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Social Policy and Income Distribution  
An Empirical Analysis for the Netherlands

Koen Caminada and Kees Goudsward

Correspondence to

Faculty of Law  
Department of Economics  
P.O. Box 9521  
2300 RA Leiden  
The Netherlands

Editors

Prof. dr K.P. Goudswaard  
Dr B.C.J. van Velthoven

# **Social Policy and Income Distribution**

## **An Empirical Analysis for the Netherlands \***

**Koen Caminada**

c.l.j.caminada@law.leidenuniv.nl

**and**

**Kees Goudsward**

k.p.goudsward@law.leidenuniv.nl

Leiden University  
Public Finance Department  
P.O. Box 9521, 2300 RA Leiden  
The Netherlands  
tel: ++31 (0)71 527 7756  
fax: ++31 (0)71 512 2140

### **Abstract**

In most OECD-countries income inequality has increased during the last two decades. In this paper, we investigate to what extent changes in the overall distribution of incomes can be attributed to social policy measures. The case for the Netherlands is particularly interesting, because the Dutch welfare state has been reformed rather fundamentally in recent years.

The budget incidence analysis indicates that in the period 1981-1996 inequality of adjusted disposable household income increased sharply. The main force behind this phenomenon was a more unequal distribution of market incomes, but social transfers also explain a substantial large part of the rise in inequality. Social security reforms indeed seem to have made the income distribution less equal.

The results of a more detailed analysis for 1996 on the redistributive impact of social policy and of specific social programs - using data from an unique income panel survey - can be summarised as follows:

- The first five income deciles clearly gain from social security, while the higher deciles loose. Social security causes a reduction in inequality by 26 to 50 percent, depending on the indicator used.
- The public old age program and the social assistance program explain by far the largest part of redistribution by the social system, while the disability and unemployment programs do not have strong redistributive effects.

JEL-classification: D31, H22, and H55

Keywords: Social Policy, Income Distribution (Indices), Taxes and Transfers

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## 1 Introduction

The Dutch economy has received a great deal of acclaim recently. This attention is due to the good economic performance of the Netherlands, especially as far as employment is concerned (Bovenberg, 1997). Twenty years ago, economists were discussing the Dutch disease, now they talk about the Dutch miracle. The medicine of the 'wonderful healing' of the Dutch economy is generally recognised as: (a) the combination of anchoring the guilder to the D-mark and a policy of sustained wage moderation, (b) cutting back public spending, and reducing deficits and debts, (c) increasing labour market flexibility (i.e. growth of part-time and flexible jobs), (d) deregulation, and, (e) major social security reforms.

Some claim that one of the shadow sides of the Dutch miracle is increasing income inequality. Following Gottschalk and Smeeding (1998) Dutch income inequality has increased dramatically in the period 1980-1995, also in an international perspective.

In recent years considerable progress had been made in empirical research on income inequality in industrialised countries. However, the advancement in methods of measurement and in empirical knowledge is contrasted with the lack of insight into the causes of differences in equality across time (Gustafsson and Johansson, 1997). This should perhaps not come as a surprise as the income distribution in a country is the outcome of numerous decisions made by households, firms, organisations and the public sector. One could think of an almost infinite number of micro-level causes for differences and changes in income inequality (Gottschalk and Smeeding, 1997; Atkinson, Rainwater and Smeeding, 1995).

In this paper, we analyse to what extent changes in the overall distribution of incomes can be attributed to social policy measures (such as benefit cuts, changes in eligibility requirements, reintegration policies). The case for the Netherlands is particularly interesting, because the Dutch welfare state has been reformed rather fundamentally in recent years.

The paper is organised as follows. Section 2 we summarise literature on the development in income (re)distribution in OECD countries. Section 3 illustrates the methodological approach and our panel-dataset. Section 4 describes the main characteristics of social policy in the Netherlands in the past decades. In sections 5 and 6 we present the empirical results on the measurement of income redistribution by (changes in) social policy. Section 5 shows the results of a time-series analysis for the period 1977-1996, based on several data sources. Section 6 presents more detailed cross-section information on the redistributive effects of social programs in 1996. A unique micro-dataset is used to that end. Section 7 concludes the paper.

'Measuring inequality is tricky business, requiring a creative combination of science, craft, and art. When done well, it produces both truth and beauty.'

Philip B. Coulter in:  
*Measuring Inequality: A Methodological Handbook*  
 1989, p. 185

## 2 What Makes Income Inequality Vary over Time in Different Countries?

The growing interest in national and cross-national differences in earnings and income inequality has produced a wide range of studies (see Gottschalk, Gustafsson and Palmer eds., 1997). For many countries, studies are showing how income inequality has changed during recent years. An important development has been the launching of the Luxembourg Income Study in which microdatasets from various countries have been "harmonised". Thus there are good possibilities for studying how income inequality varies cross-countries (see for recent results Atkinson, Rainwater and Smeeding, 1995).

We summarise empirical results by analysing *trends* rather than absolute *levels* of income inequality across countries. Many factors in different studies make it difficult to compare levels in inequality over time and across countries (differences in income concepts, the income units, (summary) measures, equivalence adjustments and other factors). However, the trends in inequality will be comparable as long as differences across studies do not change over time. We start by comparing short-run trends in inequality (1980's) and then shift to long-run trends in inequality (from 1979 onwards). By doing so, we try to identify countries with the largest percentage change in income distribution by time-interval. Of course, our focus is on the relationship between social policy and the distribution of income, i.e. redistribution. So we are looking for a relationship, if any, between cutting back public expenditures on social policy (countries with major reforms in welfare state) and (any) increase in income inequality.

### ➤ Trends in income inequality during the 1980's

A typical, although not universal, observation is that inequality increased during the 1980's. Table 1 summarises the results from an extensive survey by Gottschalk and Smeeding (1997) on cross-national comparisons of earnings and income inequality. Note that disposable income is equal to market income plus transfers minus taxes. So, table 1 gives some information on social policy as well. Countries have been listed in order of changes in disposable income inequality (as measured by the change in the Gini coefficient) from largest to smallest change. It should be noted that it is certainly wrong to think in terms of a world-wide trend towards increased income inequality in the 1980's (cf. Atkinson, 1996:43).

**Table 1 Changes in Market and Disposable Income Inequality During the 1980's**

country	years	market income inequality	disposable income inequality
United Kingdom	1981 - 91	+++	++++
United States	1980 - 93	+++	+++
Sweden	1980 - 93	+++	+++
Australia	1980 - 90	+	+
Denmark	1981 - 90	+	+
New Zealand	1981 - 89	+	+
Japan	1981 - 90	+	+
the Netherlands	1981 - 89	+	+
Norway	1982 - 89	+	+
Belgium	1985 - 89	+	+
Canada	1980 - 92	+	0
Israel	1979 - 92	+	0
Finland	1981 - 92	+++	0
France	1979 - 89	0	0
Portugal	1980 - 90	0	0
Spain	1980 - 90	n.a.	0
Ireland	1980 - 87	+	0
West Germany	1983 - 90	+	0
Italy	1977 - 91	-	-

note: Degree of change is based Gini coefficient of disposable income (income concept, method of equivalence scale and computation may differ by country). Designation Range of change in Gini coefficient

-	-5 percent or more
0	-4 to +4 percent
+	5 to 10 percent
++	10 to 15 percent
+++	16 to 29 percent
++++	30 percent or more

source: Gotschalk and Smeeding (1997, table 4)

The survey of Gotschalk and Smeeding covers many aspects of income inequality. The following stylised facts can be traced from their extensive reading on the relationship between social policy and the distribution of income, i.e. redistribution.

