggests that changes in intra-household bargaining may not have played much of a role.

Table 2.4: Relative incomes in selected quintile groups in lone parent and two parent families – conventional and individual disposable income (dpi)

A. Lone parent				B. Two parents			
Conventional dpi				Conventional dpi			
Quint. group	1990	1995	1998	Quint. group	1990	1995	1998
1	0.865	0.860	0.861	1	1.013	1.020	1.022
3	0.763	0.771	0.735	3	0.971	0.974	0.984
5	0.749	0.744	0.640	5	0.941	0.900	0.910
Individual dpi				Individual dpi			
Quint. group	1990	1995	1998	Quint. group	1990	1995	1998
1	0.834	0.832	0.838	1	0.954	0.980	0.980
3	0.774	0.788	0.749	3	0.966	0.958	0.964
5	0.757	0.742	0.648	5	0.976	0.938	0.948

Source: Authors' calculations from HES microdata.

Note: The numbers are the quintile group mean of the household type relative to the quintile group mean of the overall population.

2.5.2 Levels and changes in poverty

We next turn to the analysis of poverty. Before we proceed, we need to decide how to define the poverty cut off and how to aggregate the poverty information (Jäntti and Danziger, 2000). We choose the fairly standard one-half of median income (for the relevant concept) as our poverty cut-off. To summarize poverty, we choose the “three I’s of poverty” (‘TIP’) or the cumulative poverty gap curve (Jenkins and Lambert, 1997; Shorrocks, 1998).

In order to avoid selecting a single index, researchers have examined under what conditions unanimous rankings can be achieved for larger classes of indices.¹¹ The general approach in these studies is to seek conditions under which poverty orderings can be arrived at despite differences in views on some particular choices.

For instance, methods for evaluating the order of two distributions are well-established when there is no agreement on the cardinal ordering of units with respect to needs (but an agreement exists vis-à-vis the order of unit types), the exact position of the poverty line in income space and which of the particular members of the family of additively decomposable poverty indices should be used for the comparison.

Jenkins and Lambert (1997, 1998) examine conditions under which poverty rankings can be obtained for the class of generalized poverty gap indices and possibly

¹¹See Foster and Shorrocks (1988a), Foster and Shorrocks (1988b), Atkinson (1992), Atkinson and Bourguignon (1987), Jenkins and Lambert (1993) and Jenkins and Lambert (1997).

different poverty lines in two populations. They define poverty dominance using (censored) distributions of poverty gaps $g(y; z) = \max(z - y, 0)$ or normalized poverty gaps $\Gamma(y; z) = \max(1 - y/z, 0)$. The latter turns out to be useful for the comparisons of poverty across distributions that arguably have different poverty lines – as will often be the case comparing two countries and even within a country across time. The ‘TIP’ curve for the normalized poverty gap is defined by

$$TIP_{\Gamma}(p; F) = \int_0^{F^{-1}(p)} \Gamma(y; z) dF(y) \quad (2.8)$$

where $F(y)$ is the cumulative distribution function of income y . A TIP curve summarizes several aspects of poverty. At the point at which the graph of the cumulated (relative) poverty gap becomes horizontal, the proportion of the poor can be read from the horizontal and the (relative) poverty deficit from the vertical axis. The curvature of the TIP curve prior to that point visualizes information about the extent of inequality among the poor. As shown by Jenkins and Lambert (1998), if the TIP curve of a distribution F lies everywhere below that of distribution G , then the same ranking holds for all indices that satisfy the Focus, Monotonicity, Symmetry and Replication invariance and, most importantly, the Transfer axioms.

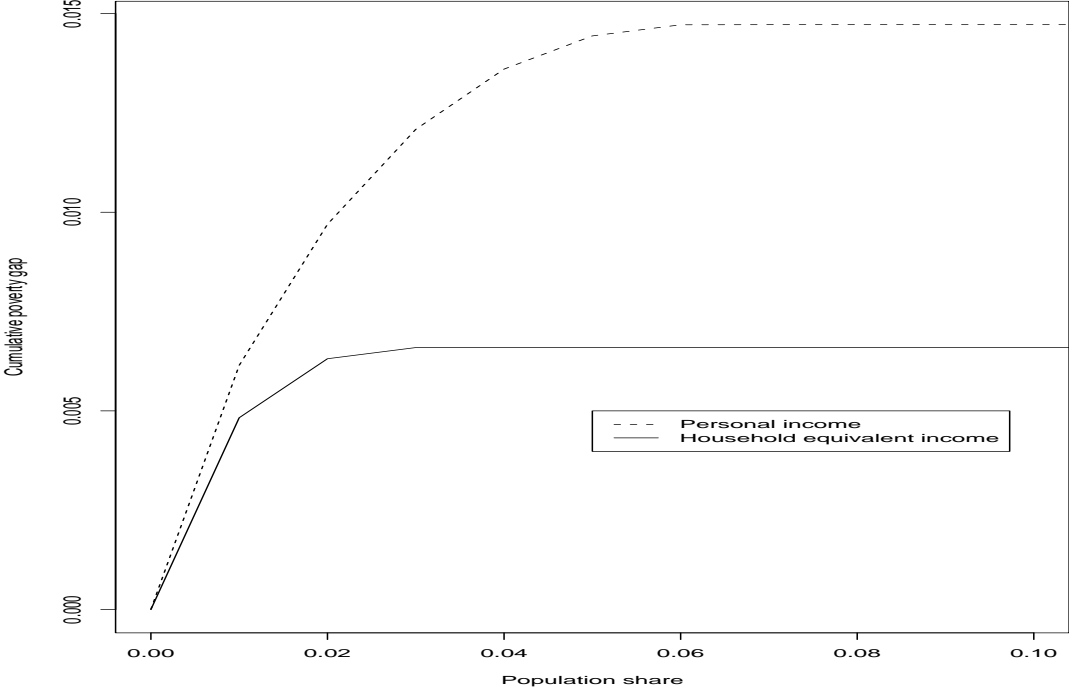
We proceed to compare poverty measured in the usual way, assuming no within-household inequality, in 1990 and 1998, using the TIP curves for normalized poverty gaps (see Figure 2.4). Clearly, poverty in terms of personal disposable income is substantially higher than that for equivalent household disposable income. For instance, in 1990, the poverty rates are around 6 percent and 3 percent for personal and household income, respectively, and the aggregate relative poverty gap is 1.5 percent vs. 0.5 percent, respectively. A similar ordering holds in 1998 also, even if the difference in the aggregate poverty gap is slightly less.

Next, we examine whether aggregate poverty can be said to have increased, using both our measures of income (see Figure 2.5). Perhaps a little surprisingly, using equivalent household disposable income, poverty cannot be said to have increased between 1990 and 1998 (see Panel A). The poverty rate is a little higher in 1998 than in 1990, as is the aggregate relative poverty gap. However, the curves cross, suggesting there was more inequality among the poor in 1990 as expressed in the greater curvature of the TIP curve in that year. On the other hand, there is clearly more poverty in both 1990 and in 1998 than in 1995, as evidenced by the fact that the TIP curves for our first and last years lie everywhere above that for 1995. Thus, poverty first decreased to increase again toward the end of the decade.

What about personal income? Here also 1995 has less poverty than both 1990 and 1998. Using personal income, in contrast to equivalent household income, there was less poverty in 1998 than in 1990. Thus, in stark contrast to what we find for inequality, relative poverty has decreased between 1990 and 1998 (although it

Figure 2.4: Levels of poverty based on standard income concepts and personal income – ‘TIP’ curves

A. “Standard” equivalent disposable household income



B. Personal equivalent disposable household income

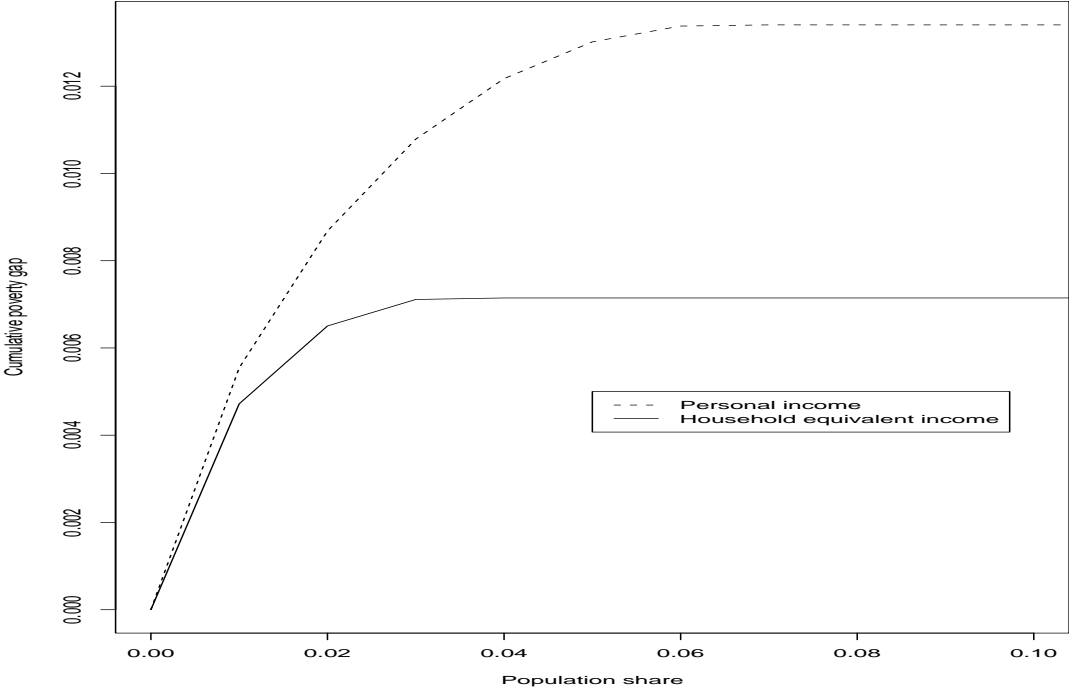
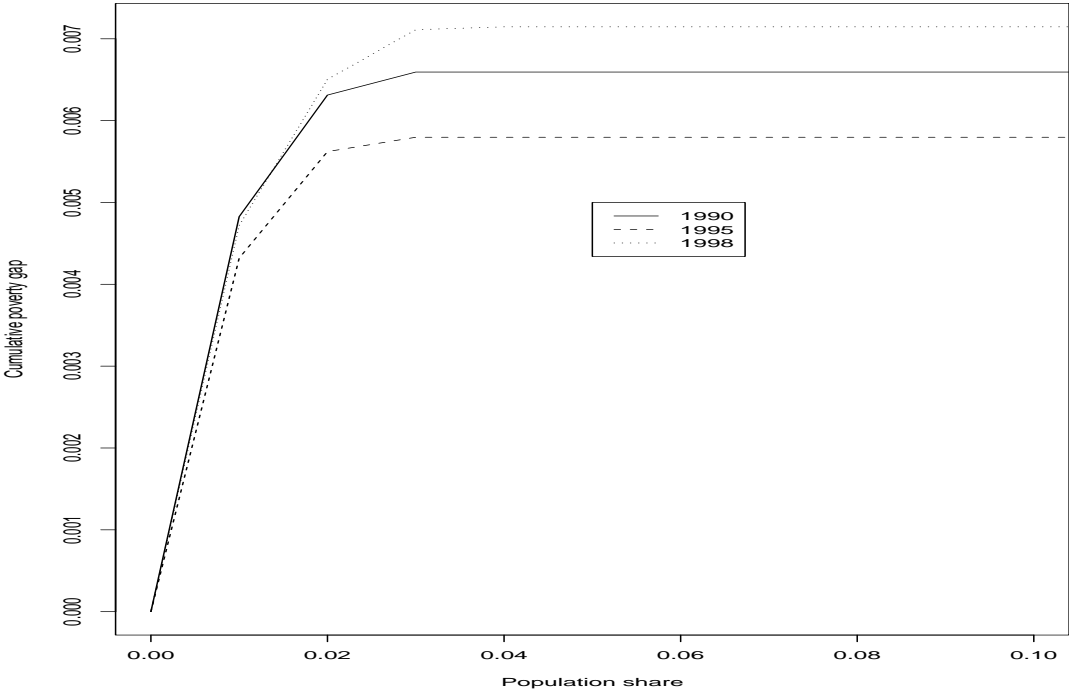
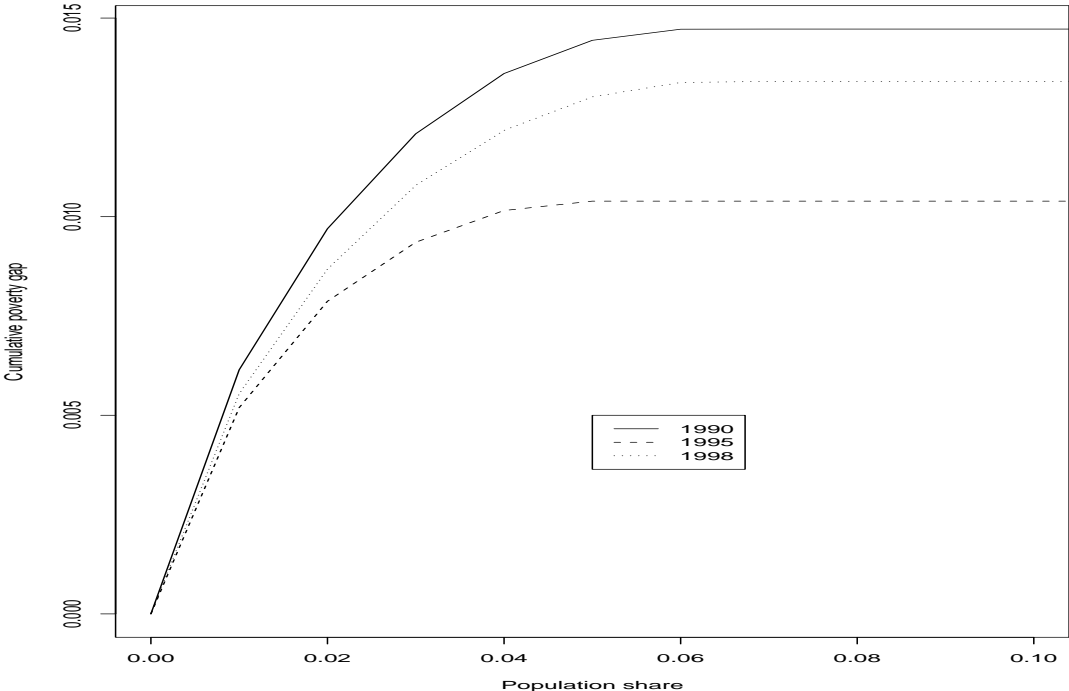


Figure 2.5: Trends in income poverty – ‘TIP’ curves of standard and personal disposable income

A. “Standard” equivalent disposable household income



B. Personal equivalent disposable household income



was even lower in 1995). Thus, we do find that the trend in poverty depends on whether or not we correct for within-household distribution. The direction of change, however, is not what we expected. Our priors were that, given the institutional changes that have occurred, taking into account within-household disparities would have led to a greater increase rather than a decrease in poverty.

2.6 Concluding comments

Inequality increased in the latter half of the 1990s in Finland to levels last seen in the 1970s. Institutional changes that occurred at the same time suggest that there may have been substantial changes in the bargaining position of men and women within households. This in turn would suggest that the distribution of resources within households may have changed. We use data from the Household Expenditure Surveys to examine if this hypothesis is supported by the data.

Both household and individual disposable income capture the secular trend in inequality and poverty across the 1990s, although there are some minor variations in this. However, we find little support for the view that intra-household inequality has changed across time.

There can be many reasons for why we find no evidence of changes in intra-household distribution. For instance, the changes in inequality have been quite substantial and other factors may dominate the changes observed. It is also important to note that our analysis is not intended, and should not be thought of, as a “test” of the bargaining hypothesis. Our conjectures of how the relative within-household bargaining powers are affected by the changes we observe may be wrong, or we may have missed other changes which suggest that bargaining powers remained more or less stable.

It still remains the case that inequality increased quite substantially. We do not find evidence suggesting that observed changes within households account for much of that increase. The reasons for this increase in dispersion thus need to be sought elsewhere.

2.7 Appendix 1. Consumption expenditure and disposable income

This section describes the composition of consumption expenditures and disposable income in the Household Expenditure Surveys. As can be seen, the definition of consumption expenditures has altered slightly between 1996 and 1998. It should also be noted that consumption expenditures have been expressed, since 1990, as gross figures.

The consumption expenditures comprise the following elements according to the Household Expenditure Surveys (Statistics Finland, 1993, 2001).

In 1990:

- + Purchase of consumer goods and services
- + Products for own use (agricultural products, produce from own garden etc.)
- + Housing benefits
- + Received goods and services
- =Consumption expenditures
- + Income transfers entering consumption (church tax, subscription to trade unions)
- =Expenditures
- + Gifts and allowances to other households
- Sold goods and services
- =Enlarged expenditures

In 1994–1996:

- + Purchase of consumer goods and services
- + Received goods and services
- + Products for own use (agricultural products, produce from own garden etc.)
- + Housing benefits
- =Consumption expenditures
- + Income transfers entering consumption (church tax, subscription to trade unions)
- =Expenditures

In 1998:

- + Purchase of consumer goods and services
- + Products for own use (agricultural products, produce from own garden etc.)
- + Housing benefits
- + Received goods and services
- + Income transfers entering consumption (church tax, subscription to trade unions)
- = Consumption expenditures

Disposable income

+ Wage income (including benefits from working)
+ Entrepreneurial income (agricultural income, self-employment income)
=Earned income
+ Capital income (rent income, capital gains, usage fees, dividends)
=Factor income
+ Transfers received (pensions, social security benefits)
=Gross income
Taxes and paid transfers (social security payments)
=Disposable income

It should be noted that neither the value of in-kind income nor the value added taxes or commodity taxes are included in the data.

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Chapter 3

Value of Housework Time and Changes in Traditional Economic Wellbeing in Finland in 1979-2000

by Päivi Mattila-Wiro

Abstract

The paper looks at the change, the level and the structure of income distribution and distribution of consumption possibilities at the individual and at the household level between the years 1979 and 2000. I also pay attention to the development of low incomes when the concept of income is expanded to include a monetary measurement of household production. The paper uses Time Use Data, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000. I find that consumption possibilities are more equally distributed than money income. Household production increases the consumption possibilities of all income groups but its effect is most significant in the low income decile groups. As a share of consumption possibilities, household production forms a significantly more important part for low income households than for high income households. By looking at consumption possibilities we can see a different distribution of economic wellbeing compared to distribution offered by money income measurement alone.

3.1 Introduction

The Finnish economy was growing and economic wellbeing increased steadily for all population sub-groups until the end of 1980s. However, the economic depression of the early 1990s led to a substantial decline in a household's income. After the depression, income inequality rose rapidly between 1994–2000. At the same time the number of individuals below the low income line increased rather constantly (see Table 3.1). This latest development suggests faster increases in real incomes and larger gains in terms of economic wellbeing in high income decile groups compared to low income decile groups (Aaberge et al., 2000, pp. 79–81; Riihelä et al., 2001*b*). The inequality and poverty measures drawn to describe the economic development and development of wellbeing in Finland are based primarily on observed money income alone. The applied measures do not fully depict the large changes in population structure, in household composition and in patterns of labor force participation, especially the fast increase in unemployment Finland has experienced since the end of the 1970s. It follows that the figures based only on money income may over- or understate changes in the distribution of economic resources and the economic wellbeing of individuals and households.

Valuing the time spent on productive household activities – using shadow and/or market prices – and adding this value to money income allows us to examine the distribution of *consumption possibilities*. This is particularly useful when examining changes in the distribution of economic wellbeing over time, since household production can adjust the level of wellbeing when income fluctuates. This means that changes in the distribution of income may show changes in wellbeing that are not observed if the development of household production is included in the analysis.¹

The paper looks at the change, the level and structure of income distribution and distribution of consumption possibilities at individual and at household level as well as in various sub-groups between years 1979 and 2000. Another interest is to look at the changes in low incomes when the concept of income is expanded to include a monetary measurement of household production. I anticipate that by looking at consumption possibilities we can see a different distribution of economic wellbeing compared to distribution offered by money income measurement alone.

¹Economic wellbeing is not an easy concept to measure or define. In the present paper I define *economic wellbeing* as a household's or individual's total access to goods and services (see for example Bryant and Zick, 1985). This definition enables the comparability of *household production* - producing goods and services within a household - and *money income* - providing means to either buy or produce goods and services. Omitting out the value of household production means that empirical estimates of economic wellbeing can be biased (see for example Bryant and Zick, 1985, p. 1100).

Table 3.1: Unemployment, Gini coefficient and proportion of individuals below the low income line in Finland from 1979 to 2000

Year	All unemployed, 1000 persons	Unemployment rate	Gini coefficient	Proportion (%) of individuals below low income line*
1979	143	6.0	.	.
1980	114	4.7	.	.
1981	121	4.9	20.5	.
1982	135	5.4	.	.
1983	138	5.5	.	.
1984	133	5.2	.	.
1985	129	5.0	20.3	.
1986	138	5.4	.	.
1987	130	5.1	19.7	3.4
1988	116	4.5	20.2	3.1
1989	80	3.1	20.4	2.9
1990	82	3.2	20.2	2.5
1991	169	6.6	20.1	3.1
1992	292	11.7	19.7	2.6
1993	405	16.3	20.9	2.7
1994	408	16.6	20.9	2.3
1995	382	15.4	21.7	2.4
1996	363	14.6	22.1	2.9
1997	314	12.7	23.5	3.2
1998	285	11.4	24.6	4.0
1999	261	10.2	25.9	3.5
2000	353	9.8	26.5	4.0

Source: Statistics Finland (Several years); Statistics Finland (2003)

Note: The Gini coefficient is calculated between individuals by using disposable income and a modified OECD equivalence scale.

* The low income line is set to 50% of the median income. A traditional OECD equivalence scale used.

The paper uses Time Use Data, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000. The analysis is carried out for fall data (September-November) in 1979, 1987 and 1999 and for full year data in 1987-1988 and 1999-2000.

3.2 Literature

3.2.1 Trends in income inequality and poverty

Income inequality in Finland, measured in disposable income, fell from 1966 to 1976 and changed little until the early 1990s. Atkinson et al. (1995, pp. 40–46) recorded that in the late 1980s Finland had one of the most equal distributions of income among 15 OECD countries measured by the Gini coefficient and 90/10 ratio. The

Lorenz curve for Finland dominated those for all other countries included in the study.²

The depression did not increase income inequality at the beginning of 1990, partly because there was a substantial drop in the real income of all households. Since 1994, however, inequality has risen considerably (see Table 3.1). After the depression, average real incomes and capital incomes grew substantially - particularly income from dividends. At the upper end of the distribution incomes have risen faster than average real income. There has been little or no increase at all in real incomes at the bottom of the income scale. High income households have benefited also from reductions in progressive taxation (Statistics Finland, 2000*a*; Statistics Finland, 2000*b*; Riihelä et al., 2001*b*, pp. 1–4; Statistics Finland, 2003).

