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Cross National Comparisons of Levels and Trends in Inequality

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Cross National Comparisons of Earnings and Income Inequality*

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Abstract

This article reviews the evidence on cross-national comparisons of earnings and income inequality in OECD countries. It begins with a series of stylized facts which are then examined and supported by recent studies in the field. Economic, demographic, institutional and policy-related influences on earnings and income distribution are reviewed. The paper concludes with a call for more work on empirically testable structural models of household income distribution.

I. Introduction

Interest in the distribution of earnings and the distribution of household income was largely a parochial backwater of economic research in the United States until the early 1980s. This lack of interest reflected the view that both the functional and personal distributions of income in the United States showed little change between the end of the 1940s and the mid-1970s.[1] This led Lampman (1971, p. 47) to remark that the stability of the income distributions was "remarkable in view of the great changes which have occurred in economic structure and in income and wealth levels." He further noted that predictions of increasing concentration of wealth "have been proved completely wrong by the American experience." Taking a somewhat more laid-back perspective, Aaron (1978, p. 17) noted that tracking changes in the distribution of income in the United States "was like watching the grass grow."

The lack of interest in distributional issues in the United States in general, and cross-national comparisons in particular, changed for several reasons in the early 1980s. First, the view that the shape of the income distribution was one of the great constants of economics came into question by a series of studies, reviewed in Levy and Murnane (1992), that showed rising inequality of labor market income in the United States and a smaller set of studies that showed that these changes in the earnings distribution were being translated into greater inequality in the distribution of total family income.

Second, it became considerably easier to perform cross-national comparisons of income distributions. Such comparisons that were available before 1980 were of a rough and ready nature

[1]In contrast, British researchers such as Atkinson (1970) and Dutch researchers such as Pen (1971) and their predecessors made key contributions to both inequality theory and measurement during the 1970s.

and did not withstand close scrutiny.[2] Yet international comparisons of income distribution can provide important benchmarks of how one nation differs from or is similar to other nations. In so doing, it can provide useful information, just as do cross-national comparisons of rates of economic growth, savings, inflation, and unemployment. Fortunately, cross-sectional micro data became publicly available for a variety of rich OECD countries.[3]

This opened several avenues for research, primarily by allowing greater richness in cross-national comparisons. While cross-national comparisons of average income had been widely used to measure differences in standard of living across countries, these comparisons had focused on the typical or average family. Questions about the relative standard of living of persons elsewhere in the distribution could now provide a more complete picture of cross-national differences. These new data also contributed to the literature on trends in inequality. Researchers were not only able to address the factual question of whether inequality grew in other countries but also to get further hints as to possible causes. For example, if countries with binding trade barriers experienced smaller increases in inequality then this would be consistent with the view that increased foreign competition was at least partially responsible for the increase in inequality. Likewise, cross country comparisons in changes in industrial structure or unionization would at least provide some stylized facts that might inform the debate on the causes of the increase in inequality.

The third factor contributing to the increased interest in distribution issues stems not from the positive interest in understanding the causes of change but the normative issues coming out of the

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[2]See, for example, Sawyer (1976) and the strong negative response to Sawyer by Bégue (1976).

[3]Database projects such as the Luxembourg Income Study (LIS), described in Smeeding, O'Higgins, and Rainwater (1990), and related efforts to make longitudinal household panel data comparable, for example, the United States-German comparative panel project described in Wagner, Burkhauser et al. (1993), have facilitated cross-national comparisons of inequality.

debate in the public policy arena over the "fairness issue." The distributive effects of changes in government policies, which had always been a key policy issue in European, Nordic, and British Commonwealth countries, have became an increasingly important policy issue in the United States.

In this article, we further develop Levy and Murnane's (1992) review of changes in earnings inequality in the United States in two directions. First, we expand our review to other major industrialized countries, largely OECD nations. Second, we broaden the focus from earnings to household income. As we will show, the increases in the dispersion of both individual earnings and total household income in the United States was larger than in almost all other countries. However, the United States was not the only country to experience an increase in inequality during the 1980s and early 1990s. While most countries experienced at least modest increases in earnings and market income (income before direct taxes and public income transfers) inequality, these were largely offset by changes in other sources of income, producing a more modest increase in the inequality of disposable incomes in most nations.

We review not only what we know about what has happened to earnings but also why experiences differed across countries. While causal explanations are never easy to pin down, the issues are by now fairly well defined when trying to explain differences across countries in individual earnings patterns. Labor economics provides a rich theoretical framework that has been applied with some success, at least in a partial equilibrium setting, to explain changes in the structure of wages.

The expansion from individual earnings to household disposable income, however, raises a whole host of analytical as well as measurement issues.[4] Economic and demographic decisions within the household are endogenous and so complex that empirical research is far from being able to sort

[4]Disposable household income includes all sources of income received by all household members, including income transfers from governments and other parties, net of income and payroll taxes.

out the linkages. The problem of endogeneity would arise even in the context of a single country. However, the problem of endogeneity is further aggravated by the expansion to the international context. Social and political institutions that may affect how other household members and government taxes and transfers respond to changes in market conditions differ considerably across countries. As a result, the responses of household disposable income to changes in the structure of wages, interest rates, or other prices will vary across countries. Given the lack of any unifying theoretical structure to analyze household income, we will largely limit ourselves to presenting the basic facts that any theory would have to explain. However, there is a strong need for a better theoretical structure in which to understand these outcomes.

We begin our review by laying out a set of stylized facts both for the United States and for other nations. We present summaries for both the level and trend in earnings and income inequality. In Section II we briefly turn to conceptual and comparability issues. This is followed in Section III by an overview of what we know about changes in earnings inequality in a variety of countries and the causes for these changes. Section IV turns to family income inequality to answer the same questions.

While we cover a wide range of topics, not everything under the rubric of changes in inequality is addressed. We are concerned with highly developed countries, almost exclusively the OECD nations, and do not address inequality in developing nations or in the transition countries of Eastern Europe and the former U.S.S.R. or in developing nations.[5] Issues related to wealth inequality, consumption and expenditure inequality, the tradeoff between inequality and efficiency, social choice theory, and the theoretical and empirical literature on inequality measurement are largely

[5]See Deinenger and Squire (1995) on income inequality in developing and developed countries and Atkinson and Micklewright (1992) on inequality in Eastern and Central Europe. See Smeeding and Gottschalk (1996) for comparisons which include the OECD nations and selected Eastern European nations and Taiwan.

excluded. Other pertinent issues, such as the burgeoning literature on growth and inequality, the dynamics of income, and intergenerational mobility are also not covered. Finally, due to constraints of space and time, the literature on cross-national comparisons of low incomes or poverty is also excluded.[6]

Stylized Facts

The growing interest in national and cross-national differences in earnings and income inequality has produced a wide range of recent comparative studies of the level and trend in inequality along with dozens of studies and reports on individual countries. Our summary of the stylized facts emerging from these studies is as follows:

A. Earnings

Levels

1. At any given time there are wide differences across modern countries in the level of earnings inequality for both men and women.

2. Nations with centralized wage bargaining (e.g., Sweden, Germany) have greater equality than nations with less centralized bargaining (e.g., the United States and Canada).

Trends

1. Almost all industrial economies experienced some increase in wage inequality among prime aged males during the 1980s (Germany and Italy are the exceptions).

2. But large differences in trends also exist across countries, with earnings inequality increasing most in the United States and the United Kingdom and least in Nordic countries.

3. The increasing demand for more skilled workers, coupled with differences across countries in the growth in supply of skilled workers, explains a large part of the differences in trends in returns to education and experience.

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[6]Interested readers should consult Förster (1993), Blackburn (1994), Atkinson, Rainwater, and Smeeding (1995a), Rainwater and Smeeding (1995).

4. Institutional constraints on wages also seem to matter. The rise in the relative unemployment rates of the least skilled in some, but not all, countries with centralized wage setting institutions, suggests that constraints were at least partially responsible for limiting the rise in inequality.

B. Disposable Income

Levels

1. There is substantial diversity in the inequality of household disposable income across major OECD nations with the greatest inequality in the United States and the least inequality in Nordic and Northern European countries.

2. Post-tax and transfer disposable money income is more equally distributed than market income in all OECD nations, and there is a noticeable correlation between public cash income transfer expenditures and disposable income inequality.

3. Even after adjusting for real income differences across countries (using purchasing power parity), low income United States citizens have real living standards below those found in most other rich OECD countries.

Trends

1. Increases in household income inequality were more muted than were changes in earning inequality in most nations. Still increased earnings inequality among men was probably the most important factor in explaining rising income inequality.

2. Income inequality increased in most, but not all, OECD nations during the 1980s and early 1990s. Trends in inequality were not closely associated with levels of inequality. Some nations with low levels of inequality experienced some of the largest increases.

3. Reductions in social welfare spending for the non-aged and regressive changes in the structure of income taxes for some countries during the 1980s account for only a small part of the trend in post-tax and transfer inequality in most nations.

4. Married women's labor force participation rates, hours, and wages increased substantially in almost all countries during the 1980s. The positive correlation between husbands' and wives' earnings also increased moderately, thus tending to increase income inequality.

II. Comparability and Data Quality

In this section we address the measurement problems raised when making comparisons of earnings and income distributions across countries. The main source of United States income data is the March Supplement to the Current Population Survey (CPS), in effect an income supplement to a labor force survey. Other countries similar to the United States have annual or periodic surveys of consumer finances or income (Canada and Australia). Other nations use specific income surveys or have extensive surveys of expenditures with detailed income components sections (e.g., The Netherlands, United Kingdom, Israel). In a few nations (Sweden, Finland, Norway) survey respondents give the statistical office permission to go directly to government records to measure incomes and report only demographic information to the survey takers. Thus, the type and purpose of surveys used for international comparisons vary widely by country.[7]

Income Definitions

Ideally income would be measured on a post-tax and transfer basis consistent with the Haig-Simons income concept of real consumption plus (or minus) change in net worth.[8] Income would include both cash and noncash components, would be adjusted for economies of scale in consumption using an appropriate equivalence scale, and would cover the period over which families can smooth consumption by lending or borrowing. For families that are not credit constrained this might require measures of lifetime post-tax and transfer income adjusted for family size. At the other extreme, the relevant measure of income might be a few pay periods for families who do not have sufficient assets

[7]For discussion of the problems of comparability across countries and for additional information on survey differences, particularly for those surveys from the Luxembourg Income Study, see Atkinson, Rainwater, and Smeeding (1995a), especially Chapters 2 and 3 and Appendices 1 through 5.

