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Finnish experiences in 1995–2008

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ABSTRACT

A large register based Finnish income panel data with detailed information on the composition of income over a 14 year time period, 1995–2008 is used to examine Finnish income mobility and income risk. This paper first considers measures of income mobility which are based on the degree of inequality (Gini coefficient) reduction over time (Shorrocks 1978). Mobility in disposable income is decreasing with age, and with a further drop near retirement age. One observes a decrease in income mobility if the late 1990's are compared with 2000's. Permanent income inequality has increased in five year cumulated disposable incomes but not in factor incomes. If mobility is measured in absolute terms, there is little change, and the decrease in income mobility seems to be related to the rise in the inequality in cumulated incomes.

In estimating relative risk premiums in average income, the education level, socio-economic status and age are controlled for. Old age people have more stable incomes but contrary to conventional wisdom are exposed to some income risk. The paper presents estimates on the redistribution effect by age using differences between Gini coefficients of equivalised factor and disposable household income. Certainty equivalent income concepts are utilised to get some information on redistribution of risk. Young adults, 15–29 years old and elderly near retirement age 55–59 years old, seem to benefit most from implicit income insurance by public sector. But all age groups, including old age people gain from redistribution in certainty equivalent income relative to unadjusted redistribution of cash. Finding reduced income redistribution over the sample period is robust to a particular value of the degree of risk aversion assumed. It seems safe to conclude that the observed decrease in mobility in disposable household income which is attributed to reduced redistribution and could have shown as lowered income risk has not off-set the decrease in redistribution in cash. The results suggest that distribution of lifetime income has widened.

Key words: income mobility, risk-premium, inequality, redistribution, age

JEL classification: D31, D63, H24, H55, I31, J14

ABSTRAKTI

Tutkimuksessa tarkastellaan laajan, rekisteripohjaisen tulopaneeliaineiston avulla ikäryhmittäistä tuloliikkuvuutta ja tuloriskejä vuosina 1995–2008. Aineisto sisältää tietoja tulojen rakenteesta, omaisuus- ja palkkatuloista ja muista, uudelleenjakoon vaikuttavista tulonlähteistä, julkista tulonsiirroista ja maksetuista veroista. Tutkimuksessa tuloliikkuvuuden mittaaminen perustuu siihen, missä määrin tuloerot pienenevät (Gini-kerroin), kun mittaus käyttää pidemmän aikavälin tuloja eikä vuosittaisia tietoja (Shorrocks 1978). Käytettävissä tuloissa mitattu (suhteellinen) tuloliikkuvuus vähenee iän myötä ja siinä on selvä alenema eläkkeelle siirtymisen yhteydessä. Tuloliikkuvuus on vähentynyt 2000-luvulla aiemmasta. Käytettävissä olevissa tuloissa mitatut tuloerot ovat kasvaneet pidempiaikaisia (viiden vuoden keski-) tuloja tarkasteltaessa. Tuotannontekijätulojen osalta tällaista muutosta ei Suomessa ole ollut. Jos tuloliikkuvuutta tarkastellaan suhteellisen mitan sijaan absoluuttisena, käy ilmi, että suhteellisena havaittu muutos liittyy pidemmän aikavälin tuloerojen kasvuun eikä absoluuttisena mitatussa arvossa näy muutosta.

Tutkimuksessa estimoidaan kotitalouksien suhteellisia tuloriskejä vakioimalla koulutustason, sosio-ekonomisen aseman ja iän vaikutus. Vanhuuseläkkeellä olevilla on muita ikäryhmiä vakaammat tulot, mutta myös he kohtaavat tuloepävarmuuteen liittyviä riskejä. Lisäksi tutkimuksessa arvioidaan ikäryhmittäin tulojen uudelleenjakoa. Tässä mittarina ovat (ekvivalenttien) tuotannontekijätulojen ja käytettävissä olevien tulojen Gini-kertoimien erotukset. Riskipreemiolla korjattuja tuloja käyttäen saadaan samalla arvioita tuloriskien uudelleenjaosta. Nuoret aikuiset, 15–29-vuotiaat ja ikääntyvät, 55–59-vuotiaat, näyttävät hyötyvän eniten julkisen sektorin implisiittisestä tulovakuutuksesta. Mutta myös muut ikäryhmät saavat lisähyötyä tästä tulovakuutuksesta, verrattaessa tuloksia konventionaaliseen rahassa mitattuun uudelleenjakoon. Kokonaisuudessaan tulojen uudelleenjako on heikentynyt tarkasteluperiodin aikana, ja tulos on riippumaton siitä, mitä oletusarvoja riskiaversioparametrista käytetään. Vaikka tuloliikkuvuuden alentuma olisi voinut pienentää tuloriskiä ja vaikuttaa näin riskivakioituun tuloon, niin muutos tulojen uudelleenjaossa dominoi tätä vaikutusta riskivakioituihin käytettävissä oleviin tuloihin perustuvaan toimeentulon jakaumaan. Tulokset viittaavat siihen, että elinkaarituloissa mitatut tuloerot ovat kasvaneet.

Asiasanat: tuloliikkuvuus, riskipreemiot, tuloerot, uudelleenjako ja ikä

CONTENTS

1 Introduction

Since early 1980s there has been widening annual income inequality in the United States and in the United Kingdom. In some other countries, such as Germany and Japan, the increase up to the early 1990s has been more modest, and Canada, France and Italy show no overall rise over the same period (Atkinson 2000). In addition, there has been surge in top incomes in some countries over the last 10–20 years. At the other end of the income distribution it has been documented that relative poverty rates have increased during the same time period as the top incomes have soared. Top incomes have been most affected in Anglo-Saxon countries, including USA, UK and Canada while in Europe Netherlands, France and Switzerland display hardly any change in top income shares (Atkinson & Piketty 2007).
In Finland annual income inequality rose significantly during the latter part of the 1990s (Riihelä et al. 2001). The period of major income equalization from mid 1960s to the mid 1990s has been reversed, taking the values of the Gini coefficient to levels of inequality found 40 years ago.[1]

As the widening income inequality has entered policy discussions, it is often argued that policy-makers should direct more attention towards information about mobility patterns than cross-sectional measures of income inequality. The reasoning is based on the equalization argument: if increased annual income inequality is associated with increased income mobility, it is possible that inequality of income measured over several years has fallen.[2]

Measuring economic mobility gives information about short term changes of individuals moving in the income distribution. The question, what income mobility is, and how it should be measured, has been given many interpretations in the literature (see Fields 2008, 2010). There is no consensus on how income mobility should be measured. A great variety of aspects and different methods involved in mobility studies are considered in Fields & Ok (1999). First, there exist alternative measurement scales, change in income ranks or in actual income; absolute or relative change. Second, one may weight the possible directions of income change (up vs. down) differently, or emphasise particular status in the income distribution, e.g. poverty. Last, one can have several choices for the reference (status quo) point for mobility measurement. In this paper the average over a time span is used as a reference point, but it has alternatives. One may be based on the current income vs. future incomes, another reference may be based on a more sophisticated prediction of future incomes (possibly with a deterministic or stochastic trend) than the simple average, which is used in this paper. The choices are reflected in a number of studies addressing income

1 Observing the rise of mega-incomes for the very top earners in the US, Piketty & Saez (2003) conclude that “the coupon-clipping rentiers have been overtaken by the working rich”. In Finland the opposite seems true. The decline in income tax progressivity since the mid 1990s and the unprecedented increase in the share of property income are important factors explaining both the increase in income inequality and top income shares in Finland in the late 1990s (Riihelä et al. 2008). In Finland, the 1993 tax reform, introducing the Nordic dual income tax model, created strong incentives to shift labour income to property income for those in the highest marginal tax brackets (Lindhe et al. 2004; Pirttilä & Selin 2006). The Finnish experience shows how changes in public policy instruments, taxation of capital, may have important effects on the income distributions.

2 In Finland income mobility has been studied previously by Riihelä & Sullström (2002) with two-year rotating panel survey data. More recently, Suoniemi & Rantala (2010) have used a similar register-based income panel data, in 1995–2004, as in the present paper.

mobility from different angles. Jenkins (2011) is an excellent monograph which offers a thoughtful and careful empirical treatment of most aspects in British income mobility.

In a given year, people may have incomes which are transitorily high or low for reasons such as unemployment, illness, youth, good or bad luck, or exceptional economic events. One of the primary motivations for economic mobility studies is to measure the extent to which longer-term incomes are distributed more or less equally than incomes in a single year. Shorrocks (1978) has emphasised: “Mobility is regarded as the degree to which equalization occurs as the period is extended. This view captures the prime importance of mobility for economists.” Krugman (1992) adds: “If income mobility were very high, the degree of inequality in any given year would be unimportant, because the distribution of lifetime income would be very even.” In contrast, a society with a rigid income distribution where everybody stays in the same position year after year is commonly regarded as inferior to a more mobile society, see Friedman (1962). An increase in income mobility tends to reduce inequality in lifetime income relative to that in a single period and is an indication that the economy is performing better.

Therefore, annual income distributions may give an incomplete and sometimes even distorted picture of longer-term economic well-being. Similarly, the recent rise in income inequality would be of less importance if it had been accompanied with a rise in mobility. One should first take into account the role of income mobility in the recent rise in annual income inequality before the rivalling hypothesis on the explanations to the rise in inequality and its economic consequences are considered.[3] For example, to seriously evaluate the various, multi-faceted hypotheses on the relationship between economic growth and income inequality, one should be careful enough to specify whether one should measure annual, possibly transitory, change in inequality or the change measured over a longer (possibly life long) time span (on these hypothesis, see Aghion et al. 1999 and Brandolini & Rossi 1998).

More generally, income mobility may be viewed as a coin with two sides. On one hand, mobility may reduce long term inequality. On the other hand, mobility means fluctuations in individual incomes. The shift in assessment from annual to multi-period inequality means that future uncertainty about incomes must be accounted for in the evaluation (Creedy & Wilhelm 2002). Faced with less than perfect capital markets, forward-looking risk-averse economic agents view rise in income fluctuations as an increase in income risk which lowers economic well-being in comparison with a steady flow of income. Therefore, interest in mobility also raises the issue of predictability, or uncertainty. Uncertainty related to income fluctuations is a key dimension of income mobility. A completely mobile society would mean complete economic insecurity.

3 Among the hypotheses about the causes of these changes are the shift from manufacturing to service production, technological change, and expanding international trade and finance. To take an example, skill biased technological change, particularly in the advent of computerised technologies, has shifted labour demand in favour of relatively high skilled and more educated workers and has driven up the wages (employment) of the higher skilled and driven down those of the lower skilled (see Atkinson 2000, for exposition and criticism of this explanation). However, the income increase is highly concentrated among the very highest earners (Atkinson & Piketty 2007). The theory is not able to explain the rise of working rich. Instead, Piketty & Saez (2003) give a central role to taxation, executive compensation and shocks to capital returns and argue that changing social norms and power are important factors in explaining the recent increase in income inequality and top income shares.

Inequality has many dimensions, wages, earnings, income and final consumption. Variability in, say, wages, is mediated by multiple mechanisms of self-insurance. First, the household can adjust supply of working hours. Second, joint earnings of the household are affected by public policies, progressive taxation, social insurance and transfers. Third, informal contracts and voluntary gifts between households lend added insurance. Fourth, the household can draw on their accumulated assets to temporarily finance consumption. Furthest in line are partial adjustments in replacements of durable goods and semi-durables. The last mechanism is particularly relevant for poor households often in the absence of simple credit market.

What is the extent of Finnish income mobility? Has there been a change in mobility as annual income inequality has increased, and has the income risk been affected? How much do families need insurance against adverse shocks? How much income insurance does government achieve? Are individuals of different age in the same situation? Are pensioners a special case? The purpose of this paper is to illustrate how income panel data can be used to answer these and similar questions. Since there is no available data on consumption, this paper confines to analysing that part of income smoothing which is affected by the two first mechanism of self-insurance (see also Carroll 1994, Carroll & Samwick 1998, and Hoynes & Luttner 2011).

We examine the dynamic income process of three different time periods in Finland, 1995–1999, 2000–2004 and 2004–2008 with a large panel data set. First, the equalization effect of income mobility in the three time periods is discussed and their age profiles are examined. Second, long-term income inequality in the three time periods is evaluated by using the Gini-coefficient in permanent income (average over the relevant time period).

The possible equalization effect of mobility is counteracted by risk aversion to random income fluctuations. The last part of the examination, role of income uncertainty, is tackled by comparing average income with an estimate of certainty equivalent income which has been risk-adjusted, and comparing their distributions. The method used is a simple and straight-forward one, and should be considered as a first step in the analysis. Creedy & Wilhelm (2002) and Creedy et al. (2011) come closest to the current paper in their method of taking (ex-ante) income uncertainty into account. In Creedy et al. (2011) the identification of the contribution of uncertainty is based on comparing actual incomes with estimates for predicted income of each individual, assigning their difference as a measure of uncertainty. The estimations are based on an autoregressive model of log-income which allows, under log-normality, for closed form expressions for predicted income and values of Atkinson index for inequality.[4]

Finally, this paper presents measures of redistribution of income and income insurance by public tax-and-transfer programs, using the difference between the Gini coefficients of factor and disposable equivalised household income. Differences between certainty equivalent income concepts are used to get some useful information on redistribution of risk

4 Atkinson index is of the same functional form as the constant relative risk-averse utility function which is used to calculate relative risk premiums in the current paper. One could have followed their approach in choosing the measure of inequality to be of the same functional form and proceeding to decomposing inequality along the lines in their paper. Instead the paper chooses the Gini-coefficient (and the underlying implicit social objective function), a robust measure of inequality.

(an additional indicator of implicit income insurance), and may be considered as adding to the literature.

The paper is organized as follows. Section 2 introduces the mobility index (Shorrocks 1978) and the inequality measure used in this paper, the Gini coefficient, and the indicator of risk-aversion, the relative risk premium. The data are discussed in Section 3. The empirical results are presented in Section 4. Section 5 discusses and concludes.

2 Methods

This section briefly presents the methods introduced by Shorrocks (1978) to consider income mobility as source of equalization of longer term (permanent) income inequality. By these methods income inequality (income variation) over a given observation period can be conveniently decomposed into two parts: the first part corresponding to income mobility over the observation period and the second part corresponding to inequality of longer term average incomes.

On the other hand, variability in individual income introduces a welfare cost to households with risk-averse preferences, if there are capital markets constraints or other constraints which prevent the individual from smoothing out consumption over time. When individuals are averse towards income fluctuations over time, the equalising effect of mobility on longer-term income should be controlled for income risk. By focusing on the distribution of longer-term average income which has been risk-adjusted with an estimated risk premium, one may take a first step in solving the problem, how to separate income risk from the income mobility as an equalizer of longer term income.

Shorrocks (1978) considers income mobility as a source of equalization of longer term income inequality as the observation period is lengthened. For Shorrocks, mobility is the opposite of rigidity (stability), defined as follows. For the case of T annual observations on income, the rigidity index compares the inequality of the mean income with the inequality of single-period incomes. Let y_{it} denote the income of individual i at time t and y_t, $t = 1,\ldots, T$, be the vector of annual incomes in the population. Similarly, let $\overline{y}_i = (1/T)\sum_t y_{it}$, be the mean income received by individual i over T periods, and $\overline{y}$ the corresponding vector. Let $I(.)$ be an inequality measure which is a convex function of relative incomes, i.e. scale invariant. Shorrocks's rigidity index has in the numerator the inequality of T-period cumulated mean income, and in the denominator a weighted average of the inequality in each year, with the weights equal to the ratio of the mean income in that year to the mean income over T years, $w_t = \mu_t / \mu$:

$$R_T = \frac{I(\overline{y})}{\sum_t w_t I(y_t)}. \tag{1}$$

Shorrocks's mobility index is then $M_T \equiv 1 - R_T$. Both R_T and M_T are bounded in the zero-one interval, since by convexity $I(\overline{y}) \leq \sum_t w_t I(y_t)$. Mobility index which is dependent on length of the time horizon, T, gives the degree of income equalization as measured by mean income relative to annual income. For example, R_5 equals 0.80 (M_5 = 0.20) indicates that 80 percent of the average annual level of inequality persists over a five year observation period, or alternatively that income inequality decreases by 20 percent when income is cumulated over five years.

Naturally, the mobility index is dependent on which underlying measure of income inequality is used. Different measures of income inequality weight the underlying income distributions differently, and corresponding mobility indices summarize the contributions of individual income movements differently according to their position in the distribution. Suoniemi & Rantala (2010) present an extensive comparison of mobility indices using the Theil entropy measure and the coefficient of variation squared with those using the Gini coefficient.

The Gini coefficient is the most extensively used summary measure of inequality. Commonly, the Gini coefficient is defined as twice the area bounded by the Lorenz curve and the unit diagonal. But it can be written in the following alternative form, directly showing that the Gini coefficient is less sensitive than other indices to observations in the tails of the distribution:

$$G(y) = 1 - (2/\mu)Ey(1-F) = (1/2\mu)E\,|y_1 - y_2|, \tag{2}$$

where E refers to the expectation (mean) operator, F is the cumulative distribution function of the income distribution considered, μ denotes the mean income, and in the last equality y_i, $i = 1,2$ refer to two independent copies of a random variable with distribution F.

The last mean-difference representation of the Gini is a most useful one. It gives the Gini coefficient as the mean of relative income differences in the population, if one introduces a conditional expectation

$$G(y) = (1/\mu)\, E\,(y_1 - y_2 \mid y_1 \geq y_2). \tag{3}$$

The Gini coefficient has several desirable properties.[5] For example the Gini coefficient is decomposable by income sources (Lerman & Yitzhaki 1985).

Below the emphasis from equalization of longer term income inequality is shifted to inequality of longer term certainty equivalent incomes which will be controlled for the undesirable effects of income fluctuations over time.

Assume that households have risk-averse preferences. They maximise a weighted sum, $\sum_t \beta^t u(c_t)$, with discount factor β, $\beta \leq 1$, under an inter-temporal budget constraint, $A_{t+1} = (1+r_t)(A_t + y_t - c_t)$, for assets, A_t income, y_t and consumption, c_t. Let the utility function to be of the constant relative risk aversion (CRRA) form, $u(c) = c^{1-\rho}/(1-\rho)$, if $\rho \neq 1$, and $u(c) = \log c$, if $\rho = 1$. Above ρ, $\rho > 0$, is the coefficient of relative risk aversion. Suppose that consumption is distributed randomly with a multiplicative shock X around a level $\overline{c}$, $c = \overline{c}X$. The equivalent risk premium (ERP) is defined by the amount ψ such that

$$u(\overline{c} - \psi) = \mathrm{E}\left[u(c)\right]. \tag{4}$$

The equivalent risk premium is the monetary value which household would be willing to forgo from the certain level $\overline{c}$, and still be as well off as with the random consumption flow,

5 The Gini coefficient which is based on absolute values of income differences gives little weight to income changes in the tails of the distribution. Cumulating income over time will most effectively smooth incomes which are temporarily high or low and has less effect for relative incomes in the middle of the distribution. The robustness property of the Gini coefficient is often seen as a justification for preferring it to other income measures if only annual data are available since figures for the Gini coefficient will have less upward bias than the annual figures for other inequality measures (Shorrocks 1980). In the current case relying on the Gini coefficient in evaluating the distribution of risk-adjusted, certainty equivalent incomes has for robustness reasons special merit.

$c = \overline{c}X$. For empirical studies a scale-less measure of relative risk premium is more useful, such as given by the relative equivalent risk premium (RERP),

$$\psi / \overline{c} = 1 - \frac{\left[\mathrm{E}X^{1-\rho}\right]^{1/(1-\rho)}}{\overline{c}}, \text{ if } \rho \neq 1, \text{ and}$$

$$\psi / \overline{c} = 1 - \frac{\exp(E \log X)}{\overline{c}}, \text{ if } \rho = 1. \tag{5}$$

Because consumption is not reported in our data, one cannot construct a measure of uncertainty that correspond exactly to the RERP. Instead, the analysis follows most of the literature, e.g. Carroll (1994), Carroll & Samwick (1998), Creedy et al. (2011) and Hoynes & Luttner (2011) in substituting corresponding income variables for average and actual consumption. In effect one assumes that individuals fully consume their disposable income, ruling out buffer-stock savings.