Riihelä et al. (2001*a*) and Riihelä et al. (2003) examined trends in poverty in Finland using the Household Budget Survey and Income Distribution Statistics. From the early 1970s to the mid 1990s, the relative poverty rate declined, the poverty line being at 50% of median (or mean income), and rose during the latter part of the 1990s. Table 3.1 shows similarly that the proportion of the population below 50% of median income increased towards the end of the 1990s. Furthermore, income poverty has become increasingly severe and incomes among the poor have become more unequally distributed than earlier. There has been an absolute drop in mean real disposable income for all unemployed households during the 1990s, which suggests that unemployed households are the most vulnerable group of the population (Riihelä et al., 2001*a*, pp. 9–13; Riihelä et al., 2003, pp. 8–10; Riihelä et al., 2001*b*).

3.2.2 Structure and time use of households

The average number of individuals in Finnish households has decreased over time, being 2.6 in 1979 and 2.16 in 1999 (see Table 3.2). This proves that the number of single person and lone parent households have increased and the number of large households has declined. Changes in labor force participation over the time period studied has also been substantial. Women's labor force participation is high in Finland, being normally between 70-80% but, during the depression, this rate dropped, especially for those with children below school age. The increase in unemployment and the introduction of the home care subsidy at the end of the 1980s may account for why women stayed at home taking care of their children and household (Statistics Finland, 1994).

Despite these changes, the overall time use did not changed very much between the end of 1970 and 2000, measured in time use studies. Changes in the labor market

²This is at least partly due to the welfare state structure in these countries; high taxes and public expenditure aimed at equalizing economic outcomes (Atkinson et al., 1995; Aaberge et al., 2000, pp. 77–79).

and the expansion of the information society show their effects in Time Use Data but do not remarkably alter the main structure of time use. On average, employment, housework, sleeping and free time take a little more than 20 hours of the average day of people of 10-64 years of age. The structure of time use has become more similar throughout the years between various social groups and between men and women. However, there can be considerable variation in time use between individuals or sub-groups (Juntto, 2002, p. 33). Housework is still divided according to traditional gender roles. Men spend more time on work outside the home than women do and women do more housework compared to men (see Table 3.2).

Table 3.2: Changes in household size and time spent on housework (hours and minutes/day)

Year of data	Number of households	Persons on average /household	time spent on housework,		
			all	women	men
1987-1988	2082000	2.3	3.04	3.50	2.15
1999-2000	2365000	2.16	3.10	3.47	2.27
fall 1979	1831000	2.6	2.46	3.39	1.50
fall 1987	2082000		2.47	3.35	2.01
fall 1999	2365000		2.51	3.36	2.03

Source: Statistics Finland (Several years); Pääkkönen and Niemi (2002); Niemi and Pääkkönen (2001)

Note: The time use on housework includes 10-64 years of age in fall 1979, 1987 and 1999 and over 10 years of age in 1987-1988 and 1999-2000.

3.2.3 Earlier studies on household production and extended income

In empirical studies it is assumed that household production adds to the economic wellbeing of household members. Evidence shows that full income, extended income or imputed income (income including the value of household production) is more equally distributed among households than the traditionally measured disposable income. There are only a very few (one published) studies on extended income in Finland but in other countries the topic has gained much greater attention.

Heikkilä and Piekkola (2003) used Finnish Time Use Data from years 1987-1988 and 1999-2000 collected by Statistics Finland, and examined how the inclusion of the value of household production in household income affects income inequality in Finland. The study was based on Becker's notion on comparative advantage to explain why men specialize in paid work and women in unpaid work. The main conclusion was that the value of household production has a decreasing effect on income inequality, as measured by Gini coefficient and income decile groups.

Bryant and Zick (1985) studied how rural and urban income distributions change if the value of household production is added to money income. They used U.S. data from the Panel Study of Income Dynamics, PSID, in 1975-1976 and 1979-1980. Only white, married-couple households with working husbands were included in the study. Bryant and Zick (1985) noticed that household production significantly raised the average family's access to goods and services. Furthermore, husbands contributed more in terms of earnings and wives in terms of household production in both rural and urban households. The Gini coefficient suggests that poor rural households make greater use of household production in order to increase their access to goods and services than do urban households.

Gottschalk and Mayer (1997) used the U.S. Panel Study of Income Dynamics (PSID) for the years 1976 and 1988 and studied household production and its effect on trends in income inequality in the USA. Households headed by people aged from 25 to 64 years were included. The paper applied three methods to measure income. Regardless of the income measure used, the results showed that housework reduced the observed inequality among households, even when inequality increased between 1976 and 1988.

Jenkins and O'Leary (1994) (see also Jenkins and O'Leary (1995)) examined the distribution of extended income in the U.K. The paper estimated models of household time use with data from the 1987 Social Change and Economic Life (SCEL) time-budget survey, and applied the estimates to impute time use to respondents to the 1986 Family Expenditure Survey (FES). The paper modified the assumptions of the traditional full-income concept and subdivided time spent at home into two activities: household production and 'pure' leisure. Due to difficulties in distinguishing genuine leisure activities from other leisure activities, which led to valuation problems, Jenkins and O'Leary (1994) decided not to incorporate pure leisure activities within the calculations of income. The results showed that extended income is more equally distributed than money income for non-elderly one-family households. The result holds, regardless of which method is used to value household production. Broadening the income definition increases the income shares of the poorest tenths and decreases those of the richest tenth.

Bonke (1992) explored what implications the inclusion of household production has on the distribution of economic resources in Denmark. The data were drawn from the Time Use Survey for the year 1987, which is a random sample of about 5000 individual adult Danish people. The economic information was taken from the register of income taxation for the respondents in the Time Use Survey. Bonke (1992) found that housework increases the access to goods and services as much as working in the labor market. The income inequality diminishes when household production is measured by the Gini coefficient. This suggests that low income households compensate their low earnings by relatively large household production.

3.3 Research strategy

3.3.1 Defining consumption possibilities

Consumption possibilities are assumed to supply wellbeing directly or indirectly to individuals or households. We must accept that monetary income, *here* money income, and the output of household production are comparable and substitutable in terms of consumption possibilities. It does not matter for an individual or a household whether the consumption possibilities are generated by money income or by household production. Consumption possibilities refer here to money income (which is either consumed directly or used as inputs in the household production process) plus the value of productive household activities. Other sources of income, wealth, borrowing or savings are not taken into consideration (due to data restrictions). Consumption possibilities are

$$C_i = M_i + RH_i, \quad (3.1)$$

where C is the consumption possibilities of an individual i , M is the income before taxes and non-taxable income transfers, and includes wages, taxable income transfers and income from capital, H is the hours of productive housework and R is the wage of a municipal houseworker. For the household the same function becomes

$$C_h = \sum_{i=1}^n M_i + R \sum_{i=1}^n H_i, \quad (3.2)$$

where C is the consumption possibilities of a household h . The particular income was chosen because it was included in all of the datasets used and therefore comparison between years was made possible. Due to data restrictions other figures for income were not available. The chosen housekeeper wage level was considered to be the most reliable estimate for the purpose of the study.³

3.3.2 The data

An ideal data to study consumption possibilities would each year include the time use of all household members, income, transfers, taxes, wealth, savings and borrowing at the individual and household level plus household characteristics. This would report the total available income of a household and total productive housework carried out. Furthermore, an ideal measure of the value of household production would include both primary activities and productive secondary activities.

The data required to study consumption possibilities at the individual level need to

³The housekeeper wage is an average figure for each year studied and it is calculated from regular monthly wage which includes regular compensations.

include at least the amount of time spent on primary activities and money income information plus background characteristics. The Time Use Data used by the present paper, collected by Statistics Finland in 1979, 1987-1988 and 1999-2000 covering the time period of interest, satisfy these requirements. Secondary activities are included only as a sensitivity analysis in Appendix 2 in the Chapter 3.7 for one dataset, 1987-1988.⁴ The data used provide us with a rich picture of the changes across time in the distribution of economic wellbeing.

The Time Use Data, gathered through detailed time-diary surveys and augmented with interviews, are combined with money income, which has been linked at the person level to the Time Use Data. The datasets are representative sample surveys and are considered to be of high quality, while the income information is similar to that available in the typical income distribution survey in Finland that relies heavily on register information. The survey includes persons 10–64 years of age not living in institutions. The respondents were advised to record in ten minute intervals their primary and secondary activities.

The data in 1979 cover a total of 12057 days. In 1979 only the months from September to November were included. The time use study in 1987-1988 included the whole year, not just the fall as in 1979. The survey is based on individual samples, as in 1979, and the respondents kept a diary for two successive days. The third Time Use Data applied was carried out in 1999-2000. The data were collected at both the household and individual levels by using interviews and diaries, similarly with the two other time use studies. The respondents kept a diary for two days, one being a weekday and the other either a Saturday or a Sunday. The respondents were all 10 years or older household members (Niemi and Pääkkönen, 1989; Väisänen, 2002).

The sample includes individuals aged 25–64, who are either employed, unemployed or taking care of their own household. Students, pensioners and the unemployable are excluded from the main analysis, as their time use patterns are likely to be quite different from others, meaning those included in the sample. The focus of the paper is on individuals for whom both labor market work and household production are important (see for example Jenkins and O’Leary, 1995) and therefore those population categories not meeting these requirements are not included. Those who kept a time use diary only for one day are excluded due to the anticipated bias these results would create. From the 1987-1988 data, one outlier is dropped due to the excessively high income of this observation. Household level comparison is possible for money income only, because the data of 1987-1988 do not include time use information on all the members of the same household. Unlike the individual level analysis, household level analysis considers all age groups.

When comparing the full time period the data from September to November are included each year since the data in 1979 were gathered only during these months

⁴Secondary activities could not be included for the whole dataset for reasons of availability.

(September-November). This analysis is labelled fall 1979, 1987, 1999. When the data collected during the whole year are included, the two latest data sets, years 1987-1988 and 1999-2000, are used. Most of the results are at the individual level and when possible also at the household level.

3.3.3 Measuring household production

In the present paper, values of time use inputs are chosen for the unit of measurement of household production. In order for it to be comparable with national accounts, household production should be valued on the basis of outputs. This would allow for the assessment of productivity. However, the output-based method of valuation requires data which are not readily available (see for example Taimio, 1991, pp. 1,4; Eurostat, 1999). The Eurostat (1999) report recommends that household production is valued through the inputs (meaning the costs of inputs) used in the production. The productive activities are the so-called main functions of a household: providing housing, providing nutrition, providing clothing, providing care and education, and volunteering.⁵ Ancillary activities like animal care, gardening and shopping are included as well, similarly with the categories 'helping other households' and 'travel related to household production'.

For the valuation of the productive activities, I choose the housekeeper cost method where one person is hired to carry out all household tasks and the value of housework is dependent on the wage of a hired person. The housekeeper cost method is chosen because it is widely used and it satisfies the 'third person criteria'. The method gives the same value for household production whether carried out by an individual earning high wage or an individual earning low wage.⁶ As a sensitivity analysis I apply the opportunity cost method in Appendix 1 in the Chapter 3.6. The opportunity cost method values an hour of housework on the basis of the opportunity cost of that time - normally the market wage of an individual. I use Heckman's selection correction method which is widely applied when calculating the value of household production by the opportunity cost method. Using the opportunity cost method leads to the situation where those earning high wages in the labor market have a higher value of production within the household than those earning low wages. This is why the opportunity cost method is not applied in the main results.

⁵In this study children enter as a kind of consumer goods for their parents. The wellbeing is not looked upon from the perspective of children. This approach is chosen so that the equivalence scale can be kept the same throughout the study.

⁶The problem with the housekeeper wage method is that it transfers the wage differences in market work between men and women to the household sector (see for example Taimio, 1991, pp. 12-16).

3.3.4 Inequality and poverty measures

Levels and changes of inequality are analyzed by applying half the squared coefficient of variation, GE(2), and the Gini coefficient. The GE(2) belongs to the class of Generalized Entropy $GE(\alpha)$ indices which are very useful due to their additively decomposability. Decomposition by subgroups provides a picture of inequality profiles. Decomposition of Gini coefficient by income source is also presented for the main results. In order to examine levels of and changes in low incomes, the head count ratio (H) and poverty gap ratio (PGR) are used. An individual (or household) is regarded as having low incomes if her/his income or consumption possibilities remain below the predetermined low income line. This means that low income measures reflect poverty which is related to access to economic resources determined via money income and consumption possibilities. Comparative results are calculated by excluding parts of the data and by taking all population groups including students, pensioners and unemployable.

All the figures used in calculations of inequality and low income measures are annual figures. The monetary measures are altered to correspond to euro values in the year 2000 by using the cost of living index. This conversion is done in order to make the figures comparable between various years. The average net wage of a municipal houseworker is chosen to represent the value of housework time. A simple household equivalence scale is applied:

$$\frac{W}{S^{0.5}} \quad (3.3)$$

where W is the total income of a household and S is the number of household members.

3.4 Results

3.4.1 Aggregate trends

Table 3.3 reports the decile group means of money income and consumption possibilities of individual data in 1987-1988 and 1999-2000. Individuals between 25 and 64 years of age are included and students, pensioners and unemployable are excluded. The decile group means of consumption possibilities are considerably higher than the corresponding means of money income. The percentage change from money income to consumption possibilities is greatest in low income decile groups and respectively smallest in high income decile groups. The same trend is seen when consumption possibilities are divided by money income (times 100). The ratio between the highest and the lowest income decile groups drops significantly when moving from money income to consumption possibilities. The corresponding results for fall 1979, 1987,

1999 are presented in Appendix 3 in the Chapter 3.7. The C/M figures are smaller (in almost all deciles) in 1999-2000 than in 1987-1988. This is not an indication of diminished importance of household production over time. Instead it shows that money income has increased faster than household production.

Table 3.3: Decile group means of money income and consumption possibilities (in Euros), % change (from money income to consumption possibilities) and consumption possibilities divided by money income (C/M x 100) in 1987-1988 and 1999-2000, individual data

Decile group	1987-1988				1999-2000			
	Money income	Consumption possibilities	%	C/M x 100	Money income	Consumption possibilities	%	C/M x 100
1	3541	13003	267	367	5157	14749	186	286
2	9790	20229	107	207	10260	22782	122	222
3	13543	23528	74	174	14709	26739	82	182
4	15682	26203	67	167	18068	29803	65	165
5	17681	28793	63	163	20397	32650	60	160
6	19610	31503	61	161	22728	35367	56	156
7	21931	34623	58	158	25458	38359	51	151
8	25176	38356	52	152	29080	42208	45	145
9	30088	44030	46	146	35212	48686	38	138
10	46041	59495	29	129	59961	72760	21	121
Mean	20306.7	31976.1			24093.2	36400.0		
Std.Dev.	12003.0	13192.8			17452.4	17906.2		

Source: Author's calculations from the Time Use Data

The figures suggest that, as a share of consumption possibilities, household production is more important for low income earners than for high income earners. For high income earners, money income dominates the composition of consumption possibilities. For the lowest decile group, household production is approximately 70% of the total value of consumption possibilities when the same ratio for the highest decile group is around 20%. Household production increases the consumption possibilities of all income groups but its effect is by far the greatest in low income decile groups. Household production thus equalizes consumption possibilities.

The Finnish Time Use Data indicate that, on average, the amount of time spent on household production drops when income increases and/or when hours of market work rise. High income households may also do less housework compared to low income households since it can be assumed that high income earners own a greater number of household durable (domestic appliances) and save time required in housework or hire outside help to carry out various activities. Many of the household productive activities are time-consuming and if these can be bought from the

market the time saved is spent on, as an example, leisure activities. High income earners can also be assumed to spend money on ready prepared food or eat out in restaurants and thus spend less time on food preparation than low income earners. Table 3.4 shows "transition matrices" of individual data. Money income and consumption possibilities are divided into five decile groups (quintiles). Each of the figures, $p_{ij}, i = 1, \dots, n, j = 1, \dots, k$ in the table represents the possibility that an individual in group i (the money income group) is also in group j (consumption possibilities group). That is, we can see whether individuals move or not from one quintile group to another when money income is altered to consumption possibilities. The sum of each row equals 1.00 (there are small differences due to rounding) because each individual either has to stay in the original location or move to another one. It seems that an individual either stays in the same quintile group as before or moves one quintile group up or down compared to the original one. Those either in the first money income quintile group or in the fifth money income quintile group tend to remain in their original quintile groups. Individuals in the middle quintile groups have the greatest variation between different locations. It must be noted that individuals in the highest money income quintile group never move to the lowest consumption possibility quintile group and very rarely even to the second one. However, individuals in the lowest money income quintile group do make their way rather often to higher quintile groups in consumption possibilities and on some occasions even to the highest one.

3.4.2 Changes in inequality

The overall trends in inequality are shown by Lorenz curves in Figure 3.1. The Lorenz curves for individual data each year, first for the whole year 1987-1988, 1999-2000 and then for fall 1979, 1988, 1999, are drawn for money income and consumption possibilities. These Lorenz curves do not cross. The results verify that economic wellbeing is more equally distributed when calculated by using consumption possibilities than when calculated by using money income. This trend is as would be expected based on decile group means (Table 3.3). The Lorenz curve for the year 1987 or 1987-1988 is closer to the diagonal than in other years which means that both money income and consumption possibilities are more evenly distributed in 1987 and in 1987-1988 than in 1979, 1999 or in 1999-2000.

In line with the results drawn by looking at the Lorenz curves, the evidence in Table 3.5 shows that consumption possibilities are more equally distributed than money income. The estimated inequality measures are smaller for consumption possibilities than for money income in all the years whether one compares the whole year in 1987-1988, 1999-2000 or fall 1979, 1987, 1999. Thus, the extended money income changes our impression of the income inequality. When the changes between years

are compared, the inequality measures first drop, from 1979 to 1987, and then rise from 1987 to 1999 or from 1987-1988 to 1999-2000, regardless of whether one looks at individual figures or household figures.

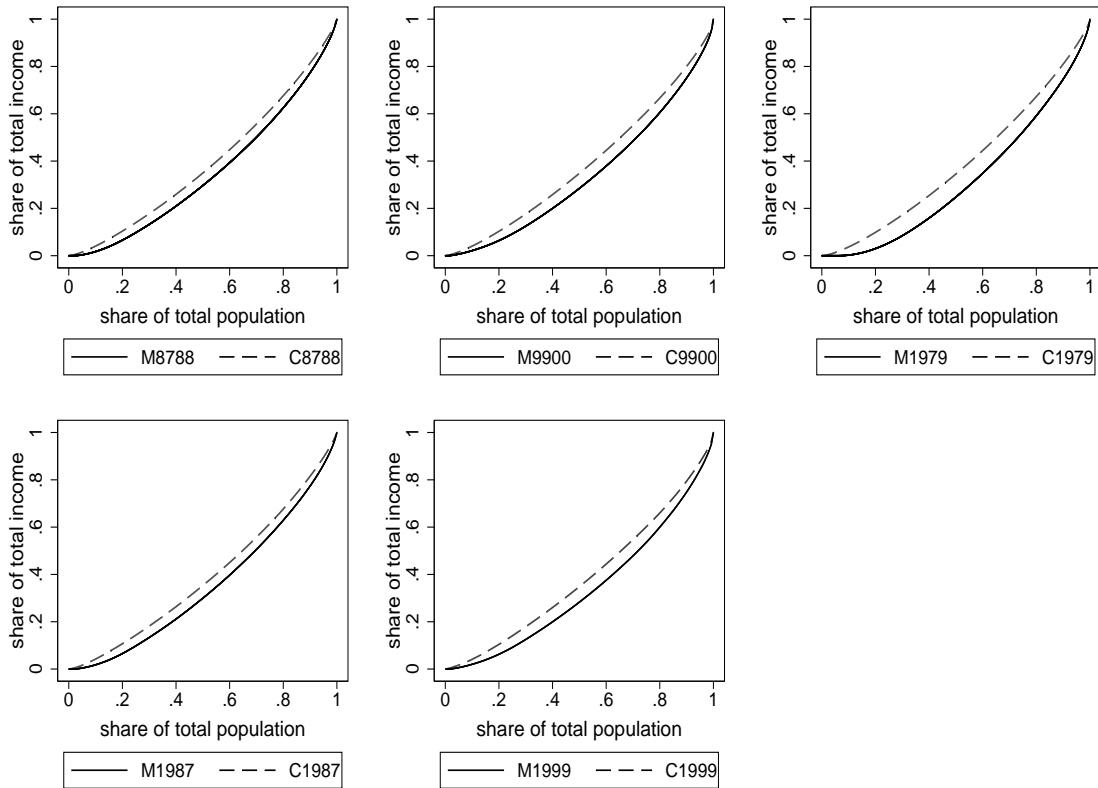
Table 3.4: Transition matrices, whole year 1987-1988, 1999-2000 and fall 1979, 1987, 1999, individual data

Money income	Consumption possibilities					
	1	2	3	4	5	
1987-1988	1	0.54	0.19	0.13	0.09	0.05
	2	0.31	0.28	0.18	0.15	0.08
	3	0.13	0.32	0.26	0.20	0.08
	4	0.02	0.21	0.36	0.27	0.14
	5	0.00	0.00	0.08	0.28	0.65
1999-2000	1	0.54	0.20	0.13	0.09	0.04
	2	0.35	0.27	0.21	0.12	0.05
	3	0.11	0.34	0.29	0.18	0.08
	4	0.01	0.19	0.31	0.33	0.16
	5	0.00	0.00	0.06	0.27	0.67
1979	1	0.47	0.18	0.16	0.13	0.06
	2	0.36	0.25	0.16	0.13	0.10
	3	0.15	0.30	0.26	0.20	0.09
	4	0.02	0.26	0.29	0.25	0.17
	5	0.00	0.01	0.13	0.29	0.58
1987	1	0.53	0.17	0.15	0.12	0.04
	2	0.33	0.26	0.16	0.15	0.10
	3	0.13	0.32	0.29	0.17	0.09
	4	0.01	0.25	0.32	0.30	0.12
	5	0.00	0.00	0.08	0.27	0.65
1999	1	0.58	0.18	0.13	0.08	0.02
	2	0.30	0.33	0.23	0.11	0.04
	3	0.12	0.33	0.28	0.19	0.08
	4	0.00	0.16	0.33	0.42	0.10
	5	0.00	0.00	0.04	0.21	0.76

Source: Author's calculations from the Time Use Data

However, the order of years changes when moving from money income to consumption possibilities. The year 1987 has the smallest measures for GE(2) and the Gini coefficient in all the cases but the years 1979 and 1999 switch places so that the year 1979 has the highest figures of income inequality measures in the case of money income and the year 1999 has the highest figures in the case of consumption possibilities. This means that in 1979 (fall data only) household production equalizes consumption possibilities in a greater degree than in 1999. As a general trend, the income inequality measures for consumption possibilities are closer to each other between years than are the corresponding figures for money income. This proves that consumption possibilities equalize economic wellbeing between years as well.

Figure 3.1: Lorenz curves, whole year 1987-1988, 1999-2000 and fall 1979, 1987, 1999 for money income (M) and consumption possibilities (C), individual data



Source: Author's calculations from the Time Use Data

In order to examine whether changes in the tails and/or extreme observations account for differences across years, I analyzed three reduced samples. I first excluded the lower 5%, then the upper 5% and finally both upper and lower 5% of the data (see Table 3.6). In all the cases, either individual data or household data and in every year, the estimated inequality measures drop systematically compared to those calculated with the original sample (Table 3.5).

The least changes are caused when the lower end is cut (Table 3.6). This is probably explained by the large number of zero or very small money income values in the data. Compared to figures in Table 3.5 the cut in the lower end keeps the direction of changes in the inequality measures the same between years and between money income and consumption possibilities within years. This means that cutting the lower end of the data does not alter the trend of inequality.

