

INTERNATIONAL COMPARISONS OF EARNINGS INEQUALITY FOR MEN IN THE 1980s

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In this paper we present a comparative analysis of earnings inequality during the 1980s among prime age men who headed households and worked year-round, full-time from five industrialized countries—Canada, Sweden, Australia, West Germany, and the United States. The data were obtained from the Luxembourg Income Study (LIS) database, a multinational collection of microdata sets from various countries which have been assembled for the primary purpose of making cross-national comparisons of economic and social well-being. The results of the comparison indicated that during the mid-1980s, the United States had the most unequal distribution of earnings and Sweden the least unequal. Between the early 1980s and mid-1980s, however, the earnings distributions in all five countries showed evidence of becoming more unequal, especially in the United States, Canada, and Sweden.

INTRODUCTION

Growing inequality in the distribution of labor market earnings in the United States has become one of the more popular research topics in labor economics in recent years. Researchers in the early 1980s first observed rising earnings inequality among men (e.g., Henle and Ryscavage, 1980; Plotnick, 1982). Since that time many papers, articles, and books have been written about the increase in earnings inequality during the 1980s and the possible explanations for that development (Levy and Murnane, 1991).

The analytical framework for explaining the greater dispersion in the earnings distribution has typically involved identifying the sources—or groups of workers—responsible for the growing inequality. Initially, an analysis of variance approach was suggested (Dooley and Gottschalk, 1982), but other decomposition techniques have been used. Sources of change in inequality measures are typically decomposed into those generated *between* and *within* specific groups of workers. These groups are typically defined on the basis of human capital attributes, such as age, experience and education.

This new literature, of course, focuses almost exclusively on increasing earnings inequality in the U.S. over the past 20 years or so, with particular emphasis on its acceleration in the 1980s. In this paper, trends in earnings inequality during the 1980s for men from five industrialized countries—Canada, Sweden, Australia, West Germany, and the U.S.—are presented. While our analysis does not involve decomposing changes in inequality, it may prove useful in understanding the changes occurring in the U.S. If a pattern of rising inequality

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is observed in other developed nations, it may be that the same phenomena causing it there is also at work in the U.S. (e.g. skill-biased technological changes). Or if there has been no change in earnings inequality in these other nations, the reason for growing inequality in the U.S. may be due to problems unique to the U.S. (e.g. import trade imbalances).

Analyses of changes in the inequality of earnings distributions in other countries are rare.¹ Some related evidence, however, was made available by the Organisation for European Cooperation and Development (OECD) in their *Employment Outlook for 1987* (OECD, 1987). The OECD examined earnings differentials between non-manual and manual workers in 16 of its member countries over the past two or three decades. Their analysis revealed that in 8 of the 16 countries studied, the trend in the differentials *since 1980* was upward. These countries were Canada, Denmark, West Germany, Italy, the Netherlands, Norway, the United Kingdom, and the United States. Although the OECD data are only suggestive at best (given comparability problems, the aggregative nature of the data, and so on), they may reflect underlying changes taking place in the earnings and wage distributions of these countries.

In this paper we begin with a brief discussion of the various measures of inequality used in the comparison, followed by a section in which we discuss the data from the Luxembourg Income Study (LIS) that was used in the analysis. In the next section we present the results of the comparison and provide data for first determining how much inequality existed in each nation's earnings distributions in the mid-1980s and second, whether or not inequality changed in these countries between the early 1980s and mid-1980s. In the final section we summarize the findings and discuss their implications for further research.

MEASURES OF EARNINGS INEQUALITY

Numerous indices exist for measuring the degree of inequality in an earnings distribution. They range from simple measures like the share of aggregate earnings received by each quintile, the coefficient of variation, and the variance of the natural logarithm of earnings, to more complex measures such as the Gini, Theil, Atkinson measures, and generalized entropy indices. All have different mathematical constructions and can lead to different assessments concerning the degree of inequality (Slottje, 1989). For this reason, multiple measures of inequality are examined in our cross-national comparison of earnings inequality in the interest of robustness.

Four of these measures of inequality deserve discussion since they have particular properties of which some readers may not be aware.² The variance of the natural logarithm is a popular measure of inequality, but does not always satisfy the "principle of transfers." When income is transferred from a high paid worker to a less highly paid worker, earnings inequality should be reduced. However, in some instances this inequality measure can produce the opposite

¹Cross-national comparisons of "income" inequality, however, are more common. For example, see O'Higgins, Schmaus, and Stephenson (1989).

²Their mathematical constructions are given in the Appendix.

finding. In addition, this measure is particularly sensitive to changes in earnings levels in the lower end of the distribution.

The Gini index, while always satisfying the principle of transfers, is more sensitive to changes in the middle of the earnings distribution rather than the tails. This is because it is derived from the Lorenz curve which expresses the relationship between the cumulated percentage of aggregate earnings and cumulated percentage of earners. An increase or decrease in earnings in the middle of the distribution will have a greater impact on the measure than a similar change at either end since there are more earners in the middle ranks.

The Theil index also satisfies the principle of transfers but is also most sensitive to movements within the middle of the distribution. Its primary advantage in analyses of inequality is its property of decomposition: Overall inequality can be decomposed into "between" and "within" groups comprising the distribution.

Both the Gini and Theil indices, however, have a common disadvantage. If they are derived from distributions with intersecting Lorenz curves, that is, curves showing the relationship between the cumulated percentage of earnings and the cumulated percentage of earners, meaningful comparisons of the indices become problematic (Braun, 1988). This is commonly referred to as Lorenz dominance.

The Atkinson measures were developed to overcome this problem. Basically, the Atkinson measures allow one to shift the "weight" given to the middle ranks of the distribution to either the lower or upper ends of the distribution. The researcher can specify the degree of sensitivity to transfers within the distribution. In this paper three different values of "epsilon," or the weight, were chosen—0.5, 0.8, and 1.5. As the value of epsilon rises, the measure becomes increasingly sensitive to inequality among low earners.

THE DATA

The data for our comparison have been obtained from the Luxembourg Income Study (LIS), a multinational collection of microdata sets from various countries (Coder, Rainwater, and Smeeding, 1988). All of the data were collected in household surveys or surveys of administrative systems (Sweden) by institutions in countries participating in LIS. Each survey used different questionnaires, collection, and processing techniques, and differences also existed in population universes, variable definitions, and response rates. To the extent possible, however, definitions of income sources and family and household characteristics have been placed on a common foundation.

As of mid-1990, the LIS database consisted of microdata sets for 14 countries.³ The countries of Canada, Australia, Sweden, West Germany, and the United States were selected for comparison because it is only for these countries that data were available covering two different periods of time in the 1980s. We refer to these periods as the early 1980s and mid-1980s, the former comprising 1979 to 1981 and the latter 1984 to 1987.⁴ The following are the specific years used

³The countries are Luxembourg, Italy, Poland, France, Israel, Netherlands, Norway, Switzerland, the United Kingdom, Canada, Australia, Sweden, West Germany, and the United States.

⁴A brief description of the surveys from each country is contained in the Appendix.

for each country:

	Early 1980s	Mid-1980s
Canada	1981	1987
Australia	1981	1985
Sweden	1981	1987
West Germany	1981	1984
United States	1979	1986

The universe initially selected for examination was adult men age 25 to 54 who headed households, worked year-round, full-time, and received no social insurance pension or private pension. This universe was chosen since the objective of the analysis was to focus on, as closely as possible, distributions of labor income which reflected standardized units of labor input (e.g., an hourly wage rate). In other words, by identifying a universe fully committed to the work force it was possible to minimize the confounding effect of differences in annual hours worked on annual wage and salary earnings.⁵

In defining the universes for analysis, however, a number of potentially troublesome comparability problems were encountered.⁶ The most important related to the lower tail of the distributions where sampling and data collection problems tend to be most conspicuous. Since the universe being analyzed was composed of prime-age men, who were household heads and work year-round, full-time, it would be expected that the lower tail of the earnings distribution would be truncated at a "minimum wage" level or its equivalent. As shown in Table 1a, unreasonably low amounts of earnings for men were observed for Sweden at the 1st percentile of the distribution; in addition, particularly low levels were also observed at the 1st percentile for Canada and Australia. After investigating the data for Sweden in some detail it was found that this problem was caused by self-employed workers (farmers and other entrepreneurs), who had also received small amounts of wage and salary income. This finding was suggestive of a more general problem which applied to the other countries, that is, year-round, full-time "self-employed" workers with wage and salary income from other jobs.