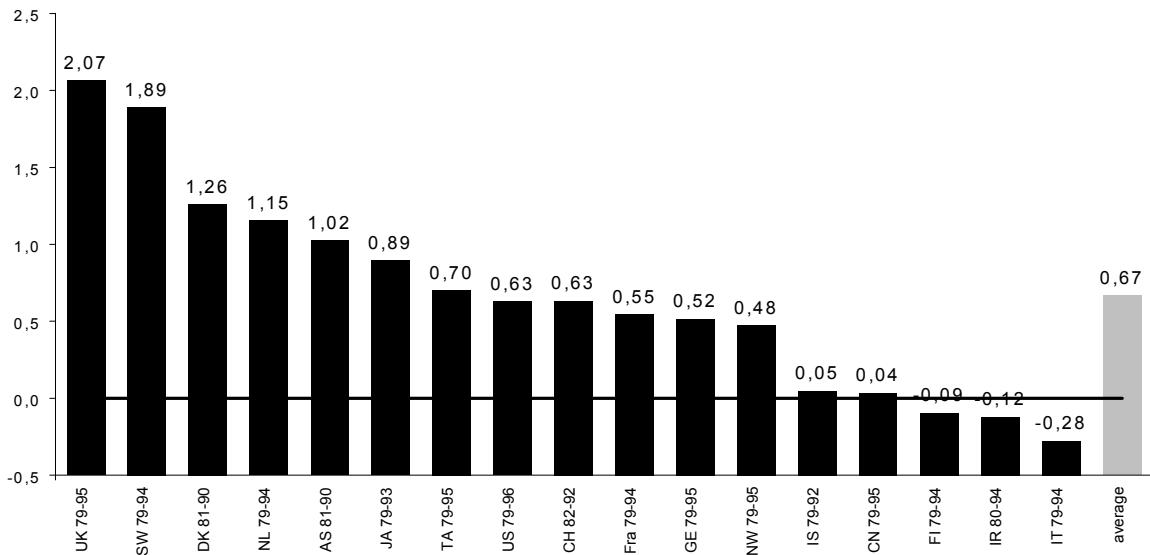
- I Almost all countries experienced some increase in wage inequality during the 1980's. Changes in household income inequality in most countries were smaller than changes in earnings inequality. In all OECD-countries post-tax and transfer disposable income is more equally distributed than market income.
- II There is a noticeable correlation between public cash transfer expenditures and disposable income inequality. The level of social spending is negatively correlated with changes in income inequality.
- III Changes in taxes paid and transfers received - due to changes in tax and transfer structures in many countries - were largely offsetting the changes in the distribution of markets income (pre-tax and pre-transfer).
- IV However, the changes in the distribution of income - as documented in table 1 - are the result of a complicated set of forces. The links between changes in tax and transfer policy and the distribution of disposable income in different countries are not well understood at this stage.

Following Gottschalk and Smeeding (1997:675) a pressing area for future research is to isolate the impact of changes in tax and transfer policies on the distribution of income from other factors (e.g. behavioural adjustments in labour supply). So, how much of the change in inequality came from explicit policy changes as compared to changes in economic behaviour of households is an important question that remains to be answered (p. 675).

➤ Trends in income inequality: 1980-1995

When we turn to long-run trends in inequality, the picture as set in table 1, alters substantially for several countries. We rely on data from another paper by Gottschalk and Smeeding (1998) who list countries in order of *yearly* percentages changes in disposable income inequality (as measured by the change in the Gini coefficient) from largest to smallest change. Disposable income inequality increased dramatically in a number of countries, but this trend was not universal. Income inequality did *not* rise in 5 of the 17 nations examined from 1979 to 1995. See figure 1.

**Figure 1 Trends in Disposable Income Inequality 1979-1995**  
Average Percentage Change per year of Gini Coefficient



*note:* Average percentage change per year equals the percentage change in the Gini coefficient over the time frame indicated divided by the number of years in the interval.

source: Gottschalk and Smeeding (1998: figure 4 and appendix tables A-2), and own calculations

Inequality increased by more than 1 percent a year in five countries over this period. The United Kingdom, Sweden, Denmark, the Netherlands and Australia are on top of the list in descending order. Compared to table 1, the United States fall back dramatically, while e.g. the Netherlands show a remarkably sharp increase. In the United States the largest increases in inequality occurred in the early 1980's, with already a high level of inequality before the increase. Following Gottschalk and Smeeding (1998:27), the nations which showed a relatively early large rise in inequality (United States, see table 1) appear to be experiencing a ceiling in those increases. Thus, the increases we are seeing today are offsetting gains made during the 1960s

and 1970s. Indeed, the Swedish, Danish and Dutch distributions had low base Gini coefficients (1979) compared to the United States. This, however, is not the case for United Kingdom. The authors put explanations of these trends high on their research agenda.

➤ Causes of change. Is it social policy?

The increase of the inequality in income distribution observed for most – but not all – Western economies over the last decades has coincided with many structural changes in the economic system. The world economy has been hit by oil crises twice, there has been a tendency towards more free market oriented policies, and more women have been participating in the labour market. For many countries the main forces behind growing disposable income inequality are the growth of inequality of earned market income, demographic changes, changes in household size and composition, and other endogenous factors. Was there a role for social policy as well? A decrease in the relative redistributive effort of welfare states is plausible for at least two reasons: increased labour market participation and welfare state reform.

In most – but not all – countries the labour force participation enhanced substantially over the last ten to fifteen years. There are several country-studies showing how labour-market activities of wives reduced inequality among couples. However, Gustafsson and Johansson (1997) could not establish a relation between increased female labour force participation and reduced income inequality in 16 OECD countries from 1966 to 1994.

One could argue as well that one of the explanations of the dissimilarity in country-ordering in table 1 compared to figure 1 could be the welfare state reform. In some countries the welfare state (tax and transfer systems) has been reformed rather drastically in recent years. Cutting back public spending and increasing income inequality could be correlated.

On basis of the LIS-data presented by Ervik (1998) we find some – but no universal - evidence for both propositions. Ervik presents for eight countries the trend in the Gini coefficients corresponding with several income concepts; moving from earned market income, via gross income (also including social transfers) to net disposable income (gross income minus social contributions and taxes). For any year (and country) the magnitude of welfare states' total redistributive effort is represented by the reduction of the Gini coefficient between market income and net disposable income (p.30). This budget incidence approach indicates that the tax and transfer system does redistribute income in such a way that a substantial reduction in overall income inequality is accomplished in all of the eight countries under consideration. How did this distributing effort by social policy vary over time in different countries? In some countries the redistributive effect of transfers and taxes decreased in the last ten to fifteen years (Sweden, the United Kingdom, Finland and the United States), whereas in other countries the redistributive effect of transfers and taxes increased (Denmark, Australia, Germany and Norway). Unfortunately, the case for the Netherlands – as well as for many other countries – was not considered. However, the differences identified between both groups of countries regarding the redistributive capacity of the welfare state do not uniformly support our expectation that cutting back public spending and increasing income inequality are related. Nevertheless, the work of Ervik seems as an attractive approach to tackle this question for the Netherlands.

### 3 Conceptual and Measurement Issues

In recent years considerable progress has been made in empirical research on income inequality. However, comparisons of income - between countries and over time - must still confront several conceptual and measurement issues. What measure would one ideally use to compare distributions? Which income concept and income unit should be used as a reference scale for (re)distribution? What is the impact of using imperfect data to approximate this ideal? It is hardly possible to answer all these questions. We begin by addressing a number of conceptual and measurement issues in empirical comparisons of survey based income data.

'Even before considering how best to describe different distributions and what is meant by inequality, a whole host of questions arise which can perhaps best be summarised by the question "the distribution of what?"'

A. Goodman, P. Johnson and S. Webb (1997:10)

#### 3.1 Methodology

There are numerous possible ways to analyse the impact of social policy on the distribution of income; some of these approaches are listed in our references. It is generally agreed upon that there is no single 'correct' methodology. However, the budget incidence approach is - still - a standard methodology for studying the combined effects of all taxes and transfers on the magnitude of (re)distributing income. Many studies analyse the budget incidence by comparing two or more income distributions. E.g., the distributional incidence is measured by comparing the post-fisc and pre-fisc income distribution at one or more specific moments in time. The interpretation of any single post-fisc distribution requires comparison with some other post-fisc or pre-fisc distribution.

The case for aggregate incidence studies was set down by Dalton (1936). From the studies in which this methodology has been implemented since research was initiated by Gillespie (1965), a small set of stylised conclusions has emerged (see below). Of course, also critical literature on budget incidence analyses has emerged – but these criticism leave the stylised conclusions intact; see a critical survey of efforts to measure budget incidence by Smolensky, Hoyt and Danziger (1987). For example, the important issue of tax/transfer shifting is totally ignored in analyses on budget incidence in such a classical framework. However, models that include all behavioural links are beyond the scope of existing empirical work (Gottschalk and Smeeding, 1998:3). Therefore, researchers have restricted themselves largely to accounting exercises which decompose changes in overall inequality into a set of components. Despite the problem of tax shifting, analyses on statutory and budget incidence can be found for decades in literature on public finance.<sup>1</sup>

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<sup>1</sup> See for example Dalton (1936), Musgrave and Tun Thin (1948), Gillespie (1965), Kakwani (1977a), Reynolds and Smolensky (1977), Kiefer (1984) and Silber (1994), and more recent analyses based on the Luxembourg Income Study database (some of them are also listed in our references).

What kind of conclusions can be drawn from this kind of empirical work? The following stylised facts are summarised by Smolensky, Hoyt and Danziger (1987:168):

- I Despite the large differences across the developed countries in the relative size and composition of the fisc, redistributive impacts are quite similar across countries.
- II Transfers play the major role in redistribution, primarily because of old age pensions.
- III Tax systems are broadly proportional.
- IV By any of the conventional income inequality measures, taking account of fisc substantially reduces measured inequality in any year.
- V Substantial growth in government expenditures in a single country over time does *not* substantially increase the spread between pre- and post-fisc income inequality in later relative to earlier years.

Most of these facts seem valid nowadays, in line with the findings of Gottschalk and Smeeding (1997 and 1998). A relation between the level of social transfer expenditures and disposable income inequality (*v*) seems to depend on country-specific aspects (cf. Ervik, 1998). Some countries reformed their welfare state rather fundamentally in recent years, while others did not. Social policy measures could have an impact on the relative size, composition and redistributive effect of the fisc in these countries. We will analyse the case for the Netherlands.

Social security schemes in the Netherlands, as in many countries, make low income earners better off after social policy than before. In general, income is transferred from high income earners to poor ones through taxes and transfers. We analyse the effect of social policy on the distribution of income as follows. The distribution of primary or wage and salary income is compared with the distribution of income after tax and after social transfers, see scheme 1. Income deciles and summary statistics before and after social policy are used to indicate the amount of distribution by social policy (in line with the work of Ervik, 1998).

To identify changes in the redistributive effect of taxes and social transfers over time, we analyse data for a long time period. For reasons of data-availability we have to analyse the whole trajectory from original or market income to net disposable income (trajectory a-c in scheme 1) to approach the impact of the tax and benefit system as part of the overall trend in income distribution. We calculate the statutory or budget incidence of social policy in line with the work of Musgrave, Case and Leonard (1974). That is, important issues of tax/transfer shifting and behavioural responses are ignored.

### scheme 1

#### primary income (a)

+/-	social welfare benefits
+/-	social insurance transfers
-/-	social security contributions
-/-	direct taxes (i.e. that part of direct taxes to finance social welfare)

= income after taxes and contributions, after transfers (b)

+/-	other sources of income
-/-	other taxes/contributions

= disposable net income (c)

### 3.2 Choice of Income Unit

The unit of analysis is an important issue often disregarded in income distribution studies. It is evident that the ultimate source of concern is the welfare of the individual. However, an individual is often not the appropriate unit of analysis. E.g. children and spouses working at home do not have recorded income, but may nevertheless be enjoying a high standard of living as a result of income sharing with parents/spouses. How to solve the problem of the key question of the unit of analysis?

Traditionally, studies have used the household income per capita (or per member) measure to adjust total incomes according to the number of persons in the household. More recently, equivalence scales have been widely used in the literature on income distribution (see Figini, 1998). An equivalence scale is a function that calculates adjusted income from income and a vector of household characteristics. The general form of these equivalence scales is given by the following expression:  $W = \frac{D}{S^E}$ , where  $W$  is adjusted income,  $D$  is income (disposable income),  $S$  is size (number of persons in households) and  $E$  is equivalence elasticity.  $E$  varies between 0 and 1. The larger  $E$ , the smaller are the economies of scale assumed by the equivalence scales. Equivalence scales range from  $E=0$  (no adjustment or full economies of scale) to  $E=1$  (zero economies of scale). Between these extremes, the range of values used in different studies is very large, strongly affecting measured inequality.

Equivalence scale elasticity for the Netherlands in the period 1990-1995 has been estimated at around 0.47 (cf. Schiepers, 1998:120). This implies that in order to have an equivalent income of a household of one person where  $D$  is 100, a household of two persons must have an income of 138 to have equivalent incomes. Alternatively an one-person household must have 72 percent of the total income of a two-person household to have equivalent income. In our historical analysis for the Netherlands we use the equivalence scales results obtained by other researchers, where  $E$  is around 0.5. In our more detailed analysis for 1996 we use equivalence scale ranging from  $E=0$  (no adjustment) to  $E=1$  (per capita income) for reasons to be explained in section 6.

### 3.3 Presentation and Interpretation of the Results

This report presents the results in a number of ways. For example, we present the results by percentiles of distribution (in 10 equal groups) and Lorenz curves. A comparison of different distributions of percentiles (Lorenz curves) does not provide a quantitative measure of the extent of differences in inequality (redistribution). A standard approach is to use a summary measure of inequality which reduces the degree of inequality to a single number. Many different summary measures can be found in the literature and all imply some *a priori* value judgements about the distribution itself.<sup>2</sup>

<sup>2</sup> See e.g. Atkinson (1970), Kiefer (1984), Formby *et al* (1990), Lambert (1993) and Silber (1994) for a technical advanced debate on the measurement of income inequality by summary statistics. See also Annex A.

Also the Gini coefficient, the Mean Log Deviation (Theil index), the Atkinson index of inequality, and the Robin Hood indicator (Schutz coefficient) are used; Annex A presents expressions and technical details of these inequality measures. Most of these measures have some things in common (derived from the well known Lorenz curve), but do not always give the same answer on the basic question: 'which of the two distributions of income is more equal?'. Especially when the Lorenz curves for two different distributions intersect, the ranking of two different distributions by different inequality measures depends on the importance each gives to inequality at different parts of the distribution (see Atkinson, 1970). Different measures may therefore value one and the same income distribution differently (cf. Champernowne, 1974). Moreover, one and the same summary statistic - e.g. Gini – can have one single value for two or more entirely different income distributions (in case the Lorenz curves do cross). However, in the case two Lorenz curves do not intersect (one lies entirely inside another one), it can unequivocally be said that the distribution represented by the outside Lorenz curve is more unequal than the one represented by the one that lies inside (Lorenz Dominance Theorem). In our budget incidence analysis the Lorenz Dominance Theorem can be applied. For all data years the Lorenz curve for disposable income (or after-tax-after-transfer income) lies inside the Lorenz curve for primary income.

Another problem we have to deal with is the problem of re-ranking. Particular individuals (or households) are initially situated on a specific point of the distribution of primary income, but could be found elsewhere on the distribution of disposable income, that is after social policy (redistribution). Re-ranking implicates that measured income equalising could be biased when summary statistics of primary income and disposable income are compared. Lambert (1993:38) showed that the full equalising effect of a fiscal system is overstated when the effect of re-ranking (if any) is ignored. In our analysis for the period 1981-1996 we - unfortunately - have to ignore the effect of re-ranking, so the results are biased upward to some extent. However, in the more extended analysis for 1996 we overcome the problem of re-ranking by analysing comparable Lorenz curves (see section 6).

### 3.4 Data

In the time-series analysis (1981-1996), we use several sources and several income units, which were not always easy to compare. For example, data on disposable income at the level of households is only available since 1977 (before data collection took place at the level of another income unit, i.e. income earners). Data collection at the level of individuals started even more recently in the Netherlands. However, for the most recent data year (1996), we use an unique income panel survey of Statistics Netherlands, which covers 217.000 individuals representing 75.000 households. So, with these data we can analyse income inequality at both the level of individuals and at the level of households. Sample data have been combined with data from the tax- and social security administrations. As a result, the survey contains detailed information on many income components, including various public and private transfers, for several socio-economic groups. The panel data are now available for a number of years up to 1996.

We make a comparison between our results and the results of the well-known Luxembourg Income Study (LIS). LIS uses household micro surveys for over 25 countries, including the Netherlands. It should be noted that any comparison is rather illustrative than conclusive. LIS-data for the Netherlands are less extensive (as far as our purpose is concerned) and less recent than our data. In view of the difference in definitions of income and weighting methods, national studies do not always show the same level and trend of inequality as these cross-country analyses (see Atkinson, Rainwater and Smeeding, 1995:59).

#### 4 Social Policies in the Netherlands

The Dutch social protection system used to be characterised by generous open-ended benefits and lax administrative control. However, the expansion of the system caused severe and growing problems, starting in the 1970's. The number of benefit recipients and the financial burden of inactivity rose dramatically, as can be seen in table 2. Combined with a number of adverse macroeconomic shocks, a vicious cycle of increasing (non-wage) labour costs, erosion of employment and growing benefit dependency was set in motion. Reform of the social system was called for and was indeed initiated in the early 1980's. Actually, the change in policy stance occurred at a relatively early stage, compared to other European countries, because of the severity of the problems.