Table 3.5: Individual and household inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999

	Individual				Household	
	100xGE(2)		100xGini		100xGE(2)	100xGini
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities	Money income	Money income
1987-1988	17.47	8.51	30.33	21.90	11.48	25.3
1999-2000	26.23	12.10	32.50	22.77	19.92	30.29
Fall	Money income	Consumption possibilities	Money income	Consumption possibilities		
1979	29.72	10.38	37.34	22.73		
1987	17.29	8.19	29.94	21.47		
1999	26.79	12.89	32.95	23.00		

Source: Author's calculations from the Time Use Data

The most substantial changes are caused when both of the tails are cut or only the upper tail of the data is cut. In contrast to results in Table 3.5, the trend of income inequality measures calculated using consumption possibilities now changes. Cutting both ends or the upper tail of the data leads to decreasing GE(2) and Gini coefficient figures between years, for both the whole year data and fall data. In the original data we had a decreasing trend for consumption possibilities only when moving from fall 1979 to fall 1987. From the results drawn we can see that the inequality results obtained from the original sample are sensitive to deletion of observations from either end or both ends.

As a comparison, if I also include the initially excluded population groups in the sample, i.e. rather than including only the employed or unemployed I also include students, pensioners and the unemployable, the inequality measures increase, apart from one case in 1999 (see Table 3.7). It seems that inequality measures for consumption possibilities rise less than those for money income, evidencing the importance of housework as a consumption possibilities equalizer and as an equalizer of economic wellbeing. The trend between years stays the same; inequality measures first drop from 1979 to 1987 and then rise from 1987 to 1999 and from 1987-1988 to 1999-2000.

Table 3.6: Individual and household aggregate inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when A. 5% of the data is cut from both ends; B. 5% of the data is cut from the lower end; and C. 5% of the data is cut from the upper end

	Individual				Household		
	100xGE(2)		100xGini		100xGE(2)	100xGini	
	Money income	Consumption possibilities	Money income	Consumption possibilities	Money income	Money income	
A.							
5% cut from both ends							
Whole year	1987-1988	8.30	5.78	22.90	18.87	5.93	19.58
	1999-2000	9.03	5.14	23.92	17.87	8.27	22.86
Fall	1979	13.32	6.23	29.32	19.72		
	1987	7.88	5.56	22.35	18.51		
	1999	9.56	5.53	24.41	18.30		
B.							
5% cut from the lower end							
Whole year	1987-1888	14.55	7.93	27.15	21.08	9.69	22.93
	1999-2000	23.35	11.44	29.85	21.84	17.68	27.96
Fall	1979	25.82	10.13	34.12	22.34		
	1987	14.45	7.73	26.82	20.82		
	1999	23.81	12.60	30.25	22.59		
C.							
5% cut from the upper end							
Whole year	1987-1988	11.04	6.36	26.44	19.77	7.63	22.20
	1999-2000	11.39	5.78	26.95	18.95	10.20	25.50
Fall	1979	16.78	6.53	32.99	20.18		
	1987	10.53	6.03	25.84	19.25		
	1999	12.01	5.84	27.49	18.84		

Source: Author's calculations from the Time Use Data

Table 3.7: Individual and household, aggregate inequality results, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when students, pensioners and the unemployable are included in the data

	Individual				Household	
	100xGE(2)		100xGini		100xGE(2)	100xGini
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities	Money income	Money income
1987-1988	19.84	9.08	32.15	22.49	14.55	28.24
1999-2000	27.95	12.30	33.75	23.19	24.24	33.31
Fall	Money income	Consumption possibilities	Money income	Consumption possibilities		
1979	33.95	11.06	40.48	23.79		
1987	19.05	8.49	31.61	21.92		
1999	28.16	12.77	34.07	23.18		

Source: Author's calculations from the Time Use Data

3.4.3 Changes in low incomes

Low income indices are relative measures where the poverty line (here *the low income line*) is chosen to be 50% of the median income or median consumption possibilities. The estimates of the head count ratio (H) and poverty gap ratio (PGR)⁷ are given in Table 3.8. The overall trend (H) indicates that the proportion of individuals below the low income line drops considerably when moving from money income to consumption possibilities. When comparing the development over time the proportion of low income individuals increases from 1987-1988 to 1999-2000, measured both by money income or by consumption possibilities. The trend from 1979 to 1987 shows that the proportion of low income individuals drops during this period. The extent or severity of low incomes (PGR) also decreases when comparing money income and consumption possibilities. The trend between years implies that, according to this data, the severity of individual low incomes drops in all cases. The lowest figures for low income indices are in the year 1987 and the highest in 1979. When every population group is included in the sample (also students, pensioners and the unemployable), the low income measures increase compared to results from the original sample (Table 3.9). The low income figures in these Tables differ from those presented in the Table 3.1 due to different data and different equivalence scale in these two calculations. The main thing is that the trend over the years are the same in all of the Tables.

⁷The poverty gap ratio or FGT(1) measure expresses the average distances of the poor below the low income line.

Table 3.8: Low income indices (head count ratio, H, and poverty gap ratio, PGR), Whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999

	Individual				Household	
	H		PGR		H	PGR
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities	Money income	Money income
1987-1988	14.03	5.95	6.65	1.76	9.90	2.96
1999-2000	16.26	6.42	6.03	1.67	12.30	3.83
Fall	Money income	Consumption possibilities	Money income	Consumption possibilities		
1979	22.22	7.34	13.79	2.33		
1987	14.64	5.15	6.71	1.53		
1999	15.37	6.35	6.16	1.45		

Source: Author's calculations from the Time Use Data
 Note: The low income line is set to 50% of the median

Table 3.9: Low income indices, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, when students, pensioners and the unemployable are included in the data

	Individual				Household	
	H		PGR		H	PGR
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities	Money income	Money income
1987-1988	16.96	6.78	7.24	2.09	13.61	4.40
1999-2000	18.12	7.21	6.26	1.96	15.10	4.89
Fall	Money income	Consumption possibilities	Money income	Consumption possibilities		
1979	26.64	8.99	16.82	3.03		
1987	17.16	6.26	7.13	1.89		
1999	17.95	6.81	6.59	1.69		

Source: Author's calculations from the Time Use Data
 Note: The low income line is set to 50% of the median

3.4.4 The structure of inequality

The Gini coefficient is decomposed by income source in order to better understand the development of inequality over time. The main source of inequality in this calculation is the consumption possibilities and the two sources of income are the money income and the value of household production. The method that is applied allows the measurement of the impact that a marginal change in a particular income source has on inequality. In Table 3.10 the decomposition of the Gini coefficient is presented so that the 'Share' refers to the contribution that each income source has

on inequality and the '% Change' refers to the impact that a 1% change in the income source will have on total inequality. The Table is comparable to those Gini coefficient figures presented in Table 3.5.

The results show that the money income always forms a more significant part of total inequality (calculated by using consumption possibilities) than does the value of household production. Interestingly, in the fall data of 1987 it seems that the money income has a positive effect on inequality and household production has a negative effect on inequality. In all the other cases this effect is the opposite, even when we look at the whole year data in 1987-1988. The most important finding is that when we compare changes over time we notice that in 1999 and in 1999-2000 the money income has a much greater role and household production the minor role in total inequality than in any other case or in any other year included.

Table 3.10: Decomposition of the Gini coefficient, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999

	Individual			
	Money income		Household production	
Whole year	Share	% Change	Share	% Change
1987-1988	0.64	0.01	0.36	-0.01
1999-2000	0.74	0.08	0.26	-0.08
Fall	Share	% Change	Share	% Change
1979	0.64	0.05	0.36	-0.05
1987	0.63	-0.01	0.37	0.01
1999	0.81	0.12	0.19	-0.12

Source: Author's calculations from the Time Use Data

Decomposition of the GE(2) measure by subgroups for individual and household level data are shown in Table 3.11. Decomposition by household type, region, age group and sex are documented at the individual level and by household type and region at the household level. The measure GE(2) is divided into within-group inequality and between-group inequality. These categories are further divided into two in the case of individual data: money income and consumption possibilities.

In general, within-group inequality dominates the between-group inequality both at the individual level and at the household level. Money income has the highest values in the within-group component in the household type decomposition and the between-group component in the case of sex decomposition. Consumption possibilities have the highest values in the within-group component in the sex decomposition and the between-group component in household type decomposition. The trend over years of within group inequality follows the general development; inequality first drops and then rises again towards 1999-2000. Between-group inequality does not

have a consistently similar trend to within-group inequality since there are some deviations of general development in the data in 1999 and 1999-2000.⁸

On the grounds of the decomposition results by household type, it is clear that within-group inequality dominates the between-group inequality for each year. The between group component is 8% or less of the total inequality for both money income and consumption possibilities. This means that there are striking differences and variation in income and in consumption possibilities within household types. There is no clear trend as to which of the household types has the greatest within-group variation, since the domination of the household type varies between years.

The decomposition by region also shows a dominance of the within-group component even when between-group inequality plays a slightly stronger role than in the case of household type decomposition. It seems that the metropolitan area often has the highest within-group inequality figures for both money income and for consumption possibilities but not in all cases. The division by age-group has similar results; the within-group component dominates the between-group one. The greatest within-group differences in both cases, in money income and in consumption possibilities and in every year, are found in the highest age-group, 55-64 years of age.

Decomposition by sexes shows that between-group inequality of money income has higher figures than any of the other decompositions but this effect vanishes when looking at the decomposition of consumption possibilities where the share of between-group inequality has dropped. This suggests that, since men earn higher wages than women, women compensate lower income by carrying out more household production activities than men do. This is evidenced also by time use studies. One interesting result in sex decomposition is that within-group inequality of money income has an increasing trend between years and between-group inequality a correspondingly decreasing trend. This reflects many things, among which are the increased labor force participation of women and a slight drop in gender differences in wages.

3.5 Conclusions

The paper analyzed the changes in the distribution of economic wellbeing and changes in income inequality in Finland between 1979 and 2000, when the value of household production (as a time-input) was added to money income. This new measure, consumption possibilities, was then used to calculate income inequality indicators and low income indices. The level, trend and structure of money income distribution and the distribution of consumption possibilities were all studied.

⁸Within-group and between-group inequality does not necessarily total aggregate inequality due to rounding.

The results indicate that consumption possibilities are more equally distributed than money income is. Similarly, the number of individuals below the low income line drops when moving from money income to consumption possibilities. Thus, widening the traditional money income concept by including the value of productive household activities alters our understanding of the distribution of economic wellbeing.

Household production increases the consumption possibilities of all income groups but its effect is most significant in low income decile groups. As a share of consumption possibilities, household production forms a significantly more important part for low income earners than for high income earners. For high income earners money income dominates the formation of consumption possibilities.

The decomposition of the Gini coefficient by income source shows that when looking at the consumption possibilities inequality the money income forms a greater share of the total inequality compared to household production. This effects strengthens in time. The decomposition of the GE(2) measure by sub groups indicate that the within-group inequality dominates the between-group inequality both at the individual level and at the household level.

Even when the structure of households changes and labor force participation alters it is obvious that work carried out in households clearly raises an individual's access to consumption goods and services and therefore increases economic wellbeing at all times. It is also obvious that since men earn higher wages than women, women compensate lower income by carrying out a greater number of household production activities than men do. This is also evidenced by time use studies.

Table 3.11: Decomposition of individual and household income inequality and inequality of consumption possibilities by population sub-groups, whole year 1987-1988, 1999-2000 and fall 1979, 1988, 1999, % is percentage of the corresponding aggregate inequality

Individual		100xGE(2)			
		Within-group inequality		Between-group inequality	
Subgroup	Whole year	Money income (%)	Consumption possibilities (%)	Money income (%)	Consumption possibilities (%)
Household type	1987-1988	17.26 (98.80)	7.96 (93.54)	0.21 (1.20)	0.55 (6.46)
	1999-2000	25.99 (99.09)	11.81 (97.60)	0.24 (0.91)	0.29 (2.40)
Region	1987-1988	16.27 (93.13)	8.22 (96.60)	1.20 (6.87)	0.29 (3.41)
	1999-2000	25.19 (96.04)	11.74 (97.02)	1.03 (3.93)	0.36 (2.98)
Age group	1987-1988	17.14 (98.11)	8.40 (98.71)	0.33 (1.89)	0.11 (1.29)
	1999-2000	25.69 (97.94)	11.95 (98.76)	0.53 (4.39)	0.15 (1.24)
Sex	1987-1988	15.44 (88.38)	8.49 (99.76)	2.03 (11.62)	0.02 (0.24)
	1999-2000	24.64 (93.94)	12.05 (99.59)	1.59 (6.06)	0.05 (0.41)
Subgroup	Fall	Money income(%)	Consumption possibilities (%)	Money income (%)	Consumption possibilities (%)
Household type	1979	29.45 (99.09)	9.88 (95.18)	0.27 (0.90)	0.50 (4.83)
	1987	17.12 (99.02)	7.70 (94.02)	0.17 (0.98)	0.50 (6.11)
	1999	26.31 (98.21)	12.42 (96.35)	0.48 (1.79)	0.47 (3.64)
Region	1979	28.07 (94.45)	10.05 (96.82)	1.65 (5.55)	0.33 (3.14)
	1987	15.77 (91.21)	7.86 (95.97)	1.52 (8.79)	0.33 (4.03)
	1999	25.37 (94.70)	12.36 (95.89)	1.42 (5.30)	0.53 (4.11)
Age group	1979	29.28(98.52)	10.28 (99.04)	0.45 (1.50)	0.09 (0.88)
	1987	17.01 (98.38)	8.12 (99.15)	0.28 (1.62)	0.07 (0.85)
	1999	26.27 (98.06)	12.74 (98.84)	0.52 (1.94)	0.15 (1.16)
Sex	1979	25.85 (86.98)	10.37 (99.90)	3.87 (13.02)	0.01 (0.01)
	1987	15.25 (88.20)	8.18 (99.88)	2.04 (11.80)	0.02 (0.24)
	1999	25.30 (94.44)	12.82 (99.46)	1.48 (5.52)	0.07 (0.54)
Household		Within-group inequality		Between-group inequality	
Subgroup	Whole year	Money income (%)		Money income (%)	
Household type	1987-1988	10.62 (92.51)		0.86 (7.49)	
	1999-2000	19.00 (95.38)		0.91 (4.57)	
Region	1987-1988	10.36 (90.24)		1.10 (9.58)	
	1999-2000	19.20 (96.39)		0.72 (3.61)	

Source: Author's calculations from the Time Use Data

Note: HOUSEHOLD TYPES, 1. living with parents, unmarried, no children under 18 years of age; 2. unmarried, divorced or widowed, no children under 18 years of age; 3. married or cohabiting, no children under 18 years of age; 4. married or cohabiting, children under 18 years of age; 5. single parent, children under 18 years of age.

REGION, 1979: 1. Metropolitan area; 2. Other Southern Finland; 3. Central Finland; 4.

Northern Finland; 1987 and 1987-1988: 1. Helsinki; 2. Other Metropolitan area; 3. Other

Southern Finland; 4. Central Finland; 5. Northern Finland; 1999 and 1999-2000: 1. Metropolitan area; 2. Uusimaa; 3. Northern Finland; 4. Eastern Finland; 5. Central Finland; 6. Northern

Finland;

AGE-GROUP, 1. 25-34; 2. 35-44; 3. 45-54; 4. 55-64.

3.6 Appendix 1. Opportunity cost method

As a comparison to earlier obtained results, opportunity cost estimates by taking individual wage rates are applied to value housework time by using 1987-1988 individual data only. In the data there is no wage information for all individuals. Some of the individuals are not working or they are taking care of their households and thus have missing wage values. Therefore, opportunity cost estimates are derived by applying Heckman's selectivity correction method (Heckman, 1979).

The Heckman model eliminates bias due to missing data. It is a two equation model including both a regression equation and a selection equation. The variables in the selection equation are assumed to determine whether the dependent variable is observed or not. In the present case we have one equation predicting wages and other one predicting whether an individual will be working or not. Separate regressions are carried out for women and men.

The model estimates a regression model of the hourly wage rates observed for those having a value for the hourly wage, and uses this estimate to impute wage rates to all the adults in the sample (see for example Jenkins and O'Leary, 1994). Estimated opportunity wage rates differ between individuals, unlike the wage value of a municipal houseworker. Due to wage differences between individuals the inequality results obtained for consumption possibilities by using a housekeeper's average wage are likely to be smaller than those obtained by individual wage rates.

Hourly wage rates are calculated by exploiting reported regular weekly working hours and salary obtained from register data (already including benefits in kind). Wage is the dependent variable which is assumed to be determined by education level, age and region. The selection equation includes age class dummies, dummies for region, marital status, education and children under 7 years of age. Table 3.13 shows the estimation results first for the wage equation and secondly for the selection equation. The regression model is of the form,

$$y = v\beta + u_1 \tag{3.4}$$

and the selection model,

$$z = u_2 > 0 \tag{3.5}$$

where the following holds,

$$u_1 \sim N(0, s), u_2 \sim N(0, 1), \text{corr}(u_1, u_2) = ? \tag{3.6}$$

The results show that the inequality indices GE(2) and the Gini coefficient as well as low income indices H and PGR for consumption possibilities rise compared to

results where household production was valued by using the wage of a municipal houseworker (Tables 3.12, 3.5 and 3.8).

Table 3.12: Aggregate inequality and low income results, whole year 1987-1988, by using opportunity cost method to value household production, individual data

	Individual			
	100xGE(2)		100xGini	
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities
1987-1988	17.47	12.36	30.33	25.56
	H		PGR	
	Money income	Consumption possibilities	Money income	Consumption possibilities
1987-1988	14.03	7.80	6.65	2.26

Source: Author's calculations from the Time Use Data

Table 3.13: Estimation results of the Heckman model

Wage equation	1987-1988			
	women	(Std.Err.)	men	(Std.Err.)
Constant	5.57*	(0.18)	7.21*	(0.29)
Age, 0 class is < 35:				
35-44	0.90*	(0.13)	1.50*	(0.16)
45-54	0.68*	(0.14)	1.75*	(0.19)
55-64	0.43*	(0.12)	0.66*	(0.30)
Secondary schooling	0.88*	(0.12)	1.62*	(0.15)
University	4.56*	(0.21)	6.38*	(0.26)
Region of living, 0 class is Helsinki:				
Other Metropolitan area	0.08	(0.26)	-0.05	(0.40)
Other Southern Finland	-1.76*	(0.17)	-2.47*	(0.30)
Central Finland	-2.13*	(0.18)	-3.35*	(0.31)
Northern Finland	-1.73*	(0.22)	-3.00*	(0.34)
Selection equation				
Constant	1.74*	(0.12)	1.68*	(0.21)
Age, 0 class is < 35:				
35-44	0.10	(0.73)	-0.06	(0.11)
45-54	-0.10	(0.09)	-0.26*	(0.12)
55-64	-0.59*	(0.10)	-0.21	(0.15)
Secondary schooling	0.08	(0.06)	0.10	(0.90)
University	0.34*	(0.10)	0.41*	(0.17)
Married or cohabiting	-0.13*	(0.07)	0.95*	(0.10)
Children under 7 years of age	-0.70*	(0.07)	-0.19	(0.12)
Region of living, 0 class is Helsinki:				
Other Metropolitan area	0.03	(0.12)	0.00	(0.27)
Other Southern Finland	-0.23*	(0.09)	-0.33*	(0.21)
Central Finland	-0.30*	(0.09)	-0.64*	(0.21)
Northern Finland	0.03	(0.12)	-0.76*	(0.22)
Number of observations	4326		4214	
rho	-0.186		-0.34	
Wald Test of independent equations:				
chi2(1)=	29.84		33.43	
Prob>chi2=	0.0000		0.0000	

Source: Author's calculations from the Time Use Data

Note: *Significant at 1% level

3.7 Appendix 2. Secondary activities

Since I was not able to include secondary activities for all the years, I ran the analysis for the whole year of 1987-1988 with both primary activities and secondary activities. This was done in order to check how much, if at all, the results would alter, had secondary activities been included in the total time spent on household production. In 1987-1988 the secondary activities are divided into 9 classes and

I use two of them: housework and childcare. Secondary activities, in this Time Use Data, are those activities carried out simultaneously and not in turn with the primary activity. How big a part of the total amount of secondary activities the Time Use Data capture is another story and it is strictly dependent on the quality of the data. In addition, the respondents do not always mark down all the secondary activities. Tables 3.14, 3.5 and 3.8 show that the income inequality indicators and low income indices alter only slightly when including secondary activities at the value of household production.

Table 3.14: Aggregate inequality and low income results, whole year 1987-1988, when secondary activities are included in the household production individual data

	Individual			
	100xGE(2)		100xGini	
Whole year	Money income	Consumption possibilities	Money income	Consumption possibilities
1987-1988	17.47	8.53	30.33	21.96
	H		PGR	
	Money income	Consumption possibilities	Money income	Consumption possibilities
Whole year	14.03	5.88	6.65	1.77
1987-1988	14.03	5.88	6.65	1.77

Source: Author's calculations from the Time Use Data

3.8 Appendix 3. Decile group means

Table 3.15: Decile group means in Euros of money income and consumption possibilities and % change, fall 1979, 1987 and 1999, individual data

Decile group	1979			1987			1999		
	Money income	Consumption possibilities	% C/M x 100	Money income	Consumption possibilities	% C/M x 100	Money income	Consumption possibilities	% C/M x 100
1	425	10825	2447	3595	13111	265	5123	15128	195
2	4741	17973	279	9455	20136	113	10836	23238	114
3	9307	21455	131	13547	23093	70	15939	27396	72
4	12815	24013	87	15545	25458	64	18977	29871	57
5	15223	26520	74	17578	27775	58	21208	32382	53
6	17244	28971	68	19457	30148	55	23565	35101	49
7	19349	31743	64	21677	33218	53	26350	38001	44
8	22317	34835	56	24505	36987	51	30956	41451	34
9	26477	39974	51	28870	43006	49	37873	49577	31
10	43594	55621	28	45119	57376	27	64385	75814	18

Source: Author's calculations from the Time Use Data

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Chapter 4

Income Distribution Effects of A Finnish Work Incentive Trap Reform

by Päivi Mattila-Wiro

Abstract

The present study concentrates on the income distribution effects of A Finnish Work Incentive Trap Reform started in 1996. I estimate how the reforms that were made have affected income levels and income inequality - the distribution of economic wellbeing. I look at the effects both without and with behavioral response. The data used is the Income Distribution Statistics of Statistics Finland from the years 1996 and 1998. The empirical part of the study is based on a microsimulation model. The results drawn without behavioral response show that the 1996 data with the 1998 legislation produces lower values for income inequality measures and higher average income levels for almost all income decile groups compared to those with the 1996 legislation. However, the changes are very small. When the labor supply effect is included, the lowest incomes rise only very little (in fact, hardly at all) and the Gini coefficient remains unaltered.

4.1 Background

Progressive taxation, together with the income deductibility of social benefits, can create a situation, an incentive trap, where working does not provide a higher level of income compared to income offered by social security. In Finland the economic depression in the 1990s with serious unemployment, the financial problems of the public sector and the complications of the labor market raised an effort to remove work incentive traps. The number of people employed needed to be increased and the number of people living on social security needed to be cut. By cutting the incentive traps it was anticipated that the price of labor and social security expenses would drop, domestic demand, demand for labor and productivity, would rise and this would eventually lead to the improved livelihood of all population groups.¹ Work incentive trap reforms are particularly intended to enhance the labor supply of those unemployed or otherwise out of the labor force.