Other potential problems concerned the upper tail of the distribution where data problems are often concentrated. One of these problems concerns "topcoding." In some countries, such as the United States, earnings in excess of certain levels may be topcoded, that is, all amounts higher than the specified limit are reduced to the limit before the data are released to the public. This practice is a means of preserving the confidentiality of survey respondents. However, it does introduce a bias into the data and affects measures of inequality. The presence of topcoding is clearly evident in the data for the U.S. shown in Table 1a where

⁵There is, no doubt, variation across countries in the definition of year-round, full-time employment. For example, in the United States the definition was 50 or more weeks of employment at 35 hours or more a week. In Sweden, on the other hand, the definition is 1,872 hours of employment or more during the year. In Canada, Australia, and West Germany precise details concerning the definition of year-round, full-time employment was not provided in the dataset, although variables identifying year-round, full-time workers were provided.

⁶All of the microdata were weighted using sample weights and all the data presented, therefore, are weighted estimates.

TABLE 1a

SUMMARY EARNINGS MEASURES FOR MEN, HEADS OF HOUSEHOLDS, AGE 25 TO 54 YEARS, WHO WORKED YEAR-ROUND, FULL-TIME IN SELECTED COUNTRIES. EARLY 1980s AND MID-1980s
(All numbers in currency of specified country).

Country/Year	A Median	B Mean	C Lowest decile*	D Highest decile*	E 1st percentile*	F 99th percentile*	G Max. value	H B/A (%)	I D/C (%)	J E/A (%)	K F/A (%)
United States											
1979	18,700	20,079	9,750	32,000	3,000	50,000	50,000	107	328	16	267
1986	27,500	30,848	13,000	50,600	5,200	100,000	100,000	112	389	19	364
Sweden											
1981	81,900	87,185	55,808	126,272	1,807	238,212	700,000	106	226	2	291
1987	129,800	140,629	86,607	207,963	924	387,609	1,800,000	108	240	1	299
Canada											
1981	23,510	24,761	13,501	37,539	4,590	57,835	105,000	105	278	20	246
1987	31,410	33,398	14,430	52,210	1,765	95,122	260,000	106	362	6	303
Australia											
1981	17,490	18,292	10,971	27,213	2,224	42,000	170,000	105	248	13	240
1987	23,290	24,763	14,088	37,190	1,318	59,352	200,000	106	264	6	255
West Germany											
1981	36,700	40,071	25,680	58,680	10,000	88,300	200,000	109	229	27	241
1984	41,200	46,173	28,900	69,300	18,000	107,900	236,000	112	240	44	262

* Figures for deciles and percentiles are upper limits of the specified group.

TABLE 1b
 SUMMARY EARNINGS MEASURES FOR MEN, HEADS OF HOUSEHOLDS, AGE 25 TO 54 YEARS, WHO WORKED YEAR-ROUND, FULL-TIME IN SELECTED
 COUNTRIES, AFTER EXCLUSION OF THE SELF-EMPLOYED, EARLY 1980S AND MID-1980S
 (All numbers in currency of specified country)

Country/Year	A Median	B Mean	C Lowest decile*	D Highest decile*	E 1st percentile*	F 99th percentile*	G Max. value	H B/A (%)	I D/C (%)	J E/A (%)	K F/A (%)
United States											
1979	18,750	20,118	9,800	32,000	3,000	50,000	50,000	107	327	16	267
1986	27,950	31,140	13,000	52,000	4,806	100,000	100,000	111	400	17	358
Sweden											
1981	84,700	93,149	64,000	131,500	40,300	242,025	700,000	110	205	48	286
1987	135,900	152,379	103,400	215,400	69,324	399,594	1,800,000	112	208	51	294
Canada											
1981	23,610	24,922	13,730	37,640	4,691	58,058	105,000	106	274	20	246
1987	32,760	35,094	17,485	53,000	5,810	97,985	260,000	107	303	18	299
Australia											
1981	17,510	18,429	11,020	27,270	2,709	42,013	170,000	105	247	15	240
1985	24,000	25,601	15,588	37,672	5,118	59,962	200,000	107	242	21	250
West Germany											
1981	36,880	40,104	25,730	58,570	10,000	88,300	200,000	109	228	27	239
1984	41,600	46,508	29,300	69,800	20,800	105,104	236,000	112	238	50	253

* Figures for deciles and percentiles are upper limits of the specified group.

the topcode in 1979 was \$50,000 and in 1986, \$100,000. In the other countries it is not so evident given the differences between the maximum value of wage and salary earnings reported and the earnings at the 99th percentile.

