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THE MAGNITUDE OF LOW-INCOME GROUPS IN SCANDINAVIA

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**DISCUSSION PAPERS**

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by

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## ABSTRACT

Do the Scandinavian countries really have income distributions that match the often repeated statement that poverty no longer exists there? Applying a relative income-level type of poverty criterion, this paper presents evidence to suggest that poverty does exist in these countries but that it afflicts a markedly smaller fraction of the population than in the United States. If the comparison is made in terms of the fraction of national income required to boost the poor's income up to a norm of uniform inequality, that fraction is about twice as large for the United States as for the Scandinavian countries.

These findings are based upon incomes before taxes and before cash transfers, and consequently represent conclusions about the inequality that results from the "market" part of the income-distribution mechanism. Taxes and transfers, in so far as they are redistributive, should tend to reduce inequality. Perhaps such redistribution does reduce poverty in Scandinavia below noticeable levels. It is commonly believed that redistribution by means of taxes and transfers is more actively pursued in Scandinavia than in the United States. It is also sometimes asserted that vigorous income redistribution will tend to be offset by "retaliatory" increases in inequality of market incomes. These findings do not seem to be consistent with that hypothesis.

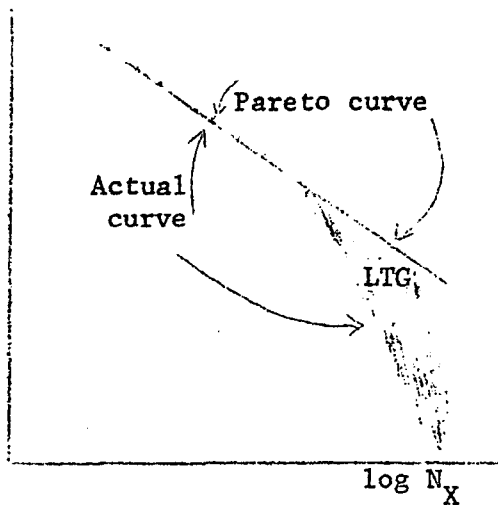
## THE MAGNITUDE OF LOW-INCOME GROUPS IN SCANDINAVIA

There is a prevailing wisdom that low-income groups really do not exist in Scandinavian countries. One obtains this impression in traveling through the countryside and villages of these lands because he rarely sees dilapidated housing. A Norwegian lady visiting the author's county in Appalachia was appalled by the shacks that she saw. Does this mean Scandinavians have no lower-tail to their income distributions? Obviously not if one believes in a unimodal curve of abilities, endeavors, and luck. But perhaps society can minimize certain hardships such as unemployment and sickness. Let us investigate Scandinavian income distributions.

### Technique

The simplest frequency curve having no lower tail and some plausibility might be one with a reverse-J shape. A Pareto curve is of this type; it is useful because of its simplicity and the fact that most income distributions conform above the median to a Pareto straight line. Using the inverse form,  $\log X = \log a - b \log N_X$ ,  $0 < N_X \leq 1$ ,  $b < 1$ ,  $N_X$  is the proportion of total frequencies above the income variate  $X$ . The lower income limit is  $\underline{a}$  and the mean,  $\bar{X}_{\text{Pareto}} = a/(1-b)$ . Suppose  $\underline{a}$  is \$100 and  $\underline{b}$  is .5, then  $X = \$100 N_X^{-0.5}$ . We get a proportional increase in the cumulative number of cases with  $N_{\$1,000,000} = .01$ ,  $N_{\$10,000} = .10$ , and  $N_{\$100} = 1.00$ . The arithmetic mean is \$200.

An actual income distribution always deviates some from the straight line in the lower portion of the curve. This is shown in the sketch as a shaded area. Let us call this deviation the "lower-tail gap" or LTG. It may be quantified as the value  $\text{LTG} = (\bar{X}_{\text{Pareto}} / \bar{X}_{\text{actual}})^{-1}$ .



If the LTG is 15 per cent, then one would have to distribute an additional 15 per cent of total income to persons in the lower tail of the actual curve in order to make the actual a Pareto curve with a minimum income of  $\underline{a}$ . It is noted that the inequality level in the upper portion of the curve, as measured by the slope or  $b$ , is used as the standard for determining the extent of the gap. If there were small inequality in the upper tail, the lower tail would be more glaring. As  $b \Rightarrow 1$ ,  $LTG \Rightarrow 0$ . Great inequality among the high income groups would not be inconsistent with large inequality in the lower tail. The suggestion is being made that the evidence in the upper portion of the curve, usually from above the median, is a good and consistent internal guide for determining the income magnitude of the lower tail problem.

It may be felt that the implied lower limit,  $\underline{a}$ , of the Pareto curve is too severe a standard. Even as  $b$  approaches 1,  $\underline{a}$  approaches one-half the median, for the Pareto curve. Victor Fuchs has suggested a simple measure of inequality based on the income value which is one-half the median. The percent of total cases below one-half the median, the "median gap" or MG, quantifies those persons who are below a reasonable income level. This index is based on one

only, the median. The shape above the median is not considered. In the tables which follow, both the terms LTG and MG will be employed, the one being concerned with the gap in income and the other with the gap in frequencies.

#### Scandinavian Income Distributions for the Economically Active Population

One is plagued by several difficulties in making international comparisons. There are differences in definitions of income and the manner in which data are gathered. The income material for Denmark, Sweden, and Norway is derived from income tax assessments. This causes some problems in relating United States distribution to that in these countries. The income is defined generally as income before personal deductions and exemptions. There are questions relating to the types of individuals included in the frequency tables. The reported income of a taxpayer may be rather that of a family than that of an individual.

In the case of Sweden and the United States, one can be rather precise by accounting for all individuals 14 years old and over. The per cent with income is about the same in each country. However, the proportion classified as economically active or in the labor force among all persons is larger in Sweden than in the United States. This should lessen the fear that the United States might have more persons in the lower tail because of more complete accounting.

What can be said about a lower tail from the data of Table 1? Certainly Sweden has one since its income and frequency gaps are greater than 10 per cent. For the economically active, 23 per cent are below the median guide; lower incomes would have to be raised by an amount

Table 1 - Income and Frequency Gaps for Persons 14 Years Old  
and Over in Sweden and in the United States in 1965

Persons 14 and older in the country	Population		Median gap		Pareto income gap		Inequality index
	Number (in thou- sands)	Index (all=100)	Median (kroner or dollars)	MG (propor- tion of frequen- cies)	The slope, b	LTG (propor- tion of total income)	The Gini coeffi- cient of concen- tration, R
<u>Sweden</u>							
All	6,255	100	7,500	.36	.35	.59	.56
All with income	4,562	73	12,700	.26	.35	.25	.40
Economically active	3,768	60	14,900	.23	.36	.14	.37
<u>United States</u>							
All	135,627	100	1,600	.40	.37	.64	.62
All with income	101,395	75	3,200	.33	.37	.37	.50
Economically active	75,060	55	4,300	.27	.39	.22	.45

Source: Statistiska Centralbyran, Skattetaxeringarna samt Fordelningen av Inkomst och Formogenhet, Assessment year 1966, Stockholm 1967, sp. 11, 42, 117, 122-3. The income averages of income classes of all those with income were used for subsets. Aggregate population data are for January 1, 1966 from Statistisk Arsbok for Sverige, 1966, pp. 22-24 and 1967, p. 344. Bureau of the Census, Current Population Reports, Series P-60, No. 51, "Income in 1965 of Families and Persons in the United States," pp. 18, 31, 33, 36, 37. The economically active were those employed or unemployed and excluded those in the armed forces. The persons were 14 and older as of March 1966. MG is the proportion of cases below one-half the median. LTG is the amount of income needed to eliminate the lower tail and obtain a Pareto line.

equivalent to 14 per cent of actual aggregate income in order to eliminate the lower tail. Has the United States a greater low-income problem? Yes. But not as great as some might have guessed. If one wished to eliminate all the economically active persons below one-half of the median, he would have to consider an initial 27 per cent of the population in the United States as opposed to an initial 23 per cent in Sweden. The difference, the median gap difference, is one of 4 persons in each 100. To eliminate the lower tail among the economically active would necessitate an income which was about 22 per cent larger in the United States as opposed to one 14 per cent larger in Sweden. This is an income gap difference of 8 per cent of total income. This is a large difference in the sense that 22 is over 50 per cent larger than 14. It is not so enormous in the sense that it amounts to 8 per cent of income.

It is more difficult to make valid comparisons between distributions in the United States, Denmark, and Norway. One is not certain who the taxpayers in Denmark and Norway are. Totals seem to be related well with the reported number of economically active in each country.



	Proportion of those 15 and older who were economically active in 1960	<u>1960 economically active</u> Number of persons in thousands	Proportion that are women	Income year and number of units in the income distribution (in thousands)
Denmark	.60	2,094	.31	2,287 taxpayers in 1963
Norway	.53	1,406	.23	1,504 taxpayers in 1965
Sweden	.55	3,244	.32	4,562 income earning taxpayers and 3,768 economically-active taxpayers in 1965
United States	.56	76,681	.32	101,395 income earners in 1965 75,060 economically active 60,411 families and unrelated individuals 65,596 taxpayers in 1965

See Tables 1 and 2 and the ILO Yearbook 1967. The 1965 economically active is the total number of persons net of those in the armed forces and those not in the labor force.

However, the more detailed evidence for Sweden and the United States is that there are many more income earners than economically active. An income-earning wife might possibly not be considered as a taxpayer, and her income may be allocated to her husband. If this were true in general, the units would conform more closely to families and unrelated individuals, a measured concept of the Bureau of the Census, or possibly taxpayers as determined by the Bureau of Internal Revenue. Suppose tax forms were sent to all persons who were thought to have an income sufficient to pay an income tax. This could lead to an understatement of those in the lower tail since there were certain exemption levels. This would be true in tax districts where authorities did not comprehensively distribute forms. One safeguard is that there was a wealth tax in each country. There were sizable

numbers paying no income tax who paid wealth taxes. Nevertheless, it seems that taxpayer distributions for Norway and Denmark are not as comprehensive as one would like from the standpoint of counting persons with income.

Let us look at the results of Table 2 remembering the above qualifications. The statistics show a relatively small group in the lower tails in Denmark and in Norway even by Swedish standards. It

Table 2 - Gaps for Taxpayers in Denmark in 1963 and Norway in 1965 and for Various Groups in the United States in 1965

Taxpayers, persons or families in the country	Number  (in thou- sands)	Median Gap		Pareto income gap		Inequality index
		Median (kroner or dollars)	MG (propor- tion of frequen- cies)	The slope, b	LTG (propor- tion of total income)	The Gini coeffi- cient of concen- tration, R
Denmark	2,287	12,900	.17	.37	.16	.38
Norway	1,504	15,900	.20	.33	.12	.35
United States						
Persons 14 and up						
All with income	101,393	3,200	.33	.37	.37	.50
Economically active	75,060	4,300	.27	.39	.22	.45
Families & unrelated individuals 14 and up	60,411	6,000	.26	.37	.20	.41
Taxpayers of Bureau of Internal Revenue	67,596	6,100	.32	.47	.47	.45

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- Source: Danmarks Statistik, Statistisk Årbog, 1967, p. 400; Norges Offisielle Statistikk, Skattestatistikk, 1965, p. 34. For United States sources, see Table 1 and Bureau of Internal Revenue, Statistics of Income, 1965, Income Tax Returns, p. 211.

seems that the United States distribution of those economically active is the closest approximation to the Danish and Norwegian distributions. The United States figures show about 7 to 10 per cent more of the total population in the lower tail if one uses the median gap difference. The lower-tail gap difference amounts to from 6 to 10 per cent of total income. A plot of the Lorenz curves for the economically active in the three Scandinavian countries and the United States indicates approximately parallel curves with essentially no intersections. The Norwegian curve is closest to the line of equality followed by that for Sweden, Denmark, and the United States.

It is worth noting that there is a group of persons with very low incomes who have some moderate amounts of wealth. In 1965 in Norway, there were 13 per cent of taxpayers with incomes below kr. 6,000. Of these,  $(7.5)/13$  or .58 had wealth which averaged kr. 28,000. This level was two-thirds the average of all wealth-holders. It was over 10 times the average income of the 13 per cent who were at the bottom of the income distribution and who were the poorest of those in our median gap.

#### Effects of Age and Sex

It has been observed that the relative importance of men and women and importance of young and old in the adult population can affect inequality substantially. These effects of age and sex may have strong confounding influences in international comparisons. They may have bearing on the way income data are collected and presented. They may be very real if countries have different attitudes about idleness or if countries are growing rapidly or slowly in population. An extreme statement might be that if there were proper stratification

for age and sex, the lower-tail gap in one country might not be different from that in another, particularly among adult males. If the proportion of women in the labor force is greater in one country than another, its relative inequality is likely to be greater from the standpoint of those who are economically active. This need not be true necessarily if there is a proper meshing of the two distributions.

Classifications by sex are available for Sweden and the United States. Each shows greater inequality when women are included in the set. These women constitute a major problem from the point of view of those who are relatively poor. The number in the lower tail

Table 3 - Gaps for Persons with Income in Sweden and the United States in 1965, Classified by Sex

Persons 14 and older with income in the country	Number (in thou- sands)	Median gap		Pareto income gap		Inequality index
		Median (kroner or dollars)	MG (propor- tion of frequen- cies)	The slope, b	LTG (propor- tion of total income)	The Gini coeffi- cient of concen- tion, R
<u>Sweden</u>						
Men and women	4,562	12,700	.26	.35	.25	.40
Men	2,670	17,400	.21	.39	.09	.34
<u>United States</u>						
Men and women	101,395	3,200	.33	.37	.37	.50
Men	59,172	4,800	.29	.39	.19	.43

Source: See Table 1.

is increased but the income gap increases much more. The figures in Table 3 show it to increase from 9 to 25 and 19 to 37 per cent or 16 and 18 per cent of total income for the two countries. A small part of this is due to the fact that there is now less inequality in the upper tail, since high-income women help lift the line at its lower level. Essentially, the configuration is determined by income of men alone and the addition of women at lower levels creates a further substantial gap. One certainly would not want to be so foolish as to compare a distribution of all persons for one country with one for males in another county.

It seems reasonable that an adult population in a country with relatively many young will have more persons in the lower tail than a country whose population is not growing rapidly. Everyone is cognizant of high unemployment rates among teenagers. Labor force participation rates may also be affected by poorer income attractions. An examination will be made of lower-tail gaps for age and sex groups in Sweden and the United States. Such detail is not available for Denmark and Norway. Only adult males will be considered in examining age classes because of vagaries of women not being in the labor force.

One would like to have an accounting of the total population of the age-sex group. If an adult male is not in the labor force or otherwise has no income, there is a strong presumption that he should be considered as a lower-tail case and be given an income of zero. An adult woman with no income may or may not be an appropriate lower-tail case. A series of possible comparisons is given in Table 4 for males. For those 14 and over, it might be well to consider only those with income. There is clearly a greater per cent of low-income

Table 4 - Gaps for Males 14 and Older and 20 and Older in Sweden and the United States in 1965

Males 14 and older in the country	Number (in thousands)	Median gap		Pareto income gap		Inequality index
		Median (in kroner or dollars)	MG (proportion of frequencies)	The slope, b	LTG (proportion of total income)	The Gini coefficient of concentration, R
<u>Sweden</u>						
Males 14 and older						
All	3,103	15,600	.30	.39	.19	.43
All with income	2,670	17,400	.21	.39	.09	.34
Males 20 and older						
All	2,731	17,100	.246	.39	.13	.38
All with income	2,516	18,100	.19	.39	.08	.33
<u>United States</u>						
Males 14 and older						
All	64,636	4,300	.32	.39	.33	.48
All with income	59,172	4,800	.29	.39	.19	.43
Males 20 and older						
All	54,374	5,200	.252	.39	.16	.40
All with income	53,497	5,300	.24	.39	.13	.39

Source: See Table 1.

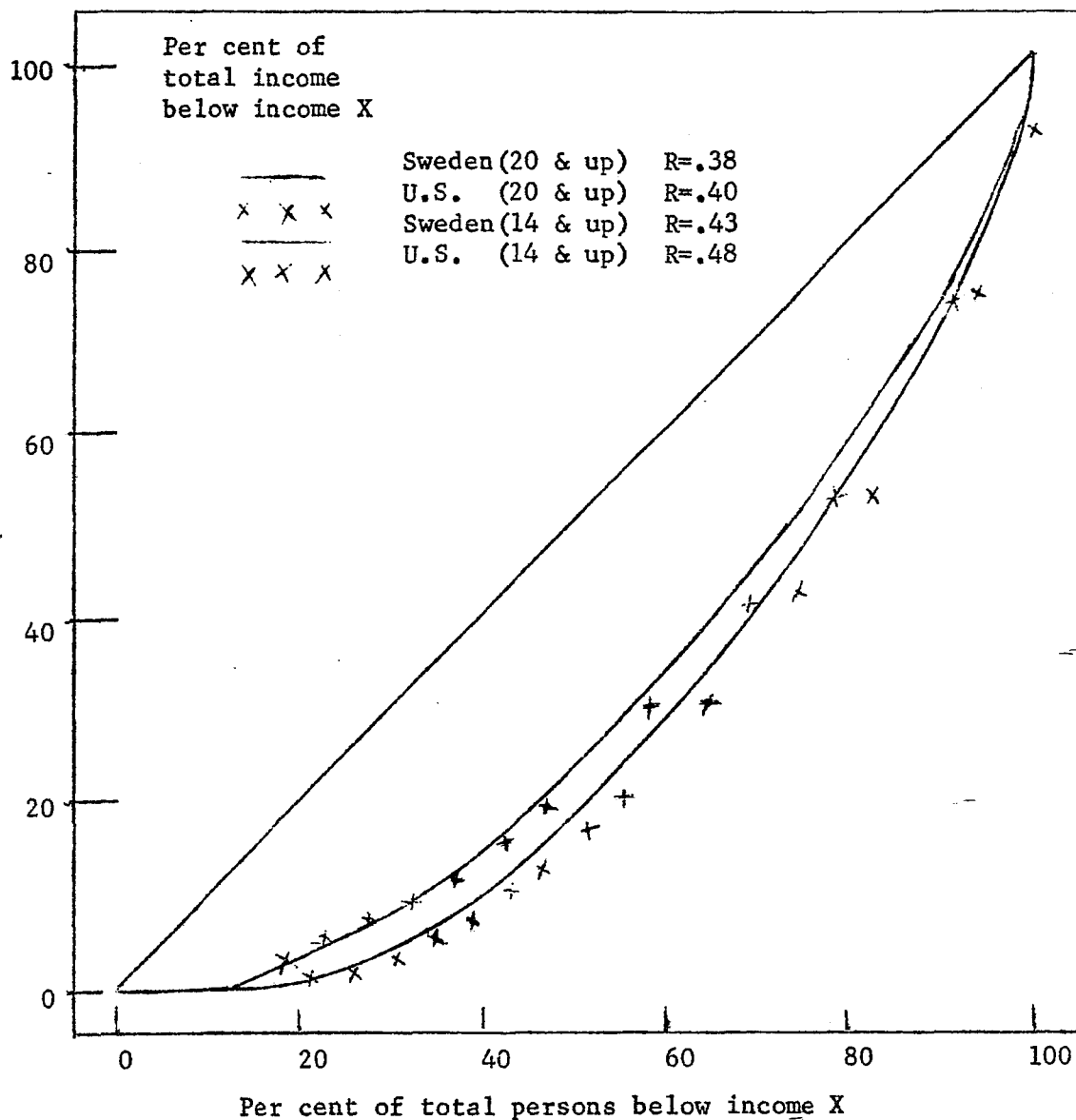
males in the United States than there is in Sweden. The median gap difference is 29 - 21 or 8 per cent and the income gap difference is 19 - 9 or 10 per cent. One finds a greater per cent of youth in the United States, and this has bearing on the results. The ratio of Males 14 to 19 to those 20 and older was .189 in the United States in March 1966 and .136 in Sweden in January 1966.

It is instructive to examine inequality among those males 20 and older. Males with and without income is probably a more germane category because the enumerated per cent without income is smaller than in the United States. A very interesting phenomenon occurs when all males 20 and older are considered in the two countries.

The median gap difference is now narrowed to  $.252 - .246 = .6$  per cent and the income gap difference to  $.16 - .13 = 3$  per cent. This result is worth study using the Lorenz curves of Chart 1. One sees the effect of youth by observing inequality levels with and without

Chart I

Lorenz Curves for All Males 14 and Older and 20 and Older in Sweden and the United States in 1965



Source of data: See Table 1

those of age 14 to 19 for each country and the Lorenz curves for those 20 and older in Sweden and the United States. At the median or half way point on the horizontal scale the lowest 50 per cent of males 20 and older receive just a little less of the proportion of total income in the United States than is the case in Sweden. Figures are presented in Table 5 for the median gap of each of seven age groups from

Table 5 - The Median and Median Gap for Males Classified by Age in Sweden and the United States in 1965

Age and Country	Sweden			United States		
	Number (in thou- sands)	Median (kroner)	MG (propor- tion of frequen- cies)	Number (in thou- sands)	Median (dollars)	MG (propor- tion of frequen- cies)
<u>All Males</u>						
14-19	372	-		10,262	100	.48
20-24	316	11,500	.30	5,860	3,000	.30
25-34	472	19,400	.14	10,532	6,000	.15
35-44	504	20,900	.14	11,576	6,700	.16
45-54	530	20,300	.15	10,625	6,300	.20
55-64	533	16,400	.22	8,068	5,200	.25
65 & up	375	5,500	.12	7,713	2,100	.18
<u>All Males with Income</u>						
14-19	154	7,600	.17	595,675	500	.25
20-24	362	13,500	.20	5,507	3,200	.27
25-34	444	19,900	.19	10,428	6,000	.15
35-44	474	21,500	.09	11,490	6,700	.16
45-54	502	20,600	.11	10,517	6,400	.17
55-64	499	17,100	.18	7,914	5,300	.24
65 & up	335	7,100	.09	7,641	2,100	.18

Source: See Table 1.

14-19 to 65 and older. Among all males the difference in the number in the lower tail for the United States and Sweden is positively correlated



with age, after age 20. The lower-tail problem is greater in the United States among the old and the very young as compared to the problem in Sweden.

### Conclusion

Indexes of income and frequency gaps have been established in measuring the extent of persons with low incomes in a country. These are based on the median and the shape of the distribution above the median. It has been determined that each of three Scandinavian countries really has low-income groups. Just as low-income groups exist in the United States, so do they exist in Scandinavian nations. It is true that the problem is greater in the United States than it is in Sweden, Denmark, and Norway. Among those with incomes in the United States, there were in 1965 about 33 per cent below one-half the median while there were 26 per cent below half the median in Sweden. In some classifications the United States shows a deficiency by having 5 to 10 per cent more of all persons who are poor. Stated in other terms, the income of those below the median in the United States is less than that in Sweden by an amount approximately equivalent to 5 or 10 per cent of total income.

It has also been shown that exclusion of women and the young makes the problem of the poor just fractionally greater in the United States than in Sweden. The problem is less in Scandinavia in part because there are fewer young. Paradoxically, it also seems less in at least one country because there are fewer women with income.

This study has been conducted using market or "pre-redistribution"

income. Social redistribution between areas and between families has not been considered. A more complete analysis should consider the effects of children allowances, housing allowances, and shifts in resources between areas.