Lipponen's first government appointed in 1995 the so-called Incentive Trap Task Force (here *Task Force*) to discuss how the compatibility of taxes, social security transfers and public service payments could be improved to decrease incentive traps and increase the profitability of working. Income provided by work should always exceed income provided by social benefits, and working extra hours or otherwise receiving extra income should increase the current disposable income. Basically, the Task Force was trying to consolidate the aims of efficiency and equality, efficiency in the sense that people would prefer working to living on social security and equality in the sense that one of the principal objectives of the social security system is equal distribution of income (Prime Minister's Office, 1996, p. 11; Laine and Uusitalo, 2001, p. 1).

Efficiency of the reforms has already been explored in detail, as an example, in the studies of Laine and Uusitalo (2001), Kurjenoja (2000) and Kurjenoja (2004). But the equality of the reforms has gained much less attention, regardless of the fact that it is of crucial importance to analyze the distributional effects of tax and social security reforms in order to target and implement successful reforms in the future. The present study concentrates on the equality of the work incentive reforms by looking at how the reforms have affected income levels and income inequality - the distribution of economic wellbeing. I first look at the changes without behavioral response and, secondly, the changes with labor supply effect (behavioral response).

¹The unfavorable effects of social security on incentives can be discerned on three levels according to Heikkilä (1997, p. 18). Firstly, high taxes needed by the welfare state do not encourage people to increase their investment in work for wages since the anticipated benefit is minor. Secondly, the livelihood security for those not working is so generous that it is not worthwhile to take on paid work for below-average wages. Finally, when social security is considered economically satisfactory this may create a culture of dependency which can be passed on from one generation to another. All these situations arise either as a form of unemployment trap or as an income trap.

The study includes the main work incentive trap reforms and those tax reforms that were implemented at the same time with the work incentive trap reforms. Other changes in the social security system or in taxation are excluded.

The data used is the Income Distribution Statistics of Statistics Finland from the years 1996 and 1998. The empirical part of the study is based on a microsimulation model developed by and explained in Laine and Uusitalo (2001). This microsimulation model, originally intended to study labor supply and marginal tax rates, has been converted and partly rewritten to produce variables needed in the analysis of income distribution. By using the simulation model it is possible to separate the effects of the incentive trap reforms on income distribution from the effects brought about by other changes in the economy and society.

The study starts with a short background review of work incentive traps in general. Secondly, each implemented sub-reform (included in the present paper) is explained in turn and the anticipated distributional consequences are analyzed. The empirical research strategy is described in chapter 4.3 and results and conclusions follow.

4.2 The Finnish Work Incentive Trap Reform

Work incentive traps are normally divided into two. *Unemployment trap* means that reservation wages are higher than wages offered to the unemployed and thus working does not pay off. *Income trap* means that incentives to carry out extra work are very small because extra taxable income results in higher taxes, lower social benefits and/or higher public service payments. In an extreme case, extra income may lead to diminishing disposable income.

Reservation wages can be cut through a reduction in the level of social security (as an example by lowering the degree of compensation) or by tightening the eligibility requirements (limiting the number of recipients and excluding them from the scope of the benefit) and possibly simultaneously cutting taxation. The alleviation of the income trap problem means reducing high marginal taxation rates, which requires the lowering of the means test of social transfers, dropping the income contingent of service charges and cutting the progressivity of taxation (Niinivaara, 1999; Laine and Uusitalo, 2001; Prime Minister's Office, 1996, pp. 12–13; Heikkilä, 1997, p. 19). When comparing the aims of cutting incentive traps and having equal income distribution in society, we know that efforts required by one of the aims easily worsens the possibilities in achieving the other. As an example, increasing work incentives presumes a decrease in taxes and, as a consequence, income inequality increases. On the other hand, reduction in income inequality by increasing the progressivity of taxation may lead to severe incentive traps² (see for example Uusitalo, 1997).

²We observe changes in income distribution when the size of various population groups alters,

In tackling the work incentive problem in Finland, the Task Force selected two principal goals. Firstly, the consistency of minimum security had to be increased and, secondly, work incentive traps of low- and middle-income earners needed to be cut. It is primarily low- and middle-income earners whose income is supplemented with income transfers aiming at equalizing income distribution. The target group³ was especially the working age population. The Task Force suggested main modifications to the housing allowance, unemployment assistance, payments of the municipal daycare, home care subsidy and the earned income deduction of municipal tax. Pensions were not included in the agenda and neither were incentive traps created by earnings-related unemployment benefit. The latter problem was already processed by another working group (Prime Minister's Office, 1996, pp. 5–11; Laine and Uusitalo, 2001, p. 1; Heikkilä, 1997, p. 19).

The basic guideline of the Task Force was that working is a primary source of economic wellbeing and this status should be maintained in relation to social security. Participating in paid work was seen as the best way of preventing marginalization in society. Thus, the focus was essentially on reducing unemployment traps since their effect on people's wellbeing was considered to be greater than the effect of income traps. The reforms were accepted by Parliament in 1995 and the implementation started between 1996 and 1998. However, not all of the suggested reforms were implemented (Prime Minister's Office, 1996, pp. 5–11; Laine and Uusitalo, 2001, p. 1; Heikkilä, 1997, p. 19).

Earlier studies on incentive traps have explored the whole range of tax and benefit reforms carried out in Finland and the consequences of these reforms. As an example, many studies have been written about the cuts in social security made in the 1990s, the background of and justification for these cuts, the economic environment before and during the cuts and the effect of the cuts on the well-being of households (see for example Kosunen, 1997; Heikkilä and Uusitalo, 1997). The income distribution effects of cuts have been examined (see Uusitalo, 1997) but only until the year 1995. Kurjenoja (2000) has studied the work incentive trap reforms made between 1996 and 1998 and their effect on the disposable income of two-parent two-child households living in Helsinki and in single parent families with one or two children.

when the average income of population groups changes, when the distribution of net income within groups alters or when the composition of household incomes changes. Indicators explaining income distribution rely on population group shares and changes in average incomes (Suoniemi, 2002, p. 104).

³Targeting reforms of social security and/or taxation is not trouble-free because these efforts have a different efficiency of allocation. The target population or group is more easily outlined in the case of social security reforms than in the case of taxation reforms. Taxation is, in principle, universal over various population groups. Furthermore, taxation is individually based and many social security transfers are family or household based. Targeting may fail when trying to find members of low income families instead of low income members of well-off families (Prime Minister's Office, 1996, pp. 12–13).

Laine and Uusitalo (2001, p. 1) concentrated in changes in reservation wages and labor supply as a result of work incentive reforms. There are no earlier studies on changes in the distribution of economic wellbeing as a result of the Finnish Work Incentive Trap Reform.

As an example of research on incentive traps carried out in other countries, Duncan and MacCrae (1999) have studied the household labor supply effects of Working Family Tax Credit in the UK. They focused especially on lone parent households. Blundell et al. (1998) have explored the labor supply responses of the UK tax reforms of married or cohabiting women. In Norway Aarbu and Thoresen (1997) have studied the effect of the Norwegian Tax Reform on income changes and income distribution.

4.2.1 Earned income deduction

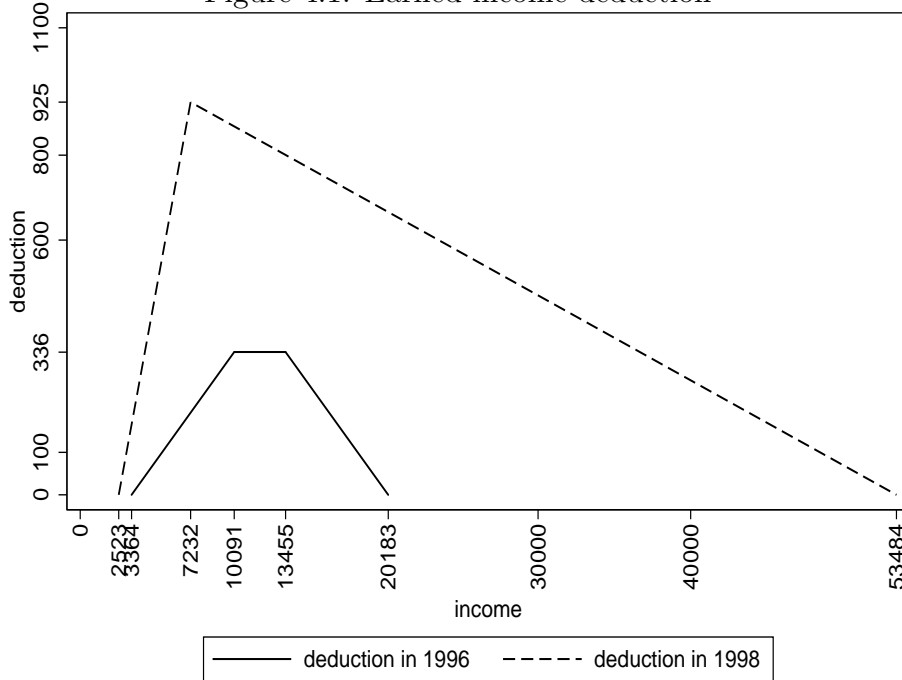
The Task Force suggested re-targeting of the municipal earned income deduction so that income taxation would be more supportive towards working. In 1996 the maximum amount of earned income deduction was 336⁴ Euros/taxation period. The deduction was 5% of the amount exceeding 3364 Euros. After 13455 Euros of income the deduction dropped by 5% of the exceeding amount (see Figure 4.1). In 1998 the maximum amount of earned income deduction was 925 Euros. The admitted deduction was now 20% of the amount exceeding 2523 Euros. After 7232 Euros of income the deduction dropped by 2%. As a result, the earned income deduction covered a wider range of income earners in 1998 than in 1996 (Laine and Uusitalo, 2001, pp. 19–21; Prime Minister’s Office, 1996; Niinivaara, 1999).

The increase in the amount of earned income deduction generally improves the attractiveness of working compared to social security. It must be noticed, however, that in 1998 the maximum amount of earned income deduction was 925 Euros when the amount of earned income was 7232 Euros/year. The national income tax-scale did not yet extend to this amount of income and meant that the total tax rate was about 20% (municipal taxation + compulsory insurance contributions). The real effect of the earned income deduction for those earning 7232 Euros/year was around 17 Euros/month (Laine and Uusitalo, 2001, pp. 19–21).

The changes in the tax rate and the progressivity of taxation are presented in Table 4.1. The marginal tax rates were lowered at all income levels in 1997 and in 1998. The simulations of Laine and Uusitalo (2001) concentrated on marginal tax rates (income trap) and showed that the changes in both, the earned income deduction and in the tax scale dropped the marginal tax rates by approximately 2% for all income earners and after tax net wages increased on average 3-4% for all earning over 6728 Euros/year. Thus, the aggregate tax reforms did slightly encourage working even when the effect was not very great.

⁴All the figures are transformed from Finnish marks to Euros and rounded.

Figure 4.1: Earned income deduction



Source: Laine and Uusitalo (2001, p. 20); Kurjenoja (2000, p. 7)

Effects on income distribution

The main target population for the earned income deduction was those working in low-paid jobs and in occasional jobs. It was expected that by cutting unemployment traps through the reform of earned income deduction especially low income earners would benefit. The reform without behavioral effects should decrease income inequality. If the reform increases the labor supply (the behavioral effect) of those unemployed, this should as well equalize income distribution and lower the level of income inequality indicators.

Parpo (2004, p. 112) has noticed that reductions in taxation favor those low income earners who are already working and thus these reforms may lead to increased income inequality. Those not working benefit from the reform if they move from unemployment to employment. In general, changes in the national progressive taxation favor those earning middle and high incomes whereas changes in municipal taxation also favor low income earners. Earned income deduction is part of municipal taxation. Furthermore, the drop in marginal tax rates and the rise in after-tax net wages suggest that middle and high income earners benefit more than low income earners (see Laine and Uusitalo, 2001, pp. 21–22). This should again increase income inequality.

Table 4.1: Tax rates in 1996 and 1998

Taxable earned income, in Euros	Tax at the lowest level, in Euros	Tax at the amount exceeding the lowest level, %
1996		
7232-9923	8	7
9923-12278	197	17
12278-17492	597	21
17492-27415	1692	27
27415-48774	4371	33
48774-	11420	39
1998		
7737-10428	8	6
10428-13119	170	16
13119-18501	600	20
18501-29097	1677	26
29097-51466	4432	32
51466-	11590	38

Source: *Suomen laki: Verolait* (1998); Laine and Uusitalo (2001, p. 20)

4.2.2 Daycare payments and home care subsidy

Daycare payments

All children under school age are entitled to communal daycare in Finland. In 1996 the number of family members and a cost-category of district of residence determined income limits on the bases of which the maximum payment of communal daycare was divided into five classes (see Table 4.2). If a family had more than one child eligible for daycare the payment of the youngest child followed the payment classes. For older siblings the payment class was one class below the class the younger child was in. It has been criticized that the payment classes created income traps for families with small children. Another criticism was that the payments varied considerably between districts/towns.

At the beginning of 1997 daycare payment classes were replaced by percentage based payments, which were the same in the whole country (see Table 4.3). The payment was dependent on family size and was proportional to the family's income. As an example, in a family of 1-2 members the payment was 11.5% of the amount exceeding the income limit of 866 Euros/month. The maximum payment/child was fixed at 168 Euros/month (Laine and Uusitalo, 2001; Prime Minister's Office, 1996, pp. 36–39; Niinivaara, 1999; Kurjenoja, 2000, pp. 10–11). Laine and Uusitalo (2001, pp. 17, 29) report that the reform of the daycare payments eliminated over 100% effective marginal tax rates and lowered some of the income traps that existed in 1996.

Table 4.2: Communal daycare payments in 1996 in Helsinki, Euros/month

Size of the family	Income limits of the daycare payments				
	1	2	3	4	5
2	992	1446	1564	1699	2641
3	1261	1766	1917	2102	3330
4	1547	2220	2388	2607	4121
5	1884	2557	2809	3112	4928
Amount of payment	65	93	139	185	241

Source: Kurjenoja (2000, p. 10)

Table 4.3: Communal daycare payments in 1997 (whole country), Euros/month

Size of the family	Minimum income limit	Percentage of deduction
1-2	866	11.5
3	1068	9.4
4	1268	7.9

Source: Kurjenoja (2000, p. 11)

Home care subsidy

Home care subsidy is paid to families with a child or children under 3 years of age who are not attending communal daycare. The allowance is paid after the end of the parent allowance period, which is 158 days. In 1996 home care subsidy consisted of the basic component, 252 Euros/month, sibling supplement, 51 Euros/month/child and an earnings-related additional component (see Table 4.4). The basic component was allowed to all those entitled to the allowance. The sibling supplement was given to all children in the same family under 7 years of age and not attending the municipal daycare. The earnings-related component required that the family's income did not exceed a predetermined limit (see Figure 4.2). The limit in 1996 was 777 Euros/month. If the family's income was more than this limit, the full earnings-related component (202 Euros/month) was cut by 15% of the amount above the limit. The earnings-related supplement was not paid if the family's income exceeded 2119 Euros/month (Kosunen, 1997, p. 55; Laine and Uusitalo, 2001, p. 17; Prime Minister's Office, 1996, pp. 32–41; Varma, 1996, pp. 39–41).

In 1997 the whole system of home care subsidy was renewed and private care assistance was introduced. Parents could choose between communal daycare, home care subsidy or private care assistance for children under 3 years of age and between communal daycare and private care assistance for children under school age. Both home care subsidy and private care assistance included care benefit and an

Table 4.4: Home care subsidy in 1996 and 1997, Euros/month

Year	Basic amount	Siblings supplement	Earnings-related component
1996	252	51	202
Year	Care benefit		Care allowance
1997	252/84/51		168

Source: Kosunen (1997, p. 55); Laine and Uusitalo (2001, p. 17); Prime Minister's Office (1996, pp. 32–41); Varma (1996, pp. 39–41)

Table 4.5: Determination of care allowance in 1997, Euros/month

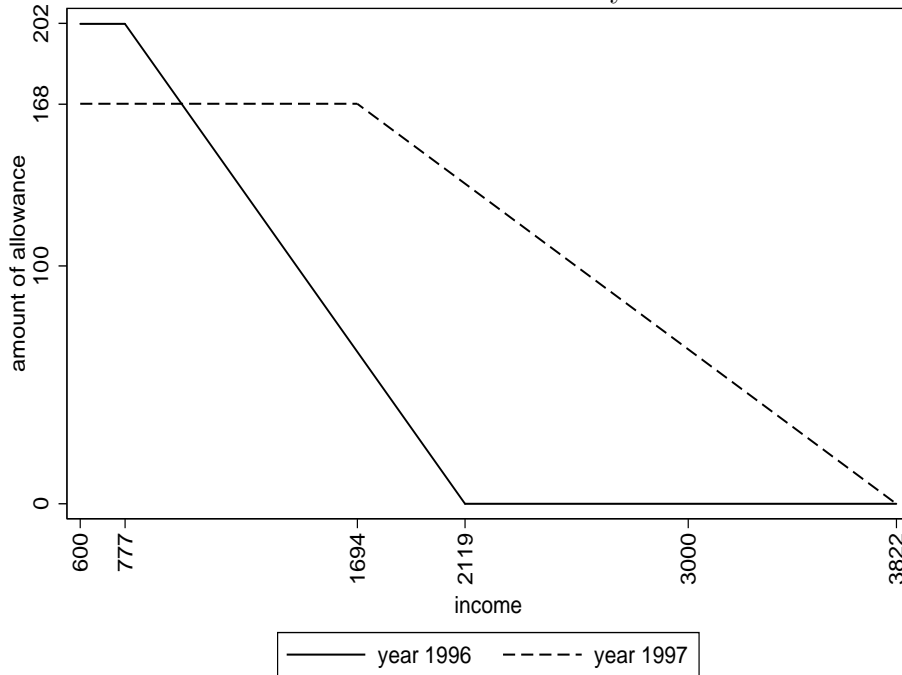
Size of the family	Income limit	Percentage of deduction
2	1159	11.5
3	1426	9.4
4	1694	7.9

Source: Kosunen (1997, p. 55); Laine and Uusitalo (2001, p. 17); Prime Minister's Office (1996, pp. 32–41); Varma (1996, pp. 39–41)

earnings-related care allowance (see Table 4.4). Care benefit was 252 Euros/month for the first child, 84 Euros/month for the second child and 51 Euros/month for all other children under school age. In 1997 the amount of care allowance depended not only on the family's income but also on the size of the family (see Table 4.5 and Figure 4.2). For a two-member family the income limit was 1159 Euros/month and the percentage for deduction was 11.5% for the amount exceeding the income limit. For a three-member family the corresponding figures were 1426 Euros/month with a 9.4% deduction and for a family with four members 1694 Euros/month and a 7.9% deduction. The full amount of care allowance was 168 Euros/month (Kosunen, 1997, p. 55; Laine and Uusitalo, 2001, pp. 17–18; Prime Minister's Office, 1996, pp. 32–41; Varma, 1996, pp. 39–41; Varma, 1997, pp. 42–46; Kurjenoja, 2000, p. 12).

For a two-adult family with two children of daycare age, the reform increased the amount of home care subsidy when one of the spouses was working and the other one took care of the household, and the income of working spouse was between 1009 and 3818 Euros/month. The increased amount of the home care subsidy resulted in worse work incentives for the spouse taking care of the household. With family income less than 1009 Euros/month the reform cut the amount of home care subsidy, which mean that the incentives to receive work outside the household increased. In brief, the home care subsidy reform decreased the labor supply of parents with small children. The total effect on the labor supply, however, also depends on the reform

Figure 4.2: Earnings related component of home care subsidy in 1996 and earnings related care allowance in 1997 for four member family



Source: Kurjenoja (2000, pp. 8–10); Varma (1996, pp. 39–41); Varma (1997, pp. 42–46); Laine and Uusitalo (2001, pp. 17–19)

of daycare payments (Laine and Uusitalo, 2001, pp. 18–19).

Effect on income distribution

The reforms of the daycare payments and home care subsidy were targeted to families with children under school age. The changes in the daycare payments in 1997 lowered some of the income traps of the families located at the borders of the payment classes in 1996. Since this has affected all households with children of daycare age it is difficult to speculate what have been the income inequality effects of this reform. The reform of the home care subsidy cut the unemployment trap of low income households, which means that if these families increased their labor supply the income inequality would also decrease. Otherwise, the decreased amount of the subsidy received by low income earners increased income inequality.

According to Laine and Uusitalo (2001, pp. 39–44) fathers with under school age children increased their labor supply as a result of these reforms compared to the control group (which was fathers in the age range 20–45 with school age children).⁵

⁵For parents with under school age children the labor supply effects were calculated by using a control group. The control group was selected so that it was as close as possible to the target

On the other hand, the reforms decreased the labor supply of mothers with children under school age.

4.2.3 Housing allowance and social assistance

Housing allowance

Low income households are eligible to receive housing allowance for both owner-occupied housing and for rented accommodations. Housing allowance is means-tested where housing expenditure, household total income and taxable income (including wealth) all affect the net amount of the allowance. In 1996 the amount of housing allowance was 80% of the reasonable housing expenditure which exceeded the excess expenditure. The excess amount was determined by the number of individuals living in a household, by the household income and by the location of the residence. The reforms implemented in 1998 increased the amount of housing allowance to cover at least the total range of social assistance. This meant that the income limit was extended for those living alone to an equivalent level with unemployment assistance and for other households to an equivalent level of housing allowance in 1995. Furthermore, the 17 Euros excess was removed (Varma, 1996; Varma, 1998; Laine and Uusitalo, 2001; Prime Minister's Office, 1996; Niinivaara, 1999).

An individual whose own income (added to the income and assets of other members of the same household) is not enough to provide an adequate level of livelihood is eligible for social assistance. The amount of assistance is means-tested based on household disposable income and those expenditures entitled to this assistance. Social assistance is formed by the basic amount and by the amount which is separately defined. In 1996 the effective marginal tax was 100% for a household receiving social assistance because earned income cut the assistance by the full amount. The social assistance was changed in 1998 so that it now included 7% excess amount of housing costs (Varma, 1996; Varma, 1998; Laine and Uusitalo, 2001; Prime Minister's Office, 1996; Niinivaara, 1999).

For incomes lower than 505 Euros/month the reforms (both housing allowance and social assistance) had almost no effect. The main effect of the combined reform was a decline in reservation wages due mainly to the rise in the income limits of the housing allowance. Increase in earned income raised the amount of disposable income already at the level of 488 Euros income/month. The reservation wage under the old system was 622 Euros/month. The 100% marginal tax rates, resulting from social assistance, had an effect after the reform only at the income level of less than 488 Euros/month. The biggest effect results from the increased level of housing

group but was not affected by the reforms.

allowance (increased income limits) (Laine and Uusitalo, 2001, p. 16; Niinivaara, 1999, pp. 6–13).

Effect on income distribution

The reforms of housing allowance and social assistance were targeted to low income households. An attempt was made to cut the unemployment traps by synchronizing these two benefits. Since those earning between 488 and 1060 Euros/month before the reforms increased their net income it is possible that income inequality equalized slightly as a direct effect of the changes. However, the total effect on income distribution is only seen after analyzing the behavioral effect, the effect on the labor supply.