3 Data

The data provided by Statistics Finland are built on a ten percent population sample drawn from the resident population in 1995–2008.[6] In the next stage Statistics Finland has collected for the sampled individuals data on employment, income, and some demographics. All the data are collected from linked administrative registers covering the whole population in 1995–2008. Households are formed around each sampled individual with the help of combining individual register data with register data covering housing units and their occupants in Finland.

Our income variables are obtained from the register data underlying the Finnish total statistics on income distribution (Statistics Finland 2006). They include the annual income of both the households and the sampled individuals. The variables include the amount of annual income and its composition from different income sources, e.g. labour and property income and also taking account of taxation and public income transfers.[7] Using the sample we can form complete and incomplete panel data sets of non-institutional population for the time period 1995–2008 allowing dynamic income distribution analyses for population sub-groups with a reasonably large number of observations.

The variables in our data include household income with components describing gross income, labour income, including wage income (employed) and entrepreneurial income (self-employed), property income of households, and public cash transfers received and paid by households.[8] Factor income is composed of labour income, the sum of wage and entrepreneurial income, and property income. Disposable income, which is the key concept in our analysis, is formed from the income components by summing factor income with cash transfers received and subtracting transfers paid by households. Economic conditions and inequality are examined using real disposable household income which has been equivalised accounting for differences in household size and composition.[9] In calculating inequality each household member is assumed to have access to an income level which is obtained by dividing total household income by an equivalence scale denoting the number of equivalent adults in the household. The (modified) OECD-equivalence scale gives weight one to the

6 Our total "target population" consists of 5 978 470 individuals which corresponds to all who have been resident sometimes in Finland in 1995–2008. Note that the sample excludes individuals living in institutions.

7 In the absence of interview data, the concepts of our income data do not meet fully the national and international recommendations for income (Canberra Group 2001). For example we do not have access to some sources of property income that are either tax-exempt (imputed net rent from owner-occupied housing) or are currently taxed at the source, e.g. interests from bank deposits. The same applies to private transfers among households. Taxes paid and cash transfers from public sector are covered completely, transfers even in the case when they are tax-exempt.

8 The income sources that define disposable income are: property income, labour (earned) income which includes both wage income (employed) and entrepreneurial (self-employed) income, cash transfers received and income transfers paid. Property income includes rents, dividends, taxable interest payments, private pensions and realised capital gains. Entrepreneurial income accrues to self-employed from agriculture, forestry and firms. Wage income consists of money wages, salaries, value of managerial stock options and compensations in kind, deducting work expenses related to these earnings. Cash transfers received include, housing benefits and child benefits, unemployment and welfare assistance, unemployment and sick insurance and national and occupational old age, disability and unemployment pensions. Income transfers paid include direct taxes and social security contributions paid by the household members. The sum of property and labour income corresponds to factor income. Adding cash transfers gives gross income. Disposable income is obtained by deducting income transfers paid.

9 Cost-of-living-index data (Statistics Finland) have been used to transform nominal annual values to real values, in 2008 prices.

first member in the household, weight 0.5 to each additional member in the household over 13 and 0.3 to those under 13 years of age.

The target population is individuals living in private households. Those living in institutions and individuals with top-coded income data (the one percent of those having the highest incomes) are excluded.[10] Top-coded income data and deletion of these observations mean that we cannot consider mobility in, out, or within the top income group. In light of Finnish experience with a considerable increase in the top income shares, which do not show up in our data, and their influence on the increasing values of inequality indices, one would expect that observed increase in annual income inequality will be in our current data more moderate than in official statistics. Our total sample size, including the top-coded observations, is 503 982 and 521 819 in 1995 and 2008, respectively. For five year complete panels, covering years 1995–1999, 2000–2004, and 2004–2008 we have available 463 488, 440 275, and 474 304, respectively.

The income data are collected from administrative registers covering the whole population and are more accurate than, say data based on interviews, imputations and estimations as is commonly done in countries without access to register data, e.g. Chen (2009), Gangl (2005) and Jenkins (2011). Register based panel data have an additional advantage, as sample attrition is relatively low in comparison to survey data (see, Chen 2009 and Ch. 4 in Jenkins 2011). In our case the 1995 cross-section has 499 072 observations and the 1995–1999 panel has 463 488 observations, a loss rate of 7.1 percent over a five year time period, counting also those lost by top-coding.

Figure 1 shows the annual Gini coefficient of equivalised disposable income in three five-year income panels, 1995–1999, 2000–2004 and 2004–2008. For comparison we have included the corresponding cross-sectional Gini coefficients in 1995–2008 from Income distribution statistics (Statistics Finland) which are based on sample surveys whose final sample size is around 10 000 households, and register-based total statistics on income distribution which includes original observations for top-coded data (total statistics in Figure 1). Our income panel data have been top-coded and the data in Income distribution statistics include some (tax-exempt) income data which are not available from administrative registers but are collected with interviews, such as housing and housing expenses data used to impute net rent from owner-occupied housing, and interest income from bank deposits and inter-household private transfers. As expected the Gini-coefficients from the income panel data of the current study are uniformly at a lower level than annual values from Income distribution statistics and those from total statistics. However, they show quite similar evolution in time.

Figure 2 reveals that a corresponding comparison using equivalised factor income gives a different picture. Here the annual values within a given income panel show an extra, increasing time trend compared to the cross-sectional values, and shows a tendency for relative inequality to increase as the individuals in a panel age. For example the panel starting in 2004 has a clearly lower value of Gini in 2004 than the panel starting in 2000. Additional reasons for the trend, other than sample attrition, are the facts that as individuals

10 The underlying population data are confidential. To guarantee the confidentiality of the individuals included in our sample Statistics Finland has top-coded all observations in the top one percent of the income distribution in each sample year. These observations are left out of the analysis. Their omission may bias our measures of income inequality and income mobility downwards.

within a given income panel age, eventually there will be no individuals left at the early ages, and simultaneously the share of retired persons increases. One may conclude that those households with small children (0–4 years) have somewhat different distribution of factor income than the rest of the population, but their distribution of disposable income corresponds more closely to that of the rest of population, and in particular to those near retirement age.

Figure 1.
The Gini coefficients of equivalised household disposable income in income panels 1995–1999, 2000–2004, 2004–2008 and annual values from the Income distribution statistics and Total statistics on income distribution (Statistics Finland).

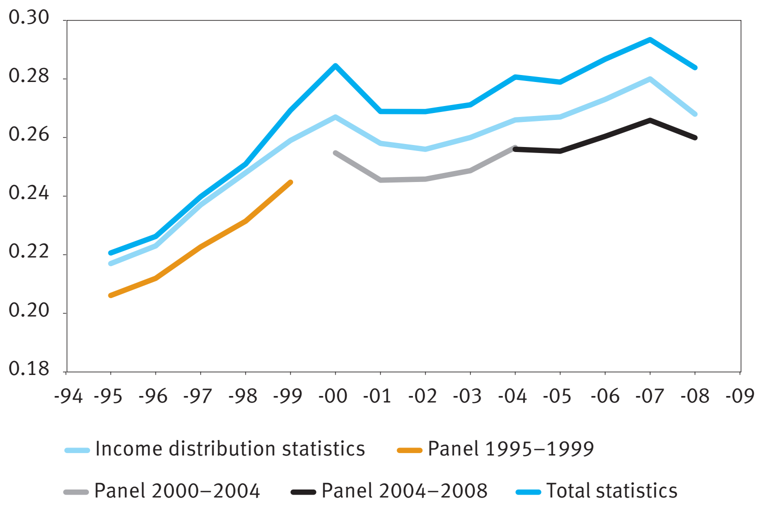
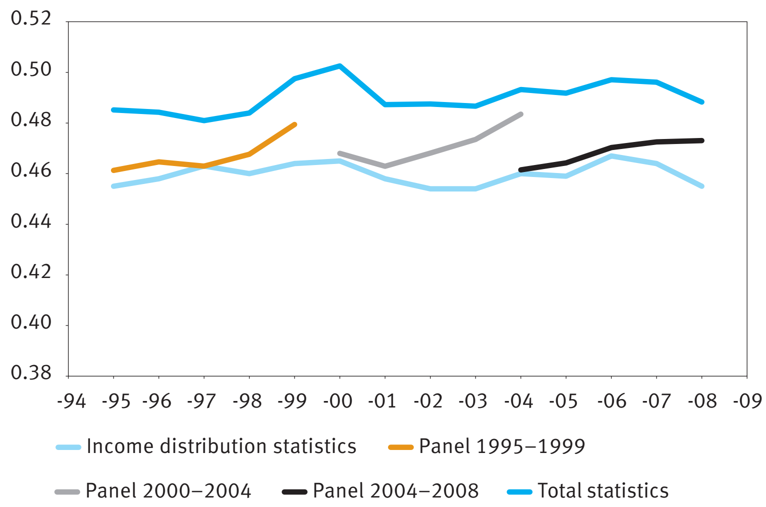


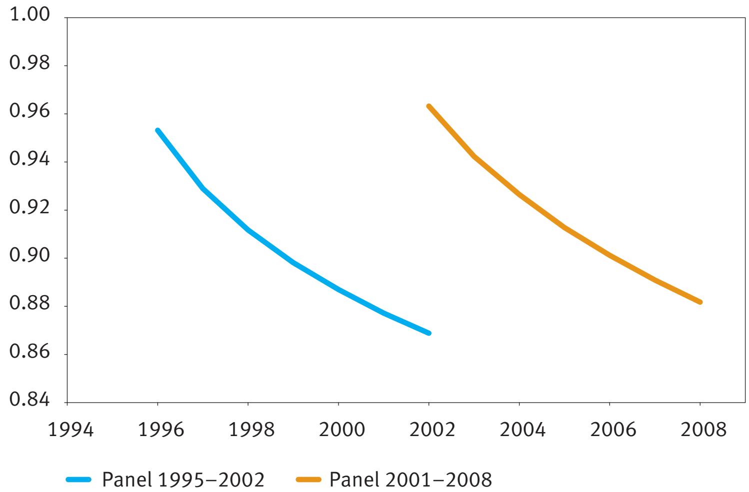
Figure 2.
The Gini coefficients of equivalised household factor income in income panels 1995–1999, 2000–2004, 2004–2008 and annual values from the Income distribution statistics and Total statistics on income distribution (Statistics Finland).



4 Results

Varying the time horizon for the 1995–2002 income panel data in calculating the income rigidity index gives stability profiles, R_T which show how the amount of observed stability depends on both the income structure and the length of time horizon, T = 2,...,8. Using the Gini coefficient 92.9 percent of income inequality (decreases by 7.1 percent) as measured by average income persists relative to annual income inequality when cumulated over three years and 86.9 percent persists (decreases by 13.1 percent) when cumulated over 8 years, in the 1995–2002 income panel data (Figure 3). These values indicate substantial income mobility in Finland. In the following five year long income panel data in 1995–1999, 2000–2004 and 2004–2008 are examined to uncover temporal change in mobility and inequality in longer term (five year) average incomes.

Figure 3.
Income stability profiles for real equivalent disposable household income (Gini coefficient) by time horizon, in (8 year) income panels 1995–2002, 2001–2008.



Using the Gini coefficient, income inequality of disposable equivalised household income decreases by 10.1 percent when cumulated over five years in the 1995–1999 income panel data. Subsequently, the corresponding mobility values show some decrease, 8.8 and 8.6 percent in the 2000–2004 and 2004–2008 income panels, respectively (for 1995–1999 and 2000–2004, see also Suoniemi & Rantala 2010 where the corresponding value was 0.110, for the 1995–1999 income panel).[11] These values are in line with those reported in a recent study by Chen (2009) for the United States, Great Britain and Germany in the 1990's (see Table A2, p. 98). For example, the mobility value for the five years time period using Gini

11 They also present comparisons of the Finnish mobility profiles of the Gini coefficient with other inequality indices, the Theil entropy measure and (half) the coefficient of variation squared. Apart from the scale difference there was hardly any difference in the shape of the profiles.

is 0.107 in the United States, 0.110 in Great Britain, and 0.098 in Germany.[12] However, there are caveats about comparability of income data across studies.[13] The mobility values in the current data are probably lowered due to deleting the top-coded income data and including retired persons depending on pensions with less volatility in their fixed income.

In Finland annual income inequality has increased simultaneously as the income mobility has decreased (Figures 1 & 3). The values of the Gini coefficient for the (five year) average in disposable income are 20.14 percent in 1995–1999, 22.80 percent in 2000–2004, and 23.73 percent in 2004–2008. There has been a clear permanent rise in inequality. The observed rise in permanent inequality is in line with the fast increase in the annual values of the Gini coefficient until 2000 (Figure 1). In fact, in comparing the early 2000's to 2004–2008 one finds a further increase in the values of the Gini for average income, whereas there is no further change in income mobility.

Mobility and age

In the following we will compare the results of three five-year income panels covering years 1995–1999, 2000–2004 and 2004–2008, respectively. The comparison of incomes panels reveals interesting temporal changes in inequality and mobility in 1995–2008. Table 1 presents the values of the Gini coefficient of the (five year) average equivalised household disposable income and the corresponding mobility index for population subgroups relating to individuals belonging to 5 year age groups from 0–4 years of age to 75–79 (and the final group 80–89 years old).[14]

Note that though we follow individuals in our income panels the evaluation of their economic welfare is based on equivalised household income. Therefore evaluation is affected by changes in family size and its composition above the effects of unemployment, illness, retirement, good or bad luck, or macroeconomic events. Changes in family size and its composition are probably most important for both young and old, retired individuals. Sample attrition by institutionalisation and death will probably affect the results in the oldest age groups.

12 Gangl (2005) has utilized the European Community Household Panel (ECHP) data to study income mobility in 11 European Union countries during the second half of the 1990's over six annual survey interviews and to compare with the U.S. data. In four countries with low income inequality the mobility indices obtained the values, 0.150 for Denmark, 0.100 for Germany, 0.110 for Netherlands and 0.150 for Belgium using the Gini coefficient. In four countries with high income inequality the corresponding figures were, 0.07 for Ireland, 0.10 for Spain, 0.13 for Greece and 0.08 for Portugal, with countries ordered in ascending order with respect to annual income inequality. In addition Gangl (2005) concluded that the European labour markets with low inequality are no less dynamic than the high-inequality United States one, and the cross-national differences in annual income inequality closely reflect the cross-national inequality differences in permanent incomes measured over a longer period of time.

13 In the panel data used by Chen (2009) the sample attrition is higher, some income data are imputed or estimated, the data has been trimmed at both ends of the distribution (affecting 4.5 to 9 percent of data), and the adult equivalent scale used (square root of the total number of household members) is different from that in this study. In the ECHP data, used by Gangl (2005), the analysis is confined to population aged 25–55. The equivalence scale is comparable to that used in our study. However, Gangl (2005) reports that the results are not sensitive to the choice of the scale.

14 Movements in short-term income inequality and income mobility may reflect differences in macro-economic conditions. It is thus more appropriate to look at longer-term (5 year) mobility. Figure A1 shows values of inequality indices for individual years and cumulative average incomes and time profiles of the mobility indices for five year income panels starting in 1995–1999, 2000–2004 and 2004–2008 using disposable income. In Figure A1 the top panel shows the values of the inequality measure for individual sample years for each income panel. The middle panel shows the corresponding values for cumulative income (time horizons from 2 to 5 years) in each income panel. Analogously, the bottom panel gives the values of the stability index.

It is frequently observed that income mobility is decreasing with age with most of the change taking place in early working years. Shorrocks (1980) examined mobility in labour incomes using Michigan panel data on income dynamics. For males reporting each year positive labour incomes, income stability increased with age. The Gini mobility values were highest for the young, under the age 30, but were broadly similar for all other age groups.[15]

In the 1995–1999 income panel data, the mobility in disposable income is highest for young adults, in the three age groups consisting of the 15–29 years old (Table 1). After that age, the mobility values tend to stabilise and decrease slowly until one gets near the retirement age when we see a further drop in income mobility (Table 1). In the 1995–1999 panel data mobility is lowest in the oldest age groups, those with individuals at least 65 years old in 1995, and due to ageing, at least 70 years old in 1999, whose incomes are based on pensions, a relatively fixed income source.[16]

Income mobility has decreased in the 2000–2004 panel data in all age groups. The change from the 1995–1999 panel data is largest in the groups consisting of young adults. This holds true also for the three age groups which are past the normal retirement age, but for them the corresponding change is smaller, and is reversed for the oldest age group. Because the decrease in mobility has affected more the working age groups, the values of the mobility index are in the age groups, 50–54 and 55–59 years old currently quite near the value in the age group 65–69 (Table 1).

Shorrocks's income mobility index (1) is measured in relative terms, in proportion to the weighted mean of the annual values of the Gini coefficient over the time period. Alternatively, extent of mobility can be shown (one-to-one) as the relative increase in the value of Gini of average income, needed to obtain the value of the weighted mean Gini in the time period, $M_T / (1 - M_T)$. Figures 4–6 show these measurements in absolute terms. To be more specific, the absolute mobility part (dark shade) shown on top of the value of Gini of average income (light shade) is equal to the nominator, i.e. the difference,

$$\sum_t w_t I(y_t) - I(\bar{y}), \tag{6}$$

of the weighted sum of annual values of the Gini coefficient and the Gini coefficient of average income (Figures 4–6). Although, we found a clear decrease in the values of (relative) mobility index (Table 1), in absolute terms (Figures 4 and 5), there is little, or no change. Therefore, the decrease in the relative measure seems to be related to the rise in the denominator of (1), showing the change in annual income inequality (Table 1 and Figure 7) while the rise in annual Gini is closely tracking the corresponding rise in Gini coefficient of average income in (6). Similarly, the absolute mobility parts stay remarkably constant in the

15 On the whole the results for females with positive labour incomes were similar to those for men but the increase in income stability with age more or less vanished in the female sample. This suggests that transitory fluctuations were significant for female low earners well into middle age. Shorrocks suggests that this may be due to more frequent part-time or seasonal work among women. Interestingly enough, family income exhibited no more stability than male earnings, showing limited opportunities to income insurance by family labour supply.

16 Income mobility studies are rare for those over retirement age. Jenkins (2011) reports that men and women aged 60 years or more have substantially lower transitory variances of income than other groups. However, Bardasi et al. (2002) find increased risk of low income incidence and mobility into low income for retired people in the UK. This encourages a further study of mobility into low income, a line of research with important policy implications.

age bracket, 35–64 years. For older people, not only the (relative) income mobility indices have lower values but also the absolute mobility parts are clearly smaller than for those in their prime working years.

Figure 4.
Gini coefficient in (five year) average equivalised household disposable income, absolute income mobility and age in 1995–1999.

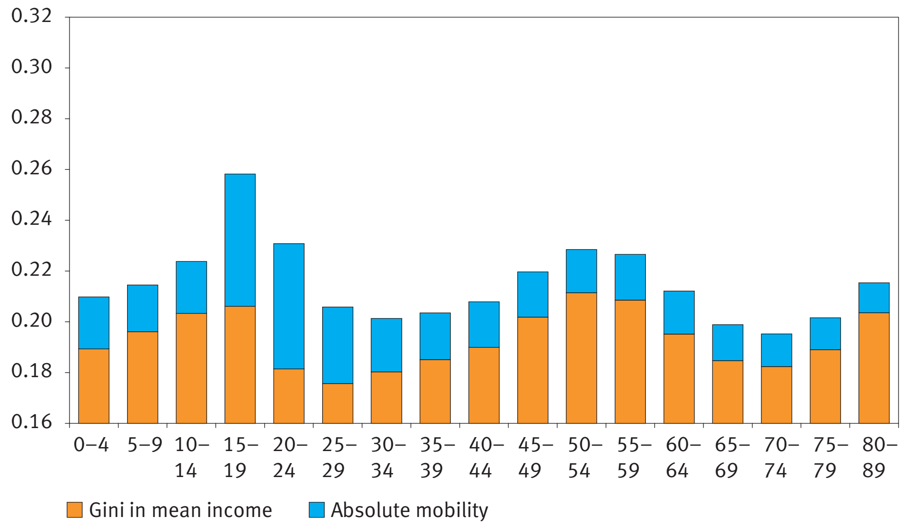


Figure 5.
Gini coefficient in (five year) average equivalised household disposable income, absolute income mobility and age in 2000–2004.