**Table 2 Keyfigures on Social Security in the Netherlands**

	1970	1980	1990	1998
Public expenditure on social security as % GDP <sup>a</sup>	17.2	26.4	25.8	22.0
Number of benefit recipients in millions	2.0	3.1	4.0	4.1
Idem under age 65	0.7	1.4	2.0	1.9
Benefit recipients as % of employment	44	65.7	82.1	74.3
Real disposable income of welfare and old age benefits (index: 1973 = 100)		124	114	112

a Excluding supplementary labour pensions and housing subsidies, including public expenditure on health care  
 source: Ministry of Social Affairs (1995:5) and (1998:13)

In the 1980's reform strategy was almost exclusively directed at cutting benefit levels. The (legally required) indexation of social benefits to wage development was suspended during almost the entire 1980's and partly in the first half of the 1990's. Actually, in many years no adjustment for inflation took place, that is benefits were frozen in nominal terms. Also, unemployment and disability benefits were cut from 80 percent to 70 percent of previous wages. As a consequence of these and other measures, real disposable income of many beneficiaries

strongly fell since 1980, as shown in table 2.<sup>3</sup> The strategy was successful in containing expenditure growth. Public expenditure on social protection roughly stabilised in the 1980's, despite continuing growth of benefit volumes.

In the 1990's the reform strategy has been primarily directed at reducing the number of beneficiaries, through encouraging labour force participation, and discouraging and preventing benefit dependency. Important policy measures in this context have been the tightening of eligibility requirements in the unemployment and disability schemes, reform of the benefit administration, and the introduction of stronger financial incentives for employees and – especially – employers. The sickness benefit scheme has been privatised in the period 1994-1996, which means that employers are now fully responsible for paying sickness benefits of 70 percent of wages during the first year of sick leave. This risk can be privately insured, which has actually occurred on a large scale. The disability scheme has also been changed fundamentally, through the introduction of experience rating. Also, the option was introduced for employers to private coverage of the disability risk during the first five years of disability. Radical changes have been made in the survivors scheme. Most people are now expected to privately insure against the risk of disease of relatives.

The reduction in statutory benefits have been offset mostly, because trade unions have negotiated supplementary benefits, especially sickness benefits and disability benefits. However, employees (and others) not taking part in these collective contracts do not profit from this.

The figures in table 2 show that these policies had some success in terms of a halting the rise in claimants under 65 years, but so far the rising trend has not been clearly reversed. A more positive development is that the ratio of benefit recipients to the number of employed is falling in recent years, as a consequence of rapid employment growth. Also, total expenditure on social security is declining in recent years. It goes without saying, however, that the reforms discussed will have a substantial impact on the income distribution. This will be analysed in the next sections.

## 5 Social Policy and Income (Re)Distribution: time-series analysis

In this section the distribution of primary or wage and salary income will be compared with the distribution of income after tax and after social transfers (cf. scheme 1) to identify the main factors behind the changes in the income distribution. Therefore we first show the long-run trend in disposable household income inequality in the Netherlands.

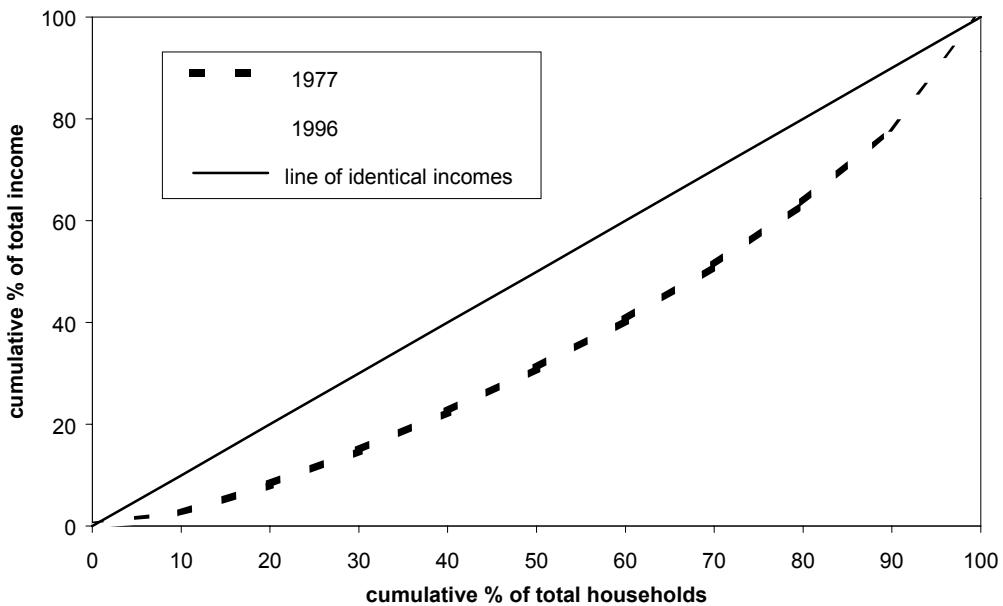
### ➤ Global view 1977-1996

Figure 2 shows the Lorenz curves of adjusted disposable household income for 1977 and 1996. The Lorenz curve for 1977 remains above the Lorenz curve for 1996 (i.e. both curves do not

<sup>3</sup> On the other hand, the increases of real disposable income of social security beneficiaries had been large in the 1970's.

intersect). Therefore it is possible to draw conclusions about the degree of inequality (see section 3). The distribution for 1977 is unambiguously more equal than the distribution of disposable income for 1996. Income inequality did go up in the Netherlands in the period 1977-1996, although the direction of change was not one-way up.

**Figure 2 Lorenz Curves of Disposable Household Income, 1977 and 1996**



source: Statistics Netherlands (1999a:118), and own calculations

Several summary statistics of disposable household income inequality are shown in table 3. All summary statistics indicate a significant increase in inequality of (adjusted) disposable income between 1977 and 1996, although the magnitude of the increase varies. The spread is between +12 percent for the Gini coefficient and +30 percent as measured by Log Deviation for adjusted income. The Gini coefficient is the most sensitive to inequality changes around the median (which did not alter so much), while the Log Deviation and the Mean Log Deviation are more sensitive for low incomes. Furthermore, the Gini coefficient shows a relatively low growth rate, because the base figure (1977) is high compared to the (Mean) Log Deviation.

**Table 3 Trend in Disposable Household Income Inequality 1977-1996**

	1977	1996	change	%-change
Gini Coefficient	0.284	0.320	+0.036	+13
idem, Equivalence Scales	0.243	0.272	+0.029	+12
Mean Log Deviation	0.143	0.179	+0.036	+25
idem, Equivalence Scales	0.110	0.136	+0.026	+24
Log Deviation Equivalence Scales	0.070	0.091	+0.021	+30

source: Gini Coefficient and Mean Log Deviation are from Trimp (1999) and Statistics Netherlands (1999a:119); Log Deviation is taken from Sociaal Cultureel Planbureau (1998:108) and refer to 1977 and 1995; and own calculations

## ➤ Budget incidence analysis 1981-1996

We perform a budget incidence analysis for the (sub)period 1981-1996, because we measure the lowest level of inequality in the early 1980's (as most studies for the Netherlands do). Inequality especially rose during the 1980's. The Mean Log Deviation (Theil index) is used as summary measure in this section, because this statistic is best suited to identify components of the change in inequality. We analyse the trajectory from primary or market income to adjusted disposable income (cf. scheme 1). Table 4 illustrates the main characteristics of the trend in inequality in the Netherlands.

As expected, adjusted disposable incomes are distributed much more equally than primary incomes. In the years shown, inequality was reduced by some 80 percent. By far the largest part of the overall reduction in inequality (about 60 percentage points) is due to social transfers. Note, however, that the redistributive effect of transfers has become smaller in the period under consideration. Taxes and social security contributions reduce inequality by some 10 percentage points. Finally, the use of equivalence scales reduces inequality by another 10 percentage points.

**Table 4 Decomposition of Inequality in Household Income: Mean Log Deviation**

	level			change
	1981	1991	1996	
primary income	0.532	0.540	0.551	+0.019
effect transfers	-0.334	-0.324	-0.323	+0.011
gross income	0.198	0.216	0.228	
effect taxes	-0.054	-0.040	-0.053	+0.001
disposable income	0.144	0.176	0.175	
adjustment for household size and composition	-0.048	-0.057	-0.056	-0.008
disposable income equivalence scale	0.096	0.119	0.119	+0.023
reduction inequality (%)	82	78	78	
effect transfers	63	60	59	
effect taxes	10	7	10	
effect equivalence scales	9	10	10	

source:

Data on the partial effects of transfers and taxes for 1981 are from Odink (1985); for 1991 from Jeurissen (1995) and for 1996 are own calculations. The partial effects of household size and composition are taken from Trimp (1993) and De Kleijn (1998). The data mentioned did not (always) correspond. For all data years we have postulated the same income concepts and used the same income units as Jeurissen (i.e. definitions from before a major tax reform in 1990) to arrive identical decomposition of income inequality for all data-years. Thereafter we reweighted the partial effects (of taxes, transfers and household size and decomposition). Because of these transformations values in the table will differ from values as presented by Statistics Netherlands (and other studies).