4.2.4 Unemployment benefit

The unemployment benefit is formed by two main benefit categories: the unemployment allowance and labor market support which was introduced in 1994. The unemployment allowance is divided again into two categories: the earnings-related daily allowance and the basic daily allowance. If a person is partly unemployed, for example in cases of temporary dismissal or part-time work, she/he is eligible for adjusted allowance, meaning that part of the earned income is deducted from the original amount of unemployment allowance during the period of adjustment. The unemployment allowance was cut in 1996 by 80% of the earned salary and in 1997 the same cut was 50%. This meant that every earned euro after 1997 cut the allowance by 50 cents. The intention of the reform was to reduce the income dependence of unemployment allowance and the purpose was to make working profitable even when receiving this allowance.

Labor market support

Labor market support is a means-tested benefit where not only the individual's own income but also the earned income of a spouse exceeding 51 Euros/month affect the final amount of the support. In 1996 the income limit of labor market support was 933 Euros/month for an individual with children and 622 Euros/month for an individual with no children. Benefit was extended by 106 Euros/month for every child under 18 years of age. Labor market support was cut by 75% of the income exceeding the income limit. In 1997 the conditions of the benefit were changed so that the new income limit for a couple, married or cohabiting, was now 848 Euros/month and the labor market support was cut by 50% of the income exceeding the limit. For an individual with no children the income limit dropped to 252 Euros/month and the reduction remained at the level of 75%. Other conditions

remained unaltered (Varma, 1996; Varma, 1997; Varma, 1998; Laine and Uusitalo, 2001; Prime Minister's Office, 1996).

The reform increased the amount of labor market support for most of the unemployed and thus made working less attractive than before for the spouse not working. The reform also affected the incentives of a working spouse. As an example, by lowering the means-test prerequisites of the benefit, the marginal effective tax rates decreased for the working spouse when the salary was between 1177 and 1850. At this income level, the work incentives increased and due to the substitution effect the labor supply should increase as well.⁶ According to the empirical results of Laine and Uusitalo (2001, pp. 44–47) the labor supply of the working spouse increased as a result of the reform.

4.2.5 Summary of the effects of the reforms

To summarize, the reforms implemented led to decreased taxes, increased earned income deduction and lowered income contingent on unemployment assistance and daycare payments. Niinivaara (1999) explains that in reducing *unemployment traps* the objectives drawn were achieved. The possibilities for an unemployed person to improve their livelihood by extra income are now better than they were before the reforms. Furthermore, the reservation wages dropped significantly in all families, whether it was a single parent, two parent family, family with more than one child or a single adult household (Niinivaara, 1999, p. 7).

Results in reducing *income traps* were more moderate. Cutting the high marginal tax rates did not succeed as well as expected. The marginal tax rates are lowered around 2-3%. This does not have a real effect on decreasing income traps (Niinivaara, 1999, p. 13).⁷ According to Kurjenoja (2000), incentive traps have remained for young families, single parents with daycare age children, and for families where one spouse receives labor market support and the other one is a wage earner. The reforms did not concentrate only on low income households, since families with two adults and children are not all at the low end of the income distribution.

⁶When the income of a working spouse was between 1346 and 2102 Euros/month the income effect cut the labor supply of a working spouse due to the increased total income of a household. Between incomes 1850 and 2102 effective marginal tax rates increased compared to the year 1996 because the impact of the labor market support's income testing extended further than before. At this level of income the substitution effect also decreases the labor supply (Laine and Uusitalo, 2001, pp. 13–14).

⁷The marginal tax rates dropped after the reforms and the change is the greatest for individuals whose marginal tax rates are between 40% and 70%. It seems that parents with children of daycare age were not affected by the reforms in the case of marginal tax rates. For single parents the marginal tax rates increased if the rates were between 70-90% (Laine and Uusitalo, 2001, pp. 22–25).

Laine and Uusitalo (2001) summarize that the reforms positively affected work incentives and the labor supply. I now turn to analyze the effect of the reforms on income levels and on income inequality. The research strategy is first explained in detail in the following section.

4.3 The empirical research strategy

The present paper focuses on changes in the distribution of economic wellbeing created by A Finnish Work Incentive Trap Reform. I especially analyze the changes in income inequality and in income levels. The years included are 1996 and 1998. Year 1996 represents the period before the reforms and 1998 the year when the reforms had already been implemented. The analysis is carried out in steps, emphasizing two perspectives, changes without behavioral adjustment and changes with behavioral responses.

The data used is the Income Distribution Statistics (IDS) of Statistics Finland. IDS includes the level, formation and distribution of income among households and the economically active population. It is based on interviews and administrative records. The sample size is about 10 000 households each year, which makes around 25 000 individuals. Half of the sample alters each year and the same households appear in two succeeding years. The data includes sample weights which help in calculating results at the level of the population. The data covers all income items affecting disposable income and received income transfers. The data has around 700 variables (Statistics Finland, 2003, p. 34).

In the present paper, household disposable income is made comparable by using the equivalence scale

$$\frac{W}{S^{0.5}} \tag{4.1}$$

where W is the total income of a household and S is the number of household members. When transferring monetary figures between years, the money values have been made comparable by using the cost of living index. Ultimately, all figures correspond to year 2000 Euros. Figures are weighted. It is always mentioned whether the figures are calculated directly from the Income Distribution Statistics or whether the microsimulation model is used. The income levels are described by decile group means (and medians in chapter 4.4.1). The income inequality measures chosen are the GE(2)-ratio and the Gini coefficient.⁸ Other factors than work incentive reforms and changes in taxation, influencing the income and income distribution, are not analyzed here.⁹

⁸The Gini coefficient is not sensitive to observations on the edge but it shows the general trend of inequality, which is important when we look at the changes over the years.

⁹In calculating the taxes the simulation model does not include taxes on capital or wealth

The microsimulation model by Laine and Uusitalo (2001) is used in the paper's calculations. The model is basically a tax-benefit calculation program.¹⁰ However, in the present paper the model is applied to examine the distributional effects of A Finnish Work Incentive Trap Reform. This means that the microsimulation model has been modified for the purpose of the study. The model has been put together from separate parts of the original model and every step of the model is checked. The microsimulation model is revised and partly rewritten to calculate the variables needed, for example, household disposable income. The microsimulation model combines micro-data (here Income Distribution Statistics) with tax and benefit rules describing each year's existing policy. This means that we can also combine the 1996 data with the 1998 legislation and vice versa.

The analysis starts by comparing household level disposable income¹¹ figures and income inequality indicators calculated from the Income Distribution Statistics directly and the corresponding figures obtained by using the microsimulation model. This analysis includes the whole population. Only those households having a disposable income level equal to zero have been deleted (the number of these households vary between years and between cases studied and is not considered to be significant in any of the calculations). Secondly, I look at what effects the changes in the system of social benefits and taxation has brought about in income levels and in income inequality. I analyze the effects of all the reforms on the whole population without behavioral response. I calculate household disposable income figures by combining year 1996 data with year 1998 legislation¹² and year 1998 data with year 1996 legislation. When we take the pre-reform population (1996) and post-reform legislation (1998) we have the 'pure' effect of changed legislation on incomes and income inequality. On the other hand, when we take pre-reform legislation (1996) and post-reform population (1998) we have the effect of demographic changes on income distribution. All the incomes in the tables are yearly figures.

Thirdly, I look at the behavioral response the reforms have generated and estimate a labor supply model. The obtained labor supply estimates are used to calculate the fitted value of months worked for the years 1996 and 1998 and for each individual. The fitted values of months worked are again applied to assess the effects of the reforms on each individual's yearly income. Finally, individual level information is

tax. Thus, from the tax parameter in the original data the same items are eliminated. Reforms concerning capital taxation are not included.

¹⁰The examples and the calculations of the microsimulation model are based on the payments applied in Helsinki.

¹¹Household disposable income is a measure of the monetary resources available to a household at a predetermined time. Disposable income is a central term when analyzing work incentive traps since disposable income reflects a household's economic situation after all income, transfers, taxes and payments (Kurjenoja, 2000, p. 5). The disposable income of a household is formed by totalling household aggregate earned income, capital income and transfers received deducted by paid taxes.

¹²Here, legislation means the rules and regulations for taxation and social security payments.

aggregated at the household level and by using the household disposable income variable we are able to calculate how the labor supply changes have affected income inequality measures and decile group means. The process of forming the labor supply function and calculating the behavioral responds is explained in detail in chapters 4.4.2 and 4.4.3.

4.4 Effects on income levels and income inequality

4.4.1 Changes without behavioral response

When we compare the mean and median values of household disposable income figures computed first from the Income Distribution Statistics (IDS) directly and secondly from the microsimulation model we can see from Table 4.7 that the microsimulation model systematically overestimates the mean and median values of disposable income. This is especially significant in the case of low income decile groups. However, the tendency to overestimate the lowest incomes is quite typical in the case of microsimulation models and it does not reduce the usefulness of the simulation model.

We can find reasons to explain the small differences in mean and median income figures calculated from the IDS data and those drawn from the microsimulation model. Some of the elements of social security can have variation between cities. The microsimulation model is based on the social security payments applied in Helsinki and these payments are not necessarily the same across the country. Secondly, social assistance as means-tested benefit is very problematic to calculate. Many of those eligible for social assistance have not either applied for it or received it. In the microsimulation model, social assistance is targeted to everyone eligible. This assumption has to be made since there is no information on those who are eligible on a certain social assistance but who do not apply for it for one reason or another. In this sense the simulation model assumes that people know what social assistance they are eligible for and also receive all of them. Finally, in the microsimulation model, the housing allowance is targeted to everyone eligible for this allowance according to their income. Similarly with social assistance, in reality, not all individuals eligible for housing allowance have applied for it or received it.

Table 4.6 shows GE(2) and Gini coefficient values for 1996 and 1998 at the household level. First, the results are drawn from the IDS data directly, and GE(2) results in a value of 11.13 and the Gini coefficient in a value of 22.49 in 1996. For 1998 the corresponding figures are 23.95 and 24.98. Secondly, the same indices are calculated by using the microsimulation model and the result changes to GE(2) 9.54 and the

Gini coefficient 20.33 in 1996 and GE(2) 25.16 and the Gini coefficient 23.17 in 1998. In both cases the income inequality measures are higher in 1998 than in 1996. This trend is verified by many other studies as well. As expected, in 1996, the income inequality measures calculated from the original data are higher than those drawn as a result of a simulation. In the case of 1998 the simulation process has resulted in a higher value for the GE(2) ratio but a lower Gini coefficient value compared to those calculated from the IDS data directly.

Table 4.6: GE(2) and Gini coefficient for 1996 and 1998, IDS results and microsimulation model results

Year of the data	IDS results*		Simulated results**			
			Year of the legislation			
	GE(2) x100	Gini x100	1996		1998	
	GE(2) x100	Gini x100	GE(2) x100	Gini x100	GE(2) x100	Gini x100
1996	11.13	22.49	9.54	20.33	9.50	20.31
1998	23.95	24.98	25.68	23.56	25.16	23.17

Source: Author's calculations from the Income Distribution Statistics

Note:*Calculated from the IDS data directly, **Calculated by using the microsimulation model

Next I simulate, at the household level and at the whole population level, the mean and median incomes of income decile groups and income inequality measures for the 1996 population by applying the year 1998 legislation. The post-reform legislation is applied to the pre-reform population. The same procedure is carried out for 1998 data using the 1996 legislation. Table 4.7 shows that the mean and median income values of the decile groups for 1996 data with the 1998 legislation are almost systematically higher than the corresponding figures when combining the 1996 data with the 1996 legislation. The only exception is the median income of the tenth decile group. This indicates that the 1998 legislation produces higher average (mean and median) income levels for almost all income decile groups compared to those with the 1996 legislation. However, the mean income of middle and high decile groups, especially decile groups from 5 to 9, increases more than the mean income of income decile groups from 1 to 4. This result suggests that the middle and high income earners have benefited more from the reforms than have the low income earners. Furthermore, the increase in the mean and median income of the lowest income decile groups is so small that it cannot be taken as reliable evidence of the success of the reforms (meaning that reforms had been beneficial especially for low income earners).

Table 4.7: Mean and median household disposable income by income decile groups in 1996 and 1998 (in year 2000 Euros)

Decile	IDS* 1996 data		Simulation** 1996 data, 1996 legislation		IDS* 1998 data		Simulation** 1998 data, 1998 legislation		Simulation** 1996 data, 1998 legislation		Simulation** 1996 data, 1998 legislation	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1	7589	8137	9043	9676	7682	8239	9630	10034	9103	9688	9169	9679
2	10668	10684	12049	12093	10875	10881	12489	12513	12072	12119	12259	12269
3	12370	12444	13582	13602	12712	12708	14002	14015	13649	13679	13839	13854
4	13896	13927	14869	14851	14386	14376	15444	15480	14944	14931	15349	15383
5	15272	15245	16201	16211	16068	16083	16931	16948	16282	16278	16837	16840
6	16767	16787	17573	17567	17789	17786	18501	18497	17663	17663	18404	18409
7	18356	18345	19086	19051	19696	19672	20269	20243	19195	19155	20138	20120
8	20455	20392	21138	21119	22089	22044	22569	22532	21256	21259	22451	22410
9	23599	23547	24051	23900	25575	25496	25980	25904	24156	24018	25867	25797
10	34682	30639	35219	31496	41020	33740	42728	34633	35287	31445	42598	34510

Source: Author's calculations from the Income Distribution Statistics

Note: *Income Distribution Statistics **Microsimulation model results

Both of the income inequality measures (see Table 4.6) are somewhat lower in case of the 1996 data with the 1998 legislation (9.50 and 20.31) than in the case of the 1996 data with the 1996 legislation (9.54 and 20.33). However, the figures differ only slightly from each other and therefore the result does not convince us that the reforms have been successful in equalizing income distribution.

When we take the 1998 data and combine that with the 1996 legislation (Table 4.7) we observe that the effect of demographic changes again results in higher mean and median decile group values compared to corresponding results when we take the 1996 data with the 1996 legislation but lower values compared to those produced by combining the 1996 data with the 1998 legislation. On the other hand, both the income inequality indicators address the increase in income inequality (Table 4.6) as a result of demographic changes (25.68 and 23.56) compared to the 1996 data with the 1996 legislation (9.54 and 20.33). Therefore, we can claim that even when the 1998 legislation seems to produce lower income inequality indicators than the 1996 legislation, the demographic effect of the year 1998 operates in the other direction and raises the income inequality measures.

Figure 4.3 shows the variation of the mean income of each income decile group. The mean income is presented in year 2000 Euros. We have four combinations of data and legislation: 1. the 1996 data with the 1996 legislation, 2. the 1996 data with the 1998 legislation, 3. the 1998 data with the 1996 legislation and 4. the 1998 data with the 1998 legislation. We can observe that the 1998 data with the 1998 legislation produces higher mean incomes for all decile groups compared to any of the other data/legislation combinations.

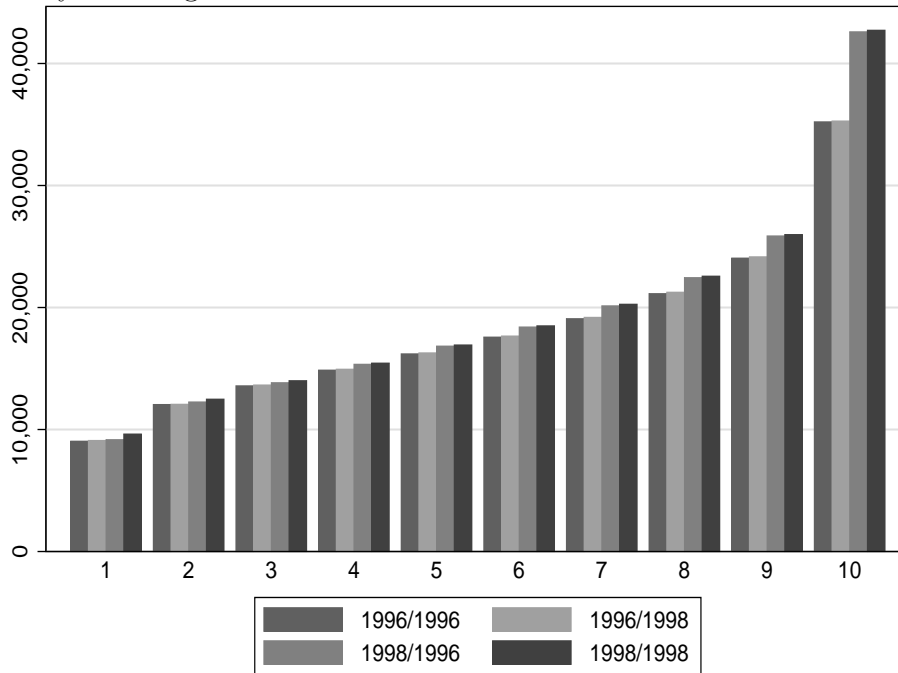
4.4.2 Labor supply

Formation of the labor supply variables

The analysis of the behavioral response starts with the estimation of a labor supply model. Change in the labor supply is regarded as the most important behavioral effect of the work incentive reforms. The time period from 1996 to 1998 is considered to be long enough to study the behavioral changes since there has been some time for individuals to adjust their behavior to implemented reforms. The estimation of the labor supply is carried out by following, as closely as possible, the steps and method explained in Laine and Uusitalo (2001) in order to maintain the usability of the tax-benefit microsimulation model.

I estimate here the effects of the changes in the tax- and social security system on the number of working months, the dependent variable. Working months is a natural choice in regard to many social security regulations, since sometimes only the fact about whether an individual is employed or not matters, not the amount of hours worked. Working months include full-time work, part-time work, being

Figure 4.3: Mean income of income decile groups with various combinations of year of data and year of legislation



Source: Authors calculations from the Income Distribution Statistics by using the microsimulation model

Note: *1996/1996* refers to year 1996 data with year 1996 legislation, *1996/1998* refers to year 1996 data with year 1998 legislation, *1998/1996* refers to year 1998 data with year 1996 legislation and *1998/1998* refers to year 1998 data with year 1998 legislation

on paid sick-leave and working as an entrepreneur or associate family member. In the labor supply estimation the sample is those of an age between 15 and 64. The population groups that have not been affected by work incentive reforms have been excluded from the sample, the full-time students, conscripts, mothers of under 1-year-old children and the unemployable. In addition, those households that have a zero value for individual net income or household disposable income have been deleted.

The data are divided into 90 cells by education, sex, number of children and age.¹³ The group-wise estimation strategy¹⁴ is applied here for the labor supply estimation because the main problem faced in evaluating the changes of both taxes and benefits is that individuals can only be observed either working and earning a certain wage

¹³The education is divided into comprehensive school, intermediate level and graduate level. The age classes are 15-24, 25-34, 35-44, 45-54, 55-64. Three classes based on the age of children are as follows: the youngest child is at the day-care age, 1-6 years of age; the youngest child is at school age, 7-18 years of age; there are no children in the family.

¹⁴See, for example, Blundell et al. (1998).

or not working and obtaining a certain amount of benefit but not both (Laine, 2002, p. 26). The use of cell means also resolves the problem of missing wages and diminish the endogeneity problem resulting from the correlation between gross wages and residuals (Laine and Uusitalo, 2001, pp. 30–31). After removing cells including fewer than 20 individuals and cells not occurring in both of the years I had 61 cells left and all together 12 812 individuals in 1996 and 12 776 individuals in 1998.

The two independent variables are marginal wage and other than labor income. Marginal wage shows the income increase as a result of one extra working month. To calculate the marginal wage rate we need the net monthly wages and transfers dependent on the number of working months. The individual’s labor income and entrepreneurial income was first added together. By using the microsimulation model the after taxes net yearly wage was calculated and furthermore by dividing this by the number of working months I ended up with the net monthly wage rate. Each cell was given its cell-specific net wage. The next variable calculated was the amount of transfers dependent on the number of working months. This was formed by adding together pension income, unemployment allowances, home care allowance etc. at the yearly level and by taxing the taxable transfers with the use of the simulation model. Finally, the amount of these transfers was divided by the number of the months the person was not working. Again, each cell was given its cell-specific amount of the transfers.

The marginal wage is calculated by subtracting from the average monthly net wage the average monthly income transfers (transfers dependent on the number of working months). Since many of the individuals in the sample received either only wage or only income transfers we cannot calculate the marginal wage at the individual level. However, by applying the weighted cell averages we can calculate the marginal wage for each cell,

$$\overline{mw}_{cell} = \overline{w(1-t)}_{cell} - \overline{s}_{cell}, \quad (4.2)$$

where \overline{mw}_{cell} is the cell-specific average marginal wage, $\overline{w(1-t)}_{cell}$ is the cell-specific average net wage rate and \overline{s}_{cell} is the cell-specific average for income transfers dependent on the number of working months (Laine and Uusitalo, 2001, p. 37). The cell-specific marginal wage depends on average gross wages, tax rates and the average income transfers of individuals within each cell.

The advantage of the method used is that the income transfers now describe all the transfers received by individuals in each cell weighted by the share of recipients of each transfer. Then alternative earnings do not have to be calculated separately for each income transfer. Furthermore, we acquire the expected net wage for those not working, which is an average wage for those of the same age, having similar education and being in a similar family situation (Laine and Uusitalo, 2001, pp. 30–31).

The other than labor income variable is calculated by using the disposable income variable. The individual disposable income (DPI) is

$$DPI = w(1 - t)h + s(12 - h) + y, \quad (4.3)$$

where w is the monthly wage, t is the tax rate and h the working months. In addition to this, an individual receives income from property y and income transfer s during the months she/he is not working ($12 - h$). When we rewrite the DPI equation,

$$DPI = [w(1 - t) - s] \times h + y + 12 \times s, \quad (4.4)$$

we can see that other income $y + 12 \times s$ can be calculated by subtracting the marginal wage rate from the disposable income and multiplying it by the number of working months $[w(1 - t) - s] \times h$. All the figures are calculated by applying the cell means similarly with the marginal wage rate calculations¹⁵(Laine and Uusitalo, 2001, pp. 36–38). The other income is

$$\overline{other\ income}_{cell} = \overline{DPI}_{cell} - \overline{mw}_{cell} \times \overline{h}_{cell}, \quad (4.5)$$

Table 4.8 shows the mean values of estimated variables for the labor supply equation.¹⁶

Table 4.8: Mean values of the labor supply function variables (in year 2000 Euros)

Variable	1996		1998	
	Mean	Std.Dev.	Mean	Std.Dev.
Working months	8.9	1.7	9.1	1.7
Net wage	1148	263	1208	276
Transfers	524	183	496	165
Marginal wage	584	173	707	209
Other income/month	1266	275	1357	303

Source: Author's calculations from the Income Distribution Statistics by using the microsimulation model

Now we can estimate the wage and income elasticities of a labor supply function

$$h = \alpha + \beta w(1 - t) + \gamma y + \delta X + \varepsilon, \quad (4.6)$$

where h is the number of working months, $w(1 - t)$ is the net monthly salary, y is

¹⁵Since the disposable income is addressed at the household level in our data, we have to subtract the spouse's wage income and personal income transfers from the household disposable income in order to arrive at a correct individual disposable income measure (Laine and Uusitalo, 2001, p. 38).

¹⁶The small differences in these mean values compared to the corresponding values obtained by Laine and Uusitalo (2001) are partly a result of the modifications done to the microsimulation model and partly a result of an unknown factor/unknown factors.

the other income, X is the vector of all the other variables affecting the labor supply, and ϵ is the residual. The aim is to estimate labor supply elasticities for net monthly salary and other income, meaning the estimates for parameters β and γ . By using the cell means we can rewrite the labor supply function,

$$\bar{h} = \alpha + \beta \overline{w(1-t)} + \gamma \bar{y} + \varphi D_{98} + \lambda D_{cells} + \bar{\epsilon}, \quad (4.7)$$

The number of average working months is now explained by the average marginal wage and by other than work incomes. Furthermore, the variable D_{98} is a dummy for changes in the general economic situation and the variable D_{cells} is a cell-specific indicator variable. The identification of the parameter estimates is based on the fact that the changes in the tax and social security systems have different effects on the net wages and other income of different population sub-groups. Changes in the labor supply in different sub-groups also vary. We basically compare changes between groups (Laine and Uusitalo, 2001, p. 32).

The estimation results are presented in Table 4.9. The estimated labor supply parameters show how much the average number of working months change in each cell when marginal wages and other income change. According to the results the increase in marginal wages increases the supply of labor. On the other hand, the effect of other income is negative. The results suggest that 10% increase in marginal wages, around 58 Euros, increases the amount of the labor supply by 0.08 months, which is around 2 working days. If other income increases by 10%, around 127 Euros, it decreases the amount of labor supplied by 0.071 months, which is around 1,5 working days.

Table 4.9: Estimation results of the labor supply equation

Variable	Estimate in		Estimate in	
	Finnish Marks	Std.Err.	Euros	Std.Err.
Marginal wages	0.239*	0.143	1.421*	0.850
Other income	-0.094	0.119	-0.556	0.705
Year 1998	-0.060	0.132	-0.060	0.132
Constant	5.570**	1.526	5.570**	1.526
Number of cells	122		122	

Source: Author's calculations from the Income Distribution Statistics by using the microsimulation model

Note: **Significant at 1% level, *significant at 10% level

4.4.3 Changes with behavioral response

On the bases of the labor supply model I calculate the fitted values of months worked for each individual,

$$M_{i,d} = \alpha + \beta mw_i + \gamma y_i + D_{98} + D_{c_j} \quad (4.8)$$

where the equation shows the fitted value of months worked M for either 1996 or 1998, marked by i and either with or without the 1998 dummy d . The coefficients are from the equation run in chapter 4.4.2: α is the constant, β is the coefficient for marginal wages, mw refers to marginal wages, γ is the coefficient for other income and y is the other income variable, D_{98} is the dummy for 1998 and finally D_{c_j} is a cell-specific dummy for cell j . By applying the microsimulation model, the marginal wages and other income variables are calculated for each individual separately¹⁷ but whenever this was not possible the marginal wages and other income variables are transformed from the corresponding cell-specific data to individual level data. Those individuals belonging to cell 1 are given the marginal wage and other income figure from cell number 1 and so forth. Cell average figures are applied, due to the same reasons explained in chapter 4.4.2.

Next we need a figure for individual yearly income Y and this is formed as follows,

$$Y = W_i M_{i,d} \quad (4.9)$$

W_i is the value for monthly income minus taxes. Monthly income includes market income, so-called other income as well as those social transfers which are dependent on months worked. The yearly income variable is combined at the level of households. From the household disposable income the 'old' yearly income is then subtracted and the 'new' corresponding yearly income is added. The 'old' yearly income refers to income obtained by using the months worked derived from the original data. And the 'new' yearly income is calculated by using the fitted values of the months worked.

Consequently, income inequality indicators and decile group mean incomes are formed by using the household level data, the household disposable income. The results show the effect on income distribution caused by the changes in the labor supply. The weight applied is multiplied by the number of household members and the equivalence scale is naturally used as well. The analysis concentrates on the Gini coefficient but the value for GE(2) is reported as well. The absolute values of the Gini coefficient or decile group mean incomes are not especially important. Instead, the main interest is to look at the trend between various cases presented.

¹⁷Notice the difference compared to earlier calculations when all the values were taken from the cell-specific data.

Table 4.10: GE(2) and Gini coefficient for fitted values of months worked, simulated results

Year of fitted values	1996 data 1996 legislation		1998 data 1998 legislation	
	GE(2)	Gini coefficient	GE(2)	Gini coefficient
1996	10.14	21.15	26.74	23.70
1998	10.30	21.16	25.54	23.76

Source: Author's calculations from the Income Distribution Statistics by using the microsimulation model

I chose two cases to demonstrate the changes in the income distribution brought about by the behavioral response as a result of A Finnish Work Incentive Trap Reform. We observe these changes when keeping the data and legislation unaltered but change the year of fitted values of months worked. Table 4.10 presents the values of income inequality indicators for each combination of year of data and legislation and year of months worked. Starting from the 1996 data with the 1996 legislation and the 1996 fitted values of months worked (individual yearly income with fitted values of months worked is formed as follows $Y = W_{96}M_{96}$) we have the Gini coefficient of 21.15. When maintaining the data and legislation unaltered but taking the 1998 fitted values the Gini coefficient rises to 21.16 ($Y = W_{96}M_{98,d}$). The rise is so small that we cannot reliably claim that there has been any effect on income inequality by the reforms that have been made. Secondly, we can look at the corresponding change by applying the year 1998 data combined with the 1998 legislation and the 1996 fitted values or the 1998 fitted values of months worked. With the 1996 fitted values ($Y = W_{98}M_{96,d}$) the Gini coefficient is 23.70 and with the 1998 fitted values the Gini coefficient is 23.76 ($Y = W_{98}M_{98,d}$). Similarly with the 1996 data and legislation the change is so small that based on these calculations and results it has to be concluded that A Finnish Work Incentive Trap Reform has not resulted in changes in income inequality at the level of all households. The rise in income inequality in general is a result of other factors than the behavioral response caused by the Finnish Work Incentive Trap Reform.

Table 4.11 shows the decile group mean income values of household disposable income for the same combinations of data, legislation and working months as we had in Table 4.10. The changes in decile group mean incomes verify the above results. Even when the mean income of all income decile groups rises for both combinations of data and legislation when moving from year 1996 fitted values of months worked to year 1998 fitted values of months worked the change is so small that it is not possible to claim that there has been any effect in income distribution as a result of changes in the labor supply. Figure 4.4 shows the mean income of income decile groups in a histogram.

Table 4.11: Mean household disposable income by income decile groups with fitted values of months worked (in year 2000 Euros), simulated results

Decile	1996 data	1996 data	1998 data	1998 data
	1996 legislation 1996 fitted values	1996 legislation 1998 fitted values	1998 legislation 1996 fitted values	1998 legislation 1998 fitted values
1	8644	8700	9199	9225
2	11577	11631	12070	12079
3	13160	13271	13731	13771
4	14519	14688	15291	15334
5	15992	16202	16824	16909
6	17467	17645	18447	18540
7	19037	19186	20269	20320
8	21082	21354	22574	22586
9	24011	24248	25851	25919
10	35182	35498	42312	42734

Source: Author's calculations from the Income Distribution Statistics

4.5 Conclusions

The present paper analyzed the changes in economic wellbeing, especially in income inequality and in income levels, caused by A Finnish Work Incentive Trap Reform carried out in Finland between 1996 and 1998. Had the reform been successful and achieving its intended goals (equality goals) the income levels should have increased, especially for low income decile groups, and income inequality would have been forced to have decreased at the level of all households.

I examined the changes from two main perspectives. I first looked at the changes without behavioral response and noticed that the 1998 legislation produced higher mean and median decile group income levels and had a tendency to result the more equal income distribution than the 1996 legislation. However, the changes are so small that I cannot plausibly claim, on the bases of these results alone, that the reforms have been successful in equalizing income distribution or in benefiting low income earners. Furthermore, the mean income of middle and high decile groups increased more than the mean income of low income decile groups. This indicates that middle and high income earners have benefited more from the reforms than have low income earners.

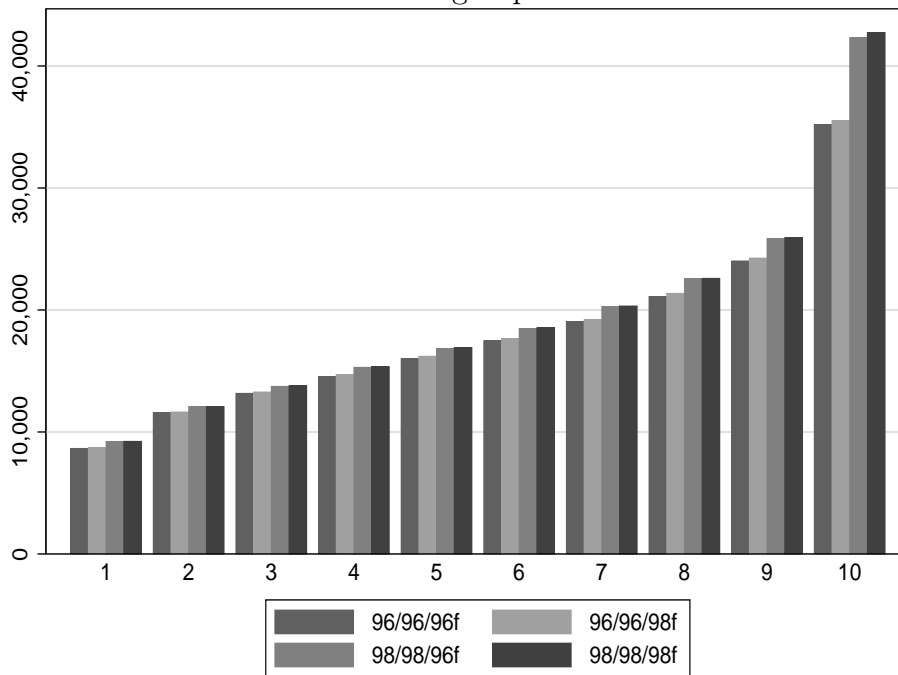
When I included the behavioral response, the labor supply effect, I noticed that at the level of all households the work incentive trap reforms have not decreased or increased income inequality nor have they notably affected the mean incomes of the lowest income decile groups and therefore the distribution of economic wellbeing has remained almost unaltered. There is hardly any change in the Gini coefficient or in the mean income of income decile group means. The rise in income inequality

from 1996 to 1998 is caused by other factors than the behavioral response following the Finnish Work Incentive Trap Reform. Obviously, some of the reforms have negatively affected income distribution and some have had a positive effect.

The result, of course, is slightly disappointing since the successful equality effect of the reforms should have resulted in lower income inequality compared to the original situation. On the other hand, the reforms have not made the situation worse and therefore we can claim that from this particular point of view the effort to increase work incentives has succeeded.

One important contribution of the paper is a methodological one. The paper used a microsimulation model to study the behavioral effects of policy changes and, furthermore, the changes in economic wellbeing that the behavioral response resulted in. This means that a dynamic aspect has been included in the microsimulation analysis. No doubt, the method of microsimulation is a powerful tool for the analysis of ex post evaluation of policy reforms. However, the method is only rarely and on very few occasions applied in Finland.

Figure 4.4: Mean income of income decile groups with fitted values of months worked



Source: Authors calculations from the Income Distribution Statistics by using the microsimulation model

Note: *96/96/96f* refers to year 1996 data with year 1996 legislation and year 1996 fitted values of months worked, *96/96/98f* refers to year 1996 data with year 1996 legislation and year 1998 fitted values of months worked, *98/98/96f* refers to year 1998 data with year 1998 legislation and year 1996 fitted values of months worked, *98/98/98f* refers to year 1998 data with year 1998 legislation and year 1998 fitted values of months worked

4.6 Appendix 1. Terminology in Finnish

- ansiotulo = earned income
- ansiosidonnaisuus = earnings dependence
- ansiotulovähennys = earned income deduction
- asuinkunta = district of residence
- asumismenot = housing expenditure
- asumistuki = housing allowance
- efektiivinen rajaveroaste = effective marginal tax rate
- hoitolisä = care allowance
- hoitoraha = care benefit
- kannustinloukku uudistukset = incentive trap reforms
- kelpoisuus, oikeutus = eligibility
- korvaus, hyvitys = compensation
- kotihoidon tuki = home care subsidy
- kynnyspalkka = reservation wage
- nettokorvausaste = net replacement rate
- omavastuu = excess
- perusosa = basic amount
- rajavero = marginal tax
- riippuvuus = contingency
- sisarkorotus = siblings supplement
- sosiaaliavustus = social assistance allowance
- sosiaalietuus = social benefit
- sosiaaliturva = social security
- soviteltu päiväraha = adjusted benefit

- tarveharkintainen = means-tested
- toimeentulotuki = social assistance
- tuloharkinta = income testing
- tuloloukku = income trap
- tuloraja = income limit
- tulosidonnaisuus = income dependence
- tulovähenteisyys = income deductibility
- työmarkkinatuki = labor market support
- työttömyysloukku = unemployment trap
- työttömyyspäiväraha = unemployment allowance
- työttömyysturva = unemployment benefit
- työtulo = labor income
- vanhempainloma = parent allowance
- vähennysprosentti = percentage of deduction
- vähimmäisturva = minimum security

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Chapter 5

Children's Wellbeing: An Examination of Income and Time Use in Finnish Families in the 1990s

by Päivi Mattila-Wiro & Eva Österbacka

Abstract

In this paper, we analyze two important elements affecting the wellbeing of children: family income and the amount of time parents allocate to childcare. For the empirical analyzes, we use two Finnish data sets, before and after the depression in the 1990s: Income Data and Time Use Data. We find that children in the lowest income quintile group are more likely to grow up in a single parent family where the parent has a low educational attainment and/or in a family where a parent is unemployed. In the highest quintile group, children grow up in a family where both parents are present, employed, and highly educated. These inequalities increased during the time period studied at the same time as the income inequality increased. The state has not managed to moderate the negative effects of the depression. In addition, we find that the total time parents spent on childcare activities has increased. Fathers' time with children has increased more, and the gender difference has decreased over the years. Based on Time Use Data, families with children have responded to changes in society, the economy and in family life.

5.1 Introduction

The Finnish economy has created several difficulties in the past 15 years. The severe depression at the beginning of the 1990s and increasing income inequality following the depression have altered household income structures and the economic situation of families. Along with the depression, the number of unemployed people increased dramatically and the GDP (Gross Domestic Product) declined considerably. After the depression average real income started to rise. However, the growth in real income has been highest in the top income decile and at the bottom of the scale there has been little or no increase at all in real income (Statistics Finland, 2000*a*; Statistics Finland, 2000*b*; Riihelä et al., 2001, pp. 1–4).

Market work today seems to include higher demands than before. As an example, towards the end of the 1990s, efficiency has become a lodestar for many employers and, as a consequence, employees are forced to work harder than they used to. In addition, the labor market requires constant acquisition of human capital and if a worker stays away from the labor market for a long period of time, e.g. on parental leave, there is a danger that the return to work will be difficult if not impossible. All these facts create tensions between family needs, including childcare needs, and needs of the market work (see for example Bradbury, 2004).

In the classification of welfare regimes Esping-Andersen (1999) claims that the changes in society are very much dependent on how society responds to failures (or changes) in the state, market, or in the family. Considering the long-term changes in the labor market in Finland, we know that women's labor force participation has been high and increased steadily over the past decades, with a diminishing home production as a consequence. The labor market has responded well to the increase in the female labor supply. The reduction in home production has been substituted by the public sector to a large extent.

As a consequence of high labor force participation among mothers, Esping-Andersen (1999) argues that dual-earner families and also single parent families face a time constraint. The tension between responsibilities for both home production and market work is a high price to pay, especially for families with children.¹ Moreover, Folbre (2001) reminds us that the costs and risks of parenthood increase when the main rewards in society are based on paid employment.

The present paper examines how the more recent changes in society, in the labor market, and in the family structure have affected children's wellbeing and the distribution of children's wellbeing in time. We concentrate on the two most important elements: the family's economic resources and the time parents allocate to childcare. We analyze the economic situation of families in 1987-1988 and in 1999-2000

¹Esping-Andersen mostly refers to women's time crunch in this context, but it is reasonable to assume that men are also time constrained due to combination of work and family responsibilities.

measured by family income. Equally importantly we study how much time Finnish parents spend with their children in various kinds of families and population groups during the same time period. At the end, we should have a fairly reliable picture of the development of children's wellbeing in Finland from the end of the 1980s to the end of the 1990s. We conclude by analyzing how society has responded to changes and failures in the state, market and family from the point of view of children's wellbeing.

5.2 Children's wellbeing

Children's wellbeing is a broad concept. According to Brown (1997) the following are important indicators of children's wellbeing: their health, education, economic security, family and neighborhood characteristics, social development, problem behavior and population characteristics. In the same book, Moore (1997) stresses that it is important to indicate wellbeing across a broad array of outcomes. Indicators should have a common interpretation, be consistent over time, reflect social goals, and be adjusted for demographic trends. In addition, Brown (1997) remarks that if these measures of children's wellbeing should serve as social indicators, they must be taken at regular intervals.

In the investment model by Becker (1994), children's wellbeing is mainly measured by their income as adults. Children's success is partly determined by their genes and their upbringing, and partly by the investments parents have made in their human capital. Parents are assumed to invest in their children as long as the rate of return on their investment is higher than the costs.² Haveman and Wolfe (1994) extend Becker's model and adopt an investment-in-children framework where the wellbeing of children is determined by three factors. First, society makes choices of which opportunities are available to families. Different policies affect families differently. Second, parents make their choices regarding which recourses are available for their children. Parents, as well as the government, choose a policy for their children's upbringing, according to their preferences and constraints. Third, the choices that the child makes, given the choices made by society and parents, determine the (adult) child's wellbeing.

The investment-in-child framework (Haveman and Wolfe, 1994) is rarely referred to; instead, most refer to the investment model (Becker, 1994) in their empirical work. For instance Klevmarken and Stafford (1997) use the investment model when

²Simultaneously in being an investment, time spent with children is a cost to parents. When estimating the cost of children (see for example Bradbury, 2004), both expenditure and time costs should be considered. It is a cost to parents to allocate time to their children instead of market work or human capital acquisition for themselves. The strong interdependence of parents' decisions about market work and time with children is studied in Hallberg and Klevmarken (2003).

analyzing how parents use their time and acquire goods and services to provide their children with human capital in the form of knowledge, experience and good health. They take it for granted that the future quality of children is important for the parents.

As we see above, it is not a simple task to measure children's wellbeing. Our contribution in this paper regards children's economic security, measured by family income, and family characteristics, measured by parental time use with children. Economic security and parental time use with children are considered as parental investments in children's human capital, but they are also direct measures of children's wellbeing in childhood. We do agree that parents invest in their children's human capital and that the future child quality is important for parents. But, the quality of children does not necessarily have to be measured when the children are adults and have marketable human capital. Children's wellbeing in childhood is certainly an important measure as well, which economists seem to forget. In this paper, we focus on the wellbeing of children in the present time and not in the future when children are already adults. And as a matter of fact, children's wellbeing today tells us something about the wellbeing of adults in the future.

5.3 Evidence for children's wellbeing

5.3.1 Family income and children's wellbeing

One of the first to both theoretically and empirically analyze the importance of parental investments in children, Leibowitz (1974) considered family income as an important source of child investment. Leibowitz found that family income was significantly related to children's earnings as adults.

Intergenerational earnings persistence can be considered as a measure of the impact of parental investment in children. Becker and Tomes (1986) conclude that the intergenerational earnings persistence is fairly low. By introducing new methods in order to reduce biases in the estimates, both Solon (1992) and Zimmerman (1992) found that intergenerational earnings persistence is significant and important. Intergenerational persistence in economic status is comparatively low in Finland, but still significant (see for example Österbacka (2001), Björklund et al. (2002), Björklund et al. (2004)).

The impact of family background on earnings is different in different countries. Those who are most likely to suffer in all countries are children born to poor families. Not all children born in poverty are predestined to poverty when growing up, but they are more likely to become poor themselves. In poverty research, it is found that children are affected negatively when growing up in poor families. Children from poor families are more likely to suffer from adverse physical health, for example,

they have lower cognitive ability, their school achievements are poorer, and they are more likely to have emotional and behavioral problems (see for example Brooks-Gunn and Duncan (1997) for an overview). These facts most likely increase their risk of poverty.

Mayer (1997*a*) is critical of the assumption that income is highly correlated with the goods and services available to children. She suggests that income measures should be complemented with other measures, such as consumption, housing, living conditions and medical care. Mayer (1997*b*) attempts to find the “true” effect of parental income on child outcomes. Her conclusion is that once children’s basic material needs are met, their parents’ characteristics become more important than money. Bojer (2003) claims that since children and parents live together, the children’s welfare is determined by their parents’ choices. As long as children cannot make their own choices, others will decide what is best for them. Income in a family can, hence, be seen as an indicator of how well parents are able to provide wellbeing for their children.

Esping-Andersen (2004) underlines the fact that the key lies in how the family’s income and the “culture” in the family interact. The key is what happens in the family; the school systems, by and large, reproduce prevailing social inequalities, while families produce the inequalities. Hence, parental characteristics are important for children’s development. Furthermore, parental characteristics are correlated with their income.³ From sociology, we can learn that social class is related to values and orientation. Specifically, parents’ working conditions are important determinants of parental child-rearing values. A higher class position (which in turn usually means higher earnings) implies a greater likelihood of stressing self-direction in parental child-rearing values. A lower class position, on the other hand, implies a greater likelihood of stressing conformity to external authorities (Kohn, 1977). It is evident that family income matters for children’s wellbeing.

5.3.2 Time spent with children and children’s wellbeing

The amount of time spent with children is naturally greatly dependent on the life-cycle stage of the family concerned. Infants need a great deal of physical care, small children’s play has to be supervised, while older children can take care of themselves to a certain extent. All children need attention in order to develop into well-behaved individuals. Most parents give their children high priority and want their children to get a better life than they have had themselves.

³Esping-Andersen (2004) stresses that the family is important for intergenerational persistence. Another view on this matter is that the educational system is a major vehicle for intergenerational persistence, see for example Erikson and Goldthorpe (2002).

In the model expressed in Leibowitz (1974), parents' investments in children's human capital was found to have a positive effect on the child's intellectual ability. Parents' investments in children's human capital was measured as parents spending "a considerable number of hours on reading, telling stories, and writing with the child" and as "an appreciable amount of instruction along particular lines". Leibowitz (1974) also found that differences in the verbal and mathematical competence of children entering first grade reflect variations in inherent ability and in the amounts of human capital acquired before the children reach the age of six.⁴

Zick et al. (2001) argue that the goals parents set for their children likely affect the parenting practices. Hence, parents engage in their children, and meaningful parent-child time reduces children's behavioral problems and increases their school grades. Hufnagel (2004, pp. 18–20), concentrating on poor German families, similarly found that time use variables play an important part in children's success at school. The more time the father or the single parent allocates to paid work, the poorer is the performance of the children at school. When paying attention to couples, he found that the father's time spent in voluntary work and media utilization (watching TV) has a negative effect on children's education.

Bryant and Zick (1996) studied the time parents share with their children in several activities, as well as the solitary time parents spend on the same activity. The results show that parents behave as though there is something inherently different about shared activity versus solitary activity. This fact constitutes weak evidence that activities shared with children stimulate the children's human capital development. Shared parent-child activities were normal economic goods, while solitary activities were found to be inferior economic goods.

Hallberg and Klevmarken (2003) argue that the introduction of daycare will increase market work and decrease time for children and leisure. They also claim that the increase in female market work is likely to explain a major share of the decline in the amount of time mothers spend with their children. However, a long debate in the US shows that the rise in maternal employment in the country has not significantly reduced maternal time in care activities (see for example Budig and Folbre (2004) for an overview). Then again, when mothers receive higher wages, they might be happy to exchange some of their childcare responsibilities for market substitutes (Folbre, 2004).

Based on the evidence presented above, we can claim that the amount of time parents allocate on childcare do affect children's human capital positively and therefore their wellbeing increases.

⁴Leibowitz (1974) noted a positive relationship between parents' education and childcare. However, opposite findings are found in the study of Deding and Lausten (2004, pp. 21–22). They claim that the level of parental education does not matter for childcare either for males or for females.

5.3.3 Research on children's wellbeing in Finland

Karvonen et al. (2000) summarize the wellbeing of children and young people in Finland in the 1990s. Within the research period, the most common long term diseases, asthma, allergies and diabetes, have become more common among children. Young people have increased their use of painkillers, and suffer from back or neck pain more often. Teenagers have increased their smoking, drinking and drug use. The occurrence of mental health problems among children has also increased. Various supportive measures taken by the authorities have increased in the 1990s, such as economic support to children, therapy, support for school attendance and placement outside home. Some of the few changes to the better are that teenage births and crime rates have decreased. Furthermore, infant mortality and children's mortality have been low and are still decreasing.

Karvonen et al. (2000) continue to report that the number of individuals receiving social assistance grew in the 1990s. Among those receiving social assistance, children and young people were the largest group of all household members. Sauli (2001) has also noticed that the relative income status of small children and young people has weakened. The average of the disposable income for individuals in households in the lowest decile was constant in the 1990s, and increasing for those in the highest decile. In 1990, the disposable income was on average 3.7 times higher for those in the highest decile compared to those in the lowest. In ten years, this figure increased to 5.2.

Forssén et al. (2002) claim that when it comes to children's wellbeing, the family's external resources (like income) and internal resources (like the parent-child relationship) has a central role to play. The family's economic position is very important since poor economic resources are easily mirrored at reflecting irregularity and incoherence of family-life. Forssén (2003) pays attention to the growth of low income families with children in Finland in the 1990s. The risk of poverty seems to be greatest for single parents under 30 years of age. Shortage of economic resources again causes stress factors in these families.⁵

Takala (2002) has studied the lack of time in families with children. He concludes that on the basis of parents' own assessment the feeling of the lack of time had not increased from 1987-1988 to 1999-2000. Around 61-62% of parents reported having experienced lack of time. Those parents suffering from the feeling of hurry had children under school age, were working in the labor market and had less free time than the average.

This overview gives the impression that children's wellbeing has by no means improved in Finland during the 1990s. We also have to conclude that there are no

⁵The number of family break-ups has increased since the change in the marriage act in 1988. Cohabitation has become more common, and cohabiting couples are more likely to break up than married couples (Karvonen et al., 2000).

previous studies in Finland that use concurrently both income and Time Use Data and concentrate on the change in the distribution of children's wellbeing.

5.4 The data

5.4.1 Income Data

For the analyzes on material wellbeing, a longitudinal data set originating from the quinquennial censuses in Finland from 1970 to 2000 is used. Furthermore, labor market statistics from 1987 to 2001 are linked to this data set. The data have been collected by Statistics Finland. This data is chosen because it is regarded the best Income Data covering the time period of the study (combined with required background information).

The original data set is constructed as follows: In 1970, a simple random sample of 58,207 individuals was drawn. All individuals who lived in the same household as those initial sample members were also included in the sample. Those individuals are followed, and new household members are included in the sample every fifth year. New sample members are either born into a family or move in with a sample member. The total sample size was 889,241 individuals in 2000. The information in the data set comes from various registers. Until 1985, some of the information was taken from the census forms. In this paper, we use register information only.

Due to the construction, young individuals, large families, and consequently those whose income subject to taxation is low are over-represented in the data. However, the sample is, by and large, quite well representative of the working population (Österbacka, 2004). In this paper, we use two subsamples of families for the analyzes. The parents are in the midst of their career, and their labor market characteristics should therefore be quite representative of the population.

Both subsamples consist of families with children, where the youngest child is younger than 18 years of age. The first sample is drawn in 1988, and the second in 2000. We collect information on the parents' labor force participation, socio-economic status, education, and income. The Income Data emanates from tax records.

In 1988, there are 156,821 individuals from 41,370 families in the data set. Since there has to be a child in the family because of the way in which the sample is constructed, the families are relatively large. On average, there are 1.81 adults in the families and 1.98 children in 1988. Among the families, there are 14.5 percent single mother families, and 4.7 percent single father families. In 2000, the data set consists of 192,743 individuals from 49,554 families. There are 1.82 adults and 2.07 children on average in the families. In 16.0 percent of the families a single mother is the head, and in 2.4 percent a single father is the head.

The data do not include disposable income for both cross sections, and therefore yearly income subject to taxation is used instead to study the material wellbeing of families. Yearly income subject to taxation does not correspond to disposable income completely. It consists of earned income, income from farms and private companies, and other taxable income such as retirement benefits, unemployment benefits, maternity leave benefits, and income from assets and property. Child allowances are not taxable income, neither is social assistance. These income sources are likely to be important for those in the lower end of the income distribution. The other main drawback is that taxes paid are not taken into consideration.

In order to reduce yearly fluctuations in the income measure, we take the mean of yearly income subject to taxation in the family from three years. In the first cross section, the income measure is the equivalent mean of family yearly income subject to taxation in 1987, 1988 and 1989. The corresponding measure for the second cross section is from the years 1999-2001. All income measures have been adjusted to year 2000 Euros, by using the cost of living index.

In order to receive an equivalent income measure, *EI*, the following equivalence scale is used in the calculations:

$$EI = \frac{\sum_i y_i}{(A + C)^{0.5}} \quad (5.1)$$

where the income, y , is totalled in the family among all the family members, $i = 1, 2, \dots, n$, and divided by the square root of the number of individuals in the family: adults, A , and children, C .

5.4.2 Time Use Data

For the time analyzes we use the Time Use Data, collected by Statistics Finland in 1987-1988 and 1999-2000. Both of the data sets are time-diary surveys which are supplemented with interviews and register information. The surveys are representative sample surveys covering persons of the age 10 and over and not living in institutions. The response interval is 10 minutes and the diary method records both primary and secondary activities.

The size of the original random sample in 1987-1988 was 9900. The data was gathered between April 1987 and March 1988. The non-response rate was 22.1%. The data includes altogether 15 000 days. The 1999-2000 Time Use Data was carried out between March 1999 and March 2000. The data included 5300 individuals and 2600 households. A total of 10 561 days is included in the final data (Väisänen, 2002; Niemi and Pääkkönen, 1989).

In the present study the data are not weighted by weekdays to get weekly aggregate figures. Ruuskanen (2004, pp. 30–32) has reported that if the diary information is multiplied or averaged to aggregate weekly figures the process introduces biases

and errors in variables. The analysis is made separately for weekdays and weekends instead, and for all, fathers and mothers. We include only families with children and we drop those families where parents are less than 18 years of age because it is expected that 18 is the limit for an adult. However, there are only a very few cases in the data belonging to this group. For the descriptive tables the sample is divided into several classes by sex, education, employment status, family type, number of children under 18 years of age and age of the youngest child.

The time use categories related to childcare in the Finnish surveys are as follows: care and supervision activities, teaching and advising a child, play and reading, having conversation with a child, helping with homework, spending time outdoors with a child, children's health services, children's leisure activities, taking a child to daycare and other travel related to childcare, and other activities. Not all of the categories are separately mentioned in both waves. In practice, we sum up all the time segments which clearly indicate that a parent has spent time with a child or children by either providing care or playing with a child or driving a child to a hobby. This guarantees that we have included at least all the time reported in the time use studies and only non-reported time has been excluded. This is the best available estimate at the moment.

It is important to include secondary activities in a study which aims to explain children's wellbeing, since a big part of childcare is carried out as a secondary activity. Secondary activities, in this study, are those activities carried out simultaneously and not in turn with the primary activity. Those secondary activities are extracted which are reported to be the same with the corresponding primary activity.⁶

With the present available data, we cannot have any information on the quality of the time spent with children even when it is an essential element in childcare. Nor do we know how many children are present at the same time, as, for example, when reading to a child. In this sense we do not receive accurate estimates for time spent per child when we divide the average time spent with children by the number of children in a family (see for example Budig and Folbre, 2004, pp. 61–62). Also, it is difficult to separate the time spent with a child alone or in conjunction with another parent (joint time use of spouses). Moreover, none of the time use studies provides information on the time people other than those living in the same dwelling with the family concerned allocate for children, educate them and take care of them. Many of these deficiencies in the data could be corrected by a data that would record time use from the point of view of a child. However, both of the data sets used (Income Data and Time Use Data) are the best available data at the moment in Finland and it can be assumed with good reason that they provide reliable estimates of children's wellbeing and development of children's wellbeing over time.

⁶In 1999-2000 only the activities included in 1987-1988 data as childcare are counted in order to preserve comparability between the two data sets.

5.5 Income and material wellbeing

When analyzing the material wellbeing of Finnish children, we look at the income of the families they live in - the yearly income subject to taxation. One simple measure of the income distribution among families is captured by the Gini coefficient. In the first cross section, the Gini coefficient is 26.0, while it is 32.2 in the second. Family income is more unequally distributed at the turn of the century than in the late 1980s. Increasing income inequality is found by many others as well, see for example Riihelä et al. (2001, 2002); Törmälehto (2004).

If we divide families into five groups according to their three-year mean equivalent family income subject to taxation, we find that the increase in income is unequally distributed among the income quintile groups (see Table 5.1). The mean equivalent income increased quite dramatically between the two years, with 22%. However, there was no increase in income in the lowest quintile group during this time period. The income increase is higher in each succeeding quintile group being 28% in the fifth quintile group. The mean equivalent income in the highest quintile group was 4 times higher than in the lowest quintile group in the first cohort. In the second cohort this figure increased to 5.6.

There are fewer parents on average in families in the low quintile groups but more children compared to the higher quintile groups. Consequently, there are fewer adults that bring in money to the children in those families. In all quintile groups the change in the number of adults from 1988 to 2000 is small. However, we can observe that the number of single-mother families has increased more in high income families than in low income families, measured in ln difference. While the number of single fathers has decreased in all but in the highest quintile group the number of single mothers has increased in all quintile groups. It must be noticed that the rate of single parenthood decreases with increasing income and single parents are still rare in the highest quintile group in both cohorts. Among the families in the lowest quintile group, 38% in 1988 and 42% in 2000 were headed by a single mother. Single fathers headed 6% of the families in the lowest quintile group in 1988, and 3% in the year 2000.

The number of children has increased in all quintile groups from 1988 to 2000 but the increase has been fastest in the lowest quintile group. Furthermore, both parents and children are somewhat older on average in 2000 than in 1988. The fertility rate increased in the late 1980s and levelled out in Finland in the mid-1990s. However, at the same time the mean age of first birth among Finnish women increased (Björklund, 2006). Consequently, those who already had children decided to have more during the depression. Women threatened by unemployment were more inclined to become mothers again while waiting for the depression to pass. Earnings-based unemployment benefits are received for 500 days only, and a parent's allowance could

be seen as a complement.

During the depression, unemployment increased dramatically, and has not decreased to the levels Finns have been used to yet. The unemployment rate was higher in 2000 than in 1988 in all quintile groups but unemployment is concentrated in the lowest quintile group.⁷ The educational level among parents has increased between the two cohorts. Women, especially, in the low income quintile groups are increasing their educational level in time. However, as a whole, parents in the low quintile groups are considerably less educated than parents in the high quintile groups. In the year 2000, more than 60% of the parents in the highest quintile group have had an education on the tertiary level.

Let us contrast these findings with mean equivalent taxable income in the different family types (see Table 5.2). Single mother families have by far the lowest equivalent mean taxable income, with the lowest standard deviation. Single father families follow. This group of families is more heterogeneous; the standard deviation is higher. Cohabiting families have the second highest mean equivalent income, and married families have the highest. Married families are the most heterogeneous group of families, with the highest standard deviation.

5.6 Parental time use with children

We now continue to analyze the amount of time parents allocate to childcare activities and how this time use changes our conception of children's wellbeing in 1987-1988 and in 1999-2000. As an econometric estimation we use the Tobit model to find out the determinants of parental time use with children (see Appendix 1 in the Chapter 5.9). We have the amount of time parent's spend with their children (minutes per day) as a dependent variable. The Tobit model is used here because the data include families with children where at least one of the parents does not participate in any of the childcare activities for one reason or another.⁸ This creates a case where we have zero values for the variable 'time spent with children'. The Tobit model takes this problem into account. The weights applied in every analysis correct both the days and the loss of the data. In the model, the exogenous variables include dummies for income quintile groups, age of a parent, employment status⁹, number of children in the family, education level of parents, age of the youngest child and family type.

⁷The rate of employment and unemployment do not total to 100. Some parents are already retired, and a share of women are still housewives.

⁸It is possible that these parents have not spent time with their children during the time of diary-keeping even when they normally do (see for example Ruuskanen, 2004, p. 34).

⁹The variable 'not employed' includes those unemployed, but also pensioners and students, and those individuals for whom an employment status was not determined.

Table 5.1: Indicators of material wellbeing in two cohorts; 1988 and 2000 and in five income quintile groups

Indicator	Year	All	Quantile groups					
			1st	2nd	3rd	4th	5th	
Gini coefficient*	1988	26.0						
	2000	32.2						
Ln difference		0.21						
Mean equiv. fam. taxable income*	1988	18,131	7,721	13,360	17,136	21,032	31,406	
	2000	22,122	7,747	14,733	19,570	24,794	43,764	
Ln difference		0.20	0.0	0.10	0.13	0.16	0.33	
Number of adults	1988	1.81	1.42	1.77	1.93	1.97	1.98	
	2000	1.82	1.44	1.79	1.92	1.96	1.97	
Ln difference		0.01	0.01	0.01	-0.01	-0.01	-0.01	
Single fathers	1988	0.05	0.09	0.07	0.04	0.02	0.01	
	2000	0.02	0.04	0.03	0.02	0.01	0.01	
Ln difference		-0.92	-0.81	-0.85	-0.69	-0.69	0.0	
Single mothers	1988	0.14	0.49	0.15	0.04	0.01	0.01	
	2000	0.16	0.52	0.18	0.05	0.02	0.02	
Ln difference		0.13	0.06	0.18	0.22	0.69	0.69	
Number of children	1988	1.98	2.03	2.02	2.00	1.82	1.77	
	2000	2.07	2.32	2.21	2.11	1.96	1.83	
Ln difference		0.04	0.13	0.09	0.05	0.07	0.03	
Mean age of fathers	1988	36.2	35.2	34.8	35.4	36.5	38.5	
	2000	39.1	36.6	37.3	38.4	39.8	41.6	
Ln difference		0.08	0.04	0.07	0.08	0.09	0.08	
Mean age of mothers	1988	34.4	33.3	33.4	33.6	34.7	36.9	
	2000	37.3	35.6	36.0	36.7	38.1	40.0	
Ln difference		0.08	0.07	0.07	0.09	0.09	0.08	
Mean age of youngest child	1988	6.2	5.4	5.5	5.7	6.6	7.6	
	2000	7.2	6.3	6.5	6.7	7.8	8.5	
Ln difference		0.15	0.15	0.17	0.16	0.17	0.11	
Fathers's employment rate %	1988	93.9	80.3	90.6	95.8	97.9	98.3	
	2000	89.7	59.0	86.1	92.6	96.9	98.4	
Ln difference		-0.05	-0.31	-0.05	-0.03	-0.05	0.0	
Mother's employment rate %	1988	79.8	62.0	70.3	82.3	89.7	93.3	
	2000	74.6	46.1	66.0	79.3	88.2	92.9	
Ln difference		-0.07	-0.30	-0.06	-0.04	-0.02	0.0	
Father's unemployment rate %	1988	2.5	7.9	4.1	1.9	1.0	0.5	
	2000	5.9	23.2	8.5	4.5	1.7	0.7	
Ln difference		0.86	1.08	0.73	0.85	0.53	0.34	
Mother's unemployment rate %	1988	4.1	7.9	5.9	3.9	2.4	0.9	
	2000	9.4	20.7	11.5	7.7	5.1	2.2	
Ln difference		0.83	0.96	0.67	0.68	0.75	0.89	
Father's education	Compulsory %	1988	31.6	43.8	37.4	35.1	31.0	17.4
		2000	20.6	35.6	25.8	21.8	17.8	10.6
Ln difference		-0.43	-0.21	-0.37	-0.48	-0.55	-0.50	
	Secondary %	1988	42.2	48.2	50.2	48.2	43.5	25.5
		2000	48.3	54.2	59.1	56.0	49.9	28.4
Ln difference		0.14	0.12	0.16	0.15	0.14	0.11	
	Tertiary %	1988	26.3	7.9	12.5	16.7	25.4	57.1
		2000	31.1	10.1	15.7	22.2	32.3	61.1
Ln difference		0.17	0.25	0.23	0.28	0.24	0.07	
Mother's education	Compulsory %	1988	30.1	40.4	33.1	30.2	28.3	19.1
		2000	16.3	28.9	18.4	14.1	12.0	8.3
Ln difference		-0.61	-0.33	-0.59	-0.76	-0.86	-0.83	
	Secondary %	1988	45.2	50.5	51.9	51.3	45.1	28.3
		2000	45.9	54.1	54.3	51.0	43.8	27.1
Ln difference		0.02	0.07	0.05	-0.01	0.07	-0.04	
	Tertiary %	1988	24.8	9.1	15.0	18.6	26.6	52.6
		2000	37.8	17.0	27.3	34.9	44.2	64.6
Ln difference		0.42	0.62	0.60	0.63	0.51	0.21	

Source: Authors' calculation from the Income Data

Note: * analyzes are weighted by number of individuals in the family

Table 5.2: Mean equivalent taxable income in different family types in the two cohorts; 1988 and 2000

Family type	Years	Mean eqv. income	Std.	N families
Married	1987–1989	19,548	17,700	30,899
	1999–2001	24,733	33,642	31,650
Ln difference		0.24		
Cohabiting	1987–1989	17,488	12,991	2,082
	1999–2001	20,663	24,043	8,793
Ln difference		0.17		
Single mothers	1987–1989	8,782	8,295	5,983
	1999–2001	9,724	13,048	7,930
Ln difference		0.10		
Single fathers	1987–1989	12,883	10,617	1,933
	1999–2001	16,675	23,264	1,181
Ln difference		0.26		

Source: Authors' calculation from the Income Data

Note: All analyzes are weighted by number of individuals in the family

The chosen model was selected on the bases of AIC criteria and the results obtained from diagnostic tests. We also compared our model and the models applied in other similar studies. The usefulness of the Tobit model is tested by comparing the results from ordinary OLS regression and Tobit regression in various cases. The differences between the results are rather considerable and it is obvious that the OLS method overestimates the time spent with children. The way in which the number of zero observations (time used with children is zero) affects the results in different special cases was also tested. The OLS and Tobit methods treat the zeros in the data differently¹⁰ and therefore the more there are zeros in each cell the greater is the difference between the OLS and Tobit estimates.¹¹

Diagnostic tests for the Tobit model are run to check the normality of error terms and model specification (see Table 5.3). The normality of residuals is required for valid hypotheses testing and correct model specification assures that no relevant variables are omitted from the model. First, we apply the Pagan and Vella (1989) test, which is a conditional moment test for assessing the null hypothesis that the residuals in the Tobit model have a normal distribution. Since asymptotic distribution of this test may produce size distortions, we use a parametric bootstrap to avoid the problem. The second test is a so-called link test by Pregibon (1980) for assessing model specification. The test is based on the idea that the model is correctly specified if we are not able to find any additional significant predictors except by chance. In

¹⁰The OLS method does not pay attention to the zeros in the data.

¹¹In almost every cell created, men had more zeros in the amount of time spent with children than women did.

Table 5.3: Diagnostic tests for Tobit Estimations

	Pagan-Vella test				Perignon link test				
	1987-1988		1999-2000		1987-1988		1999-2000		
	Test Value	Prob> Chi^2	Test Value	Prob> Chi^2	Hat^2	P-Value	Hat^2	P-Value	
Father	weekday	53.370	0.00000	weekday	21.830	0.00002	weekday	-0.0008	0.660
	weekend	19.816	0.00005	weekend	21.017	0.00003	weekend	0.0001	0.903
Mother	weekday	222.60	0.00000	weekday	59.757	0.00000	weekday	0.0006	0.145
	weekend	23.554	0.00001	weekend	16.274	0.00029	weekend	0.0002	0.734

practice, after the estimation command, the test uses predicted value and predicted value squared as the predictors to rebuild the model. If the model is correctly specified then the squared residual, Hat^2 , has no explanatory power.

The Pagan and Vella (1989) conditional moment test is rejected in all the cases (in Table 5.3). The failing of the test, however, is not considered to be critical since the test is sensitive to an increase in sample size (see for example Ruuskanen, 2004, p. 175). The link test is passed in all the cases. The results of the tests are fairly satisfactory considering the varied structure of weekdays and weekend data and data from different years.

Statistics drawn for the years 1987-1988 (see Tables 5.4 and 5.5) indicate that on weekdays fathers spend 32 minutes/day on average in all childcare activities when the corresponding figure for mothers is 92 minutes/day on average. These figures vary considerably depending on the age of the youngest child, parents' education level or employment status, the number of children or the family type. On weekends the time spent on childcare is 42 minutes/day for fathers and 74 minutes/day for mothers (Table 5.5). In every population group the father/mother ratio increases when we move from weekdays to weekends. This means that gender difference balances out during weekends when the father/mother ratio is 0.57 compared to the same ratio on weekdays 0.35 (see Tables 5.6 and 5.7). Fathers clearly increase their time spent with children during weekends. Fathers even spend more time than mothers on childcare during weekends in categories 'unemployed' and 'youngest child over 7 years of age'.

The Tobit estimates in Tables 5.8 and 5.9 suggest that the income quintile groups do not explain parental time use on childcare in 1987-1988. At the 1% level, only the first income quintile group for mothers on weekdays is positively significant. This proves that other factors than the amount of money earned from the labor market

determine the time allocated to childcare. On the other hand, there is a significant link between the increasing age of a parent and the concurrent decreasing amount of time spent with children. This fact is partly very natural since the older the parents are, the older are their children, and older children need less attention from their parents than younger ones do. In Tables 5.8 and 5.9 there are only two cases in the age category 54-64 where the age variable is not significant.

The Tobit estimates verify that the age of the youngest child has a strong effect on parental time use both on weekdays and on weekends (Tables 5.8 and 5.9). Children under school age need a greater amount of time from their parents than older children do. This is also obvious when looking at Tables 5.4 and 5.5, which are drawn directly from the Time Use Data. Similarly, the educational level does have a significant positive impact on the amount of time parents allocate to childcare (Tables 5.8 and 5.9). Higher educated parents (graduates) spend quite considerably more time with their children than parents with lower education (see also Tables 5.4 and 5.5).

Employed parents tend to spend less time with their children compared to unemployed parents (Tables 5.8 and 5.9). However, mothers taking care of their household spend a greater amount of time with their children than parents in any other employment category.¹² The influence of an employment status is more explicit in Tables 5.4 and 5.5. The number of children has a significant effect only for women and only for weekend data in 1987-1988 (Tables 5.8 and 5.9). The result is plausible when we look at the figures in Tables 5.4 and 5.5.

The variable 'family type' turned out to be very tricky in the Tobit analysis, since it is not likely that those married spend much less time with their children than do single parents like the results suggest (Tables 5.8 and 5.9). In fact, Tables 5.4 and 5.5 show that single parents spend quite systematically less time with their children than do married/cohabiting parents. The mixed result of the Tobit model is explained by the very small number of single parent fathers in the data and the high variance of the results for fathers. In Tables 5.4 and 5.5 the standard error of single parent fathers is many times larger than the standard error for married/cohabiting fathers. This means that the amount of time single parent fathers spend with their children varies on a large scale. For mothers, the Tobit estimate is significant and positive on weekdays, meaning that married/cohabiting mothers spend more time with their children than do single mothers. On weekends, this effect is no longer significant.

When we look at the corresponding figures for the year 1999-2000 (see Tables 5.4 and 5.5) we can see that the time spent with children has increased compared to the results in 1987-1988 for both fathers and mothers. The average figure for fathers is now 43 minutes/day on weekdays and 55 minutes/day on weekends. Mothers spend 107 minutes/day on weekdays and 85 minutes/day on weekends on childcare.

¹²What is interesting is that there are hardly any fathers having recorded 'taking care of a household' as the employment status in either of the years.

Table 5.4: Average time in minutes/day spent with children in various population groups in 1987-1988 and 1999-2000, and ln difference between years, WEEKDAYS (Observations less than 10 are omitted.)

	all				father				mother				
	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	ln diff.
Age of a youngest child	64	1.75	79	2.97	32	1.37	43	2.53	92	2.90	107	4.71	0.15
	104	2.74	127	4.81	49	2.12	65	4.05	157	4.28	179	7.27	0.13
	14	0.85	19	1.33	9	0.90	13	1.51	18	1.35	24	1.99	0.29
Education	43	1.86	27	2.76	25	1.60	23	3.31	64	3.46	32	4.71	-0.69
Elementary	80	0.62	86	4.64	33	3.11	51	4.23	106	6.76	115	7.41	0.08
Comprehensive/ Middle school	84	4.22	100	5.60	44	3.65	47	4.95	113	6.44	127	7.72	0.12
Graduate	55	1.73	59	2.62	32	1.40	41	2.60	79	3.05	76	4.39	-0.04
Employment status	90	13.27	92	11.31	51	17.66	56	14.25	113	17.68	106	14.77	-0.06
Unemployed	185	9.49	261	14.57	.	.	.	.	185	9.49	272	14.64	0.39
Taking care of own household	50	2.40	60	4.09	28	1.92	33	3.69	69	4.08	80	6.37	0.15
Number of children	68	2.75	90	4.82	35	2.26	51	4.33	98	4.52	122	7.61	0.22
under 18	93	5.70	93	8.02	36	3.69	44	6.11	144	8.74	135	12.79	-0.06
years of age	68	11.40	117	23.05	34	12.90	48	13.81	110	16.94	179	37.55	0.49
Family type	64	1.82	80	3.11	32	1.37	43	2.58	96	3.14	114	5.11	0.17
Married/cohabit Single parent	56	5.76	69	10.58	40	17.67	26	13.17	58	6.09	74	11.72	0.24

Source: Authors' calculation from the Time Use Data

Table 5.5: Average time in minutes/day spent with children in various population groups in 1987-1988 and 1999-2000, and ln difference between years, WEEKEND (Observations less than 10 are omitted.)

	all				father				mother				
	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	1987-1988 time	1987-1988 std.error	1999-2000 time	1999-2000 std.error	ln diff.
Age of a youngest child	97	4.03	121	4.43	63	4.38	87	5.35	136	6.31	150	6.49	0.10
	10	1.17	11	1.10	11	2.13	13	2.17	10	1.25	10	1.04	0.00
Education	30	2.64	20	2.98	25	2.92	19	3.76	39	4.88	21	4.85	-0.62
	70	5.97	81	4.39	49	7.49	66	5.50	83	8.07	94	6.56	0.12
	89	6.27	89	5.09	72	7.68	72	7.17	104	9.23	98	6.73	-0.06
Employment status	51	2.55	57	2.60	41	2.92	55	3.56	63	4.19	59	3.79	-0.07
	70	19.98	62	10.54	82	46.12	56	18.36	65	20.87	65	12.98	0.00
	183	13.72	219	13.49	.	.	.	.	183	13.72	223	13.68	0.20
Number of children under 18	38	3.12	65	4.27	33	3.80	51	5.63	43	4.81	74	6.12	0.54
	62	4.22	75	4.40	43	4.49	54	5.12	83	6.95	93	6.71	0.11
	86	7.57	68	6.65	56	9.59	58	7.96	113	10.76	78	10.24	-0.37
years of age	99	18.92	120	18.96	65	23.51	96	25.14	152	27.74	141	27.41	-0.08
Family type	60	2.70	74	2.91	42	2.93	56	3.49	80	4.45	90	4.45	0.12
	28	5.18	54	9.82	27	13.95	29	9.18	28	5.59	58	11.09	0.73

Source: Authors' calculation from the Time Use Data

Table 5.6: Father/mother ratio in various population groups and ln difference, WEEKDAY

		Father/Mother ratio WEEKDAY		
		1987-1988	1999-2000	ln difference
	Average	0.35	0.40	0.13
Age of a youngest child	<=7	0.31	0.36	0.15
	>7	0.50	0.54	0.08
Education	Elementary school	0.39	0.72	0.61
	Middle school or Comprehensive school	0.31	0.44	0.35
	Graduate	0.39	0.37	-0.05
Employment status	Employed	0.41	0.54	0.28
	Unemployed	0.45	0.53	0.16
	Taking care of own household	.	.	.
Number of children under 18 years of age	1	0.41	0.41	0.00
	2	0.36	0.42	0.15
	3	0.25	0.33	0.28
	4	0.31	0.27	-0.14
Family type	Married or cohabit	0.33	0.38	0.14
	Single parent	0.69	0.35	-0.68

Source: Authors' calculation from the Income Data

Note: All analyzes are weighted by the number of individuals in the family

Table 5.7: Father/mother ratio in various population groups and ln difference, WEEKEND

		Father/Mother ratio WEEKEND		
		1987-1988	1999-2000	ln difference
	Average	0.57	0.65	0.13
Age of a youngest child	<=7	0.46	0.58	0.23
	>7	1.10	1.30	0.17
Education	Elementary school	0.64	0.90	0.34
	Middle school or Comprehensive school	0.59	0.70	0.17
	Graduate	0.69	0.73	0.06
Employment status	Employed	0.65	0.93	0.36
	Unemployed	1.26	0.86	-0.38
	Taking care of own household	.	.	.
Number of children under 18 years of age	1	0.77	0.69	-0.11
	2	0.52	0.58	0.11
	3	0.50	0.74	0.39
	4	0.43	0.68	0.46
Family type	Married or cohabit	0.53	0.62	0.16
	Single parent	0.96	0.50	-0.65

Source: Authors' calculation from the Income Data

Note: All analyzes are weighted by the number of individuals in the family

Table 5.8: Tobit estimation results, 1987-88, WEEKDAY

Variable		Father	Std.Err.	Mother	Std.Err.
Intercept		95.63*	23.86	135.39*	14.62
Income quintile groups	2.	6.49	7.37	47.16*	9.50
1. omitted	3.	15.48**	7.64	6.28	9.93
	4.	2.65	7.92	3.98	10.52
	5.	-5.18	8.66	7.63	11.21
Age variable,	35-43	-9.80***	5.74	-27.78*	7.31
18-34 omitted	44-53	-16.46**	8.41	-66.64*	11.08
	54-64	-20.01	16.26	-137.93*	29.81
Age of the youngest child,	>7	-81.65*	6.20	-146.13*	7.51
<7 omitted					
Graduate,		21.97*	6.32	16.06**	7.17
Other than Graduate omitted					
Employment status,	Employed	-17.29***	10.23	-26.23**	11.04
Not employed omitted	Taking care of household			51.78*	13.81
Number of children,	2-3	3.17	4.99	5.12	6.47
1 omitted	>=4	-18.40	14.34	18.73	17.78
Family type,		-52.48**	21.53	20.33**	10.19
Single parent omitted					
Log likelihood		-4943.59		-8441.45	

Source: Authors' calculation from the Time Use Data

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level

Table 5.9: Tobit estimation results, 1987-88, WEEKEND

Variable		Father	Std.Err.	Mother	Std.Err.
Intercept		176.68*	49.45	60.59**	25.67
Income quintile groups	2.	-4.97	16.15	7.78	14.71
1. omitted	3.	5.67	16.12	-11.15	16.54
	4.	33.47**	16.09	-0.20	16.43
	5.	25.25	18.58	12.47	17.59
Age variable,	35-43	-41.14*	12.23	-36.99*	11.82
18-34 omitted	44-53	-64.53*	18.41	-80.21*	20.29
	54-64	-89.12**	35.49	-22.66	34.62
Age of the youngest child,	>7	-108.65*	14.39	-150.79*	12.70
<7 omitted					
Graduate,		40.69*	13.20	27.77**	12.08
Other than Graduate omitted					
Employment status,	Employed	-53.64**	24.81	27.31	19.89
Not employed omitted	Taking care of household			104.83*	22.92
Number of children,	2-3	6.64	11.29	24.67**	10.47
1 omitted	>=4	21.73	22.75	98.12*	24.77
Family type,		-87.33**	40.64	12.19	17.17
Single parent omitted					
Log likelihood		-1955.70		-2830.93	

Source: Authors' calculation from the Time Use Data

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level

Table 5.10: Tobit estimation results, 1999-2000, WEEKDAY

Variable		Father	Std.Err.	Mother	Std.Err.
Intercept		82.44*	28.86	152.04*	17.80
Income quintile groups	2.	4.39	12.96	-17.29	14.26
1. omitted	3.	-11.05	13.21	-17.44	16.09
	4.	-6.92	13.63	-3.73	16.68
	5.	-3.78	14.02	-15.93	17.73
Age variable,	35-43	-20.71**	10.00	-53.99*	11.43
18-34 omitted	44-53	-31.19**	12.37	-76.06*	15.75
	54-64	-23.35	23.78	-134.72*	47.36
Age of the youngest child,	>7	-87.41*	10.21	-114.45*	12.22
<7 omitted					
Graduate,		12.55	9.15	49.96*	9.35
Other than Graduate omitted					
Employment status,	Employed	-30.07**	14.20	-12.66	15.26
Not employed omitted	Taking care of household			115.93*	17.15
Number of children,	2-3	16.27***	8.40	29.93*	9.64
1 omitted	>=4	18.15	19.84	87.23*	24.50
Family type,		-5.38	25.92	-13.87	12.79
Single parent omitted					
Log likelihood		-2253.45		-3965.49	

Source: Authors' calculation from the Time Use Data

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level

Table 5.11: Tobit estimation results, 1999-2000, WEEKEND

Variable		Father	Std.Err.	Mother	Std.Err.
Intercept		105.71*	40.85	113.12*	19.01
Income quintile groups	2.	6.15	20.23	14.01	15.05
1. omitted	3.	0.05	20.72	13.78	16.90
	4.	15.72	20.73	21.62	17.55
	5.	16.91	21.78	31.56***	18.74
Age variable,	35-43	-34.35**	14.63	-43.33*	11.77
18-34 omitted	44-53	-117.45*	19.41	-91.15*	17.24
	54-64	-95.44**	39.97	-102.82***	53.53
Age of the youngest child,	>7	-135.38*	15.93	-161.08*	13.21
<7 omitted					
Graduate,		42.94*	13.50	33.03*	9.90
Other than Graduate omitted					
Employment status,	Employed	7.22	23.25	0.23	16.32
Not employed omitted	Taking care of household			115.18*	18.00
Number of children,	2-3	-15.56	12.81	-13.60	10.21
1 omitted	>=4	49.01	30.43	28.02	25.02
Family type,		-33.52	35.58	0.13	14.03
Single parent omitted					
Log likelihood		-2081.93		-3272.24	

Source: Authors' calculation from the Time Use Data

Note: * significant at 1% level, ** significant at 5% level, *** significant at 10% level

In a similar manner with the year 1987-1988, the father/mother ratio is higher on weekends than on weekdays in 1999-2000, in every population group.

The Tobit estimates in Tables 5.10 and 5.11 again suggest that income does not determine parental time use with children. However, similarly with the results in 1987-1988, the increasing age of a parent clearly decreases the amount of time spent on childcare. The estimates are significant except in one case in the age group of 54-64 for fathers. The age of the youngest child has a significant effect on parental time use for both men and women and on weekdays and on weekends which is also evidenced in Tables 5.4 and 5.5. The younger the child, the more time parents devote to her/his care.

The educational level has a significant positive impact on the amount of time parents spend on childcare except for men on weekdays (Tables 5.10 and 5.11). Highly educated parents tend to allocate a greater amount of their time on childcare activities than do low-educated parents. The same trend is evident in Tables 5.4 and 5.5 as well. The employment status now has mixed results according to Tobit estimates (Tables 5.10 and 5.11). Only employed fathers have a significant negative estimate on weekdays. Mothers taking care of their household spend more time with their children than other employment categories, which is quite obvious. The number of children has a significant effect only for weekdays in 1999-2000, except for men having 4 or more children (Tables 5.10 and 5.11). Two to three children in a family require more parental time devotion compared to families with only one child. Family type has no significant impact in 1999-2000 according to Tobit estimates.

In the above mentioned tables we counted both primary and secondary activities together. As a comparison we counted the same figures with only primary time included. The results show that the total amount of time spent on childcare naturally drops but the direction of the changes in time use between years, categories, weekdays and weekends remains the same.

The Tobit marginal effects are presented in Tables 5.12 and 5.13. Here the marginal effects are calculated at the mean of the independent variable. Only marginal effects that are statistically significant are reported. As an example, the predicted time use in 1987-1988 for a mother belonging to a first income quintile group, being not employed, having one child, having a degree other than graduate, spends 119 minutes/day on childcare activities. This figure increases by 29 minutes if her employment status alters to 'taking care of household' and by 8 minutes should she have a graduate degree.

Table 5.12: Tobit marginal effects for 1987-1988 data

		1987-1988			
		weekday		weekend	
		father	mother	father	mother
mean time use in childcare		61	119	78	99
Income groups 1. omitted	2.	.	25	.	.
	3.	6	.	.	.
	4.	.	.	11	.
	5.	.	.	.	.
Age variable, 18-34 omitted	35-43	-3	-14	-14	-15
	44-53	-5	-30	-19	-29
	54-64	.	-51	-24	.
Age of the youngest child, <7 omitted	>7	-27	-73	-35	-64
Graduate, Other than graduate omitted		8	8	14	12
Employment status, Not employed omitted	Employed	.	-14	-20	.
	Taking care of household	-	29	-	55
Number of children, omitted	2-3	.	.	.	10
	>=4	.	.	23	52
Family type, Single parent omitted		-22	10	-37	.

Table 5.13: Tobit marginal effects for 1999-2000 data

		1999-2000			
		weekday		weekend	
		father	mother	father	mother
mean time use in childcare		72	130	95	109
Income groups 1. omitted	2.	.	.	.	.
	3.	.	.	.	.
	4.	.	.	.	.
	5.	.	.	.	.
Age variable, 18-34 omitted	35-43	-8	-29	-11	-19
	44-53	-11	-38	-36	-36
	54-64	.	-54	-26	-35
Age of the youngest child, <7 omitted	>7	-32	-61	-44	-70
Graduate, Other than graduate omitted		.	27	14	15
Employment status, Not employed omitted	Employed	-12	.	.	.
	Taking care of household	-	74	-	61
Number of children, omitted	2-3	6	16	.	.
	>=4	.	56	.	.
Family type, Single parent omitted		.	.	.	.

5.7 Changes and trends in the wellbeing of children

Looking at the differences between income quintile groups in Table 5.1, we can find that the lowest quintile group is disadvantaged in many ways compared to the highest quintile group. The income level in the lowest quintile group has been stagnant over the years while income has increased considerably in the highest quintile group. The mean income of all families with children increased during the years studied, but at the same time income inequality increased dramatically.

In the year 2000, there is a slightly greater number of families headed by a single parent than in 1988. In the highest quintile group, the two-parent family is the norm, where both parents are well educated and have a job. In the lowest quintile group, two families out of five are headed by a single parent (mainly by a single mother). Furthermore, parents in low quintile groups (especially in the lowest quintile group) have a low educational level and a high risk of unemployment. Parents in the lowest quintile group are more likely to have a lower level of education than the average parent. In these two Income Data cohorts, single parents have a doubled risk of unemployment compared to families where both parents are present. Single parenthood and unemployment are two stressful experiences, both for parents and for children, and a sign of instable conditions in the family.

All these results suggest that the material wellbeing of children is divided unequally between families and the trend from 1988 to 2000 shows that this inequality has increased. The level of the material wellbeing of children is much worse in low income households compared to high income households. It is obvious that the material wellbeing of children in the lowest quintile group has also decreased in time relative to other quintile groups.

From the Time Use Data we can conclude that the total time parents spend with their children has increased from 1987-1988 to 1999-2000 (Tables 5.4 and 5.5). In 1987-1988 the average time spent on childcare for all parents was 64 minutes/day on weekdays and 58 minutes/day on weekends and in 1999-2000 the corresponding figures are 79 minutes/day on weekdays and 72 minutes/day on weekends. The increase, measured in ln difference, is greater for fathers than for mothers both on weekdays and on weekends. In percentage terms the increase on weekdays for fathers is 26% and for mothers 14% and on weekends the increase is 24% for fathers and 13% for mothers. This is also shown in Tables 5.6 and 5.7, where we can see that the father/mother ratio has decreased in almost every time use category. This means that the gender difference balances out not only during weekends but also in time. In both years the total average time spent on childcare activities decreases slightly during weekends as a result of mothers spending less time with their children during weekends than on weekdays. However, in total, mothers still spend considerably

more time on childcare activities compared to men.

Both men and women with elementary education are spending less time with their children in 1999-2000 than in 1987-1988 (Tables 5.4 and 5.5). This is, of course, alarming, since as we noticed earlier, those belonging to the lowest income quintile group have also the lowest education level. According to Tobit estimates (Tables 5.8, 5.9, 5.10 and 5.11) education increases the time spent with children.

Employed fathers have increased time spent with their children (Tables 5.4 and 5.5) but, on the other hand, employed mothers have decreased their time spent on childcare from 1987-1988 to 1999-2000 both on weekdays and on weekends. Unemployed fathers have slightly increased time spent on childcare on weekdays but otherwise the unemployed, both fathers and mothers, have decreased the time allocated to childcare (or have the same figure as earlier).

The number of children has mixed results on parental time use but we can see that both men and women have increased time on childcare in one and two child families and in four and more child families from 1987-1988 to 1999-2000. In the families where the youngest child is less than 7 years of age the time use on childcare has increased during weekends more than the time spent on childcare when the youngest child is over 7 years of age. This trend is the opposite when we look at the weekday data.

Based on the Time Use Data, the wellbeing of children has increased due to increased parental time use on childcare activities (total average time spent on childcare). We can also expect that the decreased gender differences in time use on childcare will positively affect children's wellbeing. But then again, the decrease in time use on childcare of those parents having only elementary education means that we have another fact showing that children belonging to families in the lowest income quintile group are losing in terms of children's wellbeing. There is weak evidence that single mothers have increased their time allocation on childcare and if this is true it would positively affect children's wellbeing, especially in the lowest income quintile group. On the other hand, those who are married/cohabiting have increased their time spent with children and they spend a greater amount of time on childcare in both years than single parents do, which again widens the gap in children's wellbeing between low and high income families.

Another fact is that the proportion of the children between 0 and 6 years of age participating a communal day care has increased between 1987 and 2001. In 1987 42% of children under school age participated communal day care and in 2001 the corresponding figure was 48%. The percentage has varied between years being at its highest at 50% in 1998 and 1999 and at its lowest at 39% in 1993¹³. One would expect that this trend had reduced the time parent's allocate on childcare but our

¹³Information provided by STAKES, National Research and Development Centre for Welfare and Health

evidence shows the opposite. The result is interesting especially when we talk about the effects on day care on children's development and parent child relationship. It seems that parental time with their children is not substituted by public day care when a child is placed on a communal day care (see Björn Gustafsson and Urban Kjulin (1994)).

5.8 Concluding remarks

Based on the results of the present study we have to conclude that the distribution of children's wellbeing in Finland is increasingly less equal in 2000 than what it was in 1988. The most disadvantaged of all are the children belonging to families in the lowest income quintile group. These families are headed by single parents more often than other quintile groups, the parents have a low level of education, and unemployment is concentrated in this group as well.

The most advantaged in terms of children's wellbeing are children in families in the highest income quintile group. In the highest income quintile group, the parents are well educated, and highly educated parents spend a greater amount of time with their children than parents with a low level of education. High income families are formed of two adults, most of whom are married, and, again, married or cohabiting parents spend more time with their children than single parents do. Having a job does not only imply stable incomes; it also creates a certain stability in life.

Finnish children have a high risk of being faced with a divided society: those who have it all, and those who are without. In a Nordic welfare state, Finland is counted as being, the state has not managed to moderate the negative effects of the depression, i.e. the market failure in the 1990s. On the contrary, as Riihelä et al. (2002) write, the state has even aggravated inequality. This sits ill with the goals of equality that once prevailed in Finland. The state has failed to respond to the changes in society.

However, on the basis of the time use study we noticed that the total time spent on childcare has increased. This means that by increasing the time allocated to childcare, families with children have responded to changes in society, the market and family life. Gender differences have balanced out as well. This would suggest that, on the basis of parental time use, average children's wellbeing has increased. On the other hand, the differences in time use between various population categories are extensive and in many cases strengthen the unequal distribution of material wellbeing and thus the unequal distribution of children's wellbeing.

5.9 Appendix 1. The Tobit model

When using the Time Use Data we encounter the problem of zero observations. However, there are a number of methods to be used when trying to fix this phenomenon. In the present paper the Tobit model is applied. The Tobit model is also known as theensored normal regression model. We apply the Tobit model to find out the determinants of parental time use with children. In the Tobit model the same parameters are applied to describe the selection and outcome, unlike in the Heckman model (Ruuskanen, 2004, pp. 34–37, 167-168). We have a latent, unobserved, variable y_i^* for which we can specify a regression model

$$y_i^* = \beta x_i + u_i$$

where x_i is the vector of explanatory variables and β is the vector of parameters. The observed y_i is defined as

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{else} \end{cases}$$

$$u_i \sim IN(0, \sigma^2)$$

$y_i^* > 0$ is for individuals who spend time with their children and 0 for those who do not spend any time with their children according to the Time Use Data. However, in this case the 0 values are a result of individual decisions; they are not a result of censoring. We apply the Tobit model despite this and despite the fact that it is not possible to observe negative values. It is anticipated that Tobit is still the best available method for the present analysis.

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