[8]This broad definition of income is an attempt to get closer to the distribution of lifetime utility.

to smooth consumption and cannot borrow against future income. Unfortunately, almost all of the existing data sets, including the CPS in the United States, measure income on a yearly basis. This is certainly too long an accounting period for families that are severely credit constrained, and too short for families that can smooth consumption over multiple years. While the problem raises important conceptual issues, the existing evidence shows that rankings of countries with respect to income inequality are robust with respect to changes in the accounting period (Aaberge et al. 1995; Burkhauser and Poupore in press).

Surveys may also differ in the income sources they include as earnings. For example, unemployment insurance and/or sick pay are included as a transfer in most countries but are included in earnings in a few (e.g., Sweden, France). Almost all nations include vacation pay ("13th month earnings") and salary bonuses in their measures of earned income. Self-employment income which differs nation by nation in quality of data reported and in its economic importance may also be included in earnings.

There is even greater diversity in the decision of what to include under total household income. Cross-national comparisons of income inequality have focused primarily on the distribution of disposable money income after direct taxes (income and employee payroll) and after transfer payments.[9] While this definition of post-tax and transfer disposable income is broad, it falls considerably short of the Haig-Simons comprehensive definition, typically excluding much of capital gains, imputed rents, home production, and income in kind. In general, no account is taken of leisure, indirect taxes or of the benefits from public spending other than cash transfers.

[9]Direct taxes are most often estimated from tax imputation models rather than official tax records. For example the after-tax data for Australia, Germany, New Zealand, and the United States in the Luxembourg Income Study are obtained using a tax imputation model at the household level to estimate direct taxes. Italy, Belgium, and Luxembourg surveys report only after-tax income; Sweden, Finland, and Norway use official records of taxes paid.

Further comparability issues are raised by definitions of income sharing units and the unit of analysis. Survey-based research on income inequality sometimes focuses attention on the household as the unit of income sharing and as the unit of analysis; other times the unit of analysis is the individuals within the household. And definitions of income sharing units themselves may differ across nations.[10]

Adjustment for Household Size and Composition: Equivalence Scales

Most studies of income inequality adjust income to take account of differences in material needs for families of different sizes. Equivalence scales are designed to accomplish this adjustment by taking into account those household characteristics deemed to affect economies of scale and economies of scope as reflected by differences in household size and composition. Total household income is divided by the number of equivalent adults in order to arrive at a measure of household "equivalent" income.

Buhmann et al. (1988) first proposed a succinct parametric approximation to equivalence scales which summarized the wide range of scales in use:

$$\text{Adjusted income} = \text{Disposable Income}/\text{Size}^{E}$$

The equivalence elasticity, E, varies between 0 and 1; the larger is E, the smaller are the economies of scale assumed by the equivalence scale. The various studies reviewed in this survey make use of equivalence scales ranging from $E = 0$ (no adjustment) to $E = 1$ (per capita income which ignore economies of scale). Between these extremes, the range of possible values is rather evenly covered.

[10]While most nations aggregate income across all members of a household, a few use a more narrow definition, for example: all related persons living together or a family (e.g., Canada); or even more narrowly related persons according to income tax regulations (e.g., Sweden).

These adjustments for family size can have a large effect on the level of measured inequality within and across nations.[11] However, using different equivalence scales preserves the general rank order of countries, albeit at different levels of inequality. Inequality rankings at a point in time are fairly robust to choice of equivalence scales (Atkinson, Rainwater, and Smeeding 1995a, Figure 4.1). Due to lack of a long time series of comparative data, the literature cannot determine if choice of equivalence scale affects trends in measured inequality across countries. However, evidence for differences in trends within the United States indicates that choice of equivalence scale may affect the level of measured inequality but not its trend (Karoly and Burtless 1993).

Noncash Benefits and Taxes

The disposable money income measures used in most studies include only public cash and near cash benefits (food stamps and other similar benefits denominated in cash). Hence, one might suspect differences across countries depending on a nation's preferences for cash versus noncash transfers. A similar type of difference may occur if countries rely on employers to provide some types of benefits (e.g., health insurance for workers in the United States, and occupational pensions in many nations), while governments provide others (e.g., health insurance and more substantial social

[11]See Coulter, Cowell and Jenkins (1992) and Buhmann et al. (1988). An important and non-obvious lesson from these papers is that the relationship between inequality measures and elasticities is non-monotonic. Most studies of cross-national distribution make no adjustments for differences in incomes within households, assuming that income is equally shared by all members of the household. Jenkins (1994a), however, shows that the estimates of overall household income inequality derived from three different methods of estimating within household inequality are very different from those derived using the conventional, equal sharing within the household assumption. The literature has moved beyond the one parameter equivalence scale used here to two parameter scales which include adjustments for types of individuals (e.g., by age) as well as for family size. See Jenkins and Cowell (1994).

retirement pensions in most other nations), or if demographic composition of nations are very different.[12]

Including noncash benefits in estimates of the level and trend of income inequality also requires the valuation of these benefits. While several national studies of noncash benefits have assessed their impact on the income distribution as measured by the cost of benefits to the supplier, the literature has made little progress in arriving at a true Hicksian equivalent variation measure of their cash equivalent value to households (U.S. Department of Commerce, Bureau of the Census 1982; Wolfe and Moffitt 1991).

In-kind benefits also tend to be a small share of total social transfers relative to cash benefits in nations with small shares of GDP spent on cash benefits. Since, high cash benefit nations tend to also be high in-kind benefit nations, the limited evidence indicates that the exclusion of noncash benefits does not have a large impact on the income inequality rankings of countries.[13]

Most studies of income distribution employ either a measure of all sources of money income prior to the deduction of all taxes ("gross income") or a measure that subtracts "direct taxes"—income and employee payroll taxes—to arrive at disposable income. In general, studies do not count personal property or wealth taxes as direct taxes. Because of differential reliance on employer and employee social security contributions across nations, and because of the differential mix of personal, business, earnings, income, property, and goods and services (expenditure, V.A.T.)

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[12]The mix of cash plus noncash benefits across OECD nations is, however, more uniform than is the distribution of cash benefits alone. See Smeeding, Saunders et al. (1993) and Whiteford and Kennedy (1994).

[13]Smeeding, Saunders et al. (1993) find that imputation of health and education benefits and some housing benefits had an equalizing impact in all countries, but did not effect the inequality ranking of countries. For one estimate of the effect of including in-kind benefits in income distribution in the United States, see U.S. Department of Commerce, Bureau of the Census (1995a). These estimates indicate that including non-cash benefits effects the level but not the trend in inequality since 1979.

taxes across OECD nations, the manner in which taxes are collected may affect the results of cross-national comparative analyses. In fact, we know of only one study has included the full burden of direct and indirect taxes in cross-national studies of income distribution.[14]

Data Quality Comparison with National Accounts

One common criticism of earnings and income distribution data derived from household surveys is that they are incomplete in coverage of income. One way of determining the size of the under reporting is to compare the total income of different types reported in the household surveys with external information drawn from national accounts and country data registers, which have been adjusted to make them comparable to the microdata sources.

Not all countries have been able to compare survey data with national accounts or other external data. Still the available information indicates that total income estimates based on the surveys used for income distribution studies are about 90 percent of the comparable national income totals in six of the eight countries for which comparison data are available in the Luxembourg Income Study (Canada, Finland, Italy, The Netherlands, the United Kingdom, and the United States). In two nations (Australia and West Germany) there is an aggregate shortfall of some 20 percent, but part of the difference can be explained by the fact that the totals are not fully comparable. Wage and salary income is, however, generally well reported in all countries.[15]

While underreporting may be small for the most important income sources, this may be of cold comfort for distributional measures. What is relevant is not only the amount of underreporting but

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[14]See Bell and Rosenberg (1993). Messere (1993) presents aggregate data on the tax mix across countries.

[15]See Atkinson, Rainwater, and Smeeding (1995a, Table 3.2 and Appendix 6). Evidence in the United States derived from a direct matching of individual responses to administrative and tax records (Radner 1983), indicates that the problem of property income under reporting is primarily found among upper income households with heads aged 65 and over, but no evidence on direct matching is available for other nations.

its distribution. If underreporting were small but non-random, this would affect both measures of central tendency and dispersion.

Level versus Trend

Point in time comparisons of the *level* of inequality across countries impose much stronger data requirements than comparisons of *trends* in inequality. As long as differences across countries (in income measures, importance of income components, adjustments for income sharing, quality of income reporting, and survey data collection practices) are constant across time, these differences will cancel. As a result, country specific idiosyncrasies would affect levels of inequality but not trends in inequality. On the other hand, if data quality changes over time, if income components that are less (or more) well reported increase in significance over time, or if factors such as top coding have different impacts over time, then trends as well as levels will be affected.

The Luxembourg Income Study (LIS) data sets were assembled specifically to overcome many of the problems addressed in these sections. LIS collects none of its own data. Rather it takes data collected mainly by national statistical agencies and applies consistent measures and concepts across countries to produce greater uniformity in cross-national comparisons.[16] Access to micro-data in LIS also makes it possible to impose consistency on additional elements such as the unit of observation, income definition, and adjustments for differences in family size. Moreover, it is possible to test sensitivity to alternative choices of units, definitions, and other measurement issues such as top and bottom coding of income. But while the aim of the LIS project is to increase the degree of cross-national comparability, complete cross-national uniformity will never be possible since the country surveys that form the starting point for LIS vary in focus and scope, and because certain aspects of

[16]For instance, the earnings and income data presented in this paper come from the same source. Other data, such as that found in the International Social Survey datafiles covers earnings well, but has very limited information on incomes.

surveys cannot be adjusted ex-post (e.g., a country survey's choice of a singular unit of income aggregation).[17]

The International Social Survey Programme (ISSP) offers an alternative collection of repeated cross-sections on a number of countries. The major advantage of these data is that they are based on responses to a uniform set of questions attached to country specific social surveys. For example, the common ISSP questions are asked to a subset of respondents to the General Social Survey in the United States and to respondents to the British Social Attitudes Survey in the United Kingdom.[18] The advantage of cross-national uniformity in the questionnaire has to be weighted against three disadvantages. First, the sample size in each year for each country is considerably smaller than in LIS (roughly 1,500 in ISSP versus 5,000-65,000 or more in the LIS datasets used here). This sample size drawback can be partially overcome by pooling years, though this is problematic when income distributions are changing over time. The second limitation of ISSP is that the questionnaire is designed to be answered in 15 minutes. Since the primary focus of the survey is on social attitudes only 22 questions are asked about economic and demographic characteristics. Finally, most countries report income or earnings in income brackets, with the top bracket being open-ended. This drawback is particularly severe when the brackets are changed making comparisons over time even more difficult, especially with small samples.