What are the main factors behind the changes in the income distribution? This is shown in the right column of table 4. The main force behind the rise in overall inequality of adjusted disposable household income (an increase in the Mean Log Deviation by 24 percent = 23

points) is a more unequal distribution of primary income (19 points). Social transfers also explain a large part of the rise in inequality (11 points). Taxes have an almost neutral effect. Finally, inequality would have risen even more without the correction for household size and composition (-8 points). The growth in the number of one-person households since 1981 has made the non-adjusted distribution of disposable household income more unequal (cf. Trimp, 1999 and Sociaal en Cultureel Planbureau, 1998:109).

We conclude that the change in social policies in the early 1980's has indeed made the income distribution more unequal. Social transfers are the second force behind the rise in overall income inequality since 1981. It should be noted, however, that our results are only rough estimates, which depend rather strongly on the data used.

### ➤ Cross-country Comparison

It can be derived from table 4 that social transfers account for 80 to 85 percent of total reduction of income inequality in 1996, while taxes account for the remaining 15 to 20 percent.<sup>4</sup> The relative importance of transfers in the total reduction of income inequality is rather high in the Netherlands, also in an international perspective.<sup>5</sup> On basis of Gini reduction figures presented by Ervik (1998:32) the transfer system accounts for 87 percent in Sweden (1992), while lower shares are found for Denmark (75 percent in 1992), Norway (74 percent in 1991), the United Kingdom (70 percent in 1991), Germany (67 percent in 1989), Finland (65 percent in 1991), Australia (52 percent in 1989) and the United States (46 percent in 1994). In the United States and in Australia the tax system is much more important in reducing inequality, as it contributes for half of total Gini reductions. Both countries are examples of welfare states, where targeted programs especially towards the poor dominate and where the general tax level is relatively low compared with the Nordic countries, Germany and the Netherlands. The latter countries combine relatively high tax levels and universal social transfers aimed at covering the whole population. However, the redistributive effect of the Dutch tax system is rather low because the effect of rate structure (marginal rates of 36%, 50 and 60%) is substantially diminished by tax deductions (very income-elastic, see Caminada and Goudswaard, 1996).

## 6 Social Policy and Income (Re)Distribution 1996: detailed approach

In this section we present a more detailed analysis of the redistributive impact of social policy and of specific social programs. Again, we use the budget incidence approach. The data are from a extensive income panel survey of Statistics Netherlands (see section 3).

A rather narrow definition of social security is used. Medical care insurances are excluded,

4 Leaving aside the effect of adjustment for household size and composition.

5 Table 4 only shows the Mean Log Deviation, but in view of the international comparability, we used Gini coefficients here as well. Both statistics roughly show the same shares of social transfers (and taxes) in total redistribution.

because most transfers are paid in kind rather than in cash, and only sources of money income are included in the data of Statistics Netherlands. Collective supplementary (labour) pensions are also excluded, because we do not have data on the contributions for these schemes. As a consequence, what is referred to as 'social security' in this section is (much) less than what is referred to as 'social benefits' in the previous section. The results are therefore difficult to compare. Nevertheless, all traditional programmes of the welfare state are included. The selected social security schemes account for 43.9 billion EURO or 14.5 percent of GDP in 1996. For each program, both benefits and taxes or contributions are shown. Social assistance and child benefits are financed by (progressive) taxes, while the other programmes are financed by flat rate contributions. The taxes for the social assistance and child benefits programs are not earmarked, so we imputed the relevant share in general taxation to income earners. This way, we were able to equalise income before and after redistribution (cf. scheme 1 trajectory a-b). Two presentations are shown:

- (1) By deciles, see table 6 and figure 4. Households are consequently ordered in accordance with the magnitude of their disposable income ( $E=0$ ) to avoid the problem of re-ranking. In Annex B all computations are repeated with individuals as the income unit ( $E=1$ ). It appears that the effect of household size and composition does not affect our results. Of course, the level of measured inequality between individuals is higher compared to inequality between households, but the magnitude of the overall reduction in income inequality through social security is more or less the same.
- (2) By summary statistics of income inequality, see table 7. We employ four summary statistics: the Gini coefficient, the Mean Log Deviation, the Robin Hood indicator, and the Atkinson index of inequality with coefficient  $\alpha=0.5$ . See Annex A and B for details.

The results can be summarised as follows:

- The first five income deciles clearly gain from social security, while the higher deciles loose.
- Social security causes a reduction in inequality by 26 to 50 percent, depending on the indicator used. The average redistributive impact of the various coefficients is 35 percent.
- The public old age program, which is based on the solidarity principle (fixed benefits, contributions as percentage of income)<sup>6</sup> and the social assistance program (by its nature) explain by far the largest part of redistribution by the social system.
- The 'Bismarck-oriented' disability and unemployment programs (both benefits and contributions are a percentage of wages) do not have strong redistributive effects between deciles. In fact, benefits from these programs accrue slightly more to the highest deciles. Combined with the contributions, however, the first five deciles are somewhat better off.
- Especially higher income groups (with on average more children) profit from the child benefits scheme. Again, combined with their share in taxation, they are somewhat worse off.

**Table 6 Redistribution through Social Security in the Netherlands, 1996**

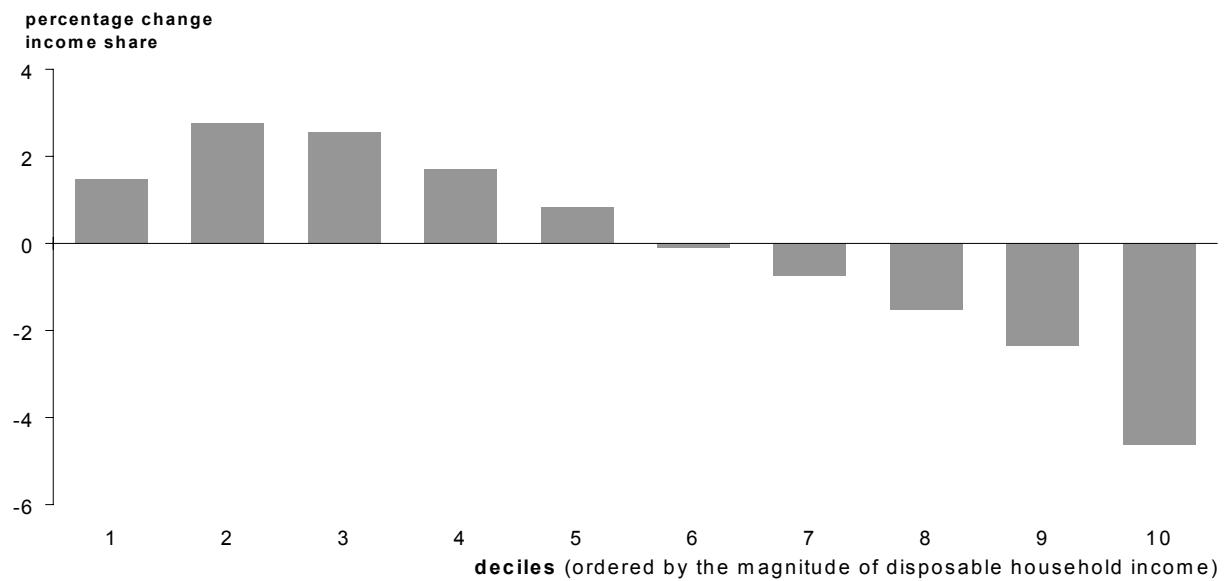
<sup>6</sup> The same holds for the survivors' scheme.

	total EURO x billion	deciles (ordered by the magnitude of disposable household income )										deciles	
		1	2	3	4	5	6	7	8	9	10	1 - 5	6 - 10
percentiles of total													
Primary income	166.0	0.7	1.5	2.9	4.7	6.8	9.5	11.9	14.7	18.2	29.0	16.7	83.3
<b>public old age pensions</b>													
benefits	15.9	6	18	16	15	12	8	7	7	6	6	66	34
contributions	15.9	2	3	5	6	8	10	12	15	17	21	24	76
<b>disability and sickness</b>													
benefits	12.4	5	9	12	12	12	11	11	10	9	9	50	50
contributions	12.4	2	4	5	7	9	11	13	15	16	18	27	73
<b>unemployment</b>													
benefits	5.0	4	6	9	9	11	13	12	12	13	12	39	61
contributions	5.0	3	4	6	8	10	12	13	15	15	14	32	68
<b>social assistance</b>													
benefits	5.6	25	22	25	11	6	4	2	2	2	1	90	10
contributions	5.6	1	1	2	3	4	6	8	11	17	48	11	89
<b>child benefits</b>													
benefits	3.0	2	2	6	7	10	14	15	15	15	14	28	72
contributions	3.0	1	1	2	3	4	6	8	11	17	48	11	89
<b>survivors</b>													
benefits	2.1	6	18	16	15	12	8	7	7	6	6	66	34
contributions	2.1	2	3	5	6	8	10	12	14	17	23	24	76
Income after Redistribution	166.0	2.2	4.3	5.4	6.4	7.7	9.4	11.2	13.1	15.9	24.4	26.0	74.0

**note:** From data of Statistics Netherlands, we select various relevant social security schemes. Next, we compare the distribution of primary income of households to the distribution of income after social security (primary income + social security benefits -/- social security contributions). Income is transferred from high deciles (dotted grey) to low deciles. For the system as a whole, we locate the insurrection between the 5<sup>th</sup> and the 6<sup>th</sup> decile (marked by the dotted line). However, for a specific scheme the alteration can be found earlier or later.

**source:** Aggregates (totals) for benefits and social contributions by selected scheme are taken from Ministry of Social Affairs (Sociale Nota 1999, bijlage 8.1.A and 8.2.A). Data to distribute these benefits and contributions - by scheme - to deciles are taken from Dutch Personal Income Distribution 1996 (Statistics Netherlands, 1999b); and own calculations.

**Figure 4 Redistribution through Social Security, 1996**



source: see under table 6

**Table 7 Redistribution through Social Security 1996: Summary Statistics**

	EURO x billion	Robin Hood indicator	Gini coefficient	Mean Log Deviation	Atkinson index ( $\alpha=0.5$ )	non-weighted average (1-4)
		(1)	(2)	(3)	(4)	
primary income	166.0	0.338	0.455	0.346	0.183	0.331
effect transfers/taxes	(43.9)	-0.093	-0.120	-0.164	-0.092	-0.117
income after taxes, after transfers	166.0	0.246	0.335	0.182	0.091	0.214
redistribution (i.e. reduction inequality) %		27.4	26.3	47.4	50.2	35.4
of which		contribution to total redistribution (shares)				
public old age pensions	15.9	41	40	38	38	39
disability and sickness	12.4	18	17	16	15	16
unemployment	5.0	3	2	1	0	1
social assistance	5.6	28	31	35	38	33
child benefits	3.0	5	5	4	3	4
survivors	2.1	6	6	6	6	6

*note:* The shares of the selected schemes in total reduction in income inequality add up to over 100 percent as measured by both the Mean Log Deviation and the Atkinson index, i.e. a troublesome and little understood residual term arises. This small residue is distributed to the selected schemes weighted by their share in total social security expenditures.

source: see under table 6

## 7 Conclusions

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In this paper, we investigated to what extent changes in the overall distribution of incomes can be attributed to social policy measures. Dutch income inequality, traditionally one of the lowest in the world, has increased rather dramatically since the early 1980's, also in an international perspective. It is interesting to analyse the role of the quite fundamental reform of the Dutch welfare state in this context.

We used the traditional budget incidence approach – despite some methodological problems we addressed – to study the combined effects of all taxes and transfers on the income (re)distribution. The distribution of primary or wage and salary income is compared with the distribution of income after tax and after social transfers. Income deciles and summary statistics before and after social policy are used to indicate the redistributive effect of social policy. We both performed a time series analysis for the period 1981-1996 and a more detailed cross-section analysis for the year 1996, based on extensive income panel data.

The following main results are found.

- Inequality of adjusted disposable household income increased in the period 1981-1996 by roughly 24 percent as measured by the Mean Log Deviation. The main force behind this was a more unequal distribution of market income, but social transfers also explain a substantial part of the rise in inequality. Our budget incidence analyses indicate that the social security reforms indeed seem to have made the income distribution less equal. Whether or not this should be considered as a shadow side of the 'Dutch miracle' is open to debate.
- Despite the changes in transfer policies, social security in 1996 still lead to a substantial reduction in inequality by 26 to 50 percent, depending on the indicator used. The first five income deciles clearly gain from social security, while the higher deciles loose. The public old age program and the social assistance program explain by far the largest part of the total redistribution, while the disability and unemployment programs do not have strong redistributive effects.
- The results presented here mark only preliminary results. The question to what extent changes in the overall distribution of incomes can be attributed to social policy measures needs further investigation. With the availability of much larger and more detailed data sources, we hope to go further in untangling the complex interactions of the various forces driving inequality.

## Annex A Definition and characteristics of summary measures of inequality

The most commonly used summary measure of inequality is the Gini coefficient. The Gini coefficient for pre-tax-pre-transfer income ( $G_v$ ) is simply the ratio of the area between the Lorenz curve and the diagonal (line of perfect equality) and the whole area under the diagonal (see Kakwani, 1977a:72). We define the Gini coefficient  $G_v$  by (cf. Lambert, 1993:44):

$$G_v = \frac{I}{2 \cdot N^2 \cdot \mu} \sum_{i=1}^N \sum_{j=1}^N |y_i - y_j| \quad \text{min} = 0 ; \text{ max} = 1$$

where  $y_i$  = pre-tax-pre-transfer income of unit  $i$   
 $\mu$  = mean income  
 $N$  = population of income recipients

The value of  $G_v$  is between zero and one.  $G_v=1$  if total pre-tax-pre-transfer income is earned by only one single person;  $G_v=0$  if total income is distributed perfectly equal over all income earners. The Gini coefficient is reduced by a small income transfer from a higher to a lower income; it is not sensitive to the levels of the incomes between which the transfer takes place. The Gini coefficient is well-known and easy to understand, but it is not a very good measure for inequality decomposition analysis (see Lambert and Aronson, 1993). Compared to other summary measures of income inequality the Gini coefficient is rather insensitive to changes in incomes (Pen and Tinbergen, 1976).

In the same way as  $G_v$ , one can construct concentration indices for taxes ( $C_t$ ) and for after tax income ( $G_n$ ). Different combinations of  $G_v$ ,  $G_n$  and  $C_t$  are used in empirical analysis of income inequality. See e.g.

Musgrave and Tun Thin (1948)	EP = $(1-G_n)/(1-G_v)$ ;
Pechman and Okner (1974)	PO = $(G_n-G_v)/G_v$ ;
Khetan and Poddar (1976)	KP = $(1-G_v)/(1-C_t)$ ;
Kakwani (1977a)	P = $C_t-G_v$ ;
Reynolds and Smolensky (1977)	RS = $G_n-G_v$ .

The Mean Log Deviation or Theil index ( $T$ ) is a summary measure frequently used for a specific purpose. The Theil index can be used to show the breakdown of inequality within and between population groups. Components of change in inequality can be identified (see Goodman *et al*, 1997:50). It is defined as:

$$T = \frac{1}{N \cdot \mu} \sum_{i=1}^N y_i \ln \frac{y_i}{\mu} \quad \text{min} = 0 ; \text{ max} = \ln N$$

The Theil index gives greatest weight to changes in incomes at the bottom of the distribution. It is bounded by zero (perfectly equal distribution) and  $\ln N$  (distribution in which inequality is maximal). The interpretation of the Theil index is more difficult than the interpretation of the Gini coefficient. The Theil index can not be calculated for an income distribution which includes negative incomes. In our empirical analysis we solve this problem by merging non-positive incomes with the lowest positive income till an income class results with non-negative income (cf. Odink and Van Imhoff, 1984).

The third summary measure that we employ is the Schuts coefficient, also known as the Robin-Hood indicator as indicated in 1992 by Atkinson and Micklewright (Statistics Netherlands, 1995:71). We prefer the last name because it measures that proportion of total income which would have to be transferred from incomes *above* the mean to income *below* the mean to achieve perfect equality. The Robin Hood indicator (*RH*) measures the maximum vertical distance between the Lorenz curve and the line of perfect equality (45° line), so:

$$RH = \frac{\sum_{i=1}^N |y_i - \mu|}{2 \cdot \mu \cdot N} \quad \text{min} = 0 ; \text{ max} = 1$$

The Robin Hood indicator is reduced by any unit income transfer from an above-average to a below-average income, but is unaffected by transfers *not* across the mean. The Robin Hood indicator is easy to understand, but it is inappropriate in relation to the so called Principle of Transfers (every transfer from higher to lower incomes should reduce the inequality measure).

The fourth summary measure is the Atkinson inequality index (*A*). Judgements about the distribution itself are made explicit in this index (i.e. weighting several parts of the income distribution differently, see Atkinson, 1970). The index is not always easily understood, but its value lies in the fact that the normative aspect is made explicit. The sensitivity to changes in the lower part of the income distribution rises with the value of the coefficient  $\alpha$  in the mathematical expression below. So the Atkinson index is higher - for a specific income distribution - for higher values of  $\alpha$  (see De Vries, 1994:33-34).

$$A = 1 - \left[ \sum_{i=1}^N \left( \frac{y_i}{\mu} \right)^{1-\alpha} \cdot \frac{p_i}{N} \right]^{\frac{1}{1-\alpha}} \quad \text{with } 0 < \alpha < 1 \quad \text{min} = 0 ; \text{ max} = 1$$

where  $p_i$  = pre-tax-pre-transfer income share of unit  $i$

It should be noted that the calculated *level* for the Atkinson index is rather sensitive for different values of  $\alpha$ . However, when the *percentage change* of the Atkinson index is calculated, e.g. when the indices of pre-tax-pre-transfer income and post-tax income are confronted, the choice for  $\alpha$  is less important (see Caminada and Goudswaard, 1998:39). Therefore only one value is used in this paper ( $\alpha=0.5$ ).

Table A1 summaries the main characteristics of the summary measures of income inequality used in this paper. This evaluation does not point in a specific direction. Weighting of the pros and cons is a rather normative exercise. Therefore we choose to show all indicators in our analysis.

**Table A1 Main Characteristics of Summary Measures of Income Inequality**

	<i>Gini</i>	<i>Theil</i>	<i>Robin Hood</i>	<i>Atkinson</i>
<b>Boundary</b>				
Minimum	0	0	0	0
Maximum	1	log N	1	1
<b>Principles (generally agreed upon)</b>				
- Principle of Symmetry: re-ranking of incomes in the way that the Lorenz curve do not alter, should not affect the measure			x	
- Principle of Transfers and Pigou-Dalton-criteria: a transfer from high to low incomes should reduce the summary measure	+	+	+	+
- Principle of Homogeneity: an equiproportionate growth in all incomes should not affect the summary measure	+	+	-	+
- Lorenz Dominantion: since the outside Lorenz curve is more unequal than the one represented by the one that lies inside, the summary measure of the latter should be lower	+	+	+	+
-	+	+	-	+
<b>Other (normative) aspects</b>				
- easily understood	+++	++	+++++	+
- easily decomposable	+	+++	+	-
- normative judgement possible?	no	no	no	yes
- sensitive for low incomes	-	+	-	depends on the choice for $\alpha$
- sensitive for middle incomes	+	++	-	
- sensitive for high incomes	-	++++	-	
- summary measure is sensitive for changes in the distribution?	---	+++	---	

source: De Vries (1994:35), Statistics Netherlands (1995:71), Odink (1985:22-34), Van der Stadt (1988:21), and Caminada and Goudswaard (1998)



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**Annex B Partial Effect of Household Size and Composition:  
Analysis with both Households and Individuals as Income Unit**

The main text illustrated the distribution of transfers and social security contributions - differentiated by scheme - at the level of households (deciles of households) for the data-year 1996. To avoid the problem of re-ranking of the income distribution, non-adjusted disposable household income ( $E=0$ ) was used to order all households in ten equal groups (deciles). In addition, all computations are repeated with individuals as the income unit focussed on ( $E=1$ ). All individuals with income are consequently ordered in accordance with the magnitude of their gross income. See tables B1 and B2.

As expected, the level of measured inequality between individuals is higher compared to the level of measured inequality between households. However, the magnitude of the overall reduction in income inequality through social security is more or less the same. Also the decomposition of the summary statistics of income inequality employed do not show significant differences. We conclude that ignoring the effect of household size and composition does not affect our results for a *specific moment in time* (1996). See table B1

Of course, the effect of household size and composition is of importance in analyses on the change in income inequality *over time*. Table B2 presents the results of a short-run time-series-analysis 1990-1996. Note that inequality of (primary and disposable) income between individuals decreased modestly in the period 1990-1996, while income inequality among households increased (also modestly). The explanation of this diverging trend can be found in the huge rise in the number of households with more than one income-earner (+19 percent in this period); the number of sole-earners decreased sharply (28 percent). Household income inequality did go up, while inequality of individual's income decreased, because in most cases the small additional incomes of women (re)entering the labour market was concentrated in households already to be found at the upper part of the household income distribution.



**Table B1 Redistribution through Social Security 1996: Summary Statistics of Income Inequality**

		All households are consequently ordered in accordance with the magnitude of their disposable income <b>(E=0)</b>					All individuals with income are consequently ordered in accordance with the magnitude of their gross income <b>(E=1)</b>				
		Robin Hood indicator	Gini coefficient	Mean Log Deviation	Atkinson index ( $\alpha=0.5$ )	non-weighted average	Robin Hood indicator	Gini coefficient	Mean Log Deviation	Atkinson index ( $\alpha=0.5$ )	non-weighted average
	EURO x billion	(1)	(2)	(3)	(4)	(1-4)	(1)	(2)	(3)	(4)	(1-4)
primary income	166.0	0.338	0.455	0.346	0.183	0.331	0.399	0.520	0.464	0.252	0.409
effect transfers/taxes	(43.9)	-0.093	-0.120	-0.164	-0.092	-0.117	-0.116	-0.123	-0.188	-0.094	-0.130
income after taxes, after transfers	166.0	0.246	0.335	0.182	0.091	0.214	0.283	0.397	0.276	0.158	0.278
redistribution (i.e. reduction inequality) %		27.4	26.3	47.4	50.2	35.4	29.1	23.7	40.5	37.4	31.9
of which		contribution to total redistribution (shares)					contribution to total redistribution (shares)				
public old age pensions	15.9	41	40	38	38	39	42	44	44	47	44
disability and sickness	12.4	18	17	16	15	16	22	17	15	13	17
unemployment	5.0	3	2	1	0	1	3	2	0	-2	1
social assistance	5.6	28	31	35	38	33	25	27	31	31	29
child benefits	3.0	5	5	4	3	4	2	3	3	3	3
survivors	2.1	6	6	6	6	6	6	6	7	8	7
entire system	43.9	100	100	100	100	100	100	100	100	100	100

*note:* The shares of the selected schemes in total reduction of income inequality add up to over 100 percent as measured by both the Mean Log Deviation and the Atkinson index, i.e. a troublesome and little understood residual term arises. This small residue is distributed to the selected schemes weighted by their share in total social security expenditures.

source: see under table 6 in the main text

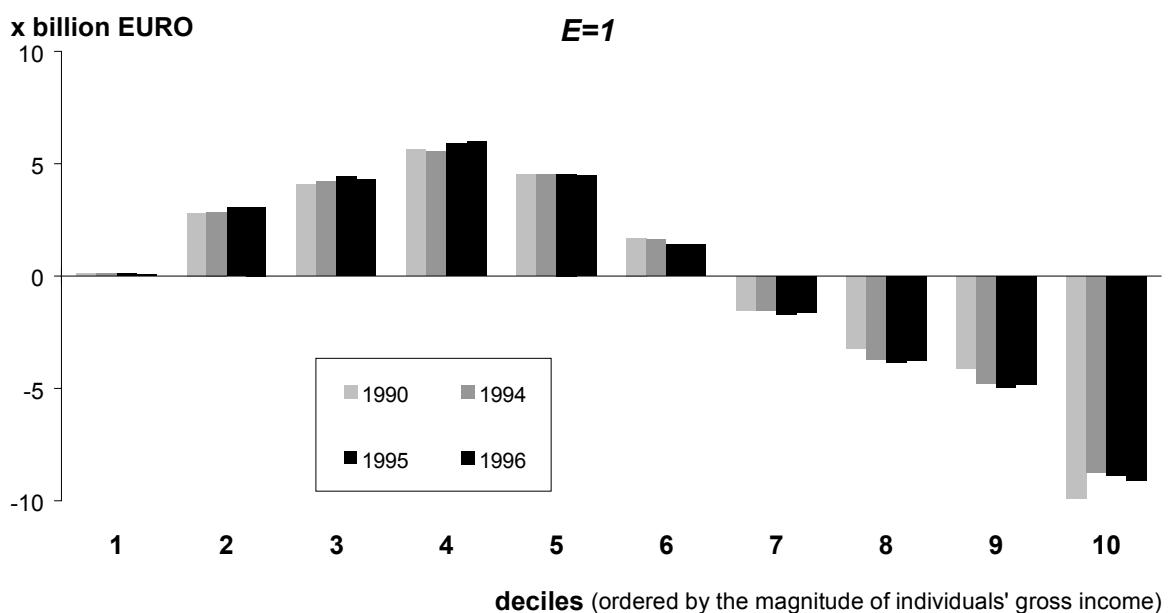
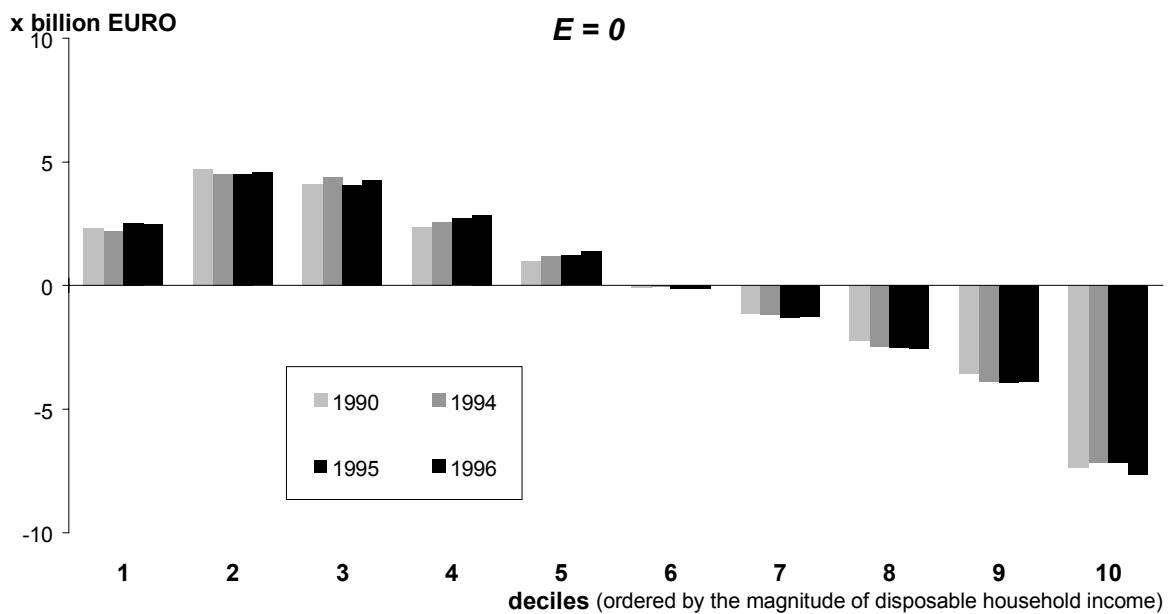
**Table B2 Redistribution through Social Security 1990-1996: Presentation by Deciles**

All households are consequently ordered in accordance with the magnitude of their disposable income (E=0)													All individuals with income are consequently ordered in accordance with the magnitude of their gross income (E=1)												
	EURO												EURO												
	1	2	3	4	5	6	7	8	9	10	1-5	6-10	1	2	3	4	5	6	7	8	9	10	1-6	7-10	
<b>primary income</b>																									
1990	158.8	0.5	1.5	3.0	5.2	7.5	9.8	11.9	14.4	17.7	28.6	17.7	82.3	0.2	1.0	2.0	2.7	4.9	8.2	12.2	15.6	19.5	33.7	19.1	80.9
1994	161.4	0.6	1.3	2.7	4.7	7.0	9.6	11.9	14.7	18.3	29.2	16.4	83.6	0.2	1.1	2.1	2.8	4.9	8.3	12.1	15.6	19.7	33.3	19.3	80.7
1995	164.9	0.7	1.4	2.9	4.6	6.9	9.5	12.0	14.6	18.4	29.1	16.5	83.5	0.4	1.1	2.1	2.7	5.0	8.3	12.0	15.6	19.6	33.2	19.6	80.4
1996	166.0	0.7	1.5	2.9	4.7	6.8	9.5	11.9	14.7	18.2	29.0	16.7	83.3	0.1	1.2	2.3	2.8	5.2	8.6	12.1	15.6	19.5	32.7	20.1	79.9
change 90-96	+7.3											⇒	+1.1											+1.0	⇒
<b>+/- social benefits</b>																									
1990	45.4	7.1	13.5	13.6	11.5	10.3	9.5	9.0	8.6	8.2	8.5	56.1	43.9	0.6	7.4	11.9	16.8	16.5	13.4	9.2	8.3	8.9	7.0	66.7	33.3
1994	44.6	6.8	13.2	14.4	12.0	10.8	9.9	9.2	8.5	7.8	7.6	57.1	42.9	0.8	7.7	12.5	17.1	17.0	13.7	9.6	7.6	7.4	6.8	68.7	31.3
1995	43.5	7.5	13.4	13.9	12.4	10.7	9.6	9.0	8.3	7.7	7.6	57.9	42.1	0.6	8.1	13.0	18.1	17.1	13.1	9.0	7.4	7.0	6.6	69.9	30.1
1996	43.9	7.5	13.6	14.2	12.6	10.9	9.4	8.8	8.1	7.6	7.3	58.8	41.2	0.6	8.2	12.8	18.3	17.0	13.1	9.2	7.3	6.7	6.7	70.0	30.0
change 90-96	+1.5											+2.7	⇒											+3.4	⇒
<b>-/- social contributions</b>																									
1990	45.4	2.0	3.2	4.6	6.4	8.2	9.8	11.5	13.5	16.1	24.8	24.3	75.7	0.4	1.2	2.9	4.5	6.6	9.7	12.6	15.4	18.0	28.8	25.3	74.7
1994	44.6	1.9	3.1	4.6	6.2	8.1	10.0	11.8	14.1	16.5	23.7	23.9	76.1	0.5	1.3	3.0	4.7	6.8	10.0	13.1	16.0	18.1	26.4	26.4	73.6
1995	43.5	1.7	3.0	4.5	6.1	8.0	9.9	11.9	14.1	16.8	24.1	23.3	76.7	0.4	1.1	2.8	4.5	6.6	9.9	13.0	16.2	18.4	27.1	25.3	74.7
1996	43.9	1.9	3.1	4.5	6.1	7.7	9.7	11.7	13.9	16.5	24.7	23.5	76.5	0.4	1.2	3.0	4.7	6.8	9.9	12.9	15.9	17.8	27.4	26.1	73.9
change 90-96	-1.5											⇒	+0.8											+0.8	⇒
<b>= income after taxes, after transfers</b>																									
1990	158.8	2.0	4.5	5.5	6.7	8.1	9.7	11.2	12.9	15.5	23.9	26.8	73.2	0.3	2.7	4.5	6.3	7.8	9.3	11.2	13.5	16.9	27.4	30.9	69.1
1994	161.4	2.0	4.1	5.4	6.3	7.8	9.5	11.2	13.2	15.9	24.8	25.6	74.4	0.3	2.9	4.7	6.2	7.7	9.3	11.1	13.3	16.7	27.8	31.0	69.0
1995	164.9	2.3	4.2	5.3	6.3	7.6	9.4	11.2	13.1	16.0	24.8	25.6	74.4	0.4	3.0	4.8	6.3	7.8	9.2	10.9	13.3	16.6	27.8	31.4	68.6
1996	166.0	2.2	4.3	5.4	6.4	7.7	9.4	11.2	13.1	15.9	24.4	26.0	74.0	0.2	3.0	4.8	6.4	7.9	9.4	11.1	13.3	16.6	27.2	31.7	68.3
change 90-96	+7.3											⇒	+0.8											+0.8	⇒

a pricelevel 1996 (CPI 1990 =1.000; 1994 = 1.121; 1995 =1.144; and 1996 =1.166)

note and source: see below figure B1

**Figure B1 Net Benefits Social Security 1990-1996 x billion EURO (pricelevel 1996)**



CPI: 1990 = 1.000; 1994 = 1.121; 1995 = 1.144; and 1996 = 1.166

**note:** From data of Statistics Netherlands, we select various relevant social security schemes. Next, we compare the distribution of primary income of households to the distribution of income after social security (primary income + social security benefits -/- social security contributions). Income is transferred from high deciles (dotted grey) to low deciles. For the system as a whole, we locate the insurrection - for all datayears - between the 5<sup>th</sup> and the 6<sup>th</sup> decile for households; the insurrection for individuals is repeatedly found between the 6<sup>th</sup> and the 7<sup>th</sup> decile.

**source:** Aggregates (totals) for benefits and social contributions by selected scheme are taken from Ministry of Social Affairs (Sociale Nota, several years). Data to distribute these benefits and contributions - by scheme - to deciles are taken from Dutch Personal Income Distribution 1990-1996 (Statistics Netherlands, several years); and own calculations.



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