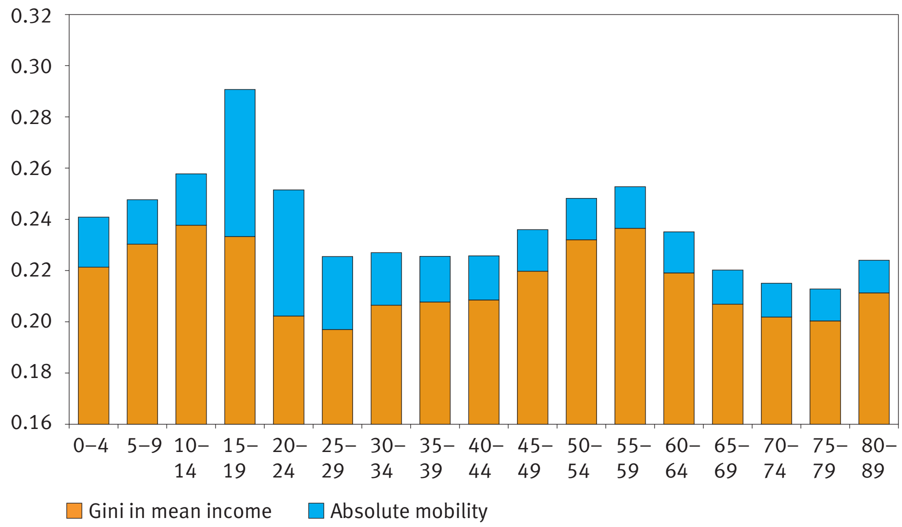


Figure 6.
Gini coefficient in (five year) average equivalised household disposable income, absolute income mobility and age in 2004–2008.

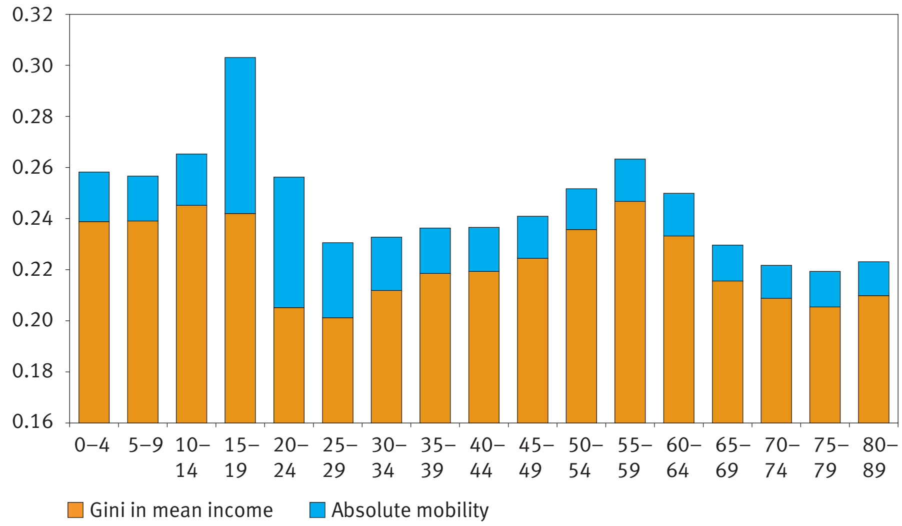
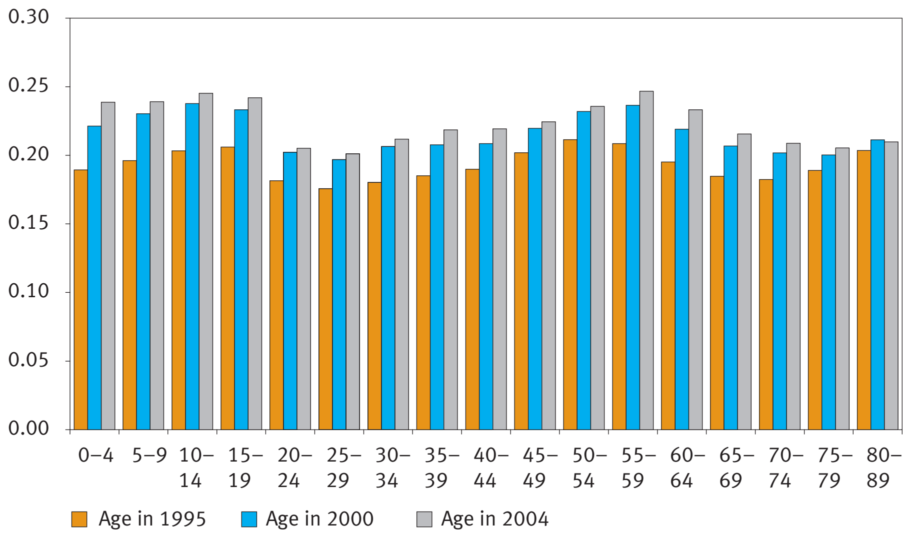


Figure 7.
Gini coefficient in (five year) average equivalised household disposable income and age in 1995–1999, 2000–2004 and 2004–2008.



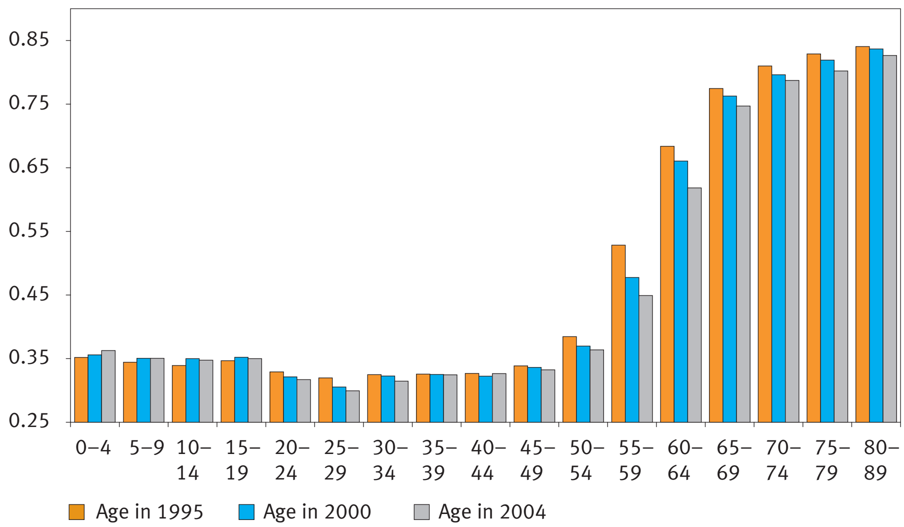
The change in income mobility between the income panels 2000–2004 and 2004–2008 has been more modest, and in some age groups there has been a reversal in the direction of change. Notable is the continued decrease in mobility affecting the age groups consisting of children under the age of 15 (Table 1). But again there is hardly any change in the absolute mobility terms (Figures 5 and 6).

Income inequality of average disposable income is clearly increasing in adult age until the age group, 55–59, but in the first 1995–1999 income panel data the peak in inequality occurred earlier, in the age group, 50–54 years (Figure 7). After that income inequality steadily decreases with the exception of the oldest age group, 80–89 years. This is probably due to the attrition of the household population by death and institutionalisation. Children and young people, 0–19 years old, have relatively high values of the Gini coefficient. This may lie underneath the recent aggravation of social problems affecting particularly households with many dependent children and rise in child poverty (Salmi et al. 2009 and Riihelä et al. 2007).

There was a general and significant rise in permanent income inequality in the late 1990's (Figure 7). The income inequality of the whole population must take into account not only inequality within the age groups but also inequality between the age groups. For the whole Finnish population the Gini coefficient of disposable equivalised household income in the 1995–1999 panel data was 20.14 percent whereas the corresponding value in the 2000–2004 data was 22.80 percent, a 13 percent increase. The simultaneous rise in annual cross-sectional values of the Gini coefficient has not been due to transitory factors.

The age profile reveals continued but more moderate trend in the income inequality after the early 2000's within most age groups. The value of the Gini coefficient of average disposable household income in the 2004–2008 panel data was 23.73 percent, a further rise by 4 percent.

Figure 8.
Gini coefficient in (five year) average equivalised household factor income and age in 1995–1999, 2000–2004 and 2004–2008.



Comparing the results for disposable income with those for factor income gives useful insight to the mechanism of income redistribution by public sector and temporal changes in its operation. Inequality of average factor income is naturally much higher than that of disposable income. The exceptionally high values for pensioners clearly show that for those past their working-years have their remaining factor incomes distributed very unequally (Figure 8). For older people, and those near the retirement age, over 55 years old, there has been a clear temporal drop in factor income inequality. This finding may reflect both demographic change and rapid economic growth after the exceptionally deep economic crisis in the early 1990's which affected particularly elderly workers.

Interestingly enough, there seems to be less mobility in factor income than in disposable income (Table 2). The observations runs counter to our intuition on the operation of income transfers and taxes as implicit insurance mechanism and automatic stabilisers in the economy. However, they are similar to the findings concerning market income in Denmark, Norway and Sweden by Aaberge et al. (2002).[17] Our data refer to the total population in Finnish households and include a substantial portion of economically inactive households dependent on income transfers and by definition with a stable (zero) factor income. The results in economically active subgroups of the population are somewhat different, cf. the results on income risk, below. If average factor income is considered the age profile of income mobility is generally similar to that of disposable income (Table 2). Factor income mobility is naturally highest for the young, 15–29 years old, and lowest for the oldest age groups. But even old age people are exposed to factor income mobility, Finally, one observes a decreasing trend in the mobility of factor income over the sample period 1995–2008 (Table 2).

In contrast to disposable income, permanent factor income inequality in late 1990's (the values of the Gini coefficient) does not show a general widening (Table 2 and Figure 8). One can observe a mild increase in inequality in children, 0–19 years old, but the rise is not very pronounced and minor comparing to that observed in disposable incomes. For the whole Finnish population the Gini coefficient of equivalised household factor income was 43.23, 43.40 and 43.57 percent, in the 1995–1999, 2000–2004 and 2004–2008 income panel data, respectively.

Risk-adjusted average income and age

So far, income mobility has been examined from a positive point of view by considering the potentially beneficial effects of mobility on equalization of longer term income inequality, together with remaining inequality of longer term average incomes. In doing this the undesirable effects of income fluctuations over time have been neglected. The shift of assessment to multi-period inequality would mean that future uncertainty about incomes must be accounted for in the evaluation procedure. Faced with less than perfect capital markets, risk-averse economic agents view rise in income fluctuations as an increase in income risk which lowers economic well-being in comparison with a steady flow of income. The uncertainty aspect of income mobility is a key dimension of income mobility. A completely mobile society would mean complete economic insecurity.

Therefore, emphasis is now shifted to examining longer term average incomes which will be controlled for the risk premium due to income fluctuations. In the evaluation average

17 Note that Aaberge et al. (2002) defined market (factor) income to include work-related transfers, such as unemployment insurance, sick pay and part-time pensions. In addition they assigned income per adult member rather than conventional equivalised income. Aaberge et al. (2002) found substantial income mobility in Scandinavian countries which was comparable to or even above the levels in the United States, a country with relatively high annual values of income inequality.

income is compared with the corresponding risk-adjusted, certainty equivalent income concept. Neoclassical economic theory assumes that household utility is based on flow of consumption not income. Therefore the proper risk premium should be calculated in terms of consumption. Since there is available no data on consumption, the analysis follows most of the literature in substituting corresponding income variables for average and actual consumption.[18] In effect, one is confined to analysing that part of insurance of household income which is affected, first, by adjusting individual supply of working hours and family labour supply (self-insurance), and second, by redistribution programs operated by public sector, progressive taxation, social insurance and transfers.

Preference toward risk is assumed to be of the constant relative risk aversion form. The calculations are made separately for several values of ρ, $(\rho = 1,\ldots,5,)$ the coefficient of relative risk aversion. The relative equivalent risk premium (5), the income risk arising from the annual variation of income around the (five year) average income is estimated as the mean of individual risk premiums over a stratum of the sample population. The classification of households is based on factors likely to affect labour market risk, the education level (6 levels), and socio-economic status (18 classes) of the sampled individual, in total 6*18 = 108 classes. To be more exact, for an individual in an age group j, with education status k and socio-economical status l,

$$1-\psi_{j,k,l} = \frac{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)\left((1/T)\sum_{t=1}^{T} y_{it}^{1-\rho}\right)^{1/(1-\rho)} \Big/ (1/T)\sum_{t=1}^{T} y_{it}}{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)}, \text{ if } \rho \neq 1, \text{ and}$$

$$1-\psi_{j,k,l} = \frac{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)\exp\left((1/T)\sum_{t=1}^{T} \log y_{it}\right) \Big/ (1/T)\sum_{t=1}^{T} y_{it}}{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)}, \text{ if } \rho = 1,$$

where $1\big(i \in A(j)\big), 1\big(i \in E(k)\big)$ and $1\big(i \in S(l)\big)$ are simple indicator functions.

Estimations are done separately for each income panel data sets, 1995–1999, 2000–2004 and 2004–2008, and each age groups, 0–4,…, 75–79, 80–89 years old. In the following step, the average household income of each individual is adjusted with the value of corresponding risk premium applicable to the population sub-group (panel, age group, education level and socio-economic status) which the individual belongs to.[19] To give an example, a lengthy Appendix presents estimates of the relative equivalent risk premiums in household disposable income in the 2000–2004 income panel data with $\rho = 3$, with their estimated standard errors.

A conservative choice of ρ, the coefficient of relative risk aversion, $\rho = 1$, would correspond to the logarithmic utility function. In the following we discuss mainly the results

18 To be exact, this measure would be identical to the true consumption-based measures only if the households consumed exactly its income. Because rational households hold assets to insure consumption against shocks to income, the stochastic element in consumption will be less variable than the corresponding income term.

19 Each age-group is treated differently in an effort to separate income fluctuations corresponding to income risk from the life-cycle pattern in income. This also motivates using a relatively short time-spans, 5 years.

with $\rho = 3$, the same (plausible) baseline value as in Hoynes & Luttner (2011).[20] In the 1995–1999 income panel data, this choice corresponds to a population mean of 5.7 percent relative risk premium, equivalent to 980 euros (in 2008 prices) in equivalised household disposable income. This corresponds to the monetary value which households would be willing to forgo from a certain income level, and still be as well off as with the random income flow, they face. In these terms and with our assumptions the mean income risk is in Finland a reasonable one, if one considers the precautionary saving motives.[21]

Comparing the average equivalised disposable household income and the corresponding risk-adjusted, certainty equivalent income between the (five year) age groups reveals that the certainty equivalent disposable incomes stay relative flat from the mid-twenties until the age group 40–44 years of age. After that the age profile rises steeply until there is a gradual decline in mid-fifties as people start to retire (Figures 9 and 10). On the average, those over retirement age have the lowest levels of risk-adjusted, certainty equivalent disposable income. Gradual voluntary postponement of retirement age is likely to lay behind the temporal narrowing of the income gap between those in the age group, 50–54, and those in the group, 55–59 years old.

After 30 years of age the relative risk premiums stay quite stable, 4.2–4.8 percent of disposable income. In the oldest, post-retirement age groups the risk premiums are lower, 2.2–2.5 percent of disposable income. Jenkins (2011) reports that men and women aged 60 years or more have substantially lower variances of transitory income than other groups. Here the low values may in small part be due to the method of calculating the premium.[22]

20 For results based on alternative values, $\rho = 1,\ldots,5$, the reader should consult Tables 3–6.

21 In calculating the risk-premium the income variables have to take positive values. Therefore they have been bottom-coded with 120 euros in annual real equivalised income (1995 prices). This has little influence on the measurements which use disposable income. However factor income is frequently observed with zero values, for example in the case of pensioners, which may have some influence on the specific values one observes.

22 In the data, all pensioners share in the same socio-economic status and only education level is available to separate income risks among these age groups, whereas among the working-age population the socio-economic status offers a much wider scale of possible variation in income risk. Similarly all dependent children have in the data their individual education levels with less scope to separate income risks. However, their socio-economic status is that of the household head's (Appendix).

Figure 9.
Average (five year) equivalised household disposable income, risk-adjusted $\rho = 3$, disposable income and age in 1995–1999.

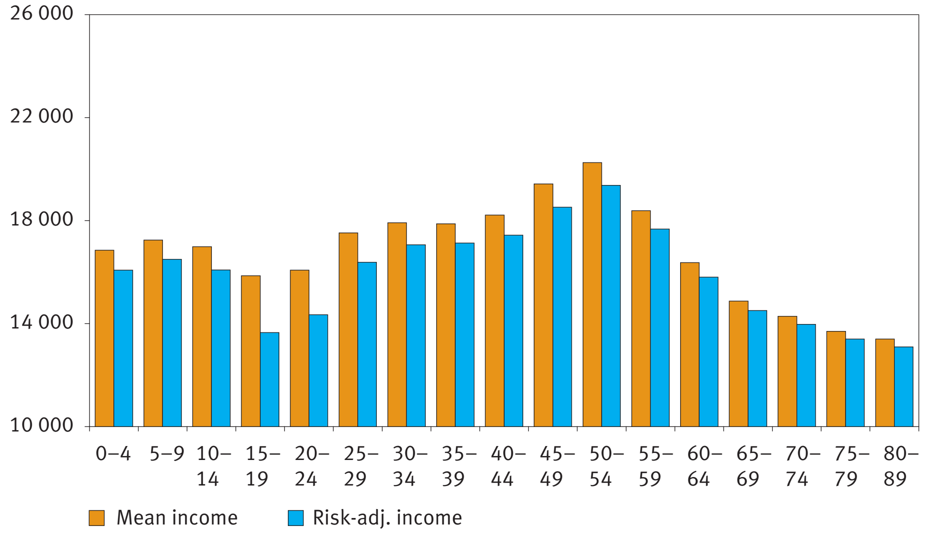


Figure 10.
Average (five year) equivalised household disposable income, risk-adjusted $\rho = 3$, disposable income and age in 2000–2004.

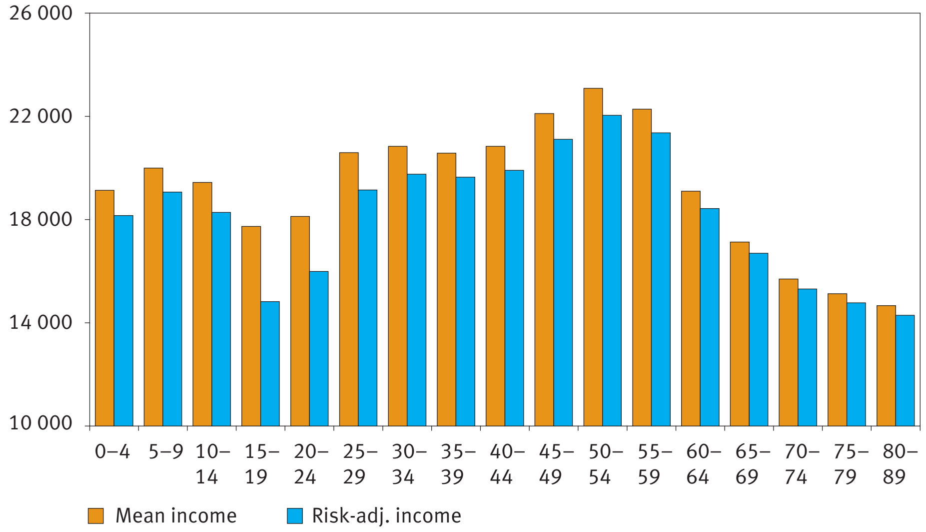


Figure 11.
The Gini coefficients of average equivalised household disposable income and risk-adjusted income $\rho = 3$, and age in 1995–1999.