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[17]While the LIS project has gone to great lengths to increase data comparability across nations, not all problems can be overcome. For instance, the LIS data cover a limited number of years. LIS data are thus unable to capture the effects of business cycles on income inequality. Also LIS has no control over the questions asked in different surveys. While all income data used in LIS are continuous variables, and while the LIS has up to 38 different categories of cash income for each nation, some items such as self-employment income may be measured differently in different nations. For additional discussion of the technical characteristics of the LIS database, see Atkinson, Rainwater, and Smeeding (1995a).

[18]ISSP started with four countries in 1984 (Australia, Germany, the United States, and the United Kingdom). By 1994 the questions were being asked in over 20 countries.

Full comparability of earnings and income distribution data will never be attainable as long as surveys and institutions differ across countries. While these limitations must be kept in mind, strong patterns emerge out of these admittedly noisy data. As we will show in the following sections, surveys with very different focus and structure give broadly similar patterns. The issue is not the existence of noise, which surely exists in all data sets, but the relative size of the signal to the noise.

III. Earnings Inequality

A vast literature, reviewed in Levy and Murnane (1992), has documented the substantial increases in inequality of wage rates and annual earnings in the United States during the 1970s and 1980s. At this point there is a wide consensus in the research community that an important driving force behind the increase in family income inequality in the United States was the increased dispersion of earnings.[19]

Levels of Inequality

Cross-national studies of earnings inequality have focused almost exclusively on trends, not levels. This largely reflects the lack of comparable data across countries.[20] We exploit recently available data in the LIS database, to compare earnings inequality across a variety of countries during

[19]See Danziger and Gottschalk (1995) and Blank (1994) for links between changes in the distribution of earnings and income. Danziger and Gottschalk (1995) attribute the majority of the change in family income inequality to changes in the distribution of men's earnings. Karoly and Burtless (1995) study working age families and find that changes in earnings inequality among men who work accounts for slightly less than half of the total change. We return to this topic later in the paper.

[20]A few previous studies have used LIS data to examine wage and salary differences of heads of households across nations at a point in time (Green, Coder, and Ryscavage 1992; Gornick 1994; Gottschalk and Joyce 1996). Blau and Kahn (1996), who use data from the International Social Survey Programme, find similar patterns.

the late 1980s and early 1990s.[21] Table 1 presents summary measures of the earnings distributions in the nine countries for which the LIS database provides consistent data on annual before-tax earnings for males and females aged 25 to 54. Since it is impossible to separate labor market earnings from returns to capital in households with self-employment income we also exclude all persons in such households.[22]

While we focus on the distribution of positive earnings we also show the proportion of persons with zero earnings in column 1 of Table 1. It should be recognized that differences in the distribution of positive earnings are very likely to be affected by these differences in the proportion of persons with zero earnings. However, without knowing the earnings that zero earners would have received if they had worked, it is impossible to determine the effect on the unconditional distribution of potential earnings. At one extreme one might assume that all zero earners came from the bottom of the distribution of potential earnings. It is, however, unlikely (especially among women) that the full difference in zero earners reflects additional persons at the bottom of the distribution. Thus, while Table 1 presents estimates of the percentile ratios of the distribution of positive earnings this should not be confused with the distribution of potential earnings for all persons.

Our summary measures of inequality are based on earnings at selected percentile points since these are less sensitive to such inter-country differences as non-uniform top and bottom coding of earnings, and under reporting of earnings at either tail of the distribution. Earnings at selected

[21]Earnings is used synonymously with wage and salary income. Income surveys and, hence, the LIS database, do not usually contain separate measures of hourly wages. All estimates shown in Table 1 refer to annual earnings except for the United Kingdom where wages and salaries are measured during the survey week. The years shown are limited by data availability in LIS. Therefore differences in cyclical conditions may affect rankings of countries with small differences in inequality.

[22]The cost of excluding the self-employed is that the distribution of earnings for the selected sample will be affected by this sample selection if the distribution of labor market earnings of the self-employed is different from the distribution for all other persons.

percentile points are measured as a proportion of earnings at the median. For example, the P10 value of 56.8 for males in Australia signifies that an Australian male at the tenth percentile earned a little more than half as much as the male at the median. We also show the 90/10 and 80/20 ratios as summary measures of overall inequality. Information is presented for full-year full-time workers and all workers with non-zero earnings.

For full-year workers these countries can be broken down into three broad groups. The United States and Canada stand out as the economies with the most unequal distributions of earnings for both males and females, measured either by the 90/10 or the 80/20 ratio. For males this largely reflects considerably lower earnings at the bottom of the distribution.[23] For females, low earnings at the bottom are matched by unusually high earnings at the top of the distribution. These countries are followed by Sweden, Australia, and the United Kingdom which have 90/10 ratios for males around 3.0, compared to 4.6 for Canada and 5.7 for the United States. The countries with the most equal distribution of male earnings are Germany and The Netherlands with 90/10 ratios for full-time males of around 2.5. The ranking of countries for women working full-time is similar to the ranking for males with the exception of Germany which goes to being one of the most equal to being more similar to Australia and the United Kingdom.

Table 1 shows that the earnings of persons at the tenth percentile are lower *relative* to the median in the United States than in any other country. This low relative earnings, however, need not translate into low absolute earnings since the median is likely to be high in the United States compared to all of the countries in Table 1. In order to get a rough comparison of absolute earnings at various points in the distribution it is necessary to translate earnings into a common currency. While comparing the purchasing power of different currencies is fraught with danger, these problems

[23]This is consistent with Blau and Kahn (1996) who use different data.

are considered small enough to warrant frequent comparisons in average (or median) incomes across countries. In the same spirit we compare earnings at several points in the earnings distribution using the Penn World Tables of purchasing power parities which allow us to translate the values in Table 1 into 1991 United States dollars.[24]

Figure 1 presents the results. While the last column shows that the United States indeed has the highest median male earnings among the countries shown, the differences and sometimes the rankings are quite different at the P10 and P90. Column 1 shows that the P10 measured in United States dollars is higher in all countries than in the United States. Indeed only Canada has values nearly as low as the United States. Thus, persons at the bottom of the earnings distribution in the United States fare poorly not only relative to the median in the United States but also relative to persons at the P10 in other countries. For example, a worker at the P10 in the German distribution earns 51 percent of the median earnings in the United States. In contrast, a worker at the P10 in the United States distribution earns only 34 percent of the United States median. At the other end of the distribution a worker at the P90 in the United States distribution earns 193 percent of the United States median. This is by far the highest value with most other countries having a P90 at around 130 to 140 percent of the United States median.

Trends in Earnings Inequality

The literature on changes in earnings inequality in developed countries is now large enough to begin to piece together a coherent picture of similarities and differences in trends. A few countries closely mirror the United States' experience while others seem to have avoided the increasing

[24]See Summers and Heston (1991) for the basis of the estimates of purchasing power parity used here. Figure 1 computes the median high and low income values used in Table 1 as a fraction of the United States median. For a similar comparison with similar outcomes, see Freeman (1993, pp. 2-13).

inequality of earnings, at least temporarily. While we are a long way from fully understanding the causes for these similarities and differences, a fairly consistent story is emerging.

Changes in Earnings Inequality in the United States

Rising earnings and wage inequality among male workers in the United States has led to a substantial literature documenting the trends and attempting to identify the causes. We follow Levy and Murnane (1992) by updating their summary of changes in the dispersion in the overall wage distribution. Like them, we further examine changes in returns to observable skills and changes in inequality within groups. The former focuses on increases in wage differentials between high school and college graduates and between new entrants and older workers. Within group inequality focuses on increased dispersion in the wage distributions within education and experience groups.

Almost all studies of the United States use the Current Population Survey (CPS) to examine the distribution of weekly or annual wages for males.[25] In order to concentrate on changes in wages and not changes in hours worked, most studies select only persons working full-time and full-year. Since the large changes in labor force participation of women make it difficult to separate changes in the distribution of wages from changes in the composition of the female labor force, most studies further focus on the distribution of earnings of males. These studies find that wage growth varied substantially between the upper, middle, and lower tails of the distribution. For example, between 1975 and 1992 the P75 ratio for hourly earnings of males in the United States increased by 10 percent and the P90 ratio increased by 14 percent. In contrast, the P10 and P25 ratios decreased by 3.2 and 5.1 percent respectively.[26] Changes in the distribution of weekly and annual earnings were even larger.

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[25]There are some exceptions. For example, Gottschalk and Moffitt (1994) use the PSID.

[26]Unpublished data updating Table 2B2 of Karoly (1993).

Part of the observed change in the distribution of wages reflects large increases in the returns to education during the 1980s. For example, in 1979 the hourly earnings of recent college graduates were 23 percent higher than the earnings of recent high school graduates.[27] By 1989 the college premium in wage rates for this group had increased to 43 percent. Since hours worked by recent high school graduates also fell relative to the hours worked by college graduates, the increase in the college premium in annual earnings was even larger (from 30 percent to 54 percent).[28] The returns to experience also increased during the 1980s, though not as much as the returns to education.[29] The result of these trends was a dramatic decline in the relative position of young, high school graduates and high school dropouts relative to workers with more experience or education.

In addition to the increased inequality between education and experience groups, studies consistently find even large increases in wage dispersion within skill groups.[30] The wage differential between the 90th and 10th percentile increased within the distribution of wages of young and old workers and within the distribution wages of high school and college graduates. Persons in the upper part of the distribution experienced significant growth in real wages while those in the lower part of the conditional distribution experienced slight growth or, in most cases, declines in real wages. The

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[27]Authors' tabulations of the 1979 and 1989 Census of population for males with less than ten years of experience.

[28]These increases in returns to college during the 1980s are in sharp contrast to the decline in the returns to education during the 1970s.

[29]Increases in returns to experience were limited to less educated workers.

[30]MaCurdy and Mroz (1995 show that the steepening of the cross-sectional experience profile is a result of downward shifts in the profiles of more recent cohorts, not the steepening of cohort specific profiles. The increase in within group inequality of relative income (i.e., $\ln(P^{90}) - \ln(P^{10})$) reflects constant *absolute* differences (i.e., constant P^{90} P^{10}) which translate into larger *relative* differences as real earnings decline.

increase in within group inequality, however, seems to have started earlier, beginning in the early 1970s.

Explanations for Rise in Earnings Inequality in the United States

While there is substantial agreement about the facts there is still disagreement about the underlying causes. A variety of changes in the economy, such as changes in industrial structure, increased foreign trade, increased immigration, skill-based technical changes, and the decline in institutions that limit the market (e.g., the fall in the minimum wage and the decline in unionization are consistent with the increase in inequality.[31] Disentangling these explanations is inherently difficult not only because of data limitations, but because these explanations are potentially interrelated. For example, if part of the decline in unionization or the technological change is the result of increased foreign competition, then one should attribute these indirect effects to trade. Likewise, changes in institutional constraints, such as a decline in unionization, may reflect changes in market forces which limit the options for low skilled workers.

One set of explanations for the rise in inequality in the United States focuses on changes in institutional constraints, specifically the erosion of the real minimum wage and the decline in union density.[32] During the 1980s the real minimum wage fell by 44 percent. This is consistent with the decline in wages at the very bottom of the distribution. But the decline in the minimum wage cannot explain the increase at the top of the distribution or increases in inequality within high education groups. Spillover effects are too small to explain the large changes elsewhere in the distribution.

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[31]For a brief summary of competing explanations see Danziger and Gottschalk (1995, chapter 6).

[32]Gordon (1996) views the change in the minimum wage and union density as part of a broader set of institutional changes in which corporations squeezed workers in reaction to increased foreign competition. According to this broader institutional view, wages are set by corporations largely independently of market forces. According to Gordon (1996, p. 206), management institutional change is probably *the* most important factor leading to the wage squeeze.

However, since much of the change in inequality in the United States reflect declines at the bottom of the distribution, the impact of the minimum wage is not negligible. Several studies estimate that the decline in the real minimum wage accounts for roughly 30 percent of the increase in the dispersion of wage rates (for example, Fortin and Lemieux 1996). If demand functions are not totally inelastic, employment will increase as the real minimum wage declines. This increase in hours will offset part of the decline in the wage, leading to a smaller increase in the dispersion of *earnings* than *wages*. This is consistent with studies that attribute considerably less than a third of the decline in the share of *earnings* received by the lowest quintile to the decline in the real minimum wage (for example, Horrigan and Mincy 1993).

The decline in unionization is another measurable institutional change which could have contributed to the increase in earnings inequality. The net impact of unions on the distribution of earnings is ambiguous. Unions increase the wage differential between unionized and non-unionized workers with similar characteristics but lower inequality by reducing differentials among organized workers and by raising the wages of persons with characteristics associated with lower earnings (e.g., semi-skilled white-collar occupations). Their impact on the distribution of hours and employment is likewise ambiguous. Estimates of the impact of the decline in unionization suggest that unions account for roughly 20 percent of the increase in male earnings inequality. The decline in unionization, however, accounts for little of the changes in the distribution of earnings among women (Freeman 1993; Fortin and Lemieux 1996).

Since studies of the impact of reductions in the minimum wage and declines in union density have focused separately on these institutions, they may well double count the impact on inequality. However, even if the estimated impacts of the decline in unions and the reduction in the minimum

wage are not additive, it is clear that changes in these two institutional factors had a substantial combined effect on the rise in earnings inequality.

Changes in market forces, however, must also be part of the story. The sharp increase in both the skill premium and skill intensity suggests that demand was shifting faster than supply. The 1980s were clearly a period of sharp increases in returns to skill, measured either in terms of returns to education or experience. These increases in the relative price of skilled workers occurred at the same time that labor markets were absorbing an increasingly large number of these workers. The baby bust made older workers a relatively abundant input and the continued increase in educational attainment meant that college educated workers were arriving on the labor market in increasing numbers. The fact that the skill intensity increased at the same time as the skill premium increased presents a *prima facie* case for the importance of demand shifts in explaining changes in the earnings distribution in the United States.

While there is substantial agreement that shifts in demand are central to the causal story, this still leaves open many competing demand side explanations. The three leading contenders are "deindustrialization," increased international competition, and skill biased technical change which all predict a shift out in the demand for skilled labor.

The deindustrialization hypothesis focuses on shifts in derived demand for skilled labor resulting from shifts in the composition of demand for final products.[33] While there is no dispute that the manufacturing sector shrank as the service sector grew, especially the high wage service sector, this change in industrial composition is not likely to be the major factor causing the increase in demand for skilled workers. Shifts in employment across sectors can account for only a fraction of the increase in skill intensity. For example, Murphy and Welch (1993, p. 126) estimate that changes in

[33]The deindustrialization hypothesis and the foreign trade explanations overlap, to the extent that some of the industrial shifts reflect changes in trading volume or patterns.

industrial shares can account for only 16 percent of the overall change in demand for college educated workers.[34] While the deindustrialization hypothesis properly predicts that both quantities and prices for skilled labor would increase, at best it is a part of a larger story.

Increased international competition could have also increased the demand for skilled labor.[35] Two theoretical frameworks have been used to analyze the links between changes in international trade and changes in the wage distribution. The factor content of trade approach, used largely by labor economists, focuses on changes in relative effective supplies of less skilled labor (for example, see Berman, Bound, and Griliches 1994). Imports embody skilled and unskilled labor which, when added to domestic supplies determine the effective supplies of these two factors. Since imports are less skill intensive than domestic production, the opening of trade increases the relative effective supply of less skilled workers, which puts downward pressure on their relative wages.

This factor content of trade approach has been severely criticized by several trade economists who argue that exogenous output prices, not endogenous factor quantities, determine relative wages (for example, see Leamer 1996). This conclusion is based on the Stolper-Samuelson theorem that develops links between factor prices and output prices which are set on world markets. Two countries with the same technology, facing the same output prices, will tend to have the same wage structure, regardless of their volume of trade. Therefore, newly liberalized international trade with less skill intensive countries change relative output prices in the domestic economy and, hence, the distribution of wages, no matter what happens to the volume of trade. According to this trade theory, it is the decline in the relative prices of less skill intensive goods, not the increase in the volume of trade, that should be the focus of empirical analysis.

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[34]Berman, Bound, and Griliches (1994) also conclude that changes in the industrial structure was not a major factor causing the increased inequality.

[35]See Richardson (1995), Freeman (1995), and Burtless (1995) for reviews of this literature.

The resolution of this ranging debate is of more than theoretical interest since estimates of the impact of trade differ widely across methods. The general consensus emerging from factor content of trade literature is that increased trade accounts for less than 20 percent of the shift in demand.[36] There is a wider range of estimates in the literature that focuses on the effects trade on output prices with some of the more vocal critics of the factor content of trade finding that trade accounts for 40 percent in the decline in wages of less skilled workers.[37]

While it is too soon to tell whether a common ground will be found, Krugman (1995) offers a possible reconciliation. He argues that the appropriate counter factual is what the prices of tradables (and hence wages) *would have been* if trade had not expanded. Existing studies that use observed changes in prices may over or understate the relevant changes in prices since they include the impact of numerous factors other than trade.[38] The question is how to infer the prices that *would have* occurred in the absence of trade. The answer to this "what if" question about prices depends crucially on the volume of trade. If the expansion of trade was small then there would be little impact on world prices of tradables. Krugman develops a CGE model based on commonly used supply and demand elasticities to infer the price changes associated with the increase in trade. As might be expected, world supply and demand do not shift very much as long as new trade volumes are small relative to the total. Given reasonable elasticities, prices have to adjust only a small amount in order to absorb the excess demand brought about by increased trade. Therefore, only a small part of the observed

[36]See Freeman (1995) for a review. The exception is Wood (1994), who attributes as much as 50 percent of the decrease in demand for less skilled workers to international trade.

[37]Lawrence and Slaughter (1993) find little impact of changes in output prices in the 1980s while Sachs and Shatz (1994) and Leamer (1996) find larger impacts. Leamer's estimate of 40 percent requires long lags since he uses price changes in the 1970s to explain wage changes in the 1980s.

[38]Factors other than trade may have either reinforced or countered the impact of trade.

change in relative prices is relevant to the question: What would prices (and hence wages) have been *if* there had been no change in trade?

The value of this work is that it has the potential for bridging the analytical gap between the two approaches by showing that the volume of trade is indeed relevant to the key "what if" question. Not surprisingly, the two approaches give similar empirical results when the hypothetical changes in prices are used rather than the actual changes in prices.

It should be noted that all explanations based on increases in international trade leave unexplained the rising skill intensity in non-traded goods as well as traded goods sectors. In spite of having to pay more for skilled workers, employers in almost all sectors (traded as well as untraded goods) chose to hire more skilled workers.[39]

Widespread skill biased technological change would be consistent with increases in both the skill intensity and skill premium within finely defined industry occupation cells.[40] Firms would bid up the price of skilled workers as their productivity increased relative to the productivity of less skilled workers.

There are two primary objections to the technological change explanation. The first is that technological change is simply a label for our ignorance. Since changes in technology are difficult to observe directly, its importance is often inferred by ruling out other factors. As Davis and Topel (1994) have colorfully stated, "The argument for the skill-biased technical change hypothesis is a bit like inferring the existence of Pluto, because Neptune's orbit does not otherwise fit the predictions of theory." Likewise ubiquitous increases in inequality require some widespread force, like

[39]Note that other explanations of the rise in inequality, such as the decline in real minimum wages or the decline in unionization, cannot explain the rise in skill intensity since these changes would have made less skilled workers cheaper, leading firms to decrease skill intensity.

[40]Trade theory models focus on sector bias, skill neutral technological change, which also raise the wages of skilled workers if the technological change takes place in the skill intensive sectors.

technology, that cannot be easily observed. While this critique does have a ring of truth, there are now a variety of studies of specific technological changes that have increased the demand for the more skilled.[41] These direct sightings of Pluto make the technological change explanation more compelling.