While no adjustments were made for the problem of topcoding, it was possible to adjust the data for those year-round, full-time self-employed workers with wage and salary income.⁷ In each country, they were excluded from the universe of male heads of households, age 25 to 54, who worked year-round, full-time. The results of this exclusion on the distributions can be seen in Table 1b.

The adjusted data in Table 1b also provide some preliminary evidence as to how these earnings distributions changed during the 1980s. The mean-to-median ratio for each country rose during the 1980s indicating that the mean in these distributions were being "pulled" up by increasingly high earnings values (column H). The highest-to-lowest decile ratio increased in all countries except Australia, indicative of greater dispersion in the distributions (column I). The 1st percentile-to-median ratio (column J) reflects the spread or distance between the bottom and middle of each distribution. This measure shows that this distance increased dramatically in West Germany and slightly in Australia and Sweden. In Canada and the United States the change in the distance between these two points of the distribution was not very large. The 99th percentile-to-median ratio (column K) reflects the gap in the distribution between the median and the top of the distribution. In each country, the distance between these two points increased from the early 1980s to the mid-1980s, with the largest increases occurring in the United States and Canada. Consequently, in each country there was preliminary evidence that distributions of earnings of prime-age men who headed households and were fully committed to the labor force had become more unequal during the 1980s.

CROSS-NATIONAL COMPARISONS OF EARNINGS INEQUALITY MEASURES

The results of the comparative analysis of earnings inequality in Canada, Sweden, Australia, West Germany, and the United States is presented in two parts. First, various earnings inequality measures are presented for these countries as of the mid-1980s which address the question as to whose distribution was the most unequal and whose was the most equal. Naturally, differences are expected given the differences in each country's economic structure (e.g., industrial composition, extent of unionization, compensation practices) and other factors that influence the shape of the earnings distribution. Second, we compare these mid-1980s earnings inequality measures to their counterparts as of the early 1980s and address the more interesting question as to whether or not the distributions changed over this period of time. Here, our expectations are less certain, although the preliminary evidence presented above suggests changes have indeed taken place.

⁷Another procedure for reducing "survey noise" and data collection and processing problems is simply to censor the distributions at the lower and upper ends (e.g., 1st and 99th percentiles). We rejected this procedure on the grounds of its arbitrariness.

Earnings Inequality in the Mid-1980s

In Table 2 we show the share of aggregate wages and salaries received in each decile by men who were heads of households and worked year-round, full-time in Canada, Sweden, Australia, West Germany, and the United States in the 1984-87 period. The distributions were arrayed (from left to right) on the basis of which country had the *smallest* proportion of aggregate earnings in its lowest decile. In other words, in which country did workers at the bottom of the earnings distribution receive the smallest share of total earnings? As shown in the table, in the U.S. the lowest decile of men received only 3.0 percent of all earnings, followed by Canada at 3.4 percent. Australia's and West Germany's lowest deciles, respectively, received the next largest shares, with Sweden's lowest decile, on the other hand, obtaining 5.9 percent.

TABLE 2

PERCENTAGE SHARE OF AGGREGATE WAGE AND SALARY INCOME RECEIVED BY MEN, HEADS OF HOUSEHOLDS, AGE 25 TO 54 YEARS, WORKING YEAR-ROUND, FULL-TIME BY DECILES FOR SELECTED COUNTRIES, MID-1980s

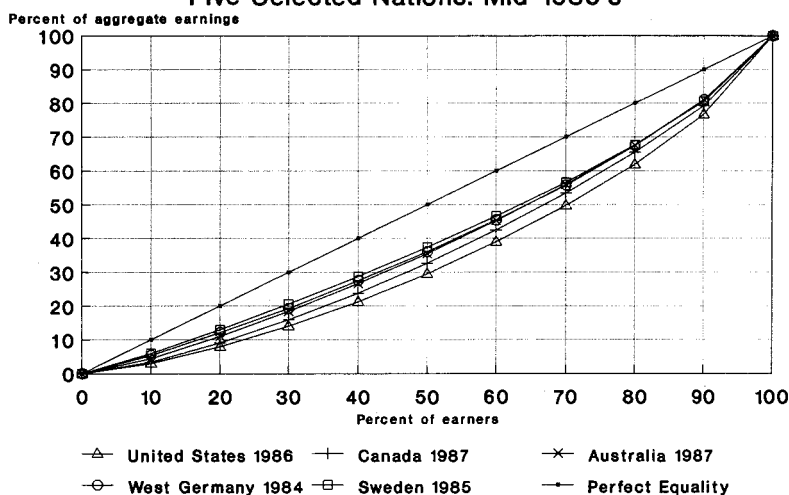
Decile	U.S.	Canada	Australia	West Germany	Sweden
Lowest	3.0	3.4	4.4	5.4	5.9
Second	4.9	5.7	6.6	6.7	7.1
Third	6.1	6.8	7.4	7.1	7.6
Fourth	7.2	7.9	8.2	8.3	8.1
Fifth	8.3	8.8	8.9	8.5	8.7
Sixth	9.5	9.9	9.8	9.4	9.2
Seventh	10.7	10.9	10.6	10.3	10.0
Eighth	12.2	12.1	11.7	11.7	11.1
Ninth	14.8	13.8	13.4	13.7	12.9
Highest	23.3	20.7	19.0	18.9	19.4

Note: United States, 1986; Canada, 1987; Australia, 1985; West Germany, 1984; Sweden, 1987.

By turning to the shares received by the highest deciles in each country a somewhat different ranking of countries is produced. Once again the U.S. would occupy the first position since its highest decile of earners received 23.3 per cent of the aggregate, followed by Canada whose highest decile received 20.7 percent. Thereafter, the ranking changes. Sweden's 19.4 percent share would now occupy the third position (if the table were rearranged), followed by Australia and West Germany with shares of 19.0 and 18.9 percent, respectively.

Indeed, careful inspection of these distributions reveals that it is difficult to compare the degree of inequality in the distributions of Australia, West Germany, and Sweden. For example, *if* the criteria for judging which distribution was more unequal was based on the shares of earnings received by the lowest and highest deciles, an unambiguous ranking could not be arrived at. In the first instance, Sweden's distribution would be considered the most equal, but in the second it would be West Germany's. Furthermore, the Lorenz curves for these countries can be seen to intersect (see Figure 1). Consequently, to completely answer the question as to whose distributions were the most equal and unequal, more sophisticated measures of earnings inequality must be used.

Lorenz Curves of Wage and Salary Earners* in Five Selected Nations: Mid-1980's



* Men age 25 to 54 who were heads of households and worked full time, year round.

Figure 1

In Table 3 we present a ranking of the five countries, with respect to earnings inequality, using several earnings inequality measures; specifically, the variance of the logarithm of annual earnings, the Gini and Theil indices, and three Atkinson measures. The table indicates that regardless of measure, the U.S. distribution of earnings showed the highest level of inequality in it in the mid-1980s. The country with the second most unequal distribution among these five countries was Canada. Although these results were anticipated from the share analysis above, these earnings inequality measures quantify how much more unequal the U.S. and Canadian distributions are from one another as well as the other countries.

TABLE 3

MEASURES OF EARNINGS INEQUALITY FOR MEN, HEADS OF HOUSEHOLDS, AGE 25 TO 54,
WORKING YEAR-ROUND, FULL-TIME FOR SELECTED COUNTRIES, MID-1980S

Rank	ln Y	Gini	Theil	Atkinson (0.5)	Atkinson (0.8)	Atkinson (1.5)
1	0.453 (US)	0.298 (US)	0.149 (US)	0.074 (US)	0.120 (US)	0.341 (US)
2	0.280 (CN)	0.253 (CN)	0.116 (CN)	0.057 (CN)	0.091 (CN)	0.185 (CN)
3	0.210 (AS)	0.212 (AS)	0.087 (AS)	0.042 (AS)	0.067 (AS)	0.146 (AS)
4	0.133 (WG)	0.204 (WG)	0.071 (WG)	0.034 (WG)	0.053 (WG)	0.097 (WG)
5	0.111 (SW)	0.190 (SW)	0.071 (SW)	0.032 (SW)	0.049 (SW)	0.082 (SW)

Note: US = United States, 1986; CN = Canada, 1987; AS = Australia, 1985; WG = West Germany, 1984; SW = Sweden, 1987.

For Australia, West Germany, and Sweden, the earnings inequality measures provide a somewhat clearer picture of whose distribution was the most unequal and most equal than the share analysis did. All of the measures indicate that Australia's was the most unequal followed by West Germany and then Sweden. The readings from the Gini and Theil indices, of course, should be viewed cautiously since Lorenz dominance was present in these distributions. Each of the Atkinson measures produced the same ranking of countries, although the magnitude of the differences varied between the measure which gives more weight to the low end of the distribution and the measure which weights the upper end more heavily.

Earnings Inequality: Early 1980s vs. Mid-1980s

Among the many factors that can influence changes in a nation's distribution of earnings are changes in the health of the economy. Although measures of earnings inequality for these countries are compared over somewhat different time periods, the economies of these countries in the early 1980s and mid-1980s were, generally speaking, in similar phases of the business cycle (OECD, 1990). In each country, the mid-1980s represented years of economic growth and recovery from recessions in the early 1980s. Gross domestic products were rising and inflation had moderated relative to the early 1980s. In the early 1980s, on the other hand, economic growth was less robust and inflation more problematic as each country was in or about to enter a period of economic slowdown.

The data presented in Table 4 show the percentage share of aggregate wages and salaries by *quintile* for men age 25 to 54 who headed households and worked full-time, year-round in Canada, Sweden, Australia, West Germany, and the U.S. in the early 1980s and mid-1980s.⁸ In each country there is evidence to varying degrees of a greater concentration of earnings in the upper quintiles of the earnings distributions. For the U.S., Canada, and Sweden, the share of earnings received by each of the lowest three quintiles declined while the share for the top quintiles increased. In the U.S., for example, the share of aggregate wage and salary earnings received by the top one-fifth of earners increased from 35.0 percent to 38.1 percent, or 3.1 percentage points. Canada had a 2.1 percentage point increase in the share going to the highest earners. The increase in the share going to Sweden's top earners, however, was only 0.7 percentage points.

In the case of Australia and West Germany, the patterns of change in the distributions were somewhat different than in the other countries. In Australia, the share received by the highest fifth of earners increased *and* the share increased (slightly) for the lowest fifth of earners as well. A similar pattern of change was evident in West Germany, except that the share also rose slightly in the fourth quintile. In other words, in these two countries the middle quintiles received slightly smaller shares of aggregate earnings. It is also important to note that Lorenz curves for the early 1980s and mid-1980s in both Australia and West Germany crossed at the lower end of the distributions.

⁸Quintiles instead of deciles are examined here since the changes in this unit of measurement over time are larger and can be more easily seen.

TABLE 4
SHARES (IN PERCENT) OF AGGREGATE WAGE AND SALARY INCOME RECEIVED BY MEN, HEADS OF HOUSEHOLDS, AGE 25 TO 54, WORKING YEAR-ROUND, FULL-TIME, BY QUINTILE FOR SELECTED COUNTRIES, EARLY 1980S AND MID-1980S

Country/year	Total	Lowest	Second	Quintile Third	Fourth	Highest
United States						
1986	100.0	7.9	13.3	17.8	22.9	38.1
1979	100.0	8.9	14.6	18.6	22.9	35.0
Canada						
1987	100.0	9.1	14.7	18.7	23.0	34.5
1981	100.0	10.1	15.5	19.0	23.0	32.4
Sweden						
1987	100.0	13.0	15.7	17.9	21.1	32.3
1981	100.0	13.2	16.1	18.1	21.0	31.6
Australia						
1985	100.0	11.0	15.6	18.7	22.3	32.4
1981	100.0	10.8	15.9	19.0	22.7	31.6
West Germany						
1984	100.0	12.2	15.4	17.9	22.0	32.6
1981	100.0	12.0	16.0	18.3	21.8	31.9

The above share analysis strongly suggests that earnings of the highest paid men in each of the countries examined were becoming more concentrated in the 1980s. This development was particularly acute in the United States and Canada. Nevertheless, some change towards greater earnings inequality was detected in Sweden, Australia, and West Germany as well. More sophisticated measures of inequality, however, are required to confirm this finding.

In Table 5 the inequality measures that were previously discussed, in connection with the question of which country had the most and least amount of inequality in its distribution, are displayed. This table, however, now includes the values of these measures for the early 1980s, and the percentage change in the measures between the early 1980s and mid-1980s. As might be expected from the share analysis, all of the measures indicate a strong increase in inequality in the United States and Canada. The percentage increases in the measures for the United States ranged from 16 percent (the Gini index) to 34 percent (Atkinson, 1.5 epsilon); for Canada, they ranged from 14 percent (the Gini index) to 38 percent (the Theil index).

All of the inequality measures for Sweden registered increases as well, but they were not as large as for the North American countries. They ranged from as little as 4 percent (Atkinson, 1.5 epsilon) to 13 percent (the Theil index). Interestingly, the increases in both the variance of the logarithm of annual earnings and the Atkinson measure (1.5 epsilon)—two measures sensitive to the low end of the distribution—were on the low side of this range reflecting the small change that occurred in the share of aggregate earnings received by the lowest quintile.

In Australia four of the six measures increased and in West Germany three measures moved higher. The increases for both were generally smaller than in the other countries (except the Theil measure for Australia). It should be remembered, however, that the span of years comprising the comparisons for these two

TABLE 5
 CHANGES IN MEASURES OF EARNINGS INEQUALITY FOR MEN, HEADS OF HOUSEHOLDS,
 AGE 25 TO 54 YEARS, WORKING YEAR-ROUND, FULL-TIME FOR SELECTED COUNTRIES,
 EARLY 1980S AND MID-1980S

Country/year	ln Y	Gini	Theil	Atkinson (0.5)	Atkinson (0.8)	Atkinson (1.5)
United States						
1986	0.453	0.298	0.149	0.074	0.120	0.341
1979	0.354	0.258	0.111	0.057	0.094	0.254
% change	28.0	15.5	34.2	29.8	27.7	34.3
Canada						
1987	0.280	0.253	0.116	0.057	0.091	0.185
1981	0.225	0.222	0.084	0.043	0.071	0.148
% change	24.4	14.0	38.1	32.6	28.2	25.0
Sweden						
1987	0.111	0.190	0.071	0.032	0.049	0.082
1981	0.105	0.180	0.063	0.029	0.045	0.079
% change	5.7	5.6	12.7	10.3	8.9	3.8
Australia						
1985	0.210	0.212	0.087	0.042	0.067	0.146
1981	0.234	0.208	0.075	0.040	0.065	0.155
% change	-9.3	1.9	16.0	5.0	3.1	-5.8
West Germany						
1984	0.133	0.204	0.071	0.034	0.053	0.097
1981	0.162	0.195	0.068	0.033	0.054	0.114
% change	-17.9	4.6	4.4	3.0	-1.9	-14.9

countries is relatively short. Again, the measures sensitive to the bottom of the distribution—the variance of the logarithm and the Atkinson measure (1.5 epsilon)—registered declines in inequality reflecting the share increases at the bottom of the distributions discussed earlier.

IMPLICATIONS OF RESULTS

The growth of earnings inequality in the U.S. in recent years has been well-documented and the subject of much concern in both the research and policy communities. One of the concerns has been whether or not the millions of jobs created in the U.S. during the 1980s were primarily of the “low-paying, low productivity” variety. Another related concern, of course, is how much of the growing earnings inequality was responsible for the growing inequality of incomes among families and households.

The results presented above suggest that the U.S. was not the only industrialized country during the 1980s to experience an increase in earnings inequality among prime age men who head families that were fully committed to the labor force. It was shown that the wage and salary earnings distributions for similar men from Canada and Sweden became more unequal as well. In addition, there was evidence that inequality was growing for these groups of men in Australia and West Germany. These findings may be further evidence of underlying structural changes taking place in the distributions of labor market incomes in many developed countries.

Clearly, the “job quality” issue as a cause of growing earnings inequality in the U.S. loses credibility when rates of employment growth in these other countries are compared to the U.S. experience. Each country had quite different employment experiences during the periods in which inequality was rising, as shown in Table 6 (OECD, 1990). In the U.S. and Canada, the annual average rate of growth was in the 1.3 to 1.5 percent range and in Australia it was 1.1 percent. In Sweden employment growth was meager, while in West Germany it was declining.

TABLE 6
AVERAGE ANNUAL GROWTH RATES IN TOTAL EMPLOYMENT FOR SELECTED COUNTRIES, EARLY-1980s TO MID-1980s

Country	Period	Average annual growth rate (%)
United States	1979-86	1.49
Canada	1981-87	1.28
Australia	1981-85	1.08
Sweden	1981-87	0.43
West Germany	1981-84	-0.77

The fact that rising earnings inequality occurred in other industrialized countries with different job creation experiences suggests that rising inequality may be related to more general phenomena occurring across nations. One possibility involves changing technologies. Computer and communication technologies have changed dramatically in recent years and these may have altered the demand for different skill classes of labor. Production processes may have been so altered that companies and factories now require more highly skilled and educated workers, while the demand for less well-trained labor associated with older production processes has declined. At the same time these shifts in demand have taken place, the supply of workers in various skill classes may have changed less rapidly thereby increasing inequality in the earnings distribution. This, of course, is speculation. Nevertheless, evidence now exists that the phenomenon of growing earnings inequality may have an international dimension.

APPENDIX: INEQUALITY MEASURES AND DATA SOURCES

Inequality Measures

The mathematical construction of four inequality measures used in this paper is discussed below.

Variance of the Natural Logarithm of Annual Earnings

This is a popular measure of relative earnings dispersion because earnings distributions are approximately lognormal and the lognormal distribution has

particular properties conducive for analysis. The measure is written as

$$\text{Var ln } Y = \frac{\sum_{i=1}^n (\ln y_i - \ln \bar{y})}{n}$$

where $\ln y_i$ is the natural logarithm of person i 's annual earnings, $\ln \bar{y}$ is the mean of annual earnings, and n is the number of persons with earnings.

The Gini Index or Coefficient of Income Concentration

The Gini index is also a popular measure of inequality. It can be written as

$$G = 1.0 - \sum_{i=1}^n f_i(p_i + p_{i-1})$$

where f_i is the proportion of earners in interval i and p_i is the proportion of total earnings received by earners in interval i and all lower intervals.

Theil's "Entropy" Index of Inequality

The Theil index can be written as

$$T = (1/n) \sum_{i=1}^n (y_i/\bar{y}) \log (y_i/\bar{y})$$

where y_i is the annual earnings of the i -th earners, \bar{y} the mean annual earnings, and n , the number of earners.

Atkinson's Measures of Inequality

The family of Atkinson measures are constructed as

$$A = 1 - \left[(1/n) \sum_{i=1}^n (y_i/\bar{y})^{1-\epsilon} \right]^{1/(1-\epsilon)}$$

with the similar notation found in the other measures, except for the ϵ , or epsilon. As the value of ϵ rises, the measure becomes increasingly sensitive to inequality among low earners. Low values of ϵ produce results similar to the Gini index.

Data Sources

The following is a brief description of the household surveys which were the source of the earnings data. Household sample sizes do not necessarily reflect the size of the original sample in all cases, but rather the number of households comprising the country's microdata set in the LIS database.

Australia

The Australian data for both 1981 and 1985 were obtained from *The Income and Housing Survey*. The sample size in 1981 was 15,985 households and in 1985, 7,560.

Canada

Earnings data for Canada were obtained from *The Survey of Consumer Finances* and refer to 1981 and 1987. Sample sizes for the LIS data base were 15,136 and 10,999.

West Germany

Data for West Germany for the year 1981 were taken from the 1981 *German Transfer Survey* and based on a household sample size of 2,727. The *German Panel Survey (Wave 2)* was the source of the data for 1984 and 5,174 households from it comprised the LIS data base.

Sweden

The *Swedish Income Distribution Survey* in both 1981 and 1987 was the source of the data for Sweden. The LIS database used data from 9,625 households in 1981 and 9,421 households in 1987.

United States

The data for the United States comes from the Work Experience and Income Supplement to the March *Current Population Survey* and relate to the years 1979 and 1986. In 1979, the sample consisted of 15,225 households and in 1986, 13,707.

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