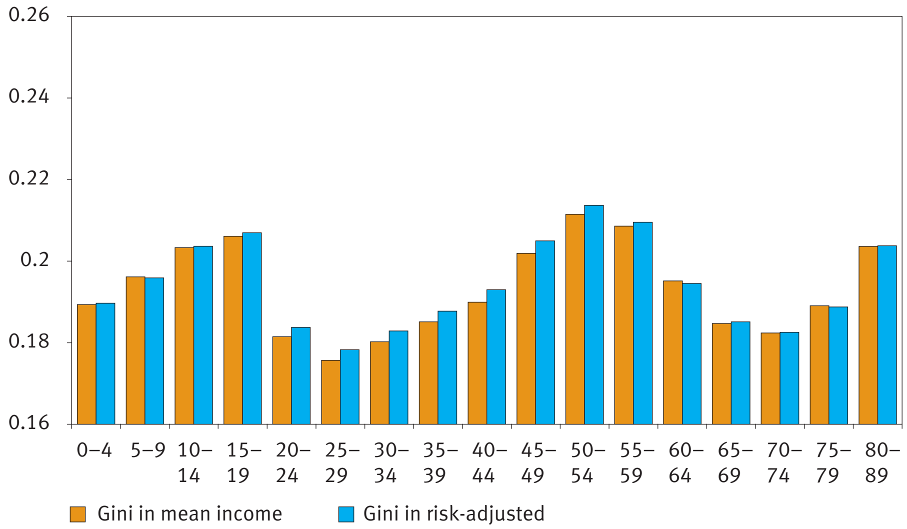
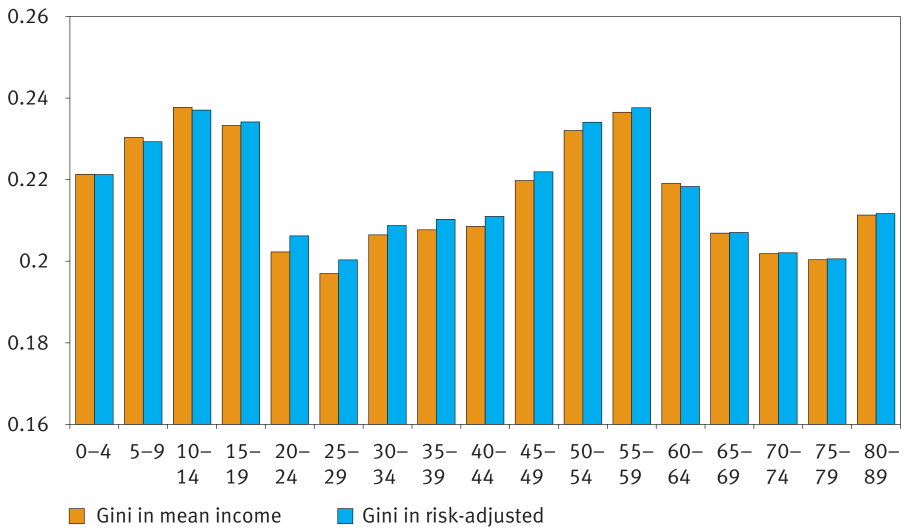


Figure 12.
The Gini coefficients of average equivalised household disposable income and risk-adjusted income $\rho = 3$, and age in 2000–2004.



Cursory glance reveals no change in the relative risk premium between the income panel data in 1995–1999 and 2000–2004. This holds also true for the age profile of the Gini-coefficients which have been calculated for average disposable income and the corresponding risk-adjusted, certainty equivalent income (Figures 11 and 12). Those over retirement age have relatively low levels of the Gini-coefficients with the exception of the very old, over 80 years of age (at the start of the panel). The exception is probably due to the attrition of the household population by death and institutionalisation.

It is natural to expect that the values of the Gini coefficient are somewhat higher in the case of risk-adjusted income variables, since they incorporate some of the original variation in income. But mathematically this does need not hold, since the reference point, mean income is also changed, as one may observe in the age groups referring to children in the income panel data 1995–1999 (Figure 12). The values of the Gini coefficient of risk-adjusted, certainty equivalent disposable household income do not change noticeably in the working-age population (with some exceptions, they are only 0.2–0.3 percentage points higher) from those of average equivalised disposable household income. Remarkably, for old age people, over 65 years of age, risk-adjusted disposable incomes have almost the same values of the Gini coefficient as the unadjusted average incomes. Although they are exposed to some income risk (Figures 9–10).

Comparison of age profiles across the income panel data in 1995–1999 and 2000–2004 and 2004–2008 reveals a steady and uniformly increasing time trend in risk-adjusted, certainty equivalent average disposable income (Figure 13). Same holds for the Gini coefficient of the certainty equivalent average disposable income. But here the change from panel 1995–1999 to panel 2000–2004 is much larger than the subsequent change from panel 2000–2004 to panel 2004–2008 (Figure 14). The relevant figures for unadjusted (five year) average household disposable income and the corresponding Gini coefficients are reported in Tables 3 (row $\rho = 0$) and 1, respectively.[23]

23 Table 3 present unadjusted ($\rho = 0$) and risk-adjusted, certainty equivalent average disposable incomes in five year age groups. Average risk premiums can be calculated as relative differences between certainty equivalent and unadjusted incomes. For example, taking $\rho = 3$ in the panel 2000–2004, and age group, 65–69 years old, the risk premium is (17 130–16 696)/17 130 which is equal to 2.5 per cent of average equivalised disposable household income.

Figure 13.
Average (five year) risk-adjusted $\rho = 3$, equivalised household disposable income and age in 1995–1999, 2000–2004 and 2004–2008.

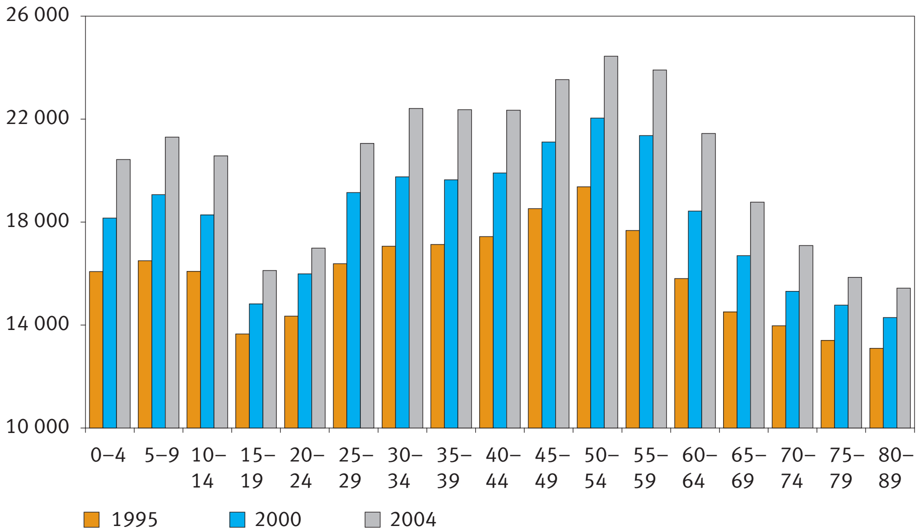
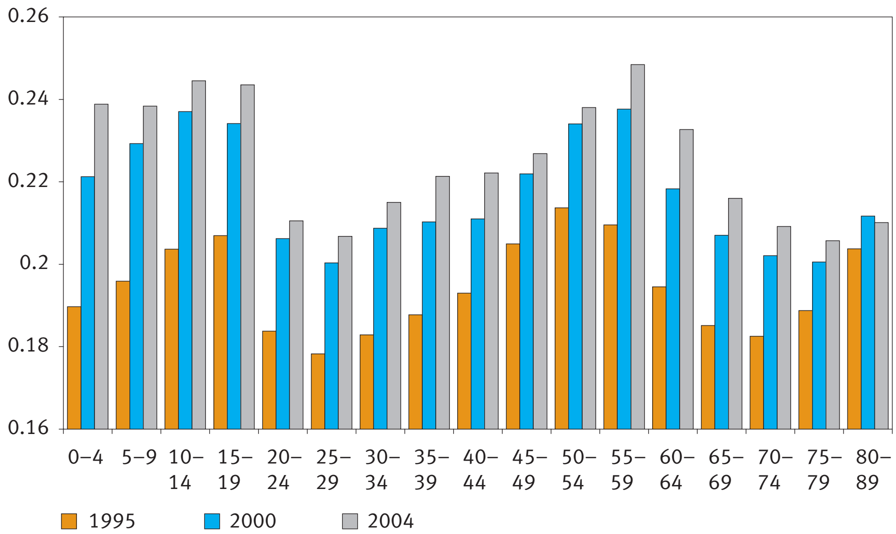
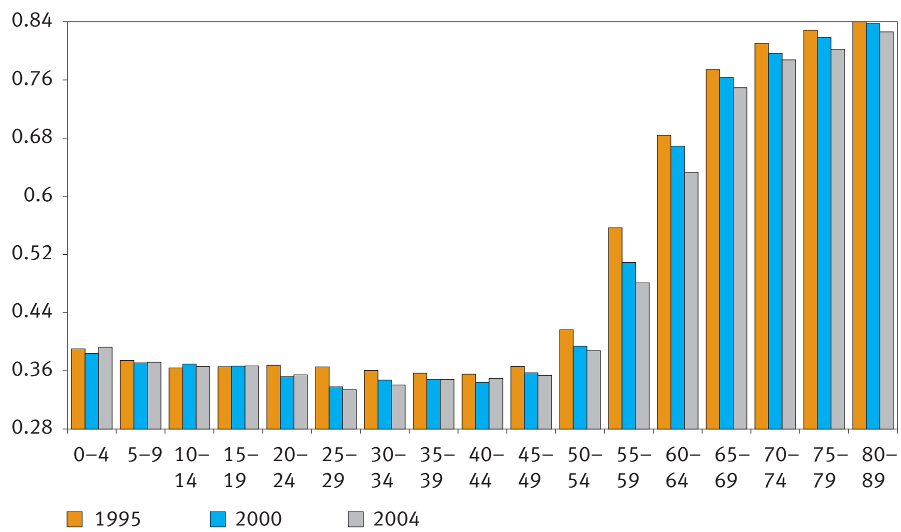


Figure 14.
The Gini coefficient of average, risk-adjusted $\rho = 3$, equivalised household disposable income and age in 1995–1999, 2000–2004 and 2004–2008.



As expected, there is considerably more variation in household factor income. In the 1995–1999 income panel data, this corresponds to an average relative risk premium of 21.5 percent, equivalent to 3 742 euros in equivalised household factor income, with $\rho = 3$. In the working-age population sub-groups, the average values range from 6 366 euros (25–29) to 2 843 euros (40–44 years old). There is substantial labour market risk in Finland, even after allowing for self-insurance by adjusting individual supply of working hours and family labour supply. Shorrocks (1980) reported that comparison of family income with male earnings showed limited opportunities to income insurance by family labour supply. Income risk of this magnitude is beyond the low-income households' means. Comparison with the corresponding mean risk premium in disposable income 981 euros clearly shows the potential for implicit income insurance by the redistribution programs consisting of progressive taxation, social insurance and transfers.

Figure 15.
The Gini coefficient of average, risk-adjusted $\rho = 3$, equivalised household factor income and age in 1995–1999, 2000–2004 and 2004–2008.



The age profiles of average risk-adjusted $\rho = 3$ household factor income show a steady income growth in the observation period 1995–2008 (Table 4). The increase in factor incomes has been particularly strong in the age group 55–59 years old, reflecting voluntary postponement of retirement age and continued participation in the labour force. In comparison to the case of disposable income, there are pronounced differences between the risk-adjusted, certainty equivalent and unadjusted means of household factor income ($\rho = 0$), indicating considerable factor income risk, especially among young adults but even in the case of old age people (Table 4).

There has been some within age-group decrease in factor income inequality during the observation period. The values of the Gini coefficient are generally highest in the income panel data in 1995–1999 (Figure 15). Household with children, age 0–19 years, make an exception. This may reflect worsening labour market position of households with many dependent children, (Salmi et al. 2009). Simultaneously the poverty rate among children has grown much faster than the poverty rate in the whole population (Riihelä et al. 2007). In Figure 15 the values get very high in old age, since the absence of factor incomes for most pensioner households. The Gini-coefficients get so large that the specific values are no longer informative. But their observed temporal change is in line with the change shown in Figure 8 for unadjusted factor income.

For the whole Finnish population the values of the Gini coefficient of risk-adjusted, certainty equivalent household factor income ($\rho = 3$) are about 4 percentage points higher than those of average household factor income. The Gini coefficients of risk-adjusted household equivalised factor income are 47.77, 47.51 and 47.82 percent, in the 1995–1999, 2000–2004 and 2004–2008 income panel data, respectively, and stay remarkably constant in the sample period.

Redistribution and income insurance

An established measure indicating how much redistribution does government achieve by public programs, cash transfers paid to households and household direct taxes (income taxes and employee social security contributions), can be calculated as the difference in income inequality before and after taxes and transfers (the Gini coefficients of equivalised factor income and disposable income). Figure 16 shows the corresponding difference for average, risk-adjusted $\rho = 3$, certainty equivalent equivalised household income by age. Figure 17 reports redistribution of unadjusted (five year) average equivalised income.

Observed "redistribution within age groups" is considerably larger in risk-adjusted income measures.[24] The public sector operates a considerable income insurance mechanism, over and above the redistribution of average (five year) income. Surprisingly, the age profiles of income redistribution are quite flat over a large part of the "life-cycle". The families with children do not seem to stand out in the comparison. Income redistribution effect jumps up at the post-retirement age groups. The jump is no surprise since most pensioners receive almost all of their income from public transfers, and their factor incomes are distribute quite unequally. The differences between the Gini-coefficients get so large that the specific numbers are no longer informative but their observed temporal change is in line with the rest of the population.[25] Note that the remarkable temporal change affecting the age groups, 55–59 and 60–64 years old, is again due to the voluntary postponement of retirement age during the observation period. More importantly, the data in average incomes point out that there has been a substantial cut-back in public redistribution from the late 1990's.

The changes observable in Figures 16 & 17 hold for redistribution effects within tightly defined age groups (birth year cohorts), and do not tell the whole story about redistribution over the whole life-cycle. However, comparison of the adjacent age groups across panels reveals changes in about a 10 year time span, since, for example those of 25–29 years old in the 1995–1999 income panel data will be 34–38 years old in the 2004–2009 panel data.

24 The Gini coefficients are calculated separately for each five year age groups. Therefore they do not show that part in distribution of income and public redistribution between age groups which are affected by group size and group means, and provide a simple but crude method to control for trends that affect these components. On the other hand, this ignores the question, how redistribution is financed (in part by other age groups, see Figures 17 and 18).

25 For simplicity, consider in Figures 16 and 17 that they are financed through the mean contributions by the other age groups, see Figures 18 and 19.

Figure 16.
Public sector redistribution of average, risk-adjusted $\rho = 3$, equivalised household income within age-groups, in 1995–1999, 2000–2004 and 2004–2008.

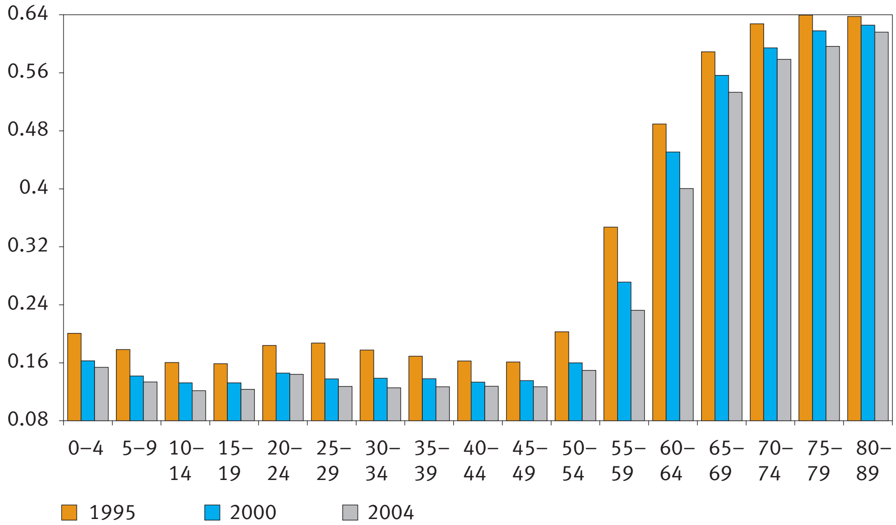
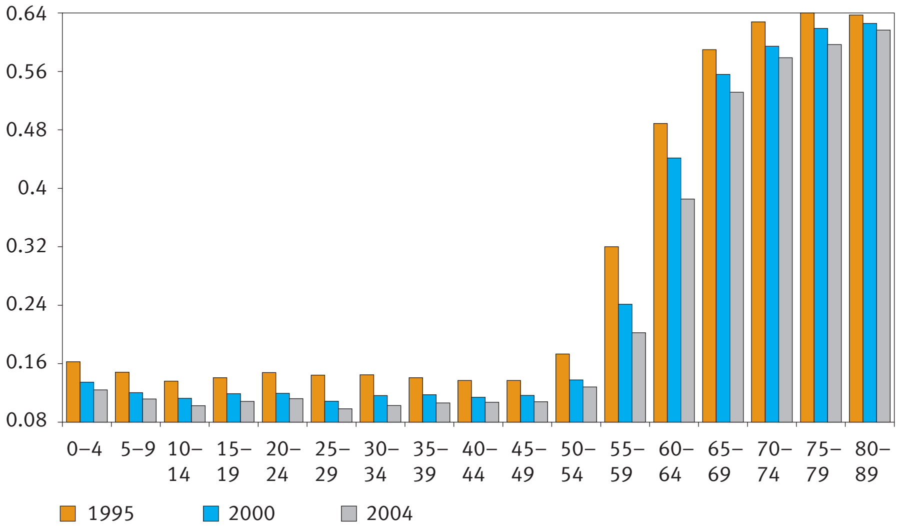


Figure 17.
Public sector redistribution of average, equivalised household income within age-groups, in 1995–1999, 2000–2004 and 2004–2008.



For the whole Finnish household population redistribution effects, as measured by the difference of Gini coefficients, of risk-adjusted equivalised household income were 25.06, 22.44 and 21.87 percent, in the 1995–1999, 2000–2004 and 2004–2008 income panel data, respectively (Table 6). In unadjusted equivalised household income the corresponding figures were 23.09, 20.60 and 19.84. Differences of these numbers, taken here as indicating redistribution of income risk, implicit income insurance by public sector, corresponds to about two percentage points and 9 per cent of total amount of redistribution of equivalised household income using relative risk aversion coefficient, $\rho = 3$. In the sample period redistribution of both (five year) average unadjusted and risk-adjusted household income has decreased by 3.3–3.6 percentage points (13–14 percent) if the 1995–1999 and 2004–2008 income panel data are compared (Table 6).

Figure 18 shows, how the mean burden of the public net transfers underlying the redistribution programs is shared by age, see also Table 5. On the average, all age groups seem to be net payers until the mid-fifties, and the burden in €'s paid is increasing from the early 2000's on. Pensioners are the biggest gainers in the mean values. Their cash transfers net of taxes have increased during the observation period (Figure 18), although we found a decreased redistribution effect within the group (Figure 17). On the other hand, the net payments made by the working-age groups have increased on the average. Since the different age groups are not of same size the age profiles of mean net transfers do not reveal the total scale of redistribution in the society, and for example the relative size of the baby-boom generation is not displayed here. Furthermore, cash transfers are also financed with other than household taxes, such as indirect taxes and corporate taxes, and there is a sizeable element of non-cash transfers in publicly-provided services, to be accounted for before the whole picture of redistribution is complete.

Figure 19 gives the corresponding risk-adjusted, $\rho = 3$, figures for public net transfers. Comparison with Figure 18 reveals, reveals how both young adults, 15–29 years old and elderly near retirement age 55–59 years old, seem to benefit most from implicit income insurance by public sector. However, all age groups, including old age people gain from redistribution in certainty equivalent income relative to unadjusted cash redistribution.

Figure 18.
Mean net transfers in average, equivalised household income and age in 1995–1999, 2000–2004 and 2004–2008.

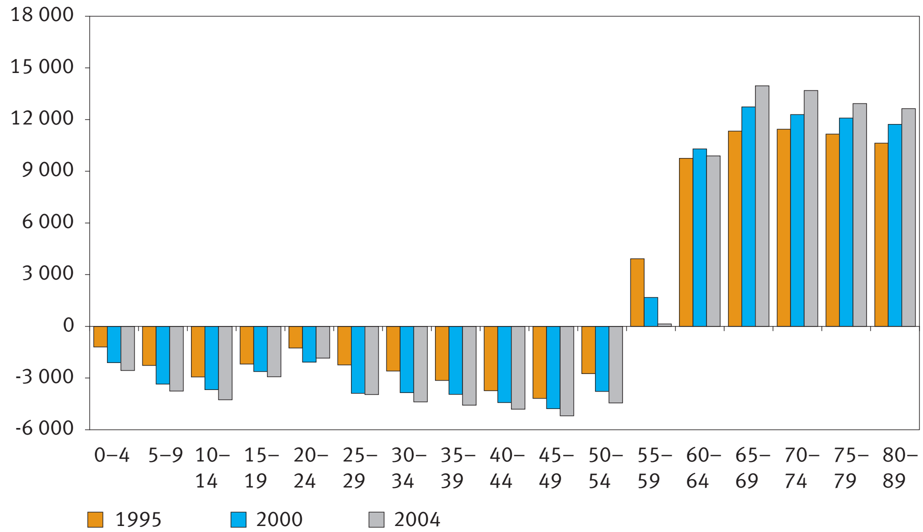
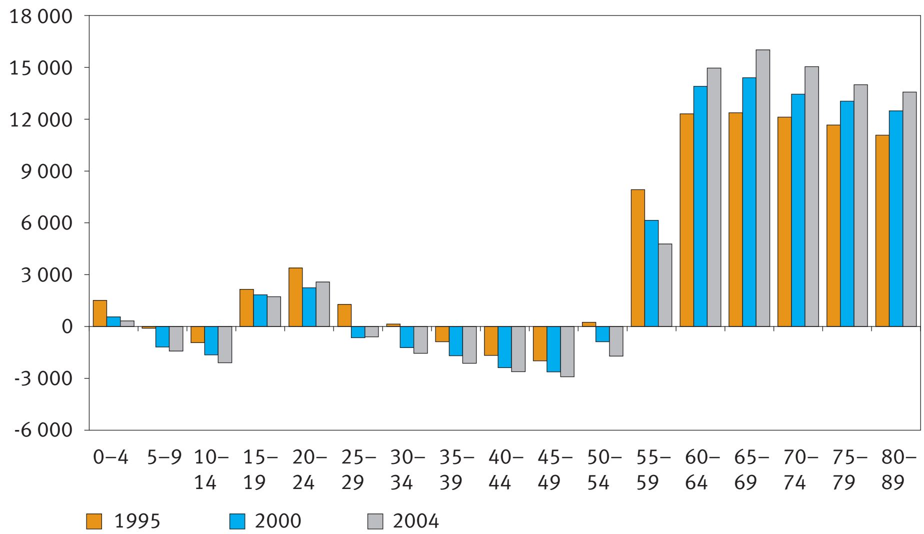


Figure 19.
Mean net transfers in average, risk-adjusted $\rho = 3$ equivalised household income and age in 1995–1999, 2000–2004 and 2004–2008.



Above we have shown results for a baseline choice of the relative risk aversion coefficient, $\rho = 3$, as in Hoynes & Luttner (2011). Tables 3 & 4 give the results from calculations which vary the values of ρ, the coefficient of relative risk aversion. If a larger value is chosen, by definition the larger risk premium one gets. In the 2004–2008 income panel data, with $\rho = 1$ the average relative risk premium is 10.3 percent (2 337 €) in equivalised household factor income, with $\rho = 5$ the risk premium rises to 23.1 percent (5 244 €, Table 4). In terms of equivalised disposable income the corresponding figures are 2.5 percent (552 €), $\rho = 1$, and 8.6 percent (1 896 €), $\rho = 5$ (Table 3).

Similarly the extent of implicit public income insurance is increased with the value of ρ. For example, in the 2004–2008 income panel data implicit income insurance (the difference between the redistribution of risk-adjusted and unadjusted income, $\rho = 0$) is 2.03 percentage points with $\rho = 1$, and it rises to 4.05 with $\rho = 5$ (Table 6). If the change in the income redistribution from the 1995–1999 income panel data to the 2004–2008 income panel data is considered there is no such clear cut dependence, with $\rho = 0$ no risk, the change is 3.25 percentage points (decrease), with $\rho = 1$, the change is slightly smaller 3.19 percentage points, after that the values increase, getting to 3.62, with $\rho = 5$.

However, income redistribution has been reduced in the sample period, and the result is not dependent on whether one considers risk-adjusted income measures or cash measure. Above a decrease in income mobility in the sample period has been found in equivalised disposable income but not in factor income, and therefore attributed to the effects of redistribution. Although this may have reduced the risk component in individual incomes the effect has not off-set the decrease in redistribution in cash.

5 Conclusion and discussion

It has long been recognized that income distributions with income cumulated over a longer time horizon give a better picture of inequality and economic welfare than distributions based on snapshot income. Annual income distributions may give even distorted picture of longer-term economic well-being. The paper has examined Finnish income mobility and permanent income inequality and their temporal evolution using a large income panel data in 1995–2008. The results indicate substantial income mobility in Finland and equalization in longer term average incomes. The data show a clear decrease in mobility of equivalised disposable household income over the sample period. However, the decrease in the (relative) mobility measure seems to be related to the rise in the permanent income inequality, and the mobility values, in absolute terms, stay remarkably constant, in the age bracket 35–64 years old. The rise in annual Gini is closely tracking the corresponding rise in Gini coefficient of permanent (average) income. In addition, there seems to be less mobility in factor income than in disposable income, and in contrast to disposable income the values of the Gini coefficient do not show a general widening in permanent factor income inequality in late 1990's and 2000's. There has been a substantial cut-back in public redistribution. Old age people experience less income mobility than other age groups, but contrary to conventional wisdom they are not in a static phase of life. They have some mobility even in their factor incomes.

Subsequently, this paper examined to what extent one can equate income mobility with income risk. Income mobility is frequently seen to represent a positive element in society whereas income risk imposes costs to risk-averse households without access to perfect capital markets. How to introduce income mobility as an equalizer of longer term income into the social objective function, while simultaneously recognising the role of risk, is a demanding task (Fields 2010). Creedy et al. (2011) present a framework which comes nearest to the one used in the current paper. Here relative risk premiums are estimated to adjust individual average incomes for risk aversion. The results look reasonable. In our data the population mean of relative risk premiums in disposable income is 5.7 percent of average income (980 € in 2008 euros) in the 1995–1999 income panel data and 6.2 percent (1 370 €) in the 2004–2008 income panel data. The results depend by definition on the value of the degree of risk-aversion one chooses. Old age people have more stable incomes but are exposed to some income risk. For example, in the group, 65–69 years old, the mean relative risk premium in disposable income is 2.46 percent of their average income (370 € in 2008 euros) in the 1995–1999 income panel data and 2.53 percent (430 €) in the 2004–2008 income panel data.

To obtain reasonable estimates of risk premiums, education level, socio-economic status and age, factors likely to affect variability of income, are controlled for. A large number of observations available in the data facilitates this rather detailed procedure based on weak distributional assumptions. Naturally the results depend on the conditioning factors. Including more conditioning factors one tends to get more variation in the estimators of income risk. In the extreme case one would equate all income variation at the individual level with income risk. To give an example, assume constant relative risk aversion together with social preferences with constant relative inequality aversion, as in Creedy & Wilhelm (2002). Assume for simplicity that these parameters would have same value, so one would weight risk within individuals and inequality between individuals equally.[26] In this special case of Creedy & Wilhelm (2002), one could combine aversions to inequality and income variability to a single index calculated as the Atkinson inequality index over all observation in the income panel. All income variation at the individual level is not to be equated with unpredictable income risk.[27] The method used is a simple and straight-forward one, and next step in the analysis would be to consider robustness of results to the chosen set of conditioning factors used to estimate income risk.

In the current paper an effort has been made in separating income risk from the life-cycle effects on the income process by conditioning the estimators of relative risk premium on age. This is an important aspect and life-cycle effects should be given a more thoughtful treatment in studies of income risk. In the future greater reliance on potentially volatile income sources in old age and increasing longevity makes it more likely that older people may observe substantial changes in their income. Old age is not a static phase of life and post-retirement income dynamics is of growing policy importance.

Finally, this paper presents estimates on the redistribution effect using differences between Gini coefficients of equivalised factor and disposable household income. Risk-adjusted¸ certainty equivalent income concepts are utilised to get potentially useful information on redistribution of risk (an additional indicator of implicit income insurance), and may be considered as adding to the literature. The amount of implicit income risk one observes is naturally dependent on the degree of risk aversion assumed. All age groups, including old age people gain from redistribution in certainty equivalent income relative to unadjusted redistribution of cash. The corresponding Gini coefficients of certainty equivalent factor and disposable household income also depend on the degree of risk aversion assumed. However, the difference between these, an indicator of implicit income insurance, is influenced less by the degree of risk aversion assumed. In addition, finding of reduced redistribution in certainty equivalent income over the sample period is robust to a particular value assumed. Therefore, it is safe to conclude that the observed decrease in the mobility of equivalised disposable household income in the sample period which could have shown as lowered income risk has not been large enough to off-set the effects of reduced redistribution in cash.

Hoynes & Luttner (2011) have a similar task while they estimate the (forward-looking) total value of state tax-and-transfer programs in the United States. Total across person value of state tax-and-transfer programs in the United States is approximately 1 000 $ in 2005 dollars at the median real income with $\rho = 3$. In the current paper, one observes an average risk-adjusted monetary equivalent of redistribution which is 2 760 euros larger than the average cash redistribution (in 2008 euros), in the 1995–1999 income panel data. In the 2004–2008 income panel data the corresponding amount is 3 020 euros. In Finland

26 This should not be taken for a guideline. It is used here only to make a simple remark.

27 Creedy et al. (2011) estimate relative risk premiums using three underlying parameters and relatively strong distributional assumptions, together with **income in the initial period.** The current paper utilises substantially more parameters (about 1000) to control for age, education level and socio-economic status in the initial period, together with **mean income,** and relatively weak distributional assumptions.

the in-cash tax-and-transfer programs are more extensive than the state tax-and-transfer programs in the United States (OECD, Social expenditure database, SOCX). Furthermore, the methodology differs significantly. Hoynes & Luttner (2011) use more involved and sophisticated methods to decompose the total value of state tax-and-transfer programs into predictable changes in income and unexpected changes in income. They denote the last effect as the insurance value of state programs. Current paper does not aim at to make this distinction in trying to separate insurance vs. redistributive components to this degree.

Accounting for saving and borrowing decisions is outside the scope of this paper and the available data. To uncover joint dynamics of income and consumption processes and to obtain more accurate measure of risk premium this would be desirable. However, such panel data sets are mostly unavailable and most of the literature has resorted to using income data instead (Blundell & Etheridge 2010 is a notable exception to the rule). Ideally, one should also take note on adjustments in replacements of durable goods and semi-durables which mechanism is particularly relevant for poor households often in the absence of simple credit market. In addition, there is special merit in giving the risk of being poor, and spells of low-income, a special status in a thorough dynamic analysis, which motivates for a further study.

Furthermore, the effects of public policies are taken into account by forward-looking, rational economic agents while economic decisions on labour supply and saving are made. Construction of the counterfactual case of no public policies is a difficult problem, and the problem is frequently ignored in analysing income distribution and income inequality. The current paper is no exception to the rule. However, Hoynes & Luttner (2011) utilize matching across states to control for differences in state tax-and-transfer policies and to obtain an estimate of the insurance value of state tax-and-transfer programs in the United States.

Neoclassical welfare analysis which underlies most income distribution studies and public economics is firmly anchored to static models under certainty. The analysis is somewhat lacking in established views how to incorporate dynamics and evolving uncertainty into the models of, e.g. optimal tax theory. How to introduce the income mobility as an equalizer of longer term income into the social objective function (Fields 2010)? Have prospects of mobility some special merit over and above a mere comparison of static longer term (life cycle) income distributions? How to combine income mobility both as an equalizer of longer term income and as an income risk modifier into a well-defined social objective function (Creedy & Wilhelm 2002 and Fields 2010)? These questions confront dynamic welfare analysis and public economics, and empirical work like one in the current paper is in need of guidance by more theoretical work on these questions.

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Tables

Table 1.
The Gini coefficient in average household disposable income and income mobility by age in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0.1894	0.1961	0.2033	0.2061	0.1815	0.1757	0.1802	0.1851	0.1899	0.2019	0.2115	0.2086	0.1952	0.1847	0.1824	0.1890	0.2036	0.2014
2000–2004	0.2213	0.2303	0.2377	0.2333	0.2023	0.1970	0.2065	0.2077	0.2085	0.2198	0.2320	0.2365	0.2191	0.2069	0.2019	0.2004	0.2113	0.2280
2004–2008	0.2388	0.2391	0.2452	0.2420	0.2052	0.2012	0.2119	0.2185	0.2194	0.2245	0.2358	0.2468	0.2332	0.2156	0.2088	0.2054	0.2099	0.2373
1995–1999	0.0974	0.0856	0.0915	0.2018	0.2139	0.1464	0.1049	0.0903	0.0865	0.0810	0.0744	0.0793	0.0800	0.0712	0.0658	0.0622	0.0547	0.1009
2000–2004	0.0812	0.0701	0.0779	0.1976	0.1957	0.1265	0.0903	0.0791	0.0764	0.0688	0.0652	0.0645	0.0683	0.0606	0.0615	0.0586	0.0567	0.0878
2004–2008	0.0753	0.0684	0.0757	0.2016	0.1993	0.1273	0.0898	0.0752	0.0727	0.0682	0.0633	0.0629	0.0669	0.0611	0.0582	0.0634	0.0594	0.0858

Table 2.
The Gini coefficient in average household factor income and income mobility by age in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0.3520	0.3443	0.3394	0.3468	0.3292	0.3199	0.3250	0.3258	0.3269	0.3388	0.3847	0.5285	0.6838	0.7746	0.8102	0.8290	0.8407	0.4323
2000–2004	0.3560	0.3506	0.3502	0.3523	0.3216	0.3055	0.3228	0.3252	0.3225	0.3363	0.3698	0.4778	0.6606	0.7628	0.7963	0.8192	0.8369	0.4340
2004–2008	0.3628	0.3507	0.3476	0.3502	0.3172	0.2995	0.3147	0.3247	0.3265	0.3324	0.3639	0.4492	0.6185	0.7471	0.7875	0.8021	0.8265	0.4357
1995–1999	0.0889	0.0735	0.0740	0.1719	0.1913	0.1322	0.0957	0.0765	0.0679	0.0648	0.0654	0.0740	0.0791	0.0650	0.0534	0.0476	0.0391	0.0753
2000–2004	0.0798	0.0648	0.0683	0.1745	0.1847	0.1221	0.0875	0.0729	0.0653	0.0593	0.0622	0.0664	0.0733	0.0637	0.0573	0.0498	0.0434	0.0699
2004–2008	0.0761	0.0642	0.0677	0.1814	0.1893	0.1255	0.0909	0.0717	0.0638	0.0603	0.0572	0.0664	0.0775	0.0685	0.0618	0.0593	0.0487	0.0699

Table 3.

Average risk-adjusted household disposable income in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	ρ	Disposable income 0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0	16 849	17 244	16 985	15 858	16 076	17 527	17 917	17 879	18 216	19 424	20 253	18 388	16 367	14 877	14 283	13 702	13 401	17 283
	1	16 566	16 966	16 649	15 052	15 436	17 103	17 595	17 595	17 922	19 078	19 912	18 107	16 142	14 734	14 162	13 586	13 281	16 876
	2	16 305	16 713	16 332	14 258	14 838	16 710	17 302	17 338	17 655	18 772	19 614	17 867	15 957	14 611	14 059	13 486	13 180	16 560
	3	16 079	16 501	16 087	13 651	14 347	16 384	17 063	17 127	17 435	18 524	19 374	17 672	15 809	14 511	13 973	13 403	13 097	16 302
	4	15 886	16 323	15 890	13 207	13 956	16 112	16 861	16 948	17 247	18 314	19 170	17 507	15 686	14 428	13 902	13 334	13 028	16 089
	5	15 720	16 172	15 729	12 875	13 645	15 884	16 688	16 796	17 086	18 135	18 996	17 366	15 583	14 358	13 842	13 276	12 970	15 912
2000–2004	0	19 135	19 999	19 440	17 733	18 123	20 595	20 841	20 572	20 842	22 108	23 085	22 277	19 100	17 130	15 696	15 127	14 667	19 849
	1	18 771	19 648	18 993	16 637	17 322	20 055	20430	20 216	20 487	21 726	22 677	21 918	18 828	16 956	15 539	14 982	14 514	19 341
	2	18 439	19 332	18 584	15 588	16 583	19 557	20 062	19 901	20 172	21 388	22 325	21 612	18 607	16 813	14 076	13 576	13 142	17 307
	3	18 156	19 069	18 275	14 822	15 991	19 146	19 762	19 644	19 912	21 110	22 041	21 366	18 431	16 696	15 310	14 771	14 289	18 633
	4	17 916	18 848	18 035	14 280	15 525	18 806	19 508	19 426	19 692	20 874	21 802	21 160	18 284	16 600	15 226	14 692	14 205	18 376
	5	17 713	18 661	17 841	13 884	15 159	18 522	19 292	19 240	19 505	20 670	21 598	20 983	18 159	16 518	15 155	14 625	14 135	18 163
2004–2008	0	21 612	22 380	21 918	19 615	19 453	22 758	23 679	23 484	23 423	24 691	25 585	24 971	22 266	19 272	17 495	16 250	15 809	22 171
	1	21 173	21 972	21 403	18 286	18 512	22 117	23 198	23 051	23 006	24 236	25 132	24 546	21 934	19 067	17 327	16 084	15 655	21 619
	2	20 771	21 605	20 929	17 025	17 659	21 530	22 768	22 672	22 643	23 846	24 750	24 194	21 661	18 904	17 194	15 955	15 530	21 165
	3	20 430	21 299	20 574	16 122	16 987	21 058	22 417	22 370	22 349	23 535	24 447	23 912	21 443	18 775	17 090	15 855	15 431	20 805
	4	20 144	21 045	20 301	15 493	16 466	20 672	22 123	22 118	22 102	23 272	24 193	23 675	21 260	18 671	17 006	15 775	15 350	20 514
	5	19 902	20 832	20 082	15 041	16 059	20 353	21 873	21 905	21 892	23 047	23 977	23 474	21 106	18 585	16 937	15 709	15 283	20 275

Table 4.
Average risk-adjusted household factor income in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	ρ	Factor income 0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0	18 040	19 516	19 922	18 041	17 328	19 763	20 504	21 012	21 955	23 607	22 999	14 467	6 613	3 549	2 836	2 547	2 769	17 392
	1	16 366	18 125	18 544	14 645	14 073	17 483	18 775	19 548	20 549	22 051	20 886	11 559	4 612	2 638	2 195	2 018	2 273	15 440
	2	15 210	17 150	17 559	12 437	11 939	15 928	17 591	18 564	19 631	21 063	19 711	10 253	3 779	2 273	1 942	1 814	2 087	14 251
	3	14 570	16 599	17 024	11 501	10 961	15 105	16 922	18 008	19 112	20 512	19 128	9 750	3 495	2 141	1 849	1 740	2 020	13 650
	4	14 120	16 207	16 654	10 963	10 370	14 546	16 446	17 607	18 735	20 111	18 723	9 444	3 343	2 073	1 801	1 701	1 985	13 249
	5	13 780	15 906	16 374	10 608	99 70	14 136	16 080	17 298	18 440	19 797	18 414	9 229	3 247	2 030	1 771	1 676	1 962	12 954
2000–2004	0	21 245	23 347	23 110	20 351	20 197	24 484	24 690	24 516	25 266	26 888	26 857	20 598	8 802	4 391	3 408	3 037	2 942	20 424
	1	19 445	21 853	21 578	16 524	16 970	22 253	22 900	22 957	23 797	25 301	24 755	17 374	6 014	3 018	2 402	2 189	2 213	18 293
	2	18 269	20 853	20 507	14 056	14 825	20 700	21 697	21 935	22 850	24 309	23 557	15 864	4 913	2 483	2 000	1 845	1 912	17 051
	3	17 597	20 260	19 923	12 981	13 745	19 792	20 981	21 340	22 295	23 739	22 924	15 217	4 526	2 296	1 859	1 724	1 806	16 406
	4	17 112	19 825	19 515	12 360	13 064	19 143	20 450	20 902	21 886	23 315	22 473	14 803	4 319	2 202	1 789	1 664	1 753	15 966
	5	16 738	19 486	19 204	11 951	12 591	18 653	20 035	20 558	21 564	22 979	22 125	14 505	4 186	2 144	1 747	1 629	1 721	15 638
2004–2008	0	24 172	26 137	26 178	22 537	21 297	26 715	28 065	28 057	28 229	29 881	30 031	24 827	1 2372	5 307	3 801	3 319	3 169	22 738
	1	22 148	24 470	24 489	18 309	17 802	24 286	26 093	26 305	26 578	28 126	27 997	21 458	8 559	3 605	2 624	2 337	2 290	20 401
	2	20 859	23 377	23 325	15 607	15 547	22 631	24 774	25 178	25 562	27 068	26 823	19 862	7 034	2 985	2 203	1 985	1 973	19 061
	3	20 102	22 721	22 675	14 392	14 412	21 657	23 967	24 501	24 961	26 442	26 163	19 131	6 484	2 763	2 051	1 859	1 857	18 351
	4	19 545	22 239	22 217	13 682	13 692	20 961	23 360	23 996	24 512	25 970	25 682	18 648	6 180	2 645	1 970	1 793	1 796	17 861
	5	19 112	21 863	21 868	13 212	13 192	20 432	22 882	23 598	24 156	25 593	25 306	18 294	5 983	2 570	1 919	1 751	1 756	17 494

Table 5.
Mean transfer in risk-adjusted household income in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	ρ	Age 0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0	-1 191	-2 272	-2 937	-2 183	-1 252	-2 236	-2 586	-3 133	-3 739	-4 184	-2 746	3 921	9 753	11 327	11 447	11 155	10 632	-109
	1	201	-1 159	-1 895	407	1 363	-381	-1 181	-1 954	-2 628	-2 974	-974	6 548	11 530	12 096	11 967	11 567	11 008	1 436
	2	1 095	-437	-1 227	1 821	2 898	783	-289	-1 226	-1 975	-2 290	-97	7 614	12 177	12 338	12 117	11 672	11 093	2 310
	3	1 509	-98	-938	2 151	3 386	1 279	141	-881	-1 677	-1 988	246	7 922	12 314	12 370	12 124	11 664	11 077	2 652
	4	1 765	116	-764	2 244	3 586	1 566	415	-659	-1 488	-1 797	447	8 064	12343	12 355	12 101	11 634	11 043	2 840
	5	1 940	266	-645	2 267	3 675	1 748	607	-502	-1 354	-1 662	582	8 137	12 336	12 328	12 071	11 600	11 007	2 958
2000–2004	0	-2 110	-3 347	-3 670	-2 618	-2 075	-3 888	-3 849	-3 944	-4 424	-4 781	-3 772	1 679	10 297	12 738	12 288	12 090	11 725	-575
	1	-673	-2 206	-2 585	113	353	-2 199	-2 471	-2 740	-3 310	-3 576	-2 078	4 543	12 814	13 938	13 137	12 792	12 301	1 048
	2	170	-1 521	-1 923	1 532	1 758	-1 143	-1 635	-2 033	-2 678	-2 921	-1 232	5 747	13 694	14 330	12 076	11 731	11 230	256
	3	559	-1 191	-1 647	1 841	2 245	-645	-1 219	-1 697	-2 383	-2 628	-883	6 150	13 905	14 400	13 451	13 047	12 483	2 227
	4	804	-977	-1 480	1 919	2 462	-338	-942	-1 476	-2 194	-2 441	-671	6 357	13 965	14 398	13 437	13 028	12 453	2 409
	5	974	-825	-1 363	1 933	2 568	-131	-743	-1 318	-2 060	-2 309	-527	6 478	13 973	14 374	13 409	12 996	12 414	2 525
2004–2008	0	-2 560	-3 758	-4 260	-2 921	-1 843	-3 957	-4 386	-4 573	-4 806	-5 190	-4 446	144	9 894	13 965	13 693	12 932	12 640	-567
	1	-975	-2 497	-3 086	-24	710	-2 169	-2 894	-3 255	-3 572	-3 890	-2 865	3 088	13 375	15 462	14 703	13 747	13 365	1 217
	2	-88	-1 772	-2 397	1 418	2 112	-1 101	-2 006	-2 506	-2 919	-3 222	-2 073	4 332	14 627	15 918	14 991	13 970	13 557	2 104
	3	328	-1 423	-2 101	1 729	2 575	-600	-1 550	-2 131	-2 612	-2 907	-1 716	4 781	14 958	16 012	15 039	13 996	13 574	2 454
	4	599	-1 194	-1 916	1 811	2 774	-290	-1 237	-1 878	-2 410	-2 698	-1 489	5 027	15 080	16 026	15 036	13 982	13 554	2 652
	5	790	-1 031	-1 786	1 828	2 867	-79	-1 009	-1 693	-2 264	-2 546	-1 330	5 180	15 123	16 015	15 018	13 958	13 527	2 781

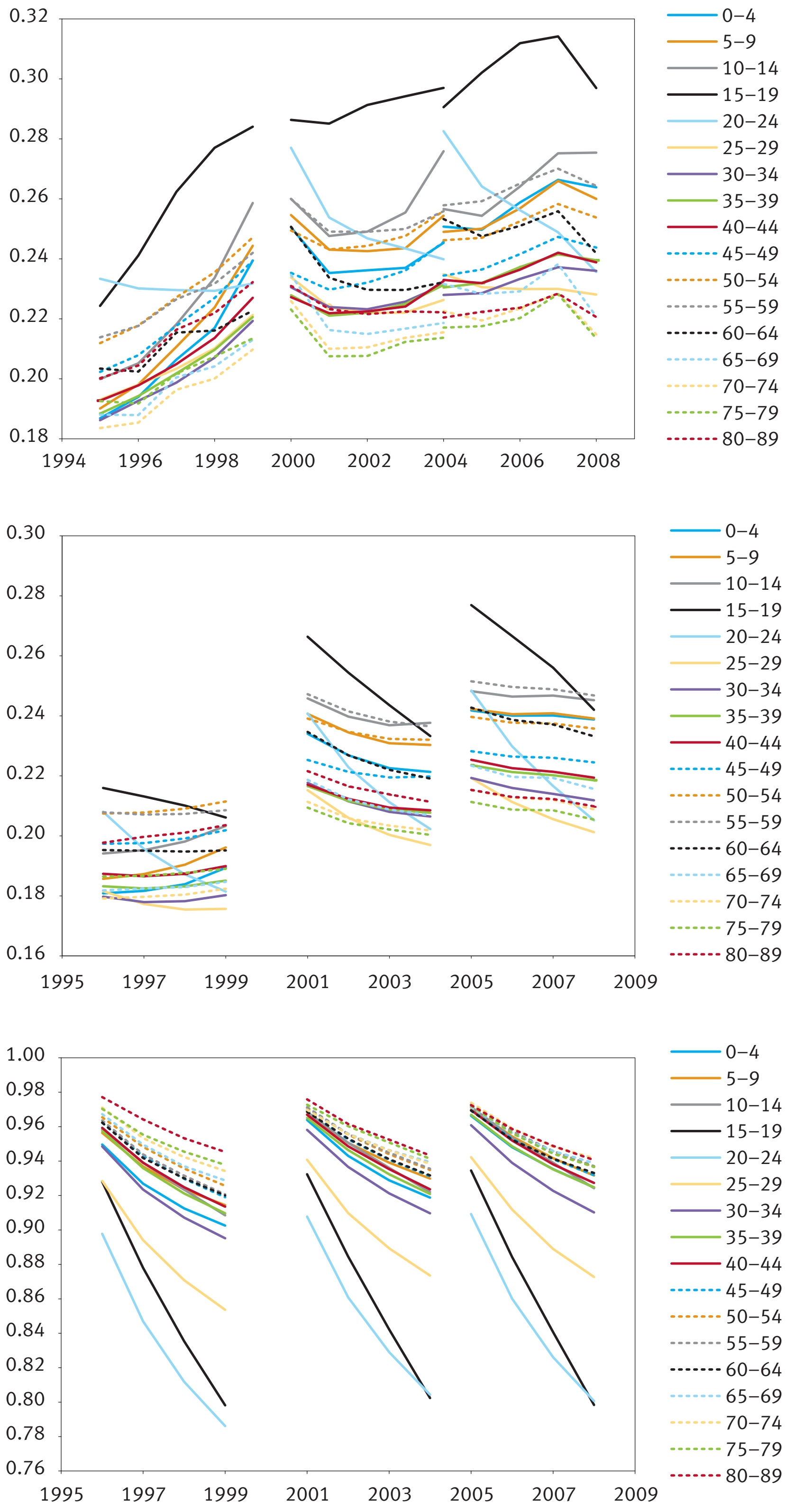
Table 6.

Redistribution (Gini difference) of risk-adjusted household income in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.

Panel	ρ	Age 0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89	All
1995–1999	0	0.1626	0.1482	0.1361	0.1407	0.1477	0.1442	0.1447	0.1407	0.1370	0.1369	0.1732	0.3199	0.4886	0.5898	0.6278	0.6400	0.6371	0.2309
	1	0.1819	0.1634	0.1480	0.1486	0.1637	0.1655	0.1618	0.1558	0.1509	0.1504	0.1904	0.3374	0.4899	0.5894	0.6276	0.6397	0.6374	0.2506
	2	0.1959	0.1742	0.1568	0.1558	0.1791	0.1820	0.1737	0.1657	0.1595	0.1584	0.1998	0.3451	0.4897	0.5892	0.6276	0.6397	0.6376	0.2655
	3	0.2006	0.1782	0.1604	0.1587	0.1840	0.1872	0.1777	0.1691	0.1625	0.1612	0.2028	0.3471	0.4894	0.5891	0.6276	0.6397	0.6378	0.2710
	4	0.2027	0.1803	0.1623	0.1600	0.1859	0.1895	0.1794	0.1707	0.1640	0.1626	0.2043	0.3478	0.4890	0.5890	0.6275	0.6397	0.6378	0.2736
	5	0.2039	0.1815	0.1634	0.1608	0.1868	0.1906	0.1804	0.1717	0.1649	0.1634	0.2052	0.3481	0.4886	0.5890	0.6275	0.6397	0.6379	0.2751
2000–2004	0	0.1347	0.1203	0.1125	0.1190	0.1193	0.1086	0.1163	0.1175	0.1140	0.1165	0.1377	0.2413	0.4415	0.5559	0.5944	0.6188	0.6256	0.2060
	1	0.1500	0.1317	0.1228	0.1250	0.1314	0.1240	0.1287	0.1288	0.1249	0.1276	0.1507	0.2598	0.4481	0.5562	0.5945	0.6184	0.6257	0.2244
	2	0.1597	0.1390	0.1298	0.1303	0.1422	0.1345	0.1364	0.1357	0.1312	0.1336	0.1577	0.2685	0.4505	0.5564	0.5945	0.6182	0.6258	0.2371
	3	0.1626	0.1417	0.1323	0.1323	0.1457	0.1378	0.1386	0.1379	0.1332	0.1355	0.1599	0.2712	0.4507	0.5564	0.5945	0.6180	0.6258	0.2415
	4	0.1640	0.1431	0.1336	0.1333	0.1471	0.1393	0.1396	0.1389	0.1342	0.1364	0.1610	0.2723	0.4505	0.5563	0.5944	0.6179	0.6258	0.2435
	5	0.1647	0.1440	0.1345	0.1338	0.1477	0.1400	0.1400	0.1395	0.1349	0.1369	0.1616	0.2729	0.4502	0.5563	0.5943	0.6179	0.6257	0.2446
2004–2008	0	0.1240	0.1116	0.1024	0.1082	0.1120	0.0983	0.1028	0.1062	0.1071	0.1079	0.1281	0.2024	0.3853	0.5315	0.5786	0.5967	0.6166	0.1984
	1	0.1411	0.1238	0.1127	0.1152	0.1273	0.1140	0.1162	0.1183	0.1192	0.1194	0.1412	0.2213	0.3964	0.5328	0.5787	0.5968	0.6163	0.2187
	2	0.1509	0.1311	0.1191	0.1211	0.1402	0.1242	0.1235	0.1249	0.1256	0.1252	0.1476	0.2300	0.3999	0.5332	0.5787	0.5967	0.6161	0.2314
	3	0.1538	0.1336	0.1214	0.1233	0.1440	0.1274	0.1255	0.1269	0.1276	0.1269	0.1496	0.2325	0.4003	0.5331	0.5785	0.5966	0.6160	0.2358
	4	0.1550	0.1349	0.1227	0.1243	0.1454	0.1287	0.1264	0.1278	0.1286	0.1278	0.1507	0.2336	0.4002	0.5330	0.5784	0.5965	0.6159	0.2378
	5	0.1557	0.1356	0.1235	0.1249	0.1460	0.1293	0.1268	0.1283	0.1292	0.1283	0.1512	0.2342	0.4001	0.5329	0.5783	0.5964	0.6159	0.2389

Figure A1.

Disposable equivalised household income, time profiles of annual Gini-cofficients (top), stabilisation of the Gini in average income over 2,…,5 years (middle) and stability profiles over 2,…,5 years (bottom panel) and age in the five-year income panel data, in 1995–1999, 2000–2004 and 2004–2008.



Appendix

Below the estimators of relative risk premium are reported for real equivalised disposable household income in the 2000–2004 income panel data with $\rho = 3$, by age and education level (6 levels) and socio-economic status (18 classes). Estimators are based on the means of the individual risk premiums in the population stratum in question. For an individual in an age group j, with education status k and socio-economical status l,

$$1-\psi_{j,k,l} = \frac{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)\left((1/T)\sum_{t=1}^{T} y_{it}^{1-\rho}\right)^{1/(1-\rho)} \Big/ (1/T)\sum_{t=1}^{T} y_{it}}{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)}, \quad \text{if } \rho \neq 1,$$

and

$$1-\psi_{j,k,l} = \frac{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)\exp\left((1/T)\sum_{t=1}^{T} \log y_{it}\right) \Big/ (1/T)\sum_{t=1}^{T} y_{it}}{\sum_i 1\big(i \in A(j)\big)1\big(i \in E(k)\big)1\big(i \in S(l)\big)}, \text{ if } \rho = 1,$$

where $1\big(i \in A(j)\big), 1\big(i \in E(k)\big)$ and $1\big(i \in S(l)\big)$ are simple indicator functions.

The classifications in Tables A1 & A2 are coded as follows

Socio-economic status	Code
farmer	10
self-employed	21
upper white collar employees	
– management	31
– research and planning	32
– education and teaching	33
– other	34
lower white collar employees	
– supervising	41
– independent work	42
– non-independent work	43
– other	44
blue collar workers	
– agricultural	51
– industrial	52
– other production	53
– service and logistics	54
students	60
pensioners	70
unemployed	81
others	99

Education level	Code
primary & lower secondary	0
upper & post secondary	3
1st stage tertiary 5B	5
1st stage tertiary 5A low	6
1st stage tertiary 5A high	7
2nd stage tertiary	8

Table A1.

Relative risk premium in the 2000–2004 income panel data with $\rho = 3$, by age, education level (6 levels) and socio-economic status (18 classes).

Soc.	Ed.	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89
10	0	0.0990	0.0962	0.1136	0.1553	0.1477	0.1127	0.0986	0.1132	0.1107	0.1024	0.1202	0.1240	0.1445	0.0346	0.0000	0.0000	0.0000
10	3	0.0000	0.0000	0.0000	0.1550	0.1758	0.1113	0.0885	0.0908	0.0946	0.1134	0.1153	0.1227	0.1126	0.0401	0.0000	0.0000	0.0000
10	5	0.0000	0.0000	0.0000	0.0000	0.1748	0.0884	0.0963	0.0996	0.0968	0.1261	0.1161	0.1509	0.1738	0.0000	0.0000	0.0000	0.0000
10	6	0.0000	0.0000	0.0000	0.0000	0.0873	0.0784	0.0603	0.0617	0.0579	0.0981	0.1101	0.1404	0.0907	0.0000	0.0000	0.0000	0.0000
10	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.1526	0.1340	0.0990	0.1213	0.1234	0.1787	0.0485	0.1697	0.0000	0.0000	0.0000	0.0000
10	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0878	0.0000	0.0000	0.0000	0.0000	0.0000
21	0	0.0962	0.0931	0.1090	0.1764	0.1623	0.1509	0.1082	0.1204	0.1031	0.1034	0.1038	0.1026	0.1009	0.0653	0.0960	0.0000	0.0000
21	3	0.0000	0.0000	0.0000	0.2356	0.1627	0.1184	0.0999	0.0937	0.0933	0.0912	0.1012	0.0950	0.1072	0.0841	0.0132	0.0000	0.0000
21	5	0.0000	0.0000	0.0000	0.0000	0.1012	0.1475	0.1136	0.0898	0.1018	0.0924	0.1150	0.0948	0.0780	0.0189	0.0000	0.0000	0.0000
21	6	0.0000	0.0000	0.0000	0.0000	0.1074	0.1765	0.1034	0.0823	0.1009	0.1354	0.0958	0.1025	0.1015	0.1586	0.0000	0.0000	0.0000
21	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0857	0.0996	0.0863	0.0880	0.0748	0.0922	0.1310	0.0954	0.0844	0.0000	0.0000	0.0000
21	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1484	0.0640	0.1111	0.1641	0.0812	0.0392	0.0000	0.0000	0.0000	0.0000
31	0	0.0639	0.0574	0.0660	0.1562	0.1428	0.1017	0.0654	0.0890	0.0501	0.0552	0.0518	0.0515	0.0789	0.0325	0.2331	0.0000	0.0000
31	3	0.0000	0.0000	0.0000	0.3284	0.1760	0.0675	0.0734	0.0575	0.0541	0.0435	0.0488	0.0354	0.0538	0.0054	0.0594	0.0000	0.0000
31	5	0.0000	0.0000	0.0000	0.0000	0.1759	0.0439	0.0491	0.0339	0.0471	0.0384	0.0330	0.0332	0.0292	0.1119	0.0000	0.0000	0.0000
31	6	0.0000	0.0000	0.0000	0.0000	0.0712	0.0743	0.0368	0.0213	0.0339	0.0413	0.0315	0.0308	0.0240	0.0000	0.0000	0.0000	0.0000
31	7	0.0000	0.0000	0.0000	0.0000	0.1568	0.0647	0.0437	0.0350	0.0315	0.0307	0.0328	0.0329	0.0213	0.0000	0.0000	0.0000	0.0000
31	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0441	0.1113	0.0377	0.0259	0.0532	0.0287	0.0184	0.0322	0.0000	0.0000	0.0000	0.0000
32	0	0.0444	0.0413	0.0495	0.1407	0.1626	0.1170	0.1408	0.1518	0.1003	0.0514	0.0579	0.0495	0.0171	0.0203	0.0000	0.0000	0.0000
32	3	0.0000	0.0000	0.0000	0.2054	0.1002	0.0840	0.0572	0.0263	0.0450	0.0301	0.0382	0.0431	0.0199	0.0372	0.0115	0.0000	0.0000
32	5	0.0000	0.0000	0.0000	0.0000	0.0555	0.0474	0.0375	0.0312	0.0243	0.0366	0.0375	0.0280	0.0285	0.0000	0.0000	0.0000	0.0000
32	6	0.0000	0.0000	0.0000	0.0000	0.0637	0.0422	0.0304	0.0272	0.0231	0.0332	0.0342	0.0268	0.0354	0.0000	0.0000	0.0000	0.0000
32	7	0.0000	0.0000	0.0000	0.0000	0.0999	0.0609	0.0472	0.0406	0.0342	0.0358	0.0336	0.0206	0.0280	0.0038	0.0012	0.0000	0.0000
32	8	0.0000	0.0000	0.0000	0.0000	0.0431	0.0604	0.0363	0.0548	0.0378	0.0405	0.0588	0.0361	0.0450	0.0000	0.0000	0.0000	0.0000
33	0	0.0411	0.0327	0.0422	0.1372	0.1032	0.1101	0.0707	0.0549	0.0311	0.0346	0.0524	0.0324	0.0381	0.0164	0.0434	0.0000	0.0000
33	3	0.0000	0.0000	0.0000	0.1511	0.1286	0.0930	0.0567	0.0473	0.0525	0.0523	0.0508	0.0504	0.0293	0.0339	0.0039	0.0000	0.0000
33	5	0.0000	0.0000	0.0000	0.0000	0.0628	0.0680	0.0462	0.0418	0.0345	0.0473	0.0348	0.0296	0.0333	0.0173	0.0061	0.0000	0.0000
33	6	0.0000	0.0000	0.0000	0.0000	0.0615	0.0660	0.0417	0.0281	0.0297	0.0358	0.0314	0.0343	0.0258	0.0189	0.0771	0.0000	0.0000
33	7	0.0000	0.0000	0.0000	0.0000	0.1021	0.0537	0.0419	0.0311	0.0295	0.0353	0.0397	0.0309	0.0315	0.0093	0.0011	0.0000	0.0000
33	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0800	0.0718	0.0465	0.0409	0.0348	0.0527	0.0299	0.0322	0.0000	0.0000	0.0000	0.0000
34	0	0.0535	0.0450	0.0589	0.1680	0.1144	0.0944	0.0983	0.0418	0.0496	0.0447	0.0490	0.0306	0.0370	0.0104	0.0497	0.0000	0.0000
34	3	0.0000	0.0000	0.0000	0.2539	0.1469	0.1029	0.0501	0.0432	0.0415	0.0502	0.0397	0.0317	0.0547	0.0139	0.0005	0.0000	0.0000
34	5	0.0000	0.0000	0.0000	0.0000	0.0567	0.0679	0.0531	0.0453	0.0329	0.0418	0.0331	0.0324	0.0198	0.0041	0.0183	0.0000	0.0000
34	6	0.0000	0.0000	0.0000	0.0000	0.0958	0.0734	0.0480	0.0424	0.0313	0.0349	0.0343	0.0353	0.0276	0.0059	0.0000	0.0000	0.0000
34	7	0.0000	0.0000	0.0000	0.0000	0.0555	0.0632	0.0502	0.0491	0.0361	0.0357	0.0405	0.0286	0.0286	0.0177	0.1046	0.0000	0.0000
34	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0283	0.0737	0.0437	0.0513	0.0462	0.0547	0.0606	0.0332	0.0029	0.0012	0.0000	0.0000
41	0	0.0376	0.0342	0.0422	0.1150	0.1038	0.0696	0.0665	0.0392	0.0299	0.0329	0.0318	0.0262	0.0439	0.0235	0.0317	0.0000	0.0000
41	3	0.0000	0.0000	0.0000	0.1737	0.0959	0.0670	0.0401	0.0311	0.0321	0.0361	0.0322	0.0258	0.0322	0.0033	0.0000	0.0000	0.0000
41	5	0.0000	0.0000	0.0000	0.0000	0.0672	0.0438	0.0332	0.0292	0.0276	0.0276	0.0281	0.0302	0.0304	0.0157	0.0185	0.0000	0.0000
41	6	0.0000	0.0000	0.0000	0.0000	0.0683	0.0502	0.0329	0.0299	0.0226	0.0334	0.0319	0.0270	0.0226	0.0000	0.0000	0.0000	0.0000
41	7	0.0000	0.0000	0.0000	0.0000	0.1015	0.0573	0.0375	0.0304	0.0394	0.0406	0.0324	0.0210	0.0304	0.0000	0.0000	0.0000	0.0000
41	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0022	0.0237	0.0437	0.0000	0.0133	0.0032	0.0593	0.0141	0.0000	0.0000	0.0000	0.0000
42	0	0.0478	0.0426	0.0478	0.1369	0.0976	0.0680	0.0497	0.0458	0.0401	0.0366	0.0315	0.0319	0.0327	0.0600	0.0063	0.0000	0.0000
42	3	0.0000	0.0000	0.0000	0.1477	0.1070	0.0700	0.0467	0.0393	0.0409	0.0370	0.0392	0.0300	0.0348	0.0403	0.0000	0.0000	0.0000
42	5	0.0000	0.0000	0.0000	0.0000	0.0784	0.0523	0.0400	0.0356	0.0360	0.0389	0.0332	0.0328	0.0353	0.0037	0.0000	0.0000	0.0000
42	6	0.0000	0.0000	0.0000	0.0000	0.0789	0.0556	0.0522	0.0409	0.0366	0.0442	0.0438	0.0320	0.0458	0.0390	0.0000	0.0000	0.0000
42	7	0.0000	0.0000	0.0000	0.0000	0.0966	0.0601	0.0552	0.0375	0.0319	0.0473	0.0486	0.0241	0.0361	0.0122	0.0000	0.0000	0.0000
42	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0361	0.0102	0.0598	0.0719	0.0663	0.0183	0.0244	0.0057	0.0000	0.0000	0.0000	0.0000
43	0	0.0486	0.0551	0.0556	0.1607	0.0873	0.0732	0.0526	0.0330	0.0521	0.0370	0.0384	0.0319	0.0378	0.0528	0.1044	0.0000	0.0000
43	3	0.0000	0.0000	0.0000	0.1618	0.1220	0.0756	0.0494	0.0511	0.0405	0.0474	0.0435	0.0354	0.0471	0.0689	0.0000	0.0000	0.0000
43	5	0.0000	0.0000	0.0000	0.0000	0.1027	0.0532	0.0439	0.0384	0.0441	0.0365	0.0323	0.0337	0.0162	0.0033	0.0000	0.0000	0.0000
43	6	0.0000	0.0000	0.0000	0.0000	0.1064	0.0994	0.0458	0.0190	0.0346	0.0615	0.1079	0.1627	0.0795	0.0000	0.0000	0.0000	0.0000
43	7	0.0000	0.0000	0.0000	0.0000	0.1054	0.0991	0.0728	0.0509	0.0683	0.0232	0.0349	0.0555	0.0247	0.0018	0.0000	0.0000	0.0000
43	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0205	0.0000	0.0065	0.0000	0.0000	0.0000	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000

Soc.	Ed.	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89
44	0	0.0426	0.0336	0.0500	0.1577	0.1121	0.0670	0.0396	0.0353	0.0343	0.0361	0.0334	0.0298	0.0302	0.0398	0.0097	0.0000	0.0000
44	3	0.0000	0.0000	0.0000	0.1491	0.0967	0.0591	0.0410	0.0325	0.0374	0.0343	0.0338	0.0304	0.0340	0.0098	0.0256	0.0000	0.0000
44	5	0.0000	0.0000	0.0000	0.0000	0.0653	0.0466	0.0430	0.0319	0.0355	0.0400	0.0403	0.0378	0.0337	0.0043	0.1576	0.0000	0.0000
44	6	0.0000	0.0000	0.0000	0.0000	0.0799	0.0487	0.0467	0.0361	0.0491	0.0397	0.0506	0.0358	0.0519	0.0129	0.0023	0.0000	0.0000
44	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0909	0.0674	0.0465	0.0366	0.0534	0.0652	0.0649	0.0355	0.0046	0.0043	0.0000	0.0000
44	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0809	0.0361	0.0504	0.0073	0.0135	0.1618	0.0000	0.0131	0.0000	0.0000	0.0000	0.0000
51	0	0.0423	0.0405	0.0674	0.1509	0.0893	0.0776	0.0620	0.0302	0.0620	0.0506	0.0456	0.0395	0.0702	0.0819	0.0156	0.0000	0.0000
51	3	0.0000	0.0000	0.0000	0.1153	0.0917	0.0669	0.0497	0.0355	0.0332	0.0334	0.0423	0.0308	0.0336	0.0000	0.0012	0.0000	0.0000
51	5	0.0000	0.0000	0.0000	0.0000	0.0653	0.0617	0.0364	0.0563	0.0308	0.0439	0.0784	0.0831	0.0055	0.0000	0.0000	0.0000	0.0000
51	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0525	0.0477	0.0126	0.0243	0.0291	0.0063	0.2960	0.0000	0.0000	0.0000	0.0000	0.0000
51	7	0.0000	0.0000	0.0000	0.0000	0.3258	0.0441	0.0153	0.0000	0.0047	0.0000	0.0000	0.0178	0.0000	0.0000	0.0000	0.0000	0.0000
51	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0433	0.0187	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
52	0	0.0311	0.0267	0.0432	0.1205	0.0792	0.0496	0.0415	0.0323	0.0369	0.0280	0.0294	0.0256	0.0354	0.0233	0.0080	0.0000	0.0000
52	3	0.0000	0.0000	0.0000	0.1237	0.0692	0.0415	0.0309	0.0271	0.0278	0.0285	0.0277	0.0253	0.0377	0.0306	0.0000	0.0000	0.0000
52	5	0.0000	0.0000	0.0000	0.0000	0.0702	0.0424	0.0349	0.0367	0.0455	0.0313	0.0499	0.0359	0.0215	0.1273	0.0000	0.0000	0.0000
52	6	0.0000	0.0000	0.0000	0.0000	0.0773	0.0510	0.0356	0.0324	0.0574	0.0629	0.0402	0.0403	0.0000	0.3976	0.0000	0.0000	0.0000
52	7	0.0000	0.0000	0.0000	0.0000	0.0988	0.1324	0.0317	0.1340	0.1493	0.0341	0.1100	0.0214	0.0000	0.0000	0.0000	0.0000	0.0000
52	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.2517	0.0335	0.0000	0.0000	0.0067	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
53	0	0.0350	0.0290	0.0461	0.1368	0.0758	0.0570	0.0412	0.0388	0.0351	0.0271	0.0277	0.0308	0.0317	0.0794	0.0074	0.0000	0.0000
53	3	0.0000	0.0000	0.0000	0.1371	0.0887	0.0549	0.0342	0.0298	0.0325	0.0300	0.0306	0.0261	0.0317	0.0015	0.0109	0.0000	0.0000
53	5	0.0000	0.0000	0.0000	0.0000	0.0531	0.0483	0.0445	0.0440	0.0330	0.0244	0.0444	0.0396	0.0648	0.0000	0.0000	0.0000	0.0000
53	6	0.0000	0.0000	0.0000	0.0000	0.0421	0.0639	0.0430	0.0244	0.0191	0.0226	0.0423	0.0474	0.0000	0.0000	0.0000	0.0000	0.0000
53	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.1150	0.0722	0.0264	0.1497	0.0246	0.0141	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
53	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.9785	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
54	0	0.0378	0.0341	0.0477	0.1422	0.0913	0.0575	0.0480	0.0430	0.0396	0.0361	0.0314	0.0304	0.0304	0.0307	0.0508	0.0000	0.0000
54	3	0.0000	0.0000	0.0000	0.1567	0.1010	0.0560	0.0393	0.0380	0.0363	0.0343	0.0311	0.0308	0.0392	0.0444	0.0236	0.0000	0.0000
54	5	0.0000	0.0000	0.0000	0.4090	0.0919	0.0587	0.0415	0.0417	0.0353	0.0435	0.0450	0.0486	0.0207	0.0268	0.0175	0.0000	0.0000
54	6	0.0000	0.0000	0.0000	0.0000	0.1033	0.0853	0.0532	0.0449	0.0372	0.0368	0.0476	0.0712	0.0185	0.0171	0.0070	0.0000	0.0000
54	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.1748	0.1233	0.0513	0.1202	0.0393	0.0755	0.0372	0.1355	0.0404	0.0000	0.0000	0.0000
54	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0122	0.0000	0.3772	0.0000	0.0744	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
60	0	0.0938	0.0763	0.1021	0.1809	0.1576	0.1140	0.0972	0.0719	0.0821	0.0784	0.0657	0.0356	0.0495	0.0292	0.1493	0.0000	0.0000
60	3	0.0000	0.0000	0.0000	0.1988	0.1634	0.1450	0.1031	0.0786	0.0741	0.0851	0.0692	0.0581	0.0294	0.0244	0.0008	0.0000	0.0000
60	5	0.0000	0.0000	0.0000	0.0000	0.1458	0.1372	0.0917	0.0766	0.1008	0.0903	0.0454	0.0738	0.0672	0.0079	0.0486	0.0000	0.0000
60	6	0.0000	0.0000	0.0000	0.0000	0.1575	0.1570	0.1236	0.1145	0.1728	0.0967	0.1671	0.0880	0.0894	0.0266	0.0075	0.0000	0.0000
60	7	0.0000	0.0000	0.0000	0.0000	0.2439	0.1769	0.2006	0.1243	0.1546	0.1648	0.0746	0.0385	0.0879	0.0515	0.0062	0.0000	0.0000
60	8	0.0000	0.0000	0.0000	0.0000	0.0809	0.1363	0.2725	0.2433	0.1688	0.5070	0.1551	0.0000	0.0560	0.0955	0.0000	0.0000	0.0000
70	0	0.0656	0.0538	0.0856	0.0999	0.0706	0.0523	0.0273	0.0407	0.0325	0.0334	0.0361	0.0343	0.0264	0.0246	0.0233	0.0240	0.0259
70	3	0.0000	0.0000	0.0000	0.1059	0.0819	0.0566	0.0489	0.0403	0.0361	0.0393	0.0312	0.0332	0.0270	0.0249	0.0278	0.0238	0.0305
70	5	0.0000	0.0000	0.0000	0.0000	0.0668	0.1271	0.0760	0.0445	0.0366	0.0395	0.0304	0.0327	0.0260	0.0233	0.0231	0.0197	0.0223
70	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.1263	0.0485	0.0292	0.0525	0.0346	0.0299	0.0408	0.0291	0.0233	0.0276	0.0185	0.0243
70	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.1293	0.2109	0.0814	0.0956	0.0833	0.0425	0.0293	0.0314	0.0246	0.0173	0.0250	0.0168
70	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019	0.0337	0.0011	0.0494	0.0677	0.0188	0.0255	0.0171	0.0223	0.0130
81	0	0.0542	0.0499	0.0651	0.1517	0.1081	0.0771	0.0620	0.0593	0.0545	0.0534	0.0536	0.0383	0.0407	0.0656	0.0895	0.0000	0.0000
81	3	0.0000	0.0000	0.0000	0.1556	0.1050	0.0708	0.0637	0.0585	0.0523	0.0576	0.0527	0.0373	0.0416	0.0661	0.0000	0.0000	0.0000
81	5	0.0000	0.0000	0.0000	0.2770	0.0956	0.0743	0.0619	0.0597	0.0583	0.0706	0.0598	0.0439	0.0425	0.0824	0.0040	0.0000	0.0000
81	6	0.0000	0.0000	0.0000	0.0000	0.1391	0.1098	0.0948	0.0623	0.0612	0.0793	0.1054	0.0679	0.0794	0.0000	0.0000	0.0000	0.0000
81	7	0.0000	0.0000	0.0000	0.0000	0.0764	0.1167	0.1252	0.0956	0.0958	0.1187	0.0832	0.0515	0.0523	0.0000	0.0000	0.0000	0.0000
81	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0936	0.1559	0.0817	0.0640	0.1562	0.0467	0.0133	0.0000	0.0000	0.0000	0.0000
99	0	0.0856	0.0858	0.0968	0.1710	0.1340	0.1203	0.1190	0.1196	0.1150	0.0978	0.1279	0.1398	0.1179	0.1343	0.1841	0.0000	0.0000
99	3	0.0000	0.0000	0.0000	0.1647	0.1537	0.1198	0.1061	0.1030	0.1106	0.1251	0.1225	0.1008	0.0610	0.0831	0.0348	0.0000	0.0000
99	5	0.0000	0.0000	0.0000	0.0000	0.1324	0.1148	0.1000	0.1237	0.1452	0.1444	0.1126	0.1467	0.2001	0.0471	0.0372	0.0000	0.0000
99	6	0.0000	0.0000	0.0000	0.0000	0.2000	0.1482	0.1388	0.1556	0.1476	0.0920	0.1900	0.1687	0.1147	0.0793	0.1256	0.0000	0.0000
99	7	0.0000	0.0000	0.0000	0.0000	0.1331	0.1399	0.1044	0.1282	0.1053	0.1088	0.2125	0.1717	0.1866	0.1278	0.0072	0.0000	0.0000
99	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0725	0.3889	0.1884	0.0323	0.0801	0.2117	0.0285	0.9341	0.0272	0.0000	0.0000	0.0000

Table A2.

Standard errors of relative risk premium in the 2000–2004 income panel data with $\rho = 3$, by age, education level (6 levels) and socio-economic status (18 classes).

Soc.	Ed.	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89
10	0	0.0040	0.0033	0.0042	0.0109	0.0327	0.0165	0.0151	0.0119	0.0102	0.0066	0.0055	0.0071	0.0105	0.0151	0.0000	0.0000	0.0000
10	3	0.0000	0.0000	0.0000	0.0291	0.0191	0.0099	0.0057	0.0048	0.0049	0.0057	0.0054	0.0099	0.0114	0.0086	0.0000	0.0000	0.0000
10	5	0.0000	0.0000	0.0000	0.0000	0.0672	0.0123	0.0105	0.0109	0.0106	0.0167	0.0148	0.0223	0.0522	0.0000	0.0000	0.0000	0.0000
10	6	0.0000	0.0000	0.0000	0.0000	0.0363	0.0302	0.0148	0.0181	0.0180	0.0213	0.0221	0.0640	0.0264	0.0000	0.0000	0.0000	0.0000
10	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0359	0.0230	0.0410	0.0399	0.0911	0.0567	0.0115	0.0444	0.0000	0.0000	0.0000	0.0000
10	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
21	0	0.0030	0.0027	0.0033	0.0097	0.0185	0.0156	0.0097	0.0096	0.0072	0.0056	0.0051	0.0060	0.0081	0.0112	0.0437	0.0000	0.0000
21	3	0.0000	0.0000	0.0000	0.0383	0.0117	0.0080	0.0049	0.0045	0.0044	0.0044	0.0051	0.0064	0.0120	0.0340	0.0044	0.0000	0.0000
21	5	0.0000	0.0000	0.0000	0.0000	0.0199	0.0189	0.0100	0.0074	0.0077	0.0069	0.0097	0.0129	0.0127	0.0054	0.0000	0.0000	0.0000
21	6	0.0000	0.0000	0.0000	0.0000	0.0418	0.0357	0.0194	0.0155	0.0173	0.0163	0.0129	0.0186	0.0226	0.0095	0.0000	0.0000	0.0000
21	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0188	0.0194	0.0113	0.0127	0.0097	0.0118	0.0274	0.0408	0.0553	0.0000	0.0000	0.0000
21	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0912	0.0254	0.0298	0.0903	0.0269	0.0261	0.0000	0.0000	0.0000	0.0000
31	0	0.0028	0.0025	0.0031	0.0117	0.0594	0.0217	0.0280	0.0257	0.0278	0.0135	0.0091	0.0105	0.0252	0.0000	0.1365	0.0000	0.0000
31	3	0.0000	0.0000	0.0000	0.0527	0.0281	0.0086	0.0122	0.0088	0.0077	0.0063	0.0079	0.0054	0.0181	0.0000	0.0000	0.0000	0.0000
31	5	0.0000	0.0000	0.0000	0.0000	0.1171	0.0056	0.0085	0.0035	0.0068	0.0038	0.0040	0.0046	0.0053	0.0000	0.0000	0.0000	0.0000
31	6	0.0000	0.0000	0.0000	0.0000	0.0194	0.0128	0.0052	0.0025	0.0038	0.0041	0.0034	0.0035	0.0040	0.0000	0.0000	0.0000	0.0000
31	7	0.0000	0.0000	0.0000	0.0000	0.0964	0.0102	0.0044	0.0037	0.0028	0.0024	0.0028	0.0042	0.0043	0.0000	0.0000	0.0000	0.0000
31	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0109	0.0614	0.0087	0.0061	0.0202	0.0086	0.0047	0.0117	0.0000	0.0000	0.0000	0.0000
32	0	0.0016	0.0016	0.0027	0.0108	0.0361	0.0316	0.0396	0.0412	0.0322	0.0204	0.0136	0.0162	0.0043	0.0000	0.0000	0.0000	0.0000
32	3	0.0000	0.0000	0.0000	0.0536	0.0069	0.0067	0.0071	0.0029	0.0068	0.0036	0.0057	0.0112	0.0069	0.0236	0.0000	0.0000	0.0000
32	5	0.0000	0.0000	0.0000	0.0000	0.0099	0.0067	0.0049	0.0029	0.0025	0.0059	0.0072	0.0045	0.0084	0.0000	0.0000	0.0000	0.0000
32	6	0.0000	0.0000	0.0000	0.0000	0.0071	0.0024	0.0022	0.0027	0.0017	0.0026	0.0037	0.0030	0.0065	0.0000	0.0000	0.0000	0.0000
32	7	0.0000	0.0000	0.0000	0.0000	0.0231	0.0041	0.0033	0.0032	0.0031	0.0039	0.0027	0.0028	0.0051	0.0021	0.0000	0.0000	0.0000
32	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0148	0.0047	0.0096	0.0070	0.0064	0.0169	0.0143	0.0241	0.0000	0.0000	0.0000	0.0000
33	0	0.0019	0.0016	0.0026	0.0115	0.0357	0.0351	0.0145	0.0181	0.0074	0.0092	0.0188	0.0075	0.0088	0.0050	0.0381	0.0000	0.0000
33	3	0.0000	0.0000	0.0000	0.0294	0.0083	0.0081	0.0086	0.0078	0.0087	0.0071	0.0089	0.0154	0.0084	0.0134	0.0019	0.0000	0.0000
33	5	0.0000	0.0000	0.0000	0.0000	0.0137	0.0087	0.0053	0.0058	0.0048	0.0058	0.0044	0.0042	0.0082	0.0138	0.0037	0.0000	0.0000
33	6	0.0000	0.0000	0.0000	0.0000	0.0109	0.0060	0.0037	0.0025	0.0021	0.0024	0.0022	0.0030	0.0080	0.0047	0.0597	0.0000	0.0000
33	7	0.0000	0.0000	0.0000	0.0000	0.0236	0.0032	0.0026	0.0021	0.0023	0.0025	0.0030	0.0029	0.0063	0.0041	0.0000	0.0000	0.0000
33	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0205	0.0194	0.0067	0.0071	0.0043	0.0101	0.0047	0.0119	0.0000	0.0000	0.0000	0.0000
34	0	0.0024	0.0020	0.0032	0.0122	0.0258	0.0242	0.0261	0.0066	0.0129	0.0113	0.0111	0.0093	0.0108	0.0028	0.0348	0.0000	0.0000
34	3	0.0000	0.0000	0.0000	0.0353	0.0120	0.0090	0.0057	0.0049	0.0063	0.0079	0.0075	0.0053	0.0305	0.0000	0.0000	0.0000	0.0000
34	5	0.0000	0.0000	0.0000	0.0000	0.0124	0.0074	0.0069	0.0054	0.0028	0.0040	0.0032	0.0038	0.0043	0.0017	0.0000	0.0000	0.0000
34	6	0.0000	0.0000	0.0000	0.0000	0.0184	0.0090	0.0071	0.0073	0.0037	0.0036	0.0041	0.0045	0.0060	0.0031	0.0000	0.0000	0.0000
34	7	0.0000	0.0000	0.0000	0.0000	0.0129	0.0040	0.0032	0.0039	0.0023	0.0025	0.0039	0.0032	0.0047	0.0080	0.0762	0.0000	0.0000
34	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0044	0.0215	0.0095	0.0115	0.0110	0.0130	0.0239	0.0168	0.0003	0.0000	0.0000	0.0000
41	0	0.0015	0.0015	0.0021	0.0088	0.0260	0.0138	0.0134	0.0049	0.0043	0.0051	0.0029	0.0028	0.0117	0.0121	0.0151	0.0000	0.0000
41	3	0.0000	0.0000	0.0000	0.0402	0.0076	0.0056	0.0036	0.0030	0.0029	0.0029	0.0031	0.0029	0.0065	0.0009	0.0000	0.0000	0.0000
41	5	0.0000	0.0000	0.0000	0.0000	0.0085	0.0035	0.0021	0.0021	0.0018	0.0014	0.0017	0.0031	0.0042	0.0056	0.0000	0.0000	0.0000
41	6	0.0000	0.0000	0.0000	0.0000	0.0086	0.0054	0.0050	0.0034	0.0025	0.0053	0.0050	0.0055	0.0047	0.0000	0.0000	0.0000	0.0000
41	7	0.0000	0.0000	0.0000	0.0000	0.0249	0.0062	0.0048	0.0047	0.0135	0.0101	0.0080	0.0084	0.0098	0.0000	0.0000	0.0000	0.0000
41	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0033	0.0195	0.0000	0.0026	0.0000	0.0388	0.0000	0.0000	0.0000	0.0000	0.0000
42	0	0.0016	0.0013	0.0019	0.0050	0.0067	0.0070	0.0041	0.0042	0.0027	0.0021	0.0015	0.0019	0.0026	0.0207	0.0023	0.0000	0.0000
42	3	0.0000	0.0000	0.0000	0.0092	0.0027	0.0027	0.0021	0.0019	0.0020	0.0017	0.0020	0.0017	0.0044	0.0139	0.0000	0.0000	0.0000
42	5	0.0000	0.0000	0.0000	0.0000	0.0058	0.0023	0.0015	0.0015	0.0016	0.0018	0.0017	0.0028	0.0044	0.0016	0.0000	0.0000	0.0000
42	6	0.0000	0.0000	0.0000	0.0000	0.0085	0.0038	0.0070	0.0066	0.0073	0.0045	0.0062	0.0049	0.0111	0.0000	0.0000	0.0000	0.0000
42	7	0.0000	0.0000	0.0000	0.0000	0.0296	0.0053	0.0047	0.0045	0.0057	0.0083	0.0082	0.0077	0.0106	0.0048	0.0000	0.0000	0.0000
42	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0173	0.0041	0.0278	0.0293	0.0473	0.0011	0.0051	0.0000	0.0000	0.0000	0.0000	0.0000
43	0	0.0050	0.0055	0.0070	0.0133	0.0210	0.0133	0.0103	0.0071	0.0079	0.0041	0.0046	0.0043	0.0082	0.0147	0.0000	0.0000	0.0000
43	3	0.0000	0.0000	0.0000	0.0211	0.0065	0.0059	0.0057	0.0079	0.0045	0.0052	0.0045	0.0060	0.0096	0.0346	0.0000	0.0000	0.0000
43	5	0.0000	0.0000	0.0000	0.0000	0.0169	0.0065	0.0047	0.0036	0.0053	0.0050	0.0040	0.0062	0.0133	0.0012	0.0000	0.0000	0.0000
43	6	0.0000	0.0000	0.0000	0.0000	0.0305	0.0248	0.0098	0.0062	0.0163	0.0190	0.0352	0.0744	0.0000	0.0000	0.0000	0.0000	0.0000
43	7	0.0000	0.0000	0.0000	0.0000	0.0203	0.0213	0.0304	0.0124	0.0236	0.0066	0.0178	0.0210	0.0159	0.0000	0.0000	0.0000	0.0000
43	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0063	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Soc.	Ed.	0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–89
44	0	0.0018	0.0013	0.0023	0.0072	0.0138	0.0130	0.0083	0.0040	0.0031	0.0035	0.0028	0.0032	0.0037	0.0150	0.0071	0.0000	0.0000
44	3	0.0000	0.0000	0.0000	0.0160	0.0040	0.0027	0.0021	0.0014	0.0015	0.0013	0.0015	0.0020	0.0057	0.0054	0.0000	0.0000	0.0000
44	5	0.0000	0.0000	0.0000	0.0000	0.0060	0.0025	0.0023	0.0015	0.0017	0.0020	0.0021	0.0033	0.0066	0.0013	0.0000	0.0000	0.0000
44	6	0.0000	0.0000	0.0000	0.0000	0.0081	0.0038	0.0060	0.0050	0.0086	0.0070	0.0082	0.0068	0.0144	0.0075	0.0000	0.0000	0.0000
44	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0231	0.0131	0.0165	0.0067	0.0286	0.0294	0.0249	0.0000	0.0000	0.0000	0.0000	0.0000
44	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0053	0.0328	0.0018	0.0059	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
51	0	0.0039	0.0039	0.0085	0.0130	0.0202	0.0147	0.0220	0.0046	0.0130	0.0100	0.0081	0.0061	0.0224	0.0538	0.0076	0.0000	0.0000
51	3	0.0000	0.0000	0.0000	0.0187	0.0094	0.0078	0.0054	0.0036	0.0035	0.0034	0.0049	0.0064	0.0088	0.0000	0.0000	0.0000	0.0000
51	5	0.0000	0.0000	0.0000	0.0000	0.0404	0.0180	0.0116	0.0317	0.0080	0.0085	0.0526	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
51	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0183	0.0216	0.0074	0.0000	0.0162	0.0038	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
51	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0039	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
51	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
52	0	0.0007	0.0007	0.0016	0.0045	0.0045	0.0029	0.0032	0.0024	0.0022	0.0014	0.0013	0.0012	0.0045	0.0058	0.0024	0.0000	0.0000
52	3	0.0000	0.0000	0.0000	0.0063	0.0018	0.0014	0.0011	0.0010	0.0009	0.0010	0.0012	0.0015	0.0045	0.0131	0.0000	0.0000	0.0000
52	5	0.0000	0.0000	0.0000	0.0000	0.0102	0.0045	0.0048	0.0050	0.0080	0.0041	0.0091	0.0058	0.0051	0.0000	0.0000	0.0000	0.0000
52	6	0.0000	0.0000	0.0000	0.0000	0.0132	0.0068	0.0070	0.0059	0.0162	0.0166	0.0122	0.0214	0.0000	0.0000	0.0000	0.0000	0.0000
52	7	0.0000	0.0000	0.0000	0.0000	0.0466	0.0458	0.0090	0.0611	0.0735	0.0137	0.0551	0.0090	0.0000	0.0000	0.0000	0.0000	0.0000
52	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.1741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
53	0	0.0017	0.0015	0.0030	0.0070	0.0066	0.0059	0.0044	0.0042	0.0038	0.0017	0.0020	0.0029	0.0042	0.0367	0.0000	0.0000	0.0000
53	3	0.0000	0.0000	0.0000	0.0115	0.0031	0.0029	0.0018	0.0017	0.0020	0.0013	0.0024	0.0027	0.0054	0.0000	0.0000	0.0000	0.0000
53	5	0.0000	0.0000	0.0000	0.0000	0.0098	0.0077	0.0085	0.0066	0.0054	0.0037	0.0117	0.0102	0.0321	0.0000	0.0000	0.0000	0.0000
53	6	0.0000	0.0000	0.0000	0.0000	0.0045	0.0095	0.0152	0.0090	0.0062	0.0081	0.0122	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000
53	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0438	0.0281	0.0066	0.1072	0.0122	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
53	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
54	0	0.0011	0.0011	0.0020	0.0038	0.0050	0.0040	0.0032	0.0030	0.0020	0.0018	0.0013	0.0017	0.0021	0.0050	0.0070	0.0000	0.0000
54	3	0.0000	0.0000	0.0000	0.0072	0.0023	0.0020	0.0016	0.0016	0.0015	0.0012	0.0013	0.0021	0.0053	0.0134	0.0052	0.0000	0.0000
54	5	0.0000	0.0000	0.0000	0.0000	0.0125	0.0050	0.0030	0.0040	0.0034	0.0055	0.0070	0.0086	0.0059	0.0072	0.0098	0.0000	0.0000
54	6	0.0000	0.0000	0.0000	0.0000	0.0256	0.0162	0.0129	0.0107	0.0134	0.0123	0.0195	0.0256	0.0057	0.0012	0.0027	0.0000	0.0000
54	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0772	0.0498	0.0120	0.0579	0.0166	0.0313	0.0096	0.0404	0.0096	0.0000	0.0000	0.0000
54	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
60	0	0.0047	0.0053	0.0093	0.0017	0.0060	0.0091	0.0119	0.0082	0.0134	0.0127	0.0098	0.0096	0.0151	0.0239	0.0996	0.0000	0.0000
60	3	0.0000	0.0000	0.0000	0.0056	0.0019	0.0041	0.0059	0.0069	0.0072	0.0104	0.0110	0.0198	0.0147	0.0126	0.0000	0.0000	0.0000
60	5	0.0000	0.0000	0.0000	0.0000	0.0118	0.0077	0.0087	0.0095	0.0141	0.0194	0.0106	0.0201	0.0503	0.0033	0.0214	0.0000	0.0000
60	6	0.0000	0.0000	0.0000	0.0000	0.0148	0.0119	0.0218	0.0218	0.0358	0.0320	0.0409	0.0377	0.0276	0.0145	0.0018	0.0000	0.0000
60	7	0.0000	0.0000	0.0000	0.0000	0.0449	0.0176	0.0293	0.0213	0.0476	0.0426	0.0257	0.0169	0.0560	0.0312	0.0000	0.0000	0.0000
60	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0219	0.1406	0.0912	0.0695	0.3483	0.0299	0.0000	0.0000	0.0670	0.0000	0.0000	0.0000
70	0	0.0063	0.0044	0.0058	0.0083	0.0108	0.0083	0.0035	0.0051	0.0031	0.0024	0.0018	0.0012	0.0006	0.0005	0.0005	0.0006	0.0008
70	3	0.0000	0.0000	0.0000	0.0338	0.0130	0.0078	0.0056	0.0042	0.0031	0.0031	0.0018	0.0017	0.0009	0.0009	0.0012	0.0014	0.0024
70	5	0.0000	0.0000	0.0000	0.0000	0.0330	0.0355	0.0232	0.0117	0.0057	0.0055	0.0039	0.0036	0.0015	0.0015	0.0017	0.0019	0.0024
70	6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0427	0.0354	0.0198	0.0222	0.0069	0.0061	0.0060	0.0023	0.0022	0.0032	0.0028	0.0049
70	7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1107	0.0200	0.0366	0.0240	0.0121	0.0051	0.0030	0.0023	0.0021	0.0041	0.0029
70	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0208	0.0003	0.0225	0.0310	0.0039	0.0065	0.0049	0.0066	0.0076
81	0	0.0021	0.0020	0.0027	0.0068	0.0055	0.0042	0.0035	0.0034	0.0027	0.0028	0.0022	0.0013	0.0027	0.0420	0.0439	0.0000	0.0000
81	3	0.0000	0.0000	0.0000	0.0058	0.0029	0.0026	0.0027	0.0025	0.0020	0.0023	0.0022	0.0015	0.0051	0.0435	0.0000	0.0000	0.0000
81	5	0.0000	0.0000	0.0000	0.0000	0.0088	0.0064	0.0047	0.0042	0.0052	0.0055	0.0055	0.0035	0.0059	0.0482	0.0000	0.0000	0.0000
81	6	0.0000	0.0000	0.0000	0.0000	0.0117	0.0130	0.0139	0.0135	0.0071	0.0111	0.0173	0.0104	0.0225	0.0000	0.0000	0.0000	0.0000
81	7	0.0000	0.0000	0.0000	0.0000	0.0197	0.0127	0.0172	0.0146	0.0171	0.0256	0.0188	0.0073	0.0102	0.0000	0.0000	0.0000	0.0000
81	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0334	0.1075	0.0334	0.0361	0.0611	0.0169	0.0059	0.0000	0.0000	0.0000	0.0000
99	0	0.0032	0.0050	0.0059	0.0066	0.0075	0.0125	0.0132	0.0139	0.0145	0.0110	0.0121	0.0156	0.0171	0.0206	0.0270	0.0000	0.0000
99	3	0.0000	0.0000	0.0000	0.0056	0.0040	0.0091	0.0096	0.0097	0.0113	0.0119	0.0126	0.0155	0.0166	0.0553	0.0171	0.0000	0.0000
99	5	0.0000	0.0000	0.0000	0.0000	0.0217	0.0165	0.0141	0.0175	0.0227	0.0223	0.0200	0.0323	0.0695	0.0379	0.0150	0.0000	0.0000
99	6	0.0000	0.0000	0.0000	0.0000	0.0317	0.0284	0.0315	0.0492	0.0437	0.0288	0.0465	0.0523	0.0700	0.0631	0.0885	0.0000	0.0000
99	7	0.0000	0.0000	0.0000	0.0000	0.0705	0.0301	0.0199	0.0262	0.0277	0.0403	0.0472	0.0488	0.0857	0.0729	0.0000	0.0000	0.0000
99	8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0404	0.2004	0.0797	0.0114	0.0191	0.1758	0.0124	0.0000	0.0052	0.0000	0.0000	0.0000

The Finnish Centre for Pensions is a statutory co-operation body, expert and producer of joint services for the development and implementation of earnings-related pension provision. The aim of our research is to produce high-quality, widely applicable information for the evaluation and development of pension provision.

Eläketurvakeskus on työeläketurvan kehittämisen ja toimeenpanon lakisääteinen yhteistyöelin, asiantuntija ja yhteisten palveluiden tuottaja. Tutkimustoiminnan tavoitteena on tuottaa korkeatasoista ja laajasti hyödynnettävää tietoa eläketurvan arvioimiseen ja kehittämiseen.

Pensionsskyddscentralen är ett lagstadgat samorgan och sakkunnig inom verkställigheten och utvecklingen av arbetspensionsskyddet. Vi producerar gemensamma tjänster för arbetspensionssystemet. Vår forskning har som mål att ta fram högklassig information som nyttiggörs på bred front vid bedömningen och utvecklingen av pensionsskyddet.

Finnish Centre for Pensions
ELÄKETURVAKESKUS