The second argument against the importance of technological change focuses on timing (Michel and Bernstein 1996; Howell 1995). Earnings inequality increased most rapidly during the 1980s. According to the critics, this implies that technological change accelerated during this period.[42] But the well-known series on productivity growth shows a deceleration in output per hour during the 1980s, hardly strong evidence for an acceleration in technological change. Furthermore, the econometric evidence on changes in capital-skill complementarity and skill bias technical change during the 1980s is mixed.[43]

The critique based on timing properly corrects sometimes sloppy use of language but it does not deal with the heart of the argument in favor of the importance of technological change. It is true that the literature's stress on demand side factors sometimes seems to ignore Marshall's dictum that it takes both blades of the scissors (demand and supply) to explain changes in prices. *If* supply had grown at a constant rate then demand would have had to accelerate during the 1980s in order to explain the increase in the relative wages of skilled labor. But the supply of educated workers

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[41]For example, see Bailey (1988), Berman, Bound, and Griliches (1994), and Cappelli (1993), as well as BLS studies of the impact on individual industries, such as U.S. Bureau of Labor Statistics (1994).

[42]It should be pointed out that these two criticisms of the technological explanation for the growth in inequality cannot both be right. If technology cannot be directly observed then it is impossible to tell if it accelerated or not. If, on the other hand, slow growth in average productivity reflects slow technological change, then Pluto is observable.

[43]Mishel and Bernstein (1996) find no evidence of increased capital-skill complementarity while Goldin and Katz (1996) find higher complementarity and increased skill bias when comparing the 1970s with the 1980s.

increased at a decreasing rate during the 1980s, which is consistent with an increase in the college premium in the face of non-accelerating growth in demand (Katz and Murphy 1992). While it may be sloppy language to attribute the rise in the wage premium to demand side factors, there is nothing inherent in the argument that requires an acceleration in the shift in demand. Deceleration in supply will do.

What is required of any explanation for the increase in inequality is that the shift in demand be greater than the shift in supply. Otherwise the explanation will not be consistent with the rise in skill intensity in the face of a rise in the skill premium. Technological change remains one of the only factors that will result in a ubiquitous increase in the proportion of college educated workers employers are willing to hire in spite of the large increase in the college premium. Deindustrialization , increases in international trade, and declines in unionization and the real minimum wage are all consistent with the a decline in the relative wages of less skilled workers but all these theories predict that firms would choose less skill intensive production methods, not more skill intensive methods, as we in fact observe. Only technological change is consistent with rising skill intensity in the face of rising skill prices.

The final explanation for the rise in inequality focuses on the distinction between increases in inequality of permanent earnings and increases in the volatility of earnings.[44] Almost all the explanations reviewed thus far implicitly assume that the increase in inequality is a result of increases in the dispersion of permanent earnings. For example increases in the return to education, whether caused by skill biased technological change or increased international trade, will raise the permanent

[44]The basis for this distinction is the canonical error components model.

earnings of college graduates. Likewise, decreases in the real minimum wage are assumed to lower the long-run earnings of less skilled workers.[45]

While the focus of most explanations has been on factors that increase the dispersion of permanent earnings, the cross-sectional evidence that these theories are attempting to explain cannot distinguish between changes in permanent and transitory of earnings.[46] Longitudinal data is necessary to separate the relative importance of these two factors.

Evidence for the 1980s indicates that increases in the dispersion of permanent earnings and increases in the variability of transitory earnings were roughly equally important in accounting for the increase in inequality (both for annual and weekly earnings).[47] Part of the increase in the variability of earnings reflects increases in the variance of weeks worked but weekly earnings also became less stable.

This suggests that the search for causal links should focus on factors associated with greater instability of both weeks and wages. While this line of research points in a new direction, we know relatively little about changes in market or institutional forces that may have led to greater year to year (or week to week) fluctuation in earnings. The decrease in unionization seems to be part of the story, but transitory fluctuations increased among unionized as well as non-unionized workers. Involuntary job losses from layoffs and firings and voluntary quits both increased during the 1980s (Boisjoly, Duncan, and Smeeding 1996). Likewise the decrease in job duration is a contributing

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[45]Some institutional explanations, such as decreases in unionization, may be consistent with greater earnings variability.

[46]In the simplest model in which observed log of earnings is equal to a time invariant person specific permanent component and an iid transitory component the variance of log earnings is equal to the variance of the permanent component plus the variance of the transitory component.

[47]See Gottschalk and Moffitt (1994) and Moffitt and Gottschalk (1995). The latter paper defines transitory earnings as shocks that die out within three years.

factor, but instability increased even among persons who stayed in the same job.[48] The fact that increased instability accounts for roughly half of the increase in overall inequality and that we know so little about its cause opens an obvious line for future research.

Changes in Earnings Inequality in Other Industrialized Countries

Similarities and Differences

Table 2 provides a summary of changes in male earnings inequality during the 1980s. The table includes the ten countries for which we have information on trends in overall inequality and trends in returns to education (or occupation) and experience as well as trends in inequality within education and experience groups. Since studies of trends in inequality in other countries summarized in this table vary widely in populations covered, measures of inequality, period covered, and a whole host of differences that make comparisons across countries difficult, we focus on studies that contrast each country with the United States. This allows us to benchmark the change in inequality in each country to the corresponding change in the United States. We also include studies that do not provide specific comparisons but where authors discuss their findings in light of changes in the United States. Our rankings for these studies, which are marked with an asterisk, reflects the authors' qualitative judgement.

The table shows the absolute change in inequality in each country measured as a percentage of the absolute change in inequality in the United States. For example, the ++ in column (1) for Canada signifies that the increase in overall inequality in Canada was 50 to 80 percent as large as in the

[48]See Gottschalk and Moffitt (1994) for contributing factors. Farber (1994) finds little change in job duration for the period covered by Gottschalk and Moffitt. His more recent unpublished tabulations, however, show a clear decrease in duration for more recent years.

United States.[49] Since the use of absolute changes is arbitrary, we also indicate where classifications would be altered if we compared relative changes in inequality in the two countries.[50] While these two metrics do not exhaust all possible comparisons, they are the most commonly used methods.[51]

The countries shown in Table 2 break down into four broad groups. The first consists of countries that experienced at least as large an increase in inequality in the United States. This group includes only the United Kingdom.[52] A second group which experienced substantial increases in inequality but less than the United States and the United Kingdom includes Canada, Australia, and Israel.[53] France, Japan, The Netherlands, Sweden, and Finland form a third group with positive but quite small changes in earnings inequality over the 1980s (though inequality started rising in several of these countries in the second half of the decade).[54] While even the Nordic countries experienced some increase in earnings inequality during the 1980s, they started from very low levels, resulting

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[49]As Appendix A-1 indicates, Blackburn and Bloom (1994) show the variance of log earnings increasing by .018 in Canada (from .270 to .288). The change in the United States over the same period is .036 (from .286 to .320). Thus, inequality rose half as much in Canada as in the United States according to this measure.

[50]The classification for Canada is unaltered since the relative change in Canada of .067 is 77 percent as large as the .119 change in the United States (.288/ .270 -1 versus .320/ .286 -1). This continues to fall in the 50 to 80 percent band.

[51]Since any monotonic transformation of an inequality measure maintains ordinal ranks, there is no natural metric for comparisons. Each metric reflects an implicit social welfare function. Our absolute (relative) classification scheme implicitly assumes that equal changes in absolute (relative) changes in inequality are equally valued.

[52]As a result of allowing market forces to influence wages, Russia, Hungary, and the former East Germany experienced considerably larger percentage changes in earnings inequality than the United States or the United Kingdom. However, these nations are outside the scope of our study.

[53]In Canada and Australia the rise in inequality was largely a result of declines at the bottom of the distribution. Israel saw very modest declines at the bottom but large increases at the top.

[54]Eriksson and Jäntti (1994) show that the rise in inequality in Finland after 1985 was as large as the increase in the United States. Concialdi (1996, Table 1) shows moderate increases in France between 1984 and 1989.

from a long secular decline in inequality.[55] Finally, Italy and Germany form a small group that experienced no measurable increase in earnings inequality during the 1980s.[56]

Thus, what we observe is a diversity of experiences but with almost all countries experiencing some increase in earnings inequality. The hypothesis that inequality increased only in the United States can clearly be rejected. However, the hypothesis that all western industrialized countries experienced as large increases in inequality as the United States is equally unsustainable. Clearly the United States was a leader in the trend toward greater inequality of labor market outcomes but most other countries experienced some changes. Whether one stresses the differences or the commonalities is like describing a bottle as half full or half empty.

When one goes behind changes in the overall distribution and starts to examine changes in inequality at different points in the distribution or trends in returns to education or experience, further similarities and differences emerge. The United States earnings distribution became less equal both because of growth at the top and decline in absolute and relative earnings at the bottom. While the absolute decline in real earnings at the bottom of the distribution is limited to Australia, the United States, and Canada, the decline in relative earnings in the lower deciles is common across a large number of countries, including Japan, The Netherlands, Sweden, and the United Kingdom (OECD 1993, Table 5.2). While less skilled workers lost ground during the 1980s in most countries, the gains at the top of the distribution were more modest than in the United States. Only the United Kingdom rivaled the United States in the increase in the P90/P50 ratio.

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[55]Eriksson and Jäntti (1994) show that inequality increased in Finland between 1985 and 1990 but this followed a sharp decline during the 1970s and early 1980s. Likewise, what is anomalous about the 1980s in Sweden (Hibbs, 1990) and France (Concialdi, 1996) is not the rise in inequality, which was small, but the ending of a long period of rapidly falling inequality.

[56]Hauser and Becker (1993, Table 4), who exclude persons with a foreign head, show a 2.7 percent increase in the Gini coefficient for West Germany between 1983 and 1990.

Columns 5 to 7 of Table 2 summarize changes in returns to experience and education (or occupation), as well as trends in inequality within skill groups. All countries, except Finland, Israel, and Italy, experienced increases in inequality within skill groups and most countries experienced an increase in the returns to experience. The United States stands out in two important respects. First, it is the country with the largest increase in returns to education. Second, it experienced large increases in all three components—increases in returns to both education and experience, as well as increases in inequality within groups. Only the United Kingdom also experienced large increases in all three components.

The commonalities suggest that similar factors may have affected these countries. The differences suggest that these forces were either not equally strong in all countries or that they were countered by country specific factors. For example, some countries may have experienced supply shifts that countered the demand shifts, leaving relative wages constant. Countries with declining proportions of young people in the labor market should have experienced smaller increases in the experience premium, and fewer young people competing for a dwindling number of jobs should have limited the decline in their wages. Similarly, countries with large increases in college enrollments should have experienced relatively small increases in the college premium as the growth in supply offset some of the increase in demand.

Differences in wage setting institutions may account for some of the differences in growth in inequality. There is certainly a primia facie case that countries with high union coverage or centralized wage setting were able to limit the growth in inequality.[57] Germany, Italy, and the Nordic countries have fairly centralized wage setting and a high proportion of their workforce covered by collective bargaining agreements (Calmfors and Drifil 1988; OECD 1994b). At the other extreme,

[57]Freeman and Katz (1993) and Fortin and Lemieux (1997) discuss the role of institutions.

unionization rates declined in both the United States and the United Kingdom and wage bargaining became less centralized in the United Kingdom (Blanchflower and Freeman 1992).

Impact of Changes in Relative Supplies

We start by turning to the cross-national relationship between changes in the rates of return to education and experience and changes in the relative supplies of persons classified by education and experience. If market forces were responsible for the diversity of changes in returns to education, then countries with faster growth in college educated workers would have experienced smaller growth in the education premium.[58] Likewise, countries with a baby bust entering the labor market would have experienced smaller than average increases in the experience premium as less experienced workers became relatively scarce. The question we ask is whether these supply shifts are sufficient to explain the small increases in relative factor prices in countries with centralized wage setting. If they are, then this suggests that institutional constraints may not have been binding.

Exploring the importance of shifts in supply requires estimates of changes in returns to education and experience in each country. Two types of evidence are available. The first comes from LIS which allows similar earnings functions to be estimated across a variety of countries using similar samples and variable definitions (Gottschalk and Joyce 1996). The second source of evidence comes from country specific studies that provide less comparability across countries but greater detail on the specific country being studied.

The data from LIS provide evidence of the importance of market forces. There is a systematic negative relationship between the size of supply shifts and changes in education and experience premium across countries. The relationship is particularly strong for the education premia. Sweden, Finland, and Canada experienced relatively small growth in the relative supply of young workers

[58]This assumes that shifts in demand were roughly equal across countries, or at least that shifts in demand were not strongly positively correlated with supply shifts.

during the years covered by LIS (Gottschalk and Joyce 1996). This was accompanied by small increases in the age premium in these countries. In contrast, The Netherlands experienced a large inflow of young workers and a substantial decline in their relative earnings, which is again consistent with a market explanation for changes in the age premium. Changes in the education premium also show a negative relationship. The Netherlands experienced the largest yearly growth in the proportion of workers with a college degree and it experienced an actual decline in the college premia. Likewise, large increases in the supply of college workers in Israel and Australia are consistent with the small increase in their college premia. At the other extreme, the United States and Canada experienced relatively small increases in the supply of college workers. This was accompanied by substantially larger increases in the college premium than in the above countries.

The other sources of evidence on the importance of shifts in supply are country studies. While it is difficult to make comparisons across countries since concepts and measures often differ across studies, the general pattern is similar to that found in LIS. These studies find fairly consistent effects of changes in the education composition of the workforce and some weaker support for the proposition that the age composition affected the experience premium (Katz, Loveman, and Blanchflower 1995). Increases in the college premium in Japan, the United Kingdom, and the United States are consistent with demand shifting faster than supply. Likewise, Sweden, Canada, and Australia offer support for the importance of changes in the supply of college educated workers. In Sweden, the ratio of workers with a college degree to those with a gymnasium degree rose steadily during the 1970s and early 1980s. This was followed in the late 1980s by a decline in the proportion of workers with a college degree and a modest increase in the returns to education, which is consistent with a simple supply/demand explanation (Edin and Holmlund 1995). The smaller increases in returns to education in Canada than in the United States are also largely explained by the

substantially larger growth in the proportion of the workforce with a college degree in Canada than in the United States.[59] The lack of growth in the educational premium in Germany, The Netherlands, and Australia (during the 1970s) can also be explained by shifts in the relative supplies of college educated workers.[60] Australia offers a stark example of the impact of an accelerating supply of college workers. The most rapid growth in educational attainment occurred prior to 1978, a period during which the education premium actually fell (Gregory and Vella 1992). Returns to education also dropped substantially in The Netherlands during the 1980s while the proportion of workers with a college degree increased dramatically as a result of generous government subsidies for education during the 1970s (Hartog et al. 1993).

The evidence from LIS and country specific studies strongly suggests that market forces played a role in limiting the increase in inequality, including in countries with centralized wage setting institutions. While it is possible that some omitted variable is responsible for the negative correlation between changes in factor prices and changes in relative factor supplies, these studies at least provide the empirical basis for the presumption that market forces matter, even in countries with centralized wage setting.

Impact of Differences in Institutions

Given the large proportion of workers covered by collective bargaining agreements and the centralization of wage setting in many OECD countries, one should look beyond market forces to explain changes in the structure of wages. Most western European countries place a greater emphasis on distributional issues than the United States and many have centralized wage setting institutions that

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[59]See Freeman and Needles (1991). DiNardo and Lemieux (1993) conclude, however, that changes in unionization and the minimum wage, not relative supplies were the driving forces in Canada.

[60]Abraham and Houseman (1995) show that educational attainment continued to accelerate during the 1980s, which is consistent with the stability of the education premium in Germany.

can be used to limit the impact of market forces. The question is how much of the diversity in trends in inequality can be explained by these institutional factors?

Again, conceptual as well as measurement issues must be confronted. First, how should one measure the degree to which wages are set by "institutions" in different countries? One common measure is the union density rate (the proportion of the workforce belonging to a union) but this measure potentially misses workers who do not belong to a union but who are covered by union-negotiated wage agreements. For example, in France, 85 percent of the workforce was covered by collective bargaining agreements in 1980 but only 17.5 percent belonged to unions (OECD 1994c, Table 5.8). Furthermore, neither union density nor union coverage necessarily captures the degree to which wage setting is centralized. For example, Japan has low union coverage rates and bargaining is at the company level but wage demands are coordinated through a nationwide Shunto (spring offensive) which sets guidelines that form the basis for company level bargaining. Thus, while institutional wage setting in an environment of high coverage rates in countries such as Germany and Norway all point to the importance of institutionalized wage setting, the picture is less clear for countries that share some, but not all, of these attributes.

While it is easy to contrast the decentralized labor markets of the United States with the more centralized or unionized labor markets in most of Europe, ranking European countries is more problematic. Countries differ in many dimensions, making it difficult to aggregate into a single summary measure. For example, bargaining is fairly decentralized in France but the bottom of the wage structure is tightly controlled by a widely applied minimum wage (the SMIC). If market forces changed primarily at the bottom of the distribution, this seemingly minor institutional factor might be paramount. Given the idiosyncratic nature of country specific institutions, it comes as no surprise that

indices of centralization have come to different rankings depending on the weights they attach to different attributes (Calmfors and Drifil 1988; Alesina and Perotti 1994).

The diversity of institutional arrangements across countries suggests that using a single measure may be inappropriate, but this leaves a great deal of room for ex-post rationalization. If inequality increases, one may be tempted to infer that the particular institutions in that country were not effective in limiting the impact of market forces. But this is not a test of the institutional hypothesis, since it assumes that institutions matter and infers the effectiveness of the particular institution from the outcome.

The second measurement issue focuses on the distinction between levels and changes. For example, is inequality expected to increase in countries with high but declining centralization of wage negotiations? Sweden entered the 1980s with bargaining at the national level but moved somewhat away from this highly centralized system in the early 1980s as employers withdrew from this arrangement. It was only by starting with sufficiently centralized labor markets that countries like Sweden managed to end the decade with markets that were still as centralized as countries like Germany that did not experience similar institutional changes. Likewise, the union coverage declined in many countries during the 1980s, including the United Kingdom and Australia.

The key conceptual question is whether the *level* of the institutional constraint or the *change* in level is relevant? Many countries with centralized wage setting or high rates of union coverage saw these institutions weakened during the 1980s. This could be used to rationalize either stable wages (the institutions remained strong enough to block the impact of market forces) or rising inequality (the institutions weakened). With relatively few countries and a great deal of latitude in prediction, it is hard to test institutional explanations.[61]

[61]Fortin and Lemieux (1996) are careful to stipulate that they focus only on change in institutional factors.

Finally, if changes in institutional structures are central to explanations of changes in inequality, then one must at least consider the possibility that causation runs partially in the opposite direction. Surely some of the weakening of institutional barriers was a response to the increased pressure brought about by changes in market forces. If this is the case, then it is inappropriate to treat changes in institutional factors as exogenous.

The importance of centralized wage setting is often based on the observed negative cross-country correlation between the degree of centralization or unionization and the trend in inequality. Almost all countries with institutional limits on market forces managed to have either small increases in inequality (France and the Nordic countries) or no change in inequality (Germany). At the other extreme, the United States and the United Kingdom, two countries with decentralized labor markets, experienced the largest increases in inequality.

The fact that countries with small increases in earnings inequality also had some form of institutional wage setting does not necessarily mean that these constraints were binding. Differences in market forces could have been responsible for the small increase in inequality. We, therefore, examine two additional sources of information which may shed light on the importance of these institutions.

First, if these institutions were limiting prices from reaching market clearing levels then we might expect to see an increase in the relative unemployment rates of less skilled workers. Unless unions or public agencies were able to guarantee employment as well as wages, workers would find it increasingly difficult to find jobs as the demand for their services declined but wages were unable to adjust.[62]

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[62]Pencavel (1991) points to the paucity of sound empirical studies showing the employment impact of unions. This suggests that institutional constraints and wages may not lead to higher unemployment rates for less skilled workers.

Gottschalk and Joyce (1996) find some evidence that unemployment rates of the young did increase more than for the old in countries with centralized labor markets and small increases in the age premium. This is consistent with the hypothesis that these countries were using the institutional constraints at their disposal to limit the decline in wages of the young. Relative wages did not fall as much as they otherwise would have, but this wage policy was at the cost of increases in the relative unemployment rates of the young.[63]

Another piece of evidence that sheds light on the importance of institutional constraints in limiting the rise in inequality comes from distinguishing between increases at the top and declines at the bottom of the distribution. It is commonly assumed that institutional constraints were used primarily to protect those at the bottom. *If* this is the case then we should observe relatively small declines in the P10/P50. For example, the high and rising minimum wage in France (the SMIC) should have kept the bottom of the distribution from falling. The fact that the P10 and P50 grew roughly equally is evidence that this constraint was binding. The fact that the P90 grew faster than either indicates that France was also experiencing a shift in demand for high skilled workers (OECD 1996). Similar patterns of floors under the P10 are found for Belgium, Finland, and Germany but not for Australia, New Zealand, Italy and Sweden. In the later countries the increases in the P90/P10 reflect declines in the P10/P50 as well as increases in the P90/P50. This indirect evidence also suggests that institutional constraints were binding in some but not all countries.

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[63]Gottschalk and Joyce (1996) and Blau and Khan (1996) find evidence of both market and institutional factors limiting the wage decline for the young in several OECD countries. Edin and Holmund (1995) find similar increases in official youth unemployment rates and hidden youth unemployment (increases in enrollment in government training programs). Nickell and Bell (1995) track changes in unemployment rates over a longer period and find changes in the relative unemployment rates of less educated workers in Germany, The Netherlands, and Sweden, which are similar in magnitude to changes in the United States and the United Kingdom. Card, Kramarz, and Lemieux (1995) find changes in employment rates in France that are similar to those in the United States.

Finally, some countries with coordinated wage setting institutions did not stem the tide of inequality. For example, Australia's enactment of the Accord between the government and trade unions allowed unions to coordinate and centralize wage setting.[64] This agreement had the potential of limiting increases in inequality as well as reducing inflationary pressures. However, Australia experienced a large increase in earnings inequality (see Table 2). This suggests that the power to limit wage adjustments may not have been used to offset the increase in earnings inequality (Gregory and Vella 1992, p. 92). However, the Accord was weakened over the 1980s and the largest increase in inequality occurred at the end of the decade. This could imply that institutions were important because inequality increased when they were weakened (Borland 1992, p. 16). This difference in focus on the level or the change in institutions vividly illustrates the difficulty of subjecting institutional explanations to a rigorous test.

Institutional Differences and Changes in Aggregate Unemployment Rates

In the previous section we focused on relative unemployment rates of different groups to see if protected groups experienced increases in *relative* unemployment rates. Increases in aggregate unemployment in many OECD countries during the 1980s has also been cited as evidence that institutional constraints on wage adjustments were binding.[65] This argument takes several forms. The first is that these institutions were used to raise *average* wages faster than productivity. According to this argument, the United States opted for stagnant real mean wages but high employment while other OECD countries opted for wage growth but paid a price in terms of higher aggregate

[64]By increasing non-cash benefits, the Accord may have had greater impact on cash inequality plus non-cash income. See Saunders (1994).

[65]For alternative explanations of the rise in unemployment rates in OECD countries, see Bean (1994) and Bertola and Ichino (1995).

unemployment rates. This form of the argument, has no implications for inequality since it focuses on the mean, not the dispersion, of the wage distribution.

The second form of the argument is that centralized wage setting institutions were used to counter the shift in relative demand away from less skilled workers (Nickell and Bell 1995). According to this line of reasoning, aggregate unemployment rates grew in countries that were willing to accept higher unemployment rates for the least skilled in order to keep low skilled wages from falling to market driven levels. This interpretation for the rise in aggregate unemployment rates in OECD countries has two empirical implications. First, if this were the cause for the rise in aggregate unemployment rates in OECD countries, then those countries experiencing the smallest increases in inequality should have experienced the largest increases in aggregate unemployment rates.[66] Second, the rise in aggregate unemployment should reflect larger increases in the unemployment rates of low skilled workers than in the unemployment rates of more skilled workers.

While unemployment rates in many OECD countries did increase during the 1980s to levels similar in the United States, the increase in aggregate unemployment rates were not unusually large in countries with more centralized labor markets. In fact, the increases in unemployment rates were much less pronounced in Nordic countries than in other OECD countries during the 1980s.[67] Furthermore, the rise in aggregate unemployment rates were largely driven by increases in unemployment rates of more skilled workers. As Chart 1 indicates, the relative unemployment rates

[66]This assumes that the institutional barriers to a decline in the wages of the least skilled did not also operate to limit quantity adjustments. Institutions such as unions (whether centralized or not) could have bargained both on prices and quantities. In this case, however, institutions would not be responsible for the higher aggregate unemployment rates in these countries.

[67]OECD (1994c, Chart 1.13). The Nordic countries did experience large increases in unemployment rates in the late 1980s and early 1990s but this would require over five year lags in the effect of rigid wages on unemployment rates.

of the young actually declined in almost all countries with centralized labor markets.[68] Youth unemployment did become more of a problem in many OECD countries but this reflects an increase in the aggregate number of unemployed workers, not an increase in the proportion of the unemployed who were young.

Thus, this aggregate data does not provide strong support for the hypothesis that the higher unemployment rates in OECD countries reflect the consequences of distributional policies. While careful studies of the relationship between changes in relative wages and relative unemployment rates using micro data may provide stronger support for this theory, this work remains to be done.

Summary

The strength of current research on changes in earnings inequality has been to develop a set of stylized facts that any theory must fit. It is clear that the United States and the United Kingdom were not the only countries to experience an increase in earnings inequality. However, the changes in these two countries were unusually large. The challenge is to understand why some countries managed to escape the forces of inequality which affected the United Kingdom and the United States to a much greater degree. Supply shifts are clearly a part of the explanation, including in many countries with centralized labor markets. While institutional constraints do not seem to have been binding in all countries, they are also clearly part of the story. The question should not be whether it was market forces (i.e., shifts in supply that offset the shifts in demand) *or* institutional constraints that limited the increase in inequality. Both are clearly necessary to explain cross-national differences in the growth in inequality.

[68]See Gottschalk and Joyce (1996) and Nickell and Bell (1995) for changes in relative unemployment rates by education as well as age.

IV. Income Inequality and Redistribution

The preceding section has documented the substantial changes in labor markets which led to greater earnings inequality in the United States and many other industrialized countries. In this section we broaden the focus to the distribution of post-tax and transfer income. How does the distribution of income in the United States compare with that in other industrialized countries? Were changes in the distribution of labor market earnings matched by correspondingly large changes in the distribution of family income? Did changes in taxes and transfers cushion or exacerbate changes in labor market incomes?

Relative Levels of Income Inequality

Figure 2 shows the distributions of post-tax and transfer income in 19 OECD countries for the most recent year available in LIS. In the United States, a person in a household at the tenth percentile received 36 percent of the median income (column 2), while a person at the 90th percentile received 208 percent of the median (column 4). This results in a decile ratio of 5.78, indicating that a person living in a household at the 90th percentile enjoys over five and three-quarters times the income of a person at the 10th percentile.

The United States has the largest value of the 90/10 ratio recorded in Figure 1, with the next largest being the United Kingdom with a value of 4.67. The lower part of the distribution of disposable income appears to be substantially different in the United States than in other countries. The United States person at P10 has 36 percent of the median, compared with values averaging 53 percent for the other nations. This difference owes in part to the relatively low values of P10 for the United States *earnings* distribution, shown in Table 1. However, Canada which has similar low P10 values for earnings, has an 11 point higher value for P10 (47 percent) for adjusted household income

in Figure 2. Thus, individual earnings distributions may be quite different from household income distributions.

At the top of the distribution, the United States does not stand out to the same extent. In Ireland, the income at the top decile is 209 percent of the median, just about that in the United States. The top deciles are noticeably lower in Austria (which excludes self-employment income), Belgium, and the Scandinavian countries.

While percentile ratios have some obvious appeal (e.g., insensitivity to top and bottom coding, ease of understanding), they have the disadvantages of focusing on only two points in the distribution. An alternative is to use a summary measure of inequality such as the Gini which is shown in the final column of Figure 2.[69] While this ranking of nations according to the Gini differs slightly from that produced by the decile ratios, there appears to be a clear grouping of nations. Scandinavia, Austria, and the BENELUX countries have the least inequality followed by central Europe, then the Commonwealth countries, Israel, and southern Europe, with the United States, the United Kingdom, and Ireland at the bottom.

Absolute Levels of Income Inequality

Since countries differ substantially in terms of real GDP per capita, most authors have made comparisons across nations use relative income measures such as those used in Figure 1. Measures of real or absolute income differences across nations again require comparisons of the purchasing power of currencies across nations. Such comparisons can be used to test the argument that the higher the *average* standard of living in a particular nation, the better off are its citizens.[70]

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[69]Still another method would involve rank orderings based on Lorenz dominance. Such an ordering produces a very similar ranking of nations. See Atkinson, Rainwater, and Smeeding (1995a, Figure 4.4) for such a ranking.

[70]See Atkinson (1995); Smeeding and Gottschalk (1996); and Rainwater and Smeeding (1995) for additional real disposable income comparisons across nations.

Figure 3 presents the P10, P50, and P90 in each country measured as a proportion of the United States median using the same Penn World tables and methods used in Figure 1.[71] Just as we found for earnings, the wider distribution of United States incomes means that "low income" persons living in households at the P10 level in the United States had lower living standards than did similarly situated persons in each of the 14 other nations compared here, despite the United States' clear advantage at the median. For instance, a person at the 10th percentile of the Finnish distribution had an income that was 58 percent of the Finnish median (Figure 2). In terms of purchasing power parity (Figure 3), the same person has a real income which is 44 percent of the United States median. However, while Finland's median income person enjoys a standard of living that is 77 percent that of the United States (Figure 3), the person at the 10th percentile of the Finnish distribution still has a real income which is higher than that found in the United States (44 percent versus 36 percent). In fact, Figure 3 shows nations with real median incomes as low as 72 percent of the United States median, but no nation with a lower standard of living at the 10th percentile. At the other end of the scale, "high income" Americans enjoyed real living standards far above those experienced in other nations. At the P90 level, the real income of Americans was almost half again as high as the average incomes of persons at the P90 point in their distribution.

Trends in Income Inequality

In this section we show how post-tax and transfer income inequality has changed over the past 10 to 25 years. We start with an overview of trends in the United States and then turn to cross-national comparisons.

[71]Excluded from Figure 3 are nations with real median incomes below 70 percent of the United States median (Austria, Israel, Italy, Spain, and the United Kingdom).

Trends in the United States

Income inequality in the United States increased steadily during the 1980s.[72] Figure 4 shows the Gini coefficient for income before taxes but after transfers over the period 1967 to 1993. By this and almost all other measures, inequality remained relatively stable from 1967 to the mid 1970s and then started increasing.[73] Adjusting for household size and federal income and payroll taxes, weighting by persons, and thereby using an income definition which is similar to that used in the cross-national comparisons, indicates an even greater increase in inequality.[74]

The Gini values which underlie the adjusted disposable income line in Figure 3 has been reproduced in Table 3 along with the corresponding percentile points of the associated income distribution. Relative incomes fell at the bottom (P10) by about as much as they rose at the top (P90) over this period. As a result, the decile ratio rose by more than 30 percent from 1979 to 1993, while the Gini value rose by 16 percent over the period.

While household income inequality in the United States rose over this period, the effects of the 1981-82 and 1990-91 recessions hastened the trend toward greater inequality. What is unusual by historical standards is that inequality grew during the 1983-89 recovery as well.[75]

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[72]See Williamson and Lindert (1980); Plotnick and Smolensky (1992); and Goldin and Margo (1991) for a longer-term perspective on the United States income distribution.

[73]Data on inequality among families, which goes back to 1947, shows a secular decline in inequality through 1970 and an increase after 1979. Karoly and Burtless (1993) find the United States increase robust with respect to unit of observation, adjustments for unit size and unit of income aggregation (weighting by persons, households or families).

[74]The trend in post-tax and transfer disposable income can go back only to 1979 due to data restrictions. See also Karoly (1995) for a similar trend in equivalence adjusted family income from 1974-1993.

[75]See also Burkhauser, Crews, Daly, and Jenkins (1996) on this point.

Trends in OECD Countries

The available empirical evidence concerning recent trends in income inequality in different nations is summarized in Table 4.[76] Countries are listed in order of changes in disposable income inequality (as measured by the change in the Gini coefficient) from largest to least change.

The largest changes in income distribution took place in the United Kingdom and in the United States, where there has been a clear trend toward greater inequality. Rising earnings inequality among men and among two-earner families, and the growth in the number of single individuals and single female headed families were the primary factors accounting for the increase in inequality in the United States since the mid-1970s. In the United Kingdom, rising unemployment and higher numbers of single parents were important in building a large group at the bottom of the distribution, while higher earnings for well-educated men and women, increased capital income, and self-employment income were all-important in explaining the growing income share at the top.[77]

While the trends in earnings inequality and in income distribution were similar in the United States and the United Kingdom, the degree of change in the distribution of family income was markedly different. In the United States the largest increases in inequality were concentrated in the early 1980s and continued into the early 1990s. In the United Kingdom income inequality fell through the mid-1970s but the Gini coefficient rose by more than 30 percent between 1978 and 1991.

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[76]Figures in Table 4 are based on Appendix Table B-1 and are not comparable across countries since they come from a wide variety of studies. Differences in data, concepts of income or method of calculation may affect the measure of the level of inequality. These differences, which are explained in the notes to Table B-1, are less likely to affect trends. However, they do limit comparisons of percentage change in Ginis because different weighting patterns and different equivalence scales will produce different absolute values for the Gini within and across nations. See also Atkinson, Rainwater, and Smeeding (1995a, Chapter 4) on this point.

[77]For the United States see Karoly (1995), Danziger and Gottschalk (1995), and Duncan, Smeeding, and Rogers (1994); and for the United Kingdom, see Jenkins (1995a, 1996).

This is almost double the increase over a similar period in the United States, and more than double the decline in the United Kingdom from 1949 to 1976.[78]

While starting from a much lower level of inequality, Sweden experienced a pattern of change in inequality similar to that in the United Kingdom, downward until 1981, then upward in the 1980s, with the sharpest increases in the early 1990s. The Swedish Gini increased by about 20 percent between 1981 to 1993, though the Swedish income distribution remained considerably more equal than either the United States or the United Kingdom in spite of these changes.[79] In Australia, Denmark, and Japan, the upward trend over the 1980s was slightly less than that experienced in the United States and Sweden. The same is true in New Zealand, though all of these increases came during the late 1980s (Saunders 1994).

Perhaps Atkinson (1996a, p. 43) sums it up best:

> Among the other (non-United Kingdom) OECD countries, it is certainly wrong to think in terms of a world-wide trend towards increased income inequality in the 1980s: the upward trend was exhibited to differing degrees in different countries, and was not to be found in some countries. At the same time, those seeking to identify a common pattern for OECD countries other than the United Kingdom and the United States could say that continuing progression towards reduced inequality was the exception rather than the rule. Moreover, it may be that these countries are lagging behind the United States and the United Kingdom, and that the 1990s will see a rise in income inequality more generally.

Clearly the remaining evidence in Table 4 supports this assertion. Inequality rose only slightly in three nations (The Netherlands, Norway, and Belgium), and eight other countries show no change

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[78]Compare Karoly (1995) to Atkinson (1996a, Table 1).

[79]Björklund and Freeman (1994) find little increase in inequality among non-aged families with children over this period. However, they compute only subgroup inequality trends, excluding the aged and persons aged 18 and 19. Were we to calculate absolute changes in inequality as measured by the Ginis, the Swedish increase would be less in absolute terms than that found in the United States or in the United Kingdom. Also, the trend toward greater inequality in Sweden may have peaked in 1991 and has receded slightly since that time. See Appendix Table B-1.

in inequality in the 1980s. Only in Italy do we find a noticeable decrease in inequality during the 1977-1991 period.

It is also noteworthy that there appears to be no apparent relation between the trend over the 1980s and the overall level of inequality at the start of the period. Inequality increased both in the United States, with a high level of inequality even before the increase, and in Sweden, which started from a much lower level of inequality. Inequality fell in Italy, rose in the United Kingdom, both occupying intermediate positions in the mid-1980s (see Atkinson, Rainwater, Smeeding 1995a).

Nor is there a consistent country group story. Among the Scandinavian nations, Sweden experienced a rapid rise in inequality in the early 1990s, while Finland did not. In Europe we find large secular increases in inequality in the United Kingdom, smaller increases in Denmark, Belgium, and in The Netherlands, but stasis in Germany, Portugal, Ireland, and France, with a secular decrease in Italy. Canada experienced only mild increases in inequality of family income while the United States experienced much larger increases, despite similar changes in earnings inequality (Card and Freeman 1993).

Accounting for the Changes

The changes in the distribution of family income distribution that we have documented are a product of a complicated set of forces: changes in labor markets that affect earnings of individual family members; changes in returns to capital; demographic changes, such as the aging of the population and growth of single parent households, which affect both family needs and labor market decisions; changes in social norms, such as the women's movement and the purported decline in the work ethic among men, which may have affected demographic and labor market preferences; and policy changes in tax and transfer programs which not only affected family income directly but also may have affected work and investment decisions.

The inclusion of multiple income sources received by multiple individuals thwarts attempts to identify the causal links that led to variations across time and across countries in the distribution of total post-tax and transfer family income. There is ample evidence that family members take account of all sources of income available to the family in deciding not only how much each member might work, but also how to structure living arrangements. Moreover, governments themselves react differently to market income changes via changes in redistribution (tax and transfer) policy, and via other policies (e.g., government employment).

Aggregating earnings across all individuals in a household and adding other sources of income takes us from the distribution of individual earnings to the distribution of family income. Ideally one would like to know how much of the change in inequality of total family income is caused by exogenous changes in each source of income. This would require a fully articulated model of behavioral responses. For example, if exogenous increases in inequality of male earnings led wives of low income husbands to work more, then this portion of the change in overall inequality would be caused by changes in the distribution of husbands' earnings, not wives' earnings. Structural models that include all behavioral links are well beyond the scope of existing empirical work. Researchers have, therefore, limited themselves largely to purely accounting exercises which decompose changes in overall inequality into a set of component parts that may reflect endogenous as well as exogenous changes.[80]

While accounting decompositions can potentially offer insights into the patterns of changes in inequality these methods also raise a set of conceptual and measurement issues. Most accounting

[80]The primary drawback of accounting exercises is that they can easily be misinterpreted since they do not make a distinction between endogenous and exogenous factors. For example, to say that changes in mean husbands' earnings accounts for X percent of the change in mean family income does not imply that family income would have dropped by that percentage if husbands' earnings had not changed. Other sources could have responded to the decline in husbands' earnings.

decompositions income by source are based on identities between inequality of total income and three attributes of the joint distribution of the component sources: (1) inequality of each marginal distribution, (2) correlations (or some other measures of covariance) between income sources, and (3) the relative size of each source.[81] For example, the Gini coefficient for total income can be written as the sum of the products of the Gini coefficients for each source, the Gini correlation between the source and total income, and the share of the total from each source.[82] Alternatively the coefficient of variation squared, CV^2, of total income can be written in terms of the CV^2 of each source, the correlations between all sources, and the share of the total from each source.

If inequality of a particular source increases then it is easy to attribute the resulting increase in overall inequality to that source. However, it is not obvious how to classify the effects of changes in the correlations among sources or relative sizes of each source, since these factors inherently affect two or more sources. Thus, while identities allow the total to be decomposed into parts, it is often not obvious how to go from this to a meaningful accounting of the sources of the change in inequality, even overlooking the problems caused by behavioral links. Furthermore, these problematic decisions can often lead to very different conclusions (Cancian and Reed in press). For example, Karoly and Burtless (1993) and Karoly (1995) attribute much of the rise in family inequality to changes in wives' earnings, while Cancian, Danziger, and Gottschalk (1993) conclude that most of the increase in family income inequality reflects increases in male earnings inequality and that changes

[81]Other decompositions focus on population subgroups. For example, how much of the increase in family income inequality occurred among families with the same work status of head and how much comes from differences in means across family types. For example, see Jenkins (1995a). These decompositions also make no distinction between endogenous and exogenous forces.

[82]Lerman and Yitzhaki (1985) show the Gini coefficient is a weighted average of Gini's of individual sources with weights that depend on the correlation and shares. The overall Gini can be smaller than the Gini of each source, even if the correlation is positive. See Shorrocks (1982) for an early discussion of the conceptual issues.

in the distribution of wives' earnings played a more modest role.[83] This difference in interpretation partially reflects differences in the ways in which changes in correlations between wives' earnings and other sources and changes in shares of income coming from wives' earnings are treated in these decompositions.

While it is not clear how to apportion the individual pieces to a specific source, accounting identities do allow us to isolate the pieces.[84] Several important stylized facts about the individual pieces stand out in the literature. Wives' earnings have become an increasingly large proportion of family earnings but wives' earnings are only weakly correlated with husbands' earnings. This weak correlation in annual earnings reflects the negative correlation between the labor supply of wives and husbands' earnings, which partially offsets the high correlation in wages. While the correlation in earnings between spouses is low, