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**Luxembourg Income Study Working Paper No. 227**

**On the Distribution of Income  
in Five Countries**

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Liqian Ren  
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**March 2000**

# Income Inequality and Redistribution in Five Countries

Mariacristina De Nardi, Liqian Ren and Chao Wei\*

March 2000

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\*We thank Marco Bassetto, Marco Cagetti and David Marshall for helpful comments and Paul Alkemade and Dennis Sullivan for help with the data set. Neither the Federal Reserve Bank of Chicago nor the Federal Reserve System are responsible for the views expressed in this paper. All errors are our own. Email address of the corresponding author: nardi@bali.frbchi.org

# 1 Introduction

Policy makers designing or changing a country's tax and transfer system aim at redistributing income and supporting the living standards of low-income families, while at the same time encouraging work effort and economic self-sufficiency. In fact, there is a trade-off between redistribution and efficiency: not only transferring more income to the poorer people tends to reduce their work effort, but it also distorts the economic decisions of those that are taxed to provide the revenues that are being redistributed. There are several reasons why a government might want to redistribute income. Some of these are linked to the fact that people face both different outcomes and different opportunities. The government might want to provide insurance to its citizens against different outcomes, for example due to sickness or unemployment because in some cases private markets cannot work well. Moreover, not everybody faces the same opportunities in life, for example people from a poor family background are at a disadvantage<sup>1</sup>, and transfers are a way to partly offset these differences. For historical and social reasons, different countries put different weights on the costs and benefits of redistributing income. Traditionally, anglo-saxon countries have a relatively low degree of government intervention in the economy and place more emphasis on incentives, while many European countries display relatively more government redistribution, greater provision of public goods and more emphasis on equality of outcomes and opportunities. The goal of this study is to look at different countries, study their redistribution policies and discuss the effects of the redistribution/incentives tradeoff. Since we want to look at countries that display different degrees of government intervention, we pick countries belonging to both traditions. We focus on a small number of countries to study these issues in detail: the U.S., Canada, Germany, Sweden and Finland. Our choice of the particular countries is also limited by the availability of comparable data.

The link between the distribution of income and taxes and transfers is a complex one. In fact, the households in each country decide how hard to work, when to retire and how much to consume and save taking into account the incentives and disincentives provided by the structure of taxes and transfers in their own country. Therefore, the distribution of labor income is itself endogenous and the actual measure of taxes and transfers depends on the labor and saving decisions of the households. Moreover, the distribution of labor income depends on the distribution of human capital<sup>2</sup>, and the government, for example by subsidizing education, can have an impact on it.

We focus on distribution of income across working-age households in these five countries because we are interested in labor income (earnings) inequality, abstracting from normal retirement decisions. In fact, at some age most people are retired and their labor income drops while their gross income is supplemented by social-security payments, pensions and other income sources. Looking only at households of working age, however, we ignore another important aspect of redistribution: social-security transfers to older people.

We study how income inequality differs in these five countries and use different income mea-

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<sup>1</sup>Stokey [9] provides an overview of the literature on intergenerational mobility in the U.S. She concludes that even in the country considered the "land of equal opportunity", the children from rich families have more chances for economic success than the children from poor families.

<sup>2</sup>See Heckman, Lochner and Taber [5] for a theoretical model, estimated on the U.S. data, in which many of these elements interact dynamically.

asures to compare the redistributive consequences of taxes and transfers across these countries. We also discuss their likely effects on the households' labor, early retirement and savings decisions. The distinction between transfers and taxes is interesting because transfers are typically not just connected to income, but may be means tested (both asset and income based) or based on a specific condition (e.g. being unemployed or a single parent). Taxes are typically not related to means testing and depend much less on specific conditions: they rely mostly on income as the screening signal. Different mixes of taxes and transfers thus correspond to different screening mechanisms employed by each country in redistributing resources and possibly different redistributive goals.

All of the different measures of income we look at are unequally distributed across countries and their distributions are concentrated and skewed.

The U.S displays the most unequal labor income distribution among the five countries, followed by Finland, Canada, Sweden and Germany. As we mentioned already, the distribution of labor income depends on the tax and transfer system, as well as on the distribution of human capital. Human capital is linked to education, which in turn is influenced by government subsidies. It is interesting to notice that, as a result of all of these forces, the distribution of labor earnings in the countries that traditionally are more concerned with redistribution (Finland and Sweden) are not necessarily more equal than the ones that belong to the anglo-saxon tradition of low government intervention (the U.S. and perhaps Canada). Finland is one obvious example of a country of high government intervention and high labor income inequality. As we will see more in detail, this is partly due to a pattern of early retirement more pronounced in Finland than in all of the other countries. Also, economic theory suggests that unemployment benefits discourage job search and work effort. This could translate into a larger number of unemployed or under-employed, which increases measured inequality in labor earnings.

Even after taxes and transfers, the U.S. displays by far the most unequal distribution for disposable income, followed by Canada, Germany, Finland and Sweden. According to our data, and consistently with the distinction we discussed above, Finland is the country that reduces labor income inequality the most, followed by Sweden, Canada, Germany and the U.S. Interestingly, Germany engages in little redistribution, but has the most equal distribution of labor earnings among these countries.

Not only governments redistribute with different strength, but to achieve their redistributive goals they also use different instruments. In order to reduce labor income inequality, Finland and Sweden rely on a very progressive transfer system, while their tax system turns out to be very close to proportional (i.e. close to a flat tax rate regime). At the opposite extreme, the U.S. uses taxes and transfers with approximately the same degree of progressivity. Canada and Germany are somewhat in between these extremes, with Canada relying more heavily on progressive transfers than Germany.

The progressivity of the tax and transfer systems are important indicators of the distortions generated on the household's economic decisions. Another important indicator is given by the total amount of resources redistributed by the government in each country. As a measure, we can use for example the income tax faced by the average working age household. In our samples the average income tax are, respectively, 16% in the U.S., 17% in Germany, 21% in

Canada, 23% in Finland, and 25% in Sweden. In this sample, the countries with higher average income tax (Finland and Sweden), are also the ones with the least progressive tax systems. Government transfers (social insurance plus means-tested) as a fraction of gross income for the average working age household provide the same ordering of magnitude for redistribution as the average income tax. The average fraction of government transfers are respectively 3% in the U.S., 6% in Germany, 8% in Canada, 15% in Finland, and 19% in Sweden.

We also look at the impact of transfers, conditional on the labor earnings level. For those that are at the bottom 10% of the labor earnings distribution in the U.S. and Canada, means-tested, rather than social insurance transfers are the main source of gross income. On the contrary, in the other countries and especially in Sweden, the main source of gross income for the poorest are given by social insurance transfers.

Looking at the structure of earnings and transfers over the life cycle within each country we find evidence that Finland and Sweden provide stronger incentives toward early retirement because of both social security and the structure of pension schemes. This explains some of the inequality we observe in the labor earnings distribution in these two countries; once people retire, their labor earnings drop. At the opposite extreme, our data suggest that there is less incentive to retire early in Germany and the U.S.

Our findings are thus consistent with the prediction from economic theory that greater redistribution through taxes and transfers is achieved at the cost of greater distortions on labor supply and early retirement decisions. Consistently with other theoretical work<sup>3</sup> we also find that high redistribution countries use heavily instruments other than income taxes, such as transfers based on special conditions or means-tested, in order to achieve high levels of redistribution while keeping distortions as low as possible for the beneficiaries. This, however, is costly because it generates the need to monitor eligibility. As an example, in Sweden there are special agencies that monitor job search effort of the unemployed.

Germany is an interesting case: the level of redistribution through taxes and transfers is low. However, the distribution of labor earnings in Germany is remarkably more equal than in all of the countries that we are considering here. Evidently the government is using other instruments to achieve this level of equality, possibly more equal access to public education. Another reason the distribution of earnings may be more equal is the presence of powerful unions, which typically favor a flat wage structure that enhances security at the expense of incentives.

Section 2 defines the various income concepts we use throughout the paper and discusses the information they convey. Section 3 describes the data set. Section 4 gives an overview of income inequality and redistribution policies across the five countries. Section 5 discusses the Lorenz curves. Section 6 studies more in detail inequality and redistribution within each country, conditional on labor earnings. Section 7 focuses on the relationship between age, income and redistribution programs. Section 8 concludes.

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<sup>3</sup>See for example Cremer and Pestieau [3].

## 2 Definitions of Income

In this section we review the different definitions of income we use throughout the paper and comment on the information they convey.

Our unit of analysis is the household, and the first measure of income we consider is labor income (earnings). It includes gross wage, salary income<sup>4</sup> and farm and non-farm self-employment income. This measure provides us with information on the outcome of labor supply and early retirement decisions. Observing a large number of households with little or no earnings is an indication of high unemployment and/or a low participation rate. High levels of concentration in earnings might reflect a more unequal distribution of human capital and education in the population.

Our second measure of income is factor income which, besides earnings, includes cash property income (i.e., cash interests, rents, dividends, annuities) and royalties, but excludes capital gains, and all other forms of lump-sum payments. Factor income, including income from capital, gives us a more-comprehensive measure of income and provides indirect information on people’s assets and hence savings decisions.

Another measure of income is gross income, which adds social and private transfers to factor income. Government transfers might be an important channel through which the government redistributes income. Comparing the distribution of factor income with the one for gross income, we can study the effects of government transfers across different countries.

Finally, disposable income is obtained by subtracting income taxes, mandatory employee contributions and mandatory contributions for the self-employed, from gross income. Disposable personal income provides a measure of the resources the households can actually allocate to either savings or consumption after taxes are paid, and allows us to compare the progressivity of tax systems across different countries.

All of our statistics are based on total family income, without correcting for the number of family members. We also performed the computations taking into account family size to check whether different demographic patterns across countries affect our conclusions. To do so, we followed the “equivalence scale” literature and divided total family income for each family by the total number of family components, raised to the power  $\alpha$ .<sup>5</sup> This method is meant to take into account that economies of scale arise as the size of the household increases. Our conclusions were not affected by this transformation.

## 3 The Data

We use the Luxembourg Income Study (LIS) dataset. LIS collects existing household income surveys data from 25 countries and makes them comparable as much as possible in terms of data

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<sup>4</sup>Includes all forms of cash wage and salary income, including employer bonuses, gross of employee social insurance contributions/taxes but net of employer contributions/taxes.

<sup>5</sup>Typically  $\alpha$  is chosen to be between 0 and 1. When  $\alpha = 0$  we get back to the benchmark case we discuss throughout the paper: total family income is the unit of analysis. Should one choose  $\alpha = 1$ , the unit of analysis would be per-capita family income. To check our results against the case  $\alpha = 0$ , we choose  $\alpha = .5$ , which is a commonly used number in the literature.

definition. The LIS data set for the U.S. is based on the March Current Population Survey, the one for Canada on the Survey of Consumer Finances, the one for Germany on the German Social Economic Panel Study, the one for Sweden is based on the Income Distribution Survey and the one for Finland on the Income Distribution Survey. LIS provides data in waves; most of the data sets we use belong to the fourth wave. We use 1994 data for the U.S., Canada and Germany, 1995 for Finland and 1992 for Sweden, since the 1995 Swedish data set is still under revision.

Although very interesting, this data set has some limitations. Many of them stem from the fact that the data for the various countries come from existing data sets and might differ in the questions asked, their design, the definition of the household and other important dimensions. While LIS aims at harmonizing the data so that the effect of these discrepancies is reduced, some differences will persist. Our minimal requirement to include a country was to have data on the gross earnings, transfers and taxes. This criterion alone excluded many countries, such as Italy and France, for which the only data available are net of taxes.

We provide a technical description of the country-specific data sets and their construction in the appendix. Unfortunately LIS does not provide this information for the specific waves we use. We still report it, indicating to which year it refers to, since it provides insight on the quality of the data across countries.

## Lorenz Curve and Gini Coefficient

The Lorenz curve provides information on inequality. To draw it, we first sort the households by their income, starting from the ones with the lowest income. We then plot the relationship between the cumulative percentage of the population (on the horizontal axis) and the proportion of total income earned by each cumulative percentage (on the vertical axis). Figures 1 and 2 show the Lorenz curve for the two extreme cases of perfect equality and highest inequality. In the case of perfect equality everybody earns the same proportion of total income, and the Lorenz curve coincides with the 45-degree line (see figure1). In the case of perfect inequality, just one family earns all of the total income in the economy. All households except the last one earn no income, and hence the cumulative proportion of income earned by them stays at zero. The Lorenz curve stays flat until the very last household is reached, and jumps at 1 at that point, since the last family earns all of the income in the economy.

In real life we observe intermediate cases, in which some households earn more and some others less, and the Lorenz curve lies in between the perfect equality and the perfect inequality lines (fig. 3).

The Gini coefficient is a summary statistics of inequality derived from the Lorenz curve. It is defined as the ratio of area A (see figure 3: the area between the Lorenz curve and the perfect equality line), to area A+B (the area between the perfect equality and perfect inequality lines). The Gini coefficient varies between zero and one; it is equal to zero in the case of perfect equality (every household earns the same) and equal to one in the case of perfect inequality (one household earns everything). Therefore, the Gini coefficient provides a summary measure of inequality over the whole range of the distribution.



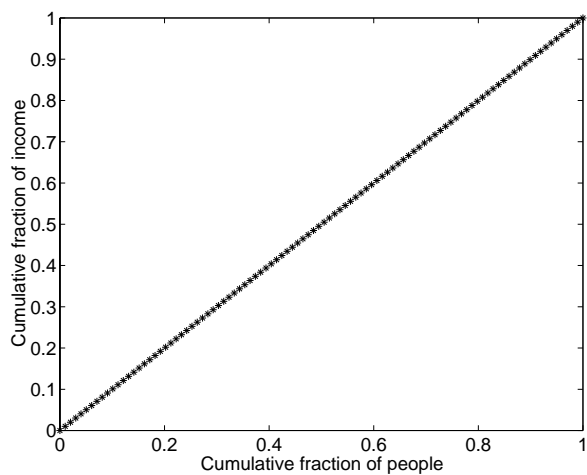


Figure 1: Perfect equality.

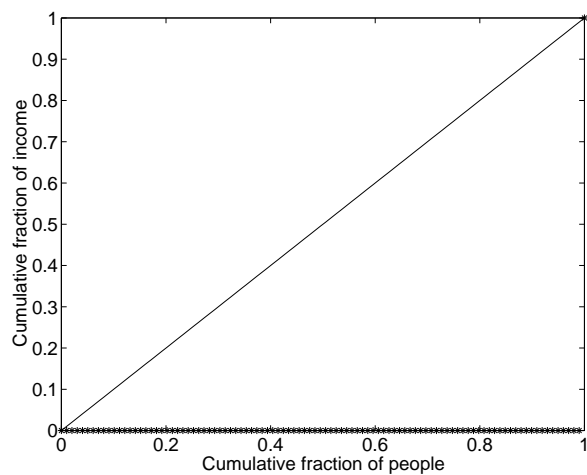


Figure 2: Perfect inequality.

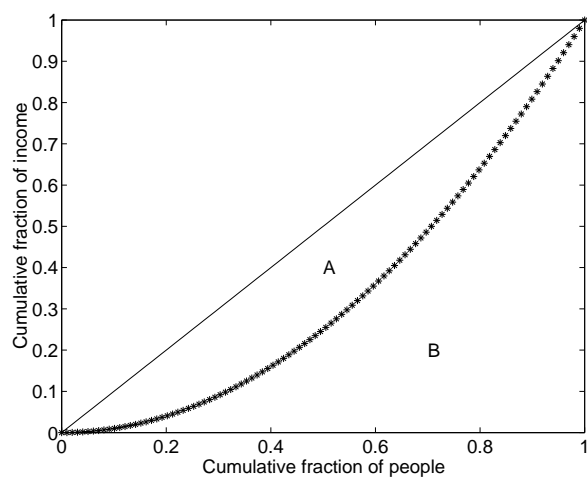


Figure 3: Intermediate case

## 4 An Overview of Income Inequality Across Countries

As said, we are interested in labor income inequality and redistribution. Unfortunately, we do not have data on retirement status for all countries. Therefore we concentrate on households whose head is of working age (25 to 60 years old, table 1). To study the possible effects of different patterns of early retirement on the income distribution, we also look at the subset of families whose head is 25-50 years of age (table 2). As we will see, this will make quite a difference in the income distribution of some of the countries we are considering but it will not matter much for others. We will provide evidence in section 7 that this is, indeed, related to early retirement decisions.

Tables 1 and 2 show that for both subsamples, earnings, factor income, gross income and disposable income are unequally distributed across households in all of the countries we are considering and their distributions are concentrated and skewed (there is a large number of people with little and a small number of people with really large income of any type). They also show that governments redistribute with different strength and using different instruments in different countries.

The first column of each table reports the fraction of people that are at zero or negative earnings, factor income, gross income and disposable income. In the data set, all of the people that are at negative earnings are households with self-employment income in financial trouble.<sup>6</sup>

Looking at table 1 we can see that the fraction of households at zero or negative earnings varies somewhat across these countries, with Finland being the one with the highest fraction (9.7%), and Germany being the one with the lowest fraction (7.0%). However, once all sources of income are taken into account and taxes are subtracted, this fraction drops below 1% for all countries, with the U.S. being the country with the highest fraction of households with zero or negative disposable income (.92%), and Finland the country with the lowest one (.07%). Comparing the number of people with zero or negative earnings and factor income, we see that in all countries the fraction of people in this category falls when cash property income is added.<sup>7</sup> Most of the people at negative earnings are entrepreneurs in trouble that are experiencing (possibly temporary) losses, but still have capital income from their investments and this explains the bulk of the reduction in the number of people at zero or negative factor income, compared with zero or negative earnings. Moreover, comparing table 1 with table 2, we can see that the heads of some of the households at zero earnings are older than 50, so they might be in early retirement, and have some income from assets, pensions and social security transfers. Looking at gross income, we can see how private and public transfers reduce the number of people at zero or negative gross income across all countries. Most of this reduction is due to public transfers.

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<sup>6</sup>Díaz-Giménez, Quadrini and Ríos-Rull [4] and Quadrini [8] report the same finding for the U.S. economy using the Panel Study of Income Dynamics (PSID) and the Survey of Consumer Finances.

<sup>7</sup>At first, this might seem surprising because in most countries the distribution of wealth is very concentrated: a few people hold huge amount of total wealth (in the U.S. the top 5% of people hold 50% of the total wealth, while the bottom 40% of people hold only 4% of total wealth, data from Wolff [10]), therefore so is income from capital. Moreover, one could expect high correlation between wealth and earnings. Díaz-Giménez, Quadrini and Ríos-Rull [4] find a small correlation (.23) between earnings and wealth, but include retirees in their sample. The correlation between earnings and wealth should be higher in our subsample. Unfortunately LIS does not provides data on assets so we cannot compute it.

The second column reports the Gini coefficient (see Box), which is a measure of inequality. The U.S. displays the highest concentration for all income measures, Germany has the least concentrated earnings distribution, and Sweden has the least concentration in the gross and disposable income distributions.<sup>8</sup> There is some evidence that Germany achieves redistribution using some other mechanisms that makes labor earnings more equal.

The drop in the Gini index from one row to the next measures the reduction in inequality. From here we can see that Finland is the country that achieves more redistribution (its Gini coefficient for disposable income is 34% lower than its Gini coefficient for factor income), most of which comes from transfers. Sweden is quite close to Finland, both in the size of the redistribution and the use of transfers to achieve it. At the opposite extreme, in the U.S. the combined effect of taxes and transfers reduces the factor income Gini coefficient by 15%, and transfers cause only about half of the reduction. Canada and Germany are somewhere in between: with Canada relying more heavily on transfers than Germany.

The fourth column of the tables report another measure of concentration. Let us take earnings:  $p80/p20$  is the ratio between the total earnings of the richest 20%, divided by total earnings of the poorest 20%. This is a measure of “social distance”, comparing richest with poorest.<sup>9</sup>

In table 1 the  $p80/p20$  earnings ratio varies between a high of 39 for Finland and a low of 13 for Germany. The ratio in Finland is high not because the richest people make more in Finland than in the other countries, but rather because the average earnings of the poorest 20% are low compared to the ones in the other countries. After taxes and transfers, the  $p80/p20$  ratio for disposable income falls noticeably. In all countries but the U.S. this is mostly due to transfer systems that increase significantly the gross income of the poorest, rather than to tax systems that reduce more than proportionally the average disposable income of the richest. The  $p80/p20$  for disposable income is highest in the U.S. (9) and lowest in Sweden (4).

Comparing table 1 and table 2 we can see that restricting our sample to households whose head is 50 and younger makes a difference, especially for Finland, Canada and Sweden. If we look for example to  $p80/p20$ , the measure of social distance from richest 20% to poorest 20%, we can see that it drops from 39 to 21 for Finland. It makes instead little difference for the U.S. and no difference for Germany. This suggests that people might retire earlier in some countries than in others. According to the Gini coefficient for earnings reported in table 2, the U.S. is still the country with the highest earnings inequality, followed by Canada, Finland, Sweden and Germany.

The last column provides information on the skewness of the distribution, disclosing in which

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<sup>8</sup>As we discussed above, cash property income is more concentrated than earnings because the distribution of wealth itself is. This implies that when we add cash property income to earnings, this increases the fraction of total factor income held by the richest people. This would increase the Gini coefficient. However, adding cash property income also reduces the fraction of people at zero or negative wealth and this reduces the Gini index. In our data set, the two forces counterbalance each other in each country so that the Gini coefficients for earnings and factor income in every country is basically the same. The fact that the Gini coefficient is unchanged is likely to be a consequence of the underreporting of interest and dividend income and of the underrepresentation of the very rich people.

<sup>9</sup>Different cutoffs for the comparisons could be chosen, for example the richest 10% with the poorest 10%. We choose to look at the poorest 20% because this is the smallest fraction of people that have positive earnings in all of the countries we consider.

percentile of the distribution the mean is located. This measure reveals that the U.S. is the country in which the distributions are more skewed, both before and after taxes and transfers. While the distributions of earnings and factor income are similarly skewed in Canada, Germany, Sweden and Finland, Sweden is the country with less skewness in its distribution of disposable income.

From now on, our sample will contain all households whose head is 25-60 years of age. We will investigate early retirement patterns in section 7.

## 5 Using the Lorenz Curves to Better Understand Inequality

Figure 1 compares the Lorenz curve for earnings across the five countries. As we explain in the box, the Lorenz curve provides more information than the Gini Index, which is a summary measure of inequality. It is interesting to observe not only the ordering of the curves for the various countries (the ones that lie to the right are the farthest from the 45-degree line and thus indicate a country with more inequality), but also whether the lines cross and where. Until the thirty-fifth percentile Finland is the country in which the poorest families earn the smallest fraction of total earnings in that country. From that percentile on, the U.S. becomes more unequal than Finland and actually the most unequal country.

Economic theory (see for a survey Mortensen and Pissarides [6]) suggests that worker's labor decisions depend, among other things, on the social security net that is in place: in countries with more generous social insurance system (such as unemployment benefits) workers will be pickier and there will be more people with zero earnings, since they receive transfers from the government. In this case, the workers are deciding not to work, or not to work for a longer period of time because of availability of the benefits, and thus may be better off than the workers in countries that do not offer such generous benefits. The incentives to retire early<sup>10</sup> also affect the number of people at low levels of earnings. As we will see, these incentives differ across countries and we provide evidence that they are particularly strong in Finland.

Looking at the earnings of the households between the fortieth and the eightieth percentile, the ordering of the countries, from most equal to most unequal is Germany, Sweden, Canada, Finland and the U.S.

Figure 2 displays the Lorenz curves for gross income<sup>11</sup> across the five countries. After adding private and government transfers, the U.S. display the most concentrated distribution by far for all percentiles. Until the the eightyfifth percentile, the ordering of gross income inequality, from the most equal to the most unequal is: Sweden, Finland, Germany, Canada and the U.S. After adding transfers, the poorest people in the other countries are noticeably better off compared to the U.S. This was not the case for the earnings distributions in figure 1. As we have discussed for

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<sup>10</sup>See Crawford and Lilien [2] for a theoretical paper on how social security influences retirement decisions.

<sup>11</sup>We do not report the Lorenz curves for factor income across the various countries because they overlap almost perfectly with the ones for earnings and the patterns are similar to those described above. This is probably a consequence of the fact that we do not have good data on interests and dividends.

table 1, transfers go a long way in redistributing income, especially at the lower levels of earnings. For all countries but the U.S. and Germany, they are the instrument most used to redistribute income. However, as we have noticed in discussing figure 1, economic theory predicts that a generous transfer system influences labor supply and early retirement decisions, increasing the number of people at zero earnings and reducing labor supply even at higher levels.

Figure 3 shows the Lorenz curves for disposable income. As it was the case in figure 2, the Lorenz curve for the U.S. is by far the most concentrated at all percentiles. The Lorenz curves for Sweden, Finland and Germany are closer than the ones for gross earnings and almost coincide for the poorest 60% of the population. High redistribution countries use heavily instruments other than income taxes, such as transfers based on special conditions or means-tested, in order to achieve high levels of redistribution while keeping distortions as low as possible for the beneficiaries. This, however, is costly because it generates the need to monitor eligibility.

Figures 4 to 9 display the Lorenz curves for earnings, gross income and disposable income within each country. Comparing the figures, we can see that the U.S. and Germany redistribute income across households using transfers and taxes roughly with the same intensity, with transfers having the strongest impact for families below the median earner family and taxes becoming more redistributive for families above the twentyfifth percentile. In Canada, the effect of transfers shifts the Lorenz curve for gross income more than it does in the U.S. Both Sweden and Finland have very high levels of redistributions enacted by transfers, also for families high up in the distribution, while taxation shifts the Lorenz curve by little in both cases. We should notice that proportional taxation (income is taxed at the same marginal tax rate, regardless of the income level) and proportional transfers do not shift the Lorenz curve and do not change the Gini coefficient. Conversely, progressive taxation (the marginal tax rate is higher the higher income is) and transfers do. Our comparison therefore shows that the Swedish and Finnish tax systems are effectively close to a proportional tax and all of the progressivity is achieved through transfers. Taxation is more progressive in the U.S., Canada, and Germany.

So far, we have discussed the progressivity of the tax and transfer system in our five countries based on how they change the relative position of the households in the income distribution. However, this criterion does not give us much information about the magnitude of income that changes hand in the economy. From the last columns of tables 3-7, we can look at another measure of redistribution within a country: aggregate taxes and transfers as a fraction of aggregate gross income. Looking at this criterion, we see that total transfers are respectively 6, 7, 11, 19, and 21% of gross income of the working age families in the U.S., Germany, Canada, Finland and Sweden. As for income taxes, we have 16, 17, 21, 23 and 25% of gross income, respectively. The magnitude of these flows provides the same ordering of strength of redistribution across countries suggested by the Lorenz curves and the Gini coefficients.

## 6 Labor Earnings and Redistribution

Tables 3-7 look more in detail at earnings, taxes and transfers for households whose head is 25 to 60 years of age, conditional on labor earnings quantiles. In each table, the columns provide information about a number of households, classified according to their relative position in the

earnings distribution of the total sample of households: the poorest 10%, the quartiles<sup>12</sup>, the richest 10%, and the population as a whole.

We study average earnings, gross income and disposable income for the households in each category.<sup>13</sup> To better understand how redistribution takes place within the quantiles of the earnings distribution, we also analyze the sources of disposable income and the tax payments.

In the second section of the table we distinguish various income sources. The first three are gross wage and salary income (labor), income from self-employment (business) and cash property income. We then distinguish several transfer components. Social insurance transfers include sick, accident, and disability pay, social retirement benefits (even if the household head is of working age, he or she may go into early retirement, or some other family member might receive these payments), child or family allowances, unemployment compensation, maternity pay, military/veteran/war benefits and other social insurance. Means-tested transfers include both cash and near-cash benefits.<sup>14</sup> Pensions include private pensions and public sector pensions. Private pensions are employer payments for retirement that may supplement social security transfers. Self-employment pension plans are included, if they are designed to supplement social security, e.g. individual retirement accounts (IRAs). Public sector pensions include pensions for public employees and do not include amounts coming from social security benefits for the aged or survivors. Private transfers include alimony or child support and other regular private income.

We then report income taxes. In fact, we do not have information on employee and self-employed contributions for all of the five countries. The comparison between income tax rates is likely to carry over to the entire tax system, as the income tax is the most progressive component of the tax code.

We also report some of the characteristics of the households in the different earnings quantiles to gain a better idea of who are the poor and rich people.

### *The U.S.*

As table 3 shows, the average household at the bottom 10% of the earnings distribution earns \$275 from labor income, which amounts to a disposable income of \$9,090 after taxes and transfers. Under 3% of its gross income comes from earnings, while 86.4% derives from transfers. For this groups, means-tested transfers account for the largest share of transfers (37.4%), followed by social insurance (26.3%) and pensions (13.4%). Consistent with the observation that lifetime earnings follow an inverted U shape, the 10% of households with the lowest earnings include a disproportionate share of the youngest and older cohorts. Young people are still accumulating human capital and waiting to climb up the earnings distribution. The fraction of oldest people (50-60 years old) suggests that a significant number of people in our sample are taking early

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<sup>12</sup>Each quartile includes 25% of the households in our sample including all working age families, ordered from poorest to richest. The first quartile represents the poorest 25% of the households, the second one the second poorest 25% (from 25% to 50%), the third one the third poorest (from 50% to 75%), the fourth one the richest 25%.

<sup>13</sup>We do not report the information on factor income separately because in this sample its distribution is very close to the one for earnings, as we noticed previously.

<sup>14</sup>Example of near-cash benefits are food stamps and housing benefits.

retirement. As we have already discussed, this is a common feature across countries, although it is much more common in Finland and Sweden.

Looking at the overall distribution, we see that transfers decline quickly as earnings increase, with means-tested ones doing so even more quickly. The share of pensions also declines throughout the distribution.

The structure of taxation is very progressive, with the average tax rate going from 3.7% for the poorest 10%, to 31% for the richest 10%. However, the average total tax rate is low, compared with the other countries we are looking at.

### *Canada*

From table 4 we can see that that Canada has a more generous transfer system than the U.S. Both social insurance and means-tested transfers are larger, but while social insurance transfers decline more slowly as earnings increase, means-tested ones do so more quickly, as households in the second quantile of both distributions receive less than 1% of their gross income from this source. The share of pension income across the the distribution looks remarkably similar to the one in the U.S. even though in Canada the fraction of people between 50 and 60 years of age is larger.

The Canadian income tax is less progressive than the U.S. one. In particular, households at the top 10% of the distribution pay an average income tax of 28%, compared to 31% in the U.S., although for the whole population the average rate is 21% in Canada and 16% in the U.S.

### *Germany*

The fraction of gross income coming from government transfers for the average household in the total population is 6.4%, compared with 3.7% in the U.S. and 8% in Canada. Interestingly, at the bottom 10% of the earnings distribution the share of transfers due to social insurance is larger than the means-tested one in Germany, unlike in the U.S. and Canada.

The share of gross income due to pensions is low; for example, at the bottom 10% it is only 3.3% , compared to about 14% in both the U.S. and Canada. This holds despite the fact that the share of people age 50-60 is larger in Germany and reflects the fact that the social security system is much less redistributive than in the other countries (see Börsch-Supan and Schnabel [1]), so the share of payments that goes to the poorest is lower.

As said, Germany is the country with the second least generous transfer system after the U.S. Correspondingly, is also the country with the second lowest average income tax, 17% of total gross income, compared to 16% in the U.S., 21% in Canada and, as we will see, much higher tax rates in Sweden and Finland. However, the bottom 10% of households pays more taxes in Germany (8.7%) than in the U.S. (3.5%) and Canada (5.4%).

### *Sweden*

In Sweden, 19% of average household gross income is due to transfers, compared to 6% in the U.S., 7% in Germany and 11% in Canada.<sup>15</sup>

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<sup>15</sup>Unfortunately, in the data set for Sweden, public pensions are lumped together with social security transfers and we have no data for private pensions. Since the latter are missing, this computation underestimates total transfers in Sweden.

Comparing tables 6 and 3 we can see that the Swedish households at the bottom 10% of the earnings distribution have \$223 in average earnings, compared to \$275 in the U.S., but end up with an average disposable income of \$19750, compared to \$9090 in the U.S. They thus receive 92% of their gross income from transfers, the majority of which is social assistance (this, however, includes public pensions in Sweden), while a much smaller fraction is means-tested. The Swedish social security transfers remain large as earnings increase: the households in the top quartile of the earnings distribution receive 5% of their gross income from government transfers.

Correspondingly, the average income tax for the whole population is also much larger (25%) than the one in the countries we discussed so far. Its structure is not very progressive, starting from an average rate of 16% for the bottom 10%, up to 31% for the richest 10%.

### *Finland*

As we can see from table 7, in Finland as in Sweden, the amount of transfer income is substantial and the part due to social insurance is generous throughout the earnings distribution. In Finland, however, means-tested transfers are more generous than in Sweden, and particularly so at low levels of earnings.

Unlike for Sweden, we do have disaggregated data for pensions for Finland. It is striking to note that pensions provide 36% of gross income for the Finnish households at the bottom 10% of the distribution and 22% for those at the bottom 25%. This is more than double the amounts we have for the U.S and Canada and about ten times the ones in Germany. Correspondingly, in Finland, the share of household heads age 50-60 at the bottom 10 and 25% are respectively 44 and 34%, compared with 25% in the total sample. A large share of these pensions is due to public pensions. The availability and generosity of public pensions in Finland seems to encourage a large share of public employees to retire early.

The average income tax rate and its progressivity are very similar to the ones in Sweden. A Tax reform was implemented in Finland from the late 1980s (OECD Economic Surveys, Finland 1991/1992 [7]). It reduced the marginal income tax rates while maintaining total tax revenues by broadening the income tax base and by raising indirect taxes. By 1992, the highest personal income tax rate was reduced by the central government from 51 to 39%. On the other hand, and partially offsetting this reduction, the social security contributions paid by employers and employees were increased. The OECD computed that, overall, the effective marginal tax rate on total labor compensation did not change significantly, because the reduction in the effective marginal tax rate on average wage earnings was more or less compensated by increases in social security contributions and consumption taxes. Unfortunately, we do not have data on consumption, nor on consumption taxes, therefore our computed tax payments should be considered as lower bounds of the actual ones.

## **7 Age, Early Retirement and Income**

In this section we look at gross income, taxes and transfers over the lifecycle to study the relationship between age and redistribution for working age families (25-60 years of age).



In all countries average gross income follows an inverse U-shape pattern, first increasing with age and then declining as the household head gets older (tables 8-12). Total transfers follow a U-shape pattern: they are more generous for younger and older households. In fact, middle-age families on average earn more and also hold more assets. As the family gets older some of its members retire and begin receiving social security payments and pensions, therefore transfers increase. In all countries but Sweden (for which unfortunately we do not have data on private pensions) total transfers to the age group 55-60 are actually the highest ones over the life-cycle. The fraction of total transfers to this age group is smallest in the U.S. and Germany (11%), larger in Canada and Sweden (respectively 19 and 22%) and largest in Finland (36%).

The incentives to retire early in the various countries are reflected in tables 3-12 by the life-cycle pattern of the fraction of gross income due to labor, self-employment and total transfers. If the fraction of total transfers rises significantly for the last (or last two) age groups, while the fraction of income from labor and self-employment goes down, we have evidence that households start to retire early. The case in which transfers go up, labor income goes down while income from self-employment increases, indicates that the households reduce their labor supply and start receiving social security and pension payments, but at the same time they engage in some self-employment activity to supplement their income. This is more likely to happen in countries in which social security payments do not decrease sharply as the people receive some extra source of income, at least up to some level. The composition of total transfers and their changes as the household ages gives some indication of which programs provide more incentives toward early retirement. In a country with a social security system that has generous provisions for early retirement, we should see the fraction of social insurance (which includes social security payments) increasing a lot for older households. In a country in which, instead, families retire early because of incentives linked to private and public pension plans, we should observe the fraction of pension income to go up.

Tables 8-12 show that in Germany pensions are lower than in all of the other countries for all age groups. In particular, if we compare the 55-60 age group, the fraction of gross income coming from pensions is 1% in Germany, 6% in the U.S., 7% in Canada and a large 20% in Finland. Social insurance, which includes social security transfers, for the same age group are respectively, 9% in Germany, 4% in the U.S., 7% in Canada and 13% in Finland. Correspondingly, German families whose head is 55-60, are the ones with the highest fraction of gross income coming from labor: 81%, compared with a low of 50% in Finland. These numbers reflect the fact that the German system provides less incentive toward early retirement than in other countries. At the opposite extreme is the Finnish system. In Finland, the fraction of gross income due to labor drops from 70% at age 50-54 to 50% for age 55-60. However, the fraction of income deriving from self-employment activities is higher than in the other countries and is even higher for older family heads. This indicates that in Finland people retire early and devote part of their time to self-employment.

As we have already discussed, Sweden and Finland are the countries with the most generous transfer systems and highest average tax rate. Unfortunately we do not have data for private pensions in Sweden, and public pensions are included in social insurance. Looking at social insurance transfers, we see that their fraction increases from 12% at age 50-54, to 21% at age

55-60, while labor income decreases from 80% to 70%. In Sweden income from self-employment increases with age, flattening out at 2.8% around age 45-49 and staying at that level later on. We have no data on private pensions for Sweden, however the available information suggests that there are some incentives to retire early and that households do not supplement their income through self-employment as our data suggest for Finland.

U.S. and Canada seem to provide some more incentives to retire early than Germany, but much less than Finland and Sweden. In both the U.S. and Canada, the transfer component increasing the most for the last income group is the pension one. The effect is somewhat stronger in Canada than in the U.S.

## 8 Conclusions

All of the various measures of income we looked at are unequally distributed across countries and their distributions are concentrated and skewed. The governments of all of these five countries have some commitment to reducing income inequality. However, they go about this task with different intensities and they use rather different tools to achieve it.

The data for the U.S. indicate less commitment to reducing income inequality and a strong emphasis on progressive taxation as a redistribution device. Moreover, a large chunk of the transfers to the poorest are means-tested.

Canada is quite close to the U.S., both in terms of size of redistribution and instruments used, with only slightly more emphasis on transfers.

Germany appears to focus on reducing labor income inequality through other policies, with less emphasis on taxes and transfers.

Sweden and Finland engage in substantial redistribution of income, using high average tax rates, little tax progressivity and aggressive transfers. Sweden uses mainly social insurance transfers, while Finland relies a little more on means-tested ones, but not nearly as much as the U.S. and Canada.

Our results provide some useful lessons for public policy. First, economic theory suggests that there is a trade-off between redistribution and efficiency: transferring more income to the poorer people tends to reduce their work effort during their working years and may induce them to retire early. In addition, it can distort the economic decisions of those that are taxed to provide the revenues that are being redistributed. Second, there are theoretical reasons why the distribution of labor income should depend on the tax and transfer system, as well as on the distribution of human capital. Human capital is linked to education, which in turn is influenced by government subsidies.

Our investigations provide evidence that is consistent with these theoretical propositions. First, notice that the distribution of labor earnings in the countries that traditionally are more concerned with redistribution (Finland and Sweden) are not necessarily more equal than the ones that belong to the anglo-saxon tradition of low government intervention (the U.S. and perhaps Canada). Finland is one obvious example of a country of high government intervention and high labor income inequality. This is partly due to a pattern of early retirement more pronounced in Finland than in all of the other countries. Also, economic theory suggests that unemployment

benefits discourage job search and work effort. This could translate into a larger number of unemployed or under-employed, which increases measured inequality in labor earnings.

Second, we find evidence that greater redistribution through taxes and transfers is achieved at the cost of greater distortions on labor supply and early retirement decisions. Consistently with other theoretical work we also find that high redistribution countries use heavily instruments other than income taxes, such as transfers based on special conditions or means-tested, in order to achieve high levels of redistribution while keeping distortions as low as possible for the beneficiaries. This, however, is costly because it generates the need to monitor eligibility. As an example, in Sweden there are special agencies that monitor job search effort of the unemployed.

Third, Germany is an interesting case: the level of redistribution through taxes and transfers is low. However, the distribution of labor earnings in Germany is remarkably more equal than in all of the countries that we are considering here. Evidently the government is using other instruments to achieve this level of equality, possibly more equal access to public education. Another reason the distribution of earnings may be more equal is the presence of powerful unions, which typically favor a flat wage structure that enhances security at the expense of incentives.

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**Table 1: Measures of earnings, income and disposable income. Age 25-60**

Country and Variable	Fraction with Zero or Negative	Concentration		Percentile Location of Mean
		GINI	p80/p20	
<i>United States</i>				
Earnings	7.7	0.46	23	60
Factor income	6.1	0.46	23	61
Gross income	0.9	0.42	12	61
Disposable income	0.9	0.39	9	60
<i>Canada</i>				
Earnings	8.9	0.42	24	56
Factor income	7.7	0.42	22	56
Gross income	0.2	0.35	8	58
Disposable income	0.2	0.32	6	56
<i>Germany</i>				
Earnings	7.0	0.38	13	56
Factor income	6.2	0.39	14	57
Gross income	0.2	0.34	7	59
Disposable income	0.2	0.30	5	58
<i>Sweden</i>				
Earnings	7.6	0.39	19	56
Factor income	3.7	0.39	17	57
Gross income	0.3	0.29	5	54
Disposable income	0.3	0.27	4	53
<i>Finland</i>				
Earnings	9.7	0.43	39	56
Factor income	7.8	0.44	36	57
Gross income	0.0	0.32	6	57
Disposable income	0.0	0.29	5	55

**Table 2: Measures of earnings, income and disposable income. Age 25-50**

Country and Variable	Fraction with Zero or Negative	Concentration		Percentile Location of Mean
		GINI	p80/p20	
<i>United States</i>				
Earnings	6.8	0.45	21	59
Factor income	5.8	0.45	21	61
Gross income	0.9	0.42	11	62
Disposable income	0.9	0.38	9	60
<i>Canada</i>				
Earnings	7.6	0.41	19	55
Factor income	7.0	0.40	18	56
Gross income	0.2	0.34	7	57
Disposable income	0.2	0.31	6	56
<i>Germany</i>				
Earnings	5.9	0.38	12	56
Factor income	5.4	0.38	12	56
Gross income	0.0	0.34	6	58
Disposable income	0.0	0.30	5	57
<i>Sweden</i>				
Earnings	6.7	0.39	17	57
Factor income	3.5	0.39	16	57
Gross income	0.3	0.29	4	54
Disposable income	0.3	0.27	4	53
<i>Finland</i>				
Earnings	7.2	0.40	21	56
Factor income	6.3	0.41	20	57
Gross income	0.0	0.31	5	57
Disposable income	0.1	0.28	4	54

**Table 3: U.S. Households ranked by earnings**

Household characteristics	Bottom 10%	Households in earnings quartiles				Top 10%	Total
		1st	2nd	3rd	4th		
<i>Earnings (\$)</i>							
Average earnings	275	6009	24494	43415	89184	122085	40676
Average gross income	9448	12295	27220	46352	94395	129545	44965
Average disposable income	9090	11320	22791	37016	68258	89275	34773
<i>Sources of gross income (%)</i>							
Labor	2.7	45.2	84.5	88.4	87.6	85.9	84.4
Business	0.2	3.6	5.5	5.3	6.9	8.4	6.0
Cash property income	10.7	6.1	2.5	2.6	3.9	4.6	3.5
Total transfers	86.4	45.1	7.6	3.7	1.6	1.2	6.0
Social insurance	26.3	16.5	3.5	1.6	0.7	0.4	2.4
Means-tested	37.4	15.9	1.0	0.2	0.0	0.0	1.3
Pensions	13.4	7.1	1.7	1.2	0.7	0.6	1.4
Private	7.3	4.8	1.2	0.6	0.2	0.1	0.8
<i>Income tax (%)</i>	3.5	4.0	9.4	13.0	21.3	25.2	16.2
<i>Average number of earners</i>	0.3	0.8	1.4	1.8	2.2	2.2	1.5
<i>Average household size</i>	2.3	2.3	2.4	2.9	3.3	3.3	2.7
<i>Age of household head (%)</i>							
25-34	32.6	37.9	38.2	29.4	17.1	13.3	30.7
35-49	39.2	39.8	43.5	49.7	56.9	57.4	47.5
50-60	28.2	22.3	18.2	20.9	26.0	29.3	21.8
Average age (years)	41.4	39.8	39.3	40.9	43.4	44.4	40.8

**Table 4: Canadian Households ranked by earnings**

Household characteristics	Bottom 10%	Households in earnings quartiles				Top 10%	Total
		1st	2nd	3rd	4th		
<i>Earnings (\$)</i>							
Average earnings	68	5088	22753	37856	68148	88188	33408
Average gross income	11004	13472	27281	40972	71363	91807	38230
Average disposable income	10412	12449	22982	32570	53112	66075	30246
<i>Sources of gross income (%)</i>							
Labor	0.5	32.7	76.5	87.4	88.1	86.3	80.9
Business	0.1	5.1	6.9	5.0	7.4	9.8	6.5
Cash property income	6.4	4.7	2.0	1.4	1.7	2.0	1.9
Total transfers	93.0	57.6	14.6	6.2	2.8	2.0	10.7
Social insurance	30.6	26.5	10.1	4.4	1.7	1.0	6.1
Means-tested	41.3	18.4	0.8	0.3	0.1	0.1	1.9
Pensions	14.1	7.4	1.7	0.8	0.4	0.3	1.4
Private	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Income tax (%)</i>	5.4	7.6	15.8	20.5	25.6	28.0	20.9
<i>Average number of earners</i>	0.1	0.8	1.6	1.9	2.4	2.6	1.7
<i>Average household size</i>	2.1	2.2	2.6	3.0	3.4	3.5	2.8
<i>Age of household head (%)</i>							
25-34	28.0	32.1	35.9	29.4	19.2	13.7	29.2
35-49	39.9	42.0	44.8	51.0	55.5	56.8	48.3
50-60	32.2	25.9	19.3	19.5	25.3	29.5	22.5
Average age (years)	43.0	41.3	39.8	40.7	43.1	44.4	41.2



**Table 5: German Households ranked by earnings**

Household characteristics	Bottom 10%	Households in earnings quartiles				Top 10%	Total
		1st	2nd	3rd	4th		
<i>Earnings (\$)</i>							
Average earnings	867	9174	30275	45496	80412	106831	41333
Average gross income	14926	18247	33344	48394	84407	113440	46092
Average disposable income	13584	15602	24236	33921	54320	70518	32016
<i>Sources of gross income (%)</i>							
Labor	5.6	44.6	86.9	87.4	85.5	80.6	82.2
Business	0.2	5.7	3.9	6.6	9.8	13.6	7.5
Cash property income	21.4	8.2	1.3	2.0	3.1	4.7	3.0
Total transfers	72.8	41.6	7.9	4.0	1.6	1.1	7.3
Social insurance	36.8	23.4	6.2	3.1	1.3	0.9	4.8
Means-tested	23.5	11.9	1.2	0.5	0.1	0.1	1.6
Pensions	3.3	1.9	0.2	0.3	0.0	0.0	0.3
Private	9.3	4.4	0.4	0.2	0.2	0.2	0.6
<i>Income tax (%)</i>	8.7	6.4	11.5	14.6	22.9	27.4	17.0
<i>Average number of earners</i>	0.3	0.8	1.4	1.8	2.1	2.1	1.5
<i>Average household size</i>	1.9	2.1	2.5	2.9	3.1	3.2	2.6
<i>Age of household head (%)</i>							
25-34	37.2	39.4	38.0	29.3	19.8	10.7	31.6
35-49	29.7	31.8	36.8	46.0	49.5	51.7	41.0
50-60	33.1	28.8	25.1	24.7	30.7	37.7	27.3
Average age (years)	42.0	40.8	40.4	41.5	43.9	45.9	41.7

**Table 6: Swedish Households ranked by earnings**

Household characteristics	Bottom 10%	Households in earnings quartiles				Top 10%	Total
		1st	2nd	3rd	4th		
<i>Earnings (\$)</i>							
Average earnings	223	7010	28120	44315	76646	96233	39020
Average gross income	23593	26798	36960	53925	84404	104351	50519
Average disposable income	19750	21806	28178	40821	60203	71928	37750
<i>Sources of gross income (%)</i>							
Labor	0.8	23.5	73.7	79.4	88.9	90.2	74.9
Business	0.1	2.7	2.4	2.8	1.9	2.1	2.3
Cash property income	4.2	3.8	2.7	3.5	3.9	3.9	3.6
Total transfers	94.8	70.0	21.2	14.3	5.3	3.9	19.2
Social insurance	73.1	55.0	18.0	13.0	5.0	3.7	16.2
Means-tested	18.6	12.6	2.0	0.9	0.1	0.1	2.3
Pensions	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Private	3.1	2.5	1.2	0.5	0.1	0.1	0.7
<i>Income tax (%)</i>	16.3	18.6	23.8	24.3	28.7	31.1	25.3
<i>Average number of earners</i>	0.5	1.0	1.3	1.7	2.1	2.1	1.5
<i>Average household size</i>	1.7	1.8	1.8	2.5	2.9	2.9	2.2
<i>Age of household head (%)</i>							
25-34	31.1	39.5	39.9	30.7	13.0	8.2	30.8
35-49	37.9	36.9	40.1	47.6	55.9	59.5	45.1
50-60	31.0	23.5	20.0	21.7	31.0	32.3	24.1
Average age (years)	41.6	39.7	39.4	40.9	44.7	45.8	41.2

**Table 7: Finnish Households ranked by earnings**

Household characteristics	Bottom 10%	Households in earnings quartiles				Top 10%	Total
		1st	2nd	3rd	4th		
<i>Earnings (\$)</i>							
Average earnings	2	3722	22688	38214	69544	88581	33533
Average gross income	17423	20473	31902	46374	76682	97418	43851
Average disposable income	14532	16783	23743	32694	49611	60534	30703
<i>Sources of gross income (%)</i>							
Labor	0.0	15.2	64.5	75.0	79.3	76.5	68.0
Business	0.0	3.0	6.6	7.4	11.4	14.4	8.5
Cash property income	2.3	5.8	1.7	2.0	3.0	4.3	2.8
Total transfers	97.7	76.0	27.2	15.6	6.3	4.7	20.7
Social insurance	34.5	32.6	16.0	10.1	4.3	3.0	11.3
Means-tested	25.0	19.0	3.9	1.4	0.5	0.4	3.5
Pensions	36.5	22.1	6.0	3.2	1.0	0.8	5.0
Private	1.4	1.8	1.2	0.7	0.5	0.5	0.8
<i>Income tax (%)</i>	13.6	14.7	19.5	22.6	27.7	30.3	23.4
<i>Average number of earners</i>	0.0	0.8	1.5	1.8	2.3	2.4	1.6
<i>Average household size</i>	1.6	1.8	2.3	2.8	3.3	3.4	2.6
<i>Age of household head (%)</i>							
25-34	15.8	28.4	37.9	29.2	15.3	11.0	27.7
35-49	39.9	37.5	40.2	50.7	59.9	59.5	47.1
50-60	44.3	34.2	22.0	20.1	24.7	29.4	25.3
Average age (years)	46.5	43.2	39.9	41.1	43.6	44.7	42.0

**Table 8: Age and income in the U.S.**

Age	Average Gross income	Income sources (%)			Transfer sources(%)				Income tax
		Labor	Bus.	Cash prop.	Social insurance	Means tested	Pension	Total	
25-29	28550	89.4	3.1	1.6	1.9	2.6	0.2	6.0	12.9
30-34	37454	88.7	4.7	1.4	2.0	2.0	0.3	5.2	14.0
35-39	44985	86.2	6.2	2.7	2.0	1.5	0.4	4.9	16.0
40-44	48808	85.6	6.6	3.1	2.2	1.1	0.6	4.8	16.4
45-49	54959	84.2	7.1	3.8	2.5	0.8	1.0	4.9	17.5
50-54	54156	81.2	7.0	5.0	3.0	0.9	2.3	6.8	17.5
55-60	49589	75.4	6.2	7.2	3.6	0.8	6.1	11.2	17.8
<i>Total</i>	44965	84.4	6.0	3.5	2.4	1.3	1.4	6.0	16.2

**Table 9: Age and income in Canada**

Age	Average Gross income	Income sources (%)			Transfer sources(%)				Income tax
		Labor	Bus.	Cash prop.	Social insurance	Means tested	Pension	Total	
25-29	28707	84.0	4.1	0.9	6.6	3.2	0.2	10.9	18.9
30-34	34120	82.0	6.4	1.1	6.8	2.4	0.3	10.5	20.3
35-39	37227	82.8	6.1	1.1	6.7	1.9	0.4	10.0	20.8
40-44	40909	82.5	7.6	1.5	5.4	1.6	0.4	8.3	21.9
45-49	43849	82.1	6.6	2.4	5.4	1.4	0.8	8.9	21.5
50-54	44607	81.9	6.0	2.3	5.3	1.6	1.4	9.8	21.4
55-60	38593	69.1	7.3	4.4	6.9	2.0	7.4	19.2	20.2
<i>Total</i>	38230	80.9	6.5	1.9	6.1	1.9	1.4	10.7	20.9

**Table 10: Age and income in Germany**

Age	Average Gross income	Income sources (%)			Transfer sources(%)				Income tax
		Labor	Bus.	Cash prop.	Social insurance	Means tested	Pension	Total	
25-29	31747	87.7	1.7	0.3	4.9	3.7	0.0	10.3	13.4
30-34	39949	85.8	7.1	0.9	4.0	1.4	0.0	6.2	15.0
35-39	45944	81.3	10.0	2.3	4.6	1.3	0.0	6.5	15.2
40-44	48523	78.7	12.0	2.7	4.3	1.7	0.0	6.6	16.0
45-49	53947	79.4	11.6	3.1	3.4	1.9	0.1	5.9	18.5
50-54	62911	82.7	5.2	7.0	3.3	1.0	0.6	5.2	23.7
55-60	45906	81.4	3.4	3.7	8.9	0.9	1.2	11.4	16.3
<i>Total</i>	46092	82.2	7.5	3.0	4.8	1.6	0.3	7.3	17.0

**Table 11: Age and income in Sweden**

Age	Average Gross income	Income sources (%)			Transfer sources(%)			Income tax
		Labor	Bus.	Cash prop.	Social insurance *	Means tested	Total **	
25-29	38037	71.2	1.2	2.4	19.8	4.8	25.2	23.2
30-34	44806	71.5	1.6	2.6	19.3	3.7	24.3	22.6
35-39	51529	72.9	2.3	3.4	17.0	3.1	21.4	23.6
40-44	54982	75.9	2.4	3.8	14.9	2.1	17.9	24.8
45-49	58375	80.2	2.8	3.8	11.2	1.4	13.2	26.7
50-54	56943	79.9	2.9	4.1	12.1	0.8	13.1	27.6
55-60	51329	70.3	2.8	4.8	21.5	0.6	22.2	28.1
<i>Total</i>	50519	74.9	2.3	3.6	16.2	2.3	19.2	25.3

\* Social insurance transfers include public pensions

\*\* Total, excluding private pensions

**Table 12: Age and income in Finland**

Age	Average Gross income	Income sources (%)			Transfer sources(%)				Income tax
		Labor	Bus.	Cash prop.	Social insurance	Means tested	Pension	Total	
25-29	31143	69.1	5.9	0.9	13.0	7.8	1.5	24.2	20.0
30-34	41433	69.4	7.6	3.1	13.3	3.9	1.3	19.9	22.2
35-39	45726	70.8	8.7	1.3	12.9	3.6	1.6	19.2	22.5
40-44	47620	70.9	9.6	2.0	11.4	3.0	2.3	17.5	23.6
45-49	49212	71.4	7.4	4.5	9.5	2.9	3.6	16.6	24.4
50-54	48934	69.7	9.2	3.3	7.4	2.5	7.3	17.9	25.5
55-60	40296	49.7	10.5	4.0	12.8	2.5	20.0	35.8	23.9
<i>Total</i>	43851	68.0	8.5	2.8	11.3	3.5	5.0	20.7	23.4

## 9 Appendix: The Data

### *The U.S. data set*

The sample frame for the survey consists of all occupied housing units. The sampling frame is a multistage stratified probability sample of the population.

Of the households participating to the survey in 1979, 8 to 9% refused to answer any of the income questions. If these cases are combined with others for which responses to some but not all income questions occurred, the “item” non-response rate for income amounts averages about 15%. Higher rates of missing responses were found for self-employment income (33%) and property income (25%). Imputation procedures were used by CPS to replace the nonresponse to the question with an answer that was typical of other households with similar characteristics. This imputation procedure partly corrects for the bias due to the fact that nonrespondents have, on average, higher levels of income than respondents.

CPS also compared the aggregates derived from the CPS data set and the ones from the national income account, and adjustments were made. Even after the adjustments, property income (interest, dividends, rent) and means-tested transfer income are of poor quality. Moreover, due to general nonsampling errors at the upper tail of the income distribution, very rich people are not well represented.

The number of observations for households whose head is of working age (25-60) in the 1994 wave that we use is 41,871.

### *The Canadian data set*

The sampling frame includes all private dwellings in the ten Canadian provinces. A stratified cluster probability sample design was employed.

In the 1987 Survey of Consumer Finances 20% of individuals did not respond to income questions. The missing values were imputed. Some specific income items (e.g. investment income sources and some government transfers) were undercovered. The top end of the income distribution curve was underrepresented in the sample.

In the data set that LIS derived from the 1994 wave of the Canadian SCF, there are 26,280 households whose head is of working age.

#### *The German data set*

The sampling frame was given by the list of registered voters. The German Socio-Economic Panel employs a two-stage stratified sample design. Adjustments and corrections to the original data set were made to improve data quality. However, the data set still suffers from a relatively high number of missing values. To get around this problem, we dropped the households for which we did not have the information on either earnings, income or disposable income (about 8% of our sample)

In the data set that LIS derived from the 1994 wave for Germany there are 4,224 households whose head is of working age.

#### *The Swedish data*

The sampling frame for the Income Distribution Survey is the taxation register for all individuals 18 years of age and older. A four-stage stratified sample design was used. The sample design was used in order to control the sample size for farmers, employers and pensioners. Evaluations of the quality of these income data were not performed and no corrections or adjustments were made to the original data. However, since the data come from the taxation register, there are no income missing data.

In the data set that LIS derived from this source, there are 8,720 households whose head is of working age.

#### *The Finnish data set*

The sampling frame for the Finnish Income Distribution Survey is the taxation register for the total population of household heads. As in the Swedish data set, there are no missing data for income. Some population groups have been oversampled, such as the farmers, other entrepreneurs and other high-income groups. This is corrected through the weighting procedure.

In the data set derived by LIS from the 1995 wave there are data on 7,033 households.

Because of either underreporting or lack of oversampling of the rich, the people at the upper tail of the earnings distribution are underrepresented in our data sets. Income from self-employment and income from interests and dividends are especially subject to underreporting.

For Germany and Finland, the original data sets did not allow the reporting of negative earnings, and set them to zero. To make our data more homogeneous across countries we set negative earnings to zero also for the other countries.

**Figure 1. Lorenz Curves for Earnings**

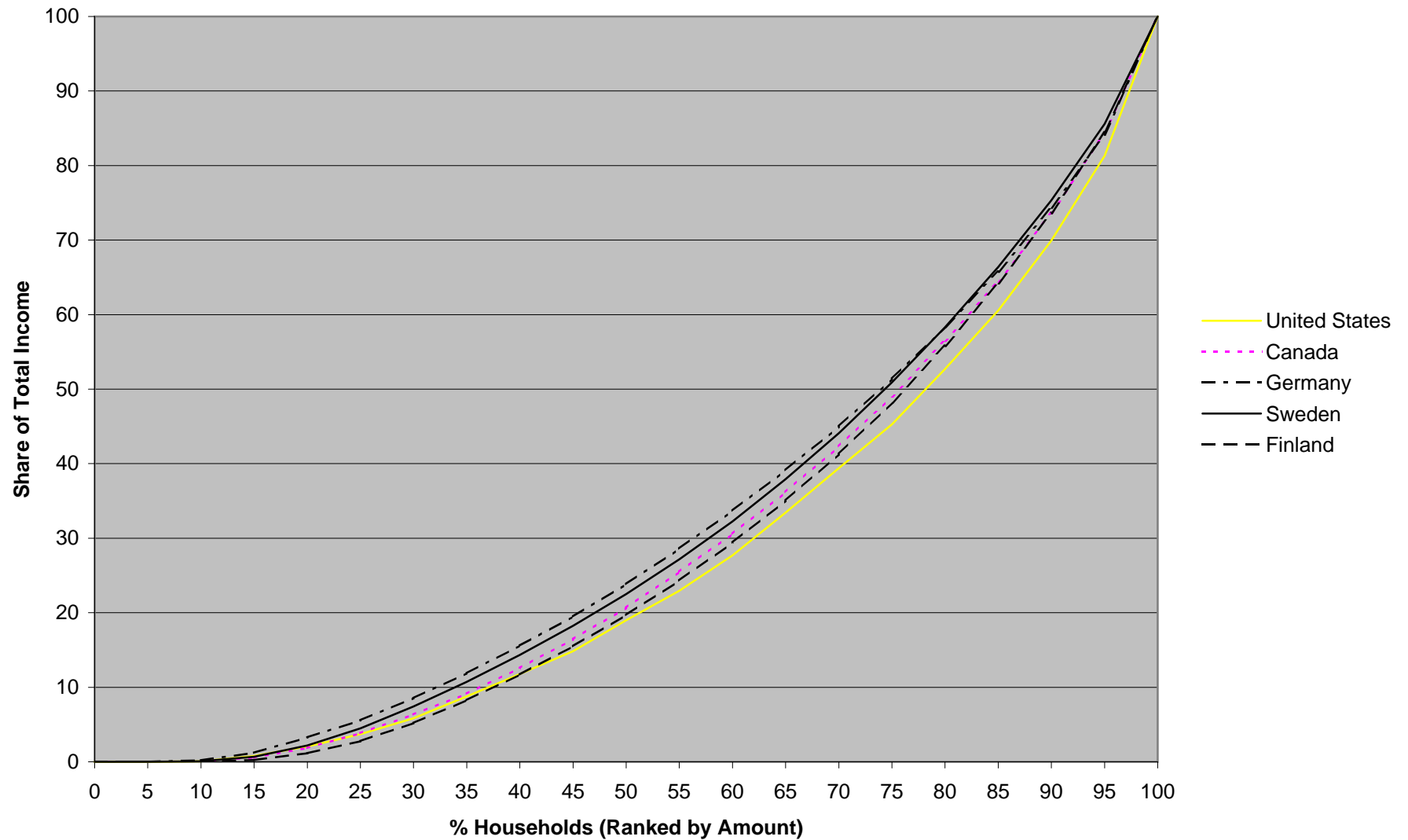




Figure 2. Lorenz Curves for Gross Income

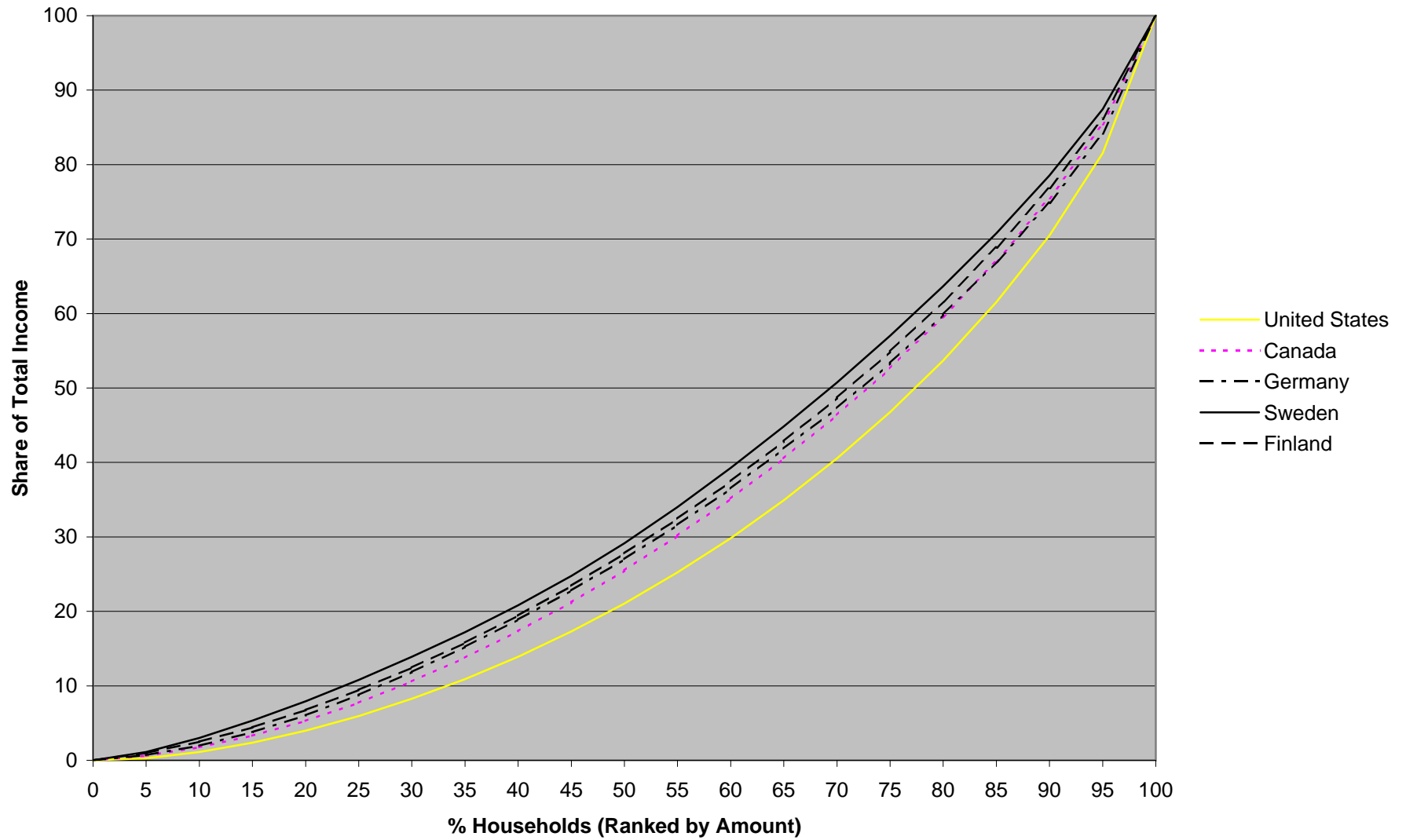


Figure 3. Lorenz Curves for Disposable Income

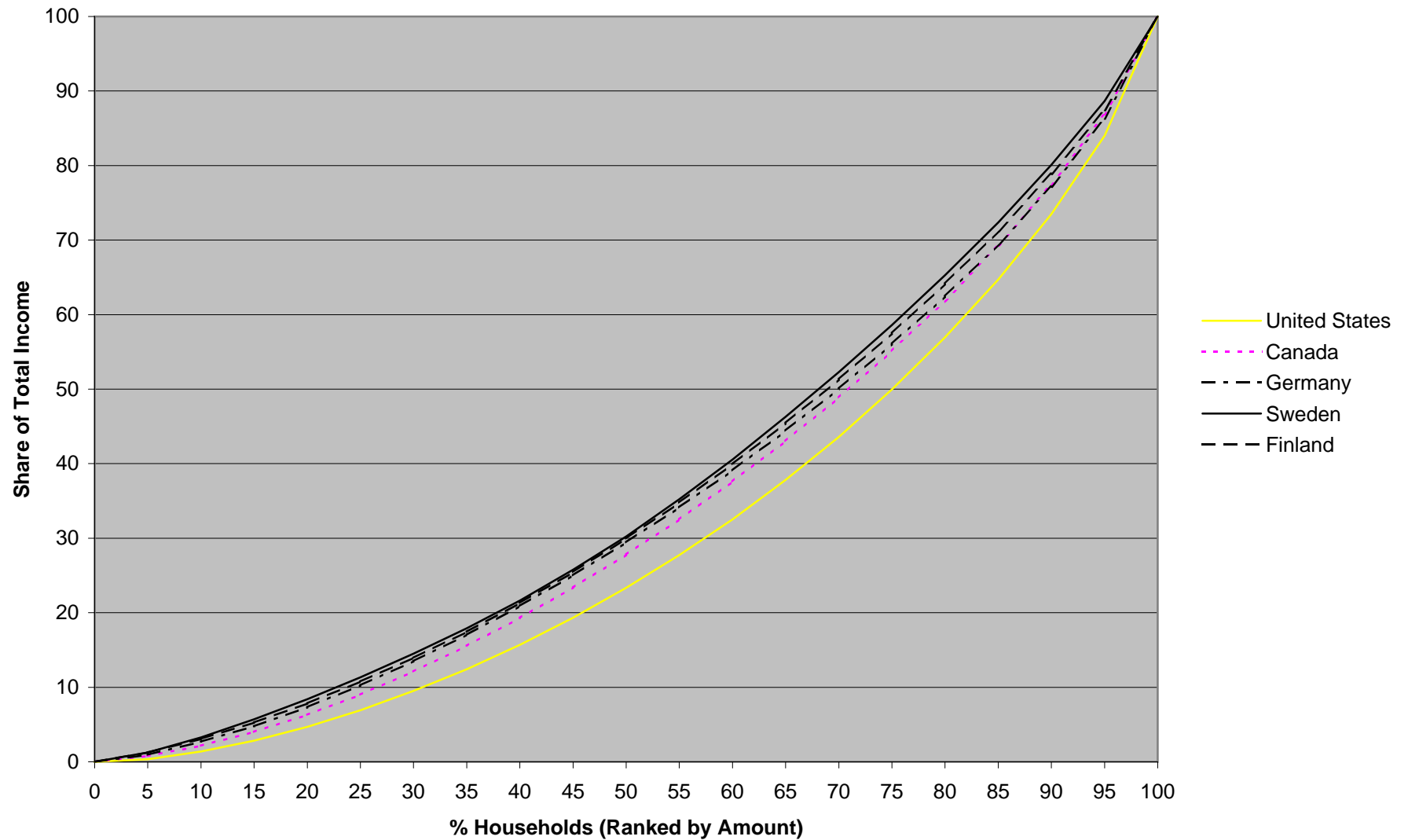


Figure 4. Lorenz Curves for the U.S.

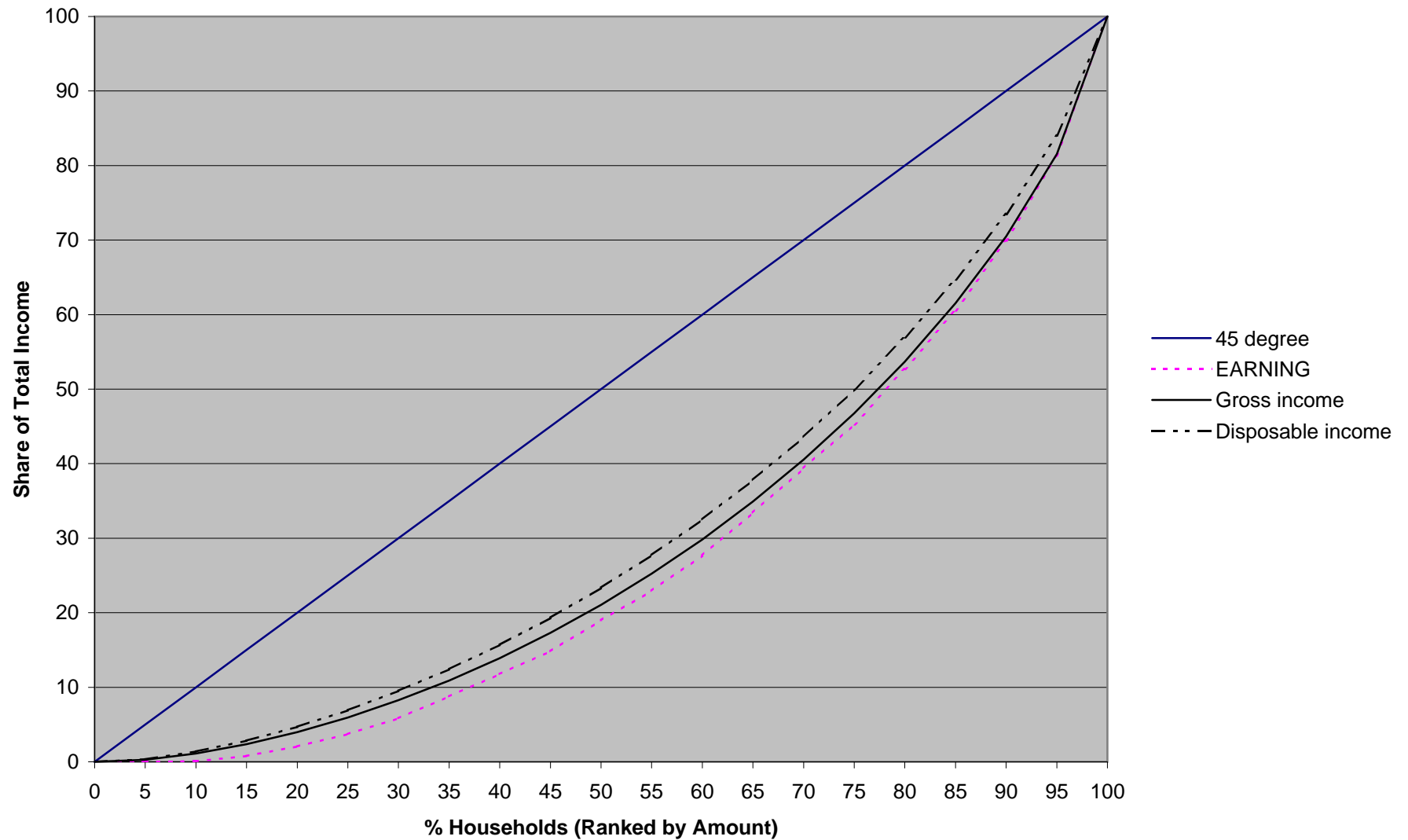


Figure 5. Lorenz Curves for Canada

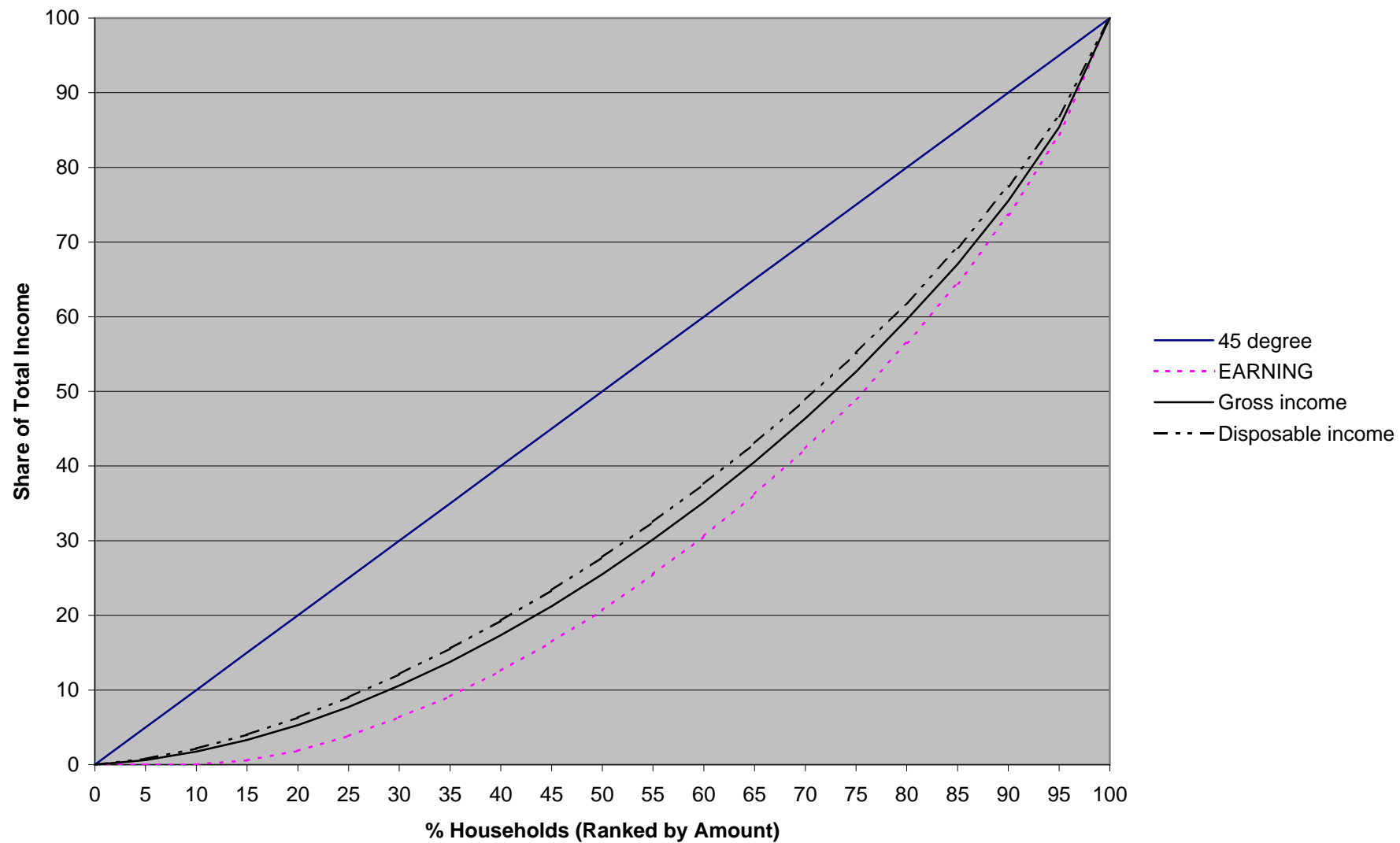


Figure 6. Lorenz Curves for Germany

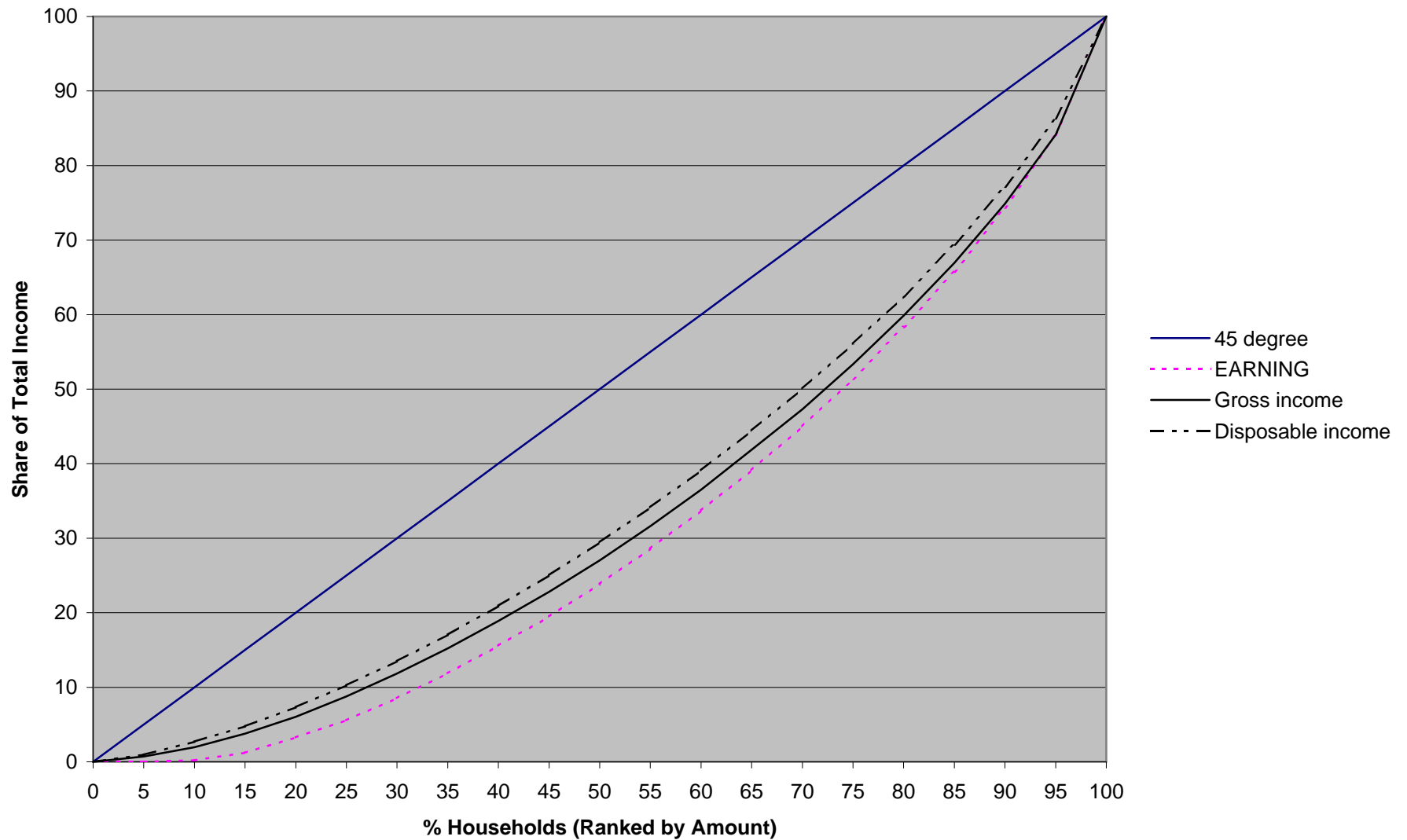


Figure 7. Lorenz Curves for Sweden

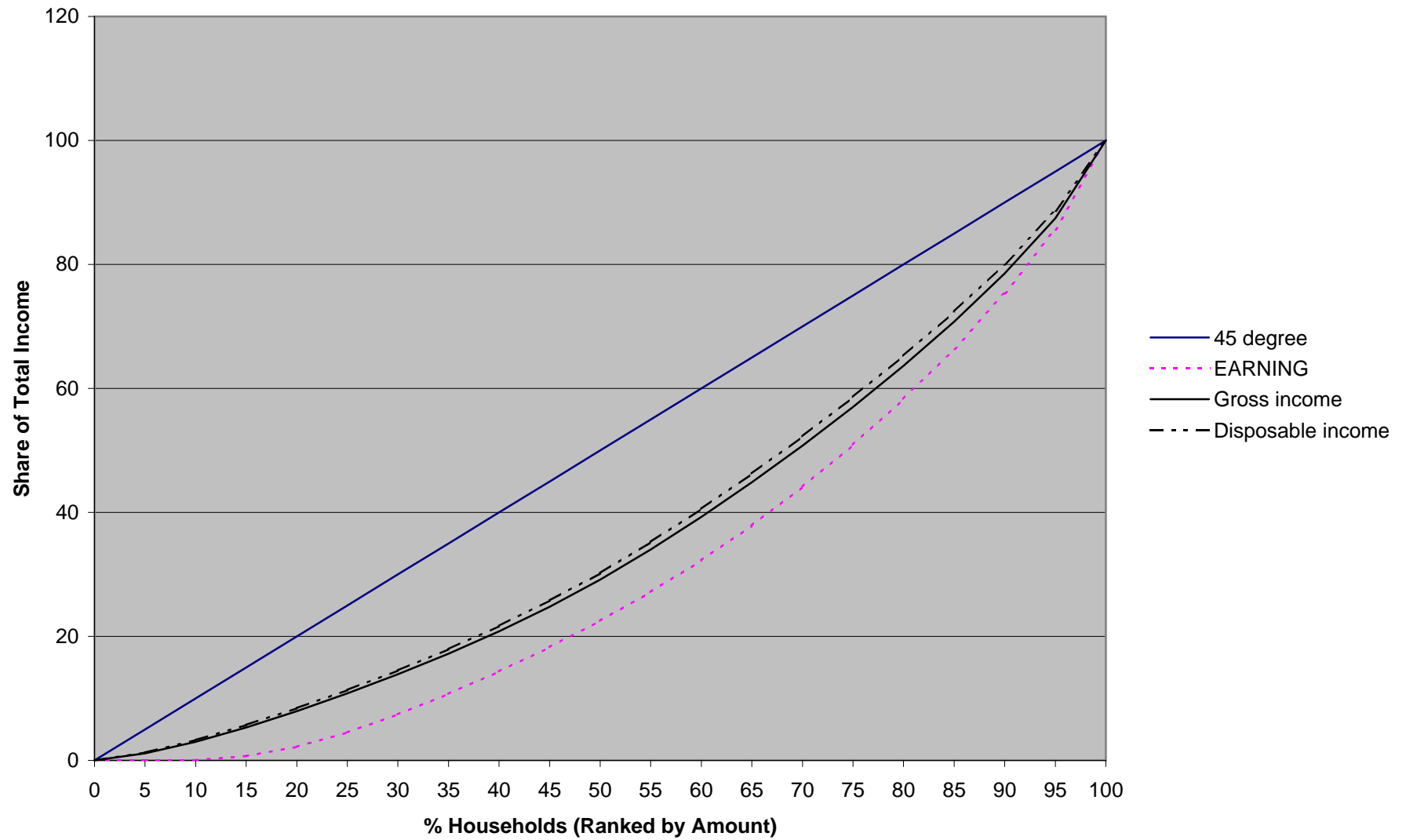


Figure 8. Lorenz Curves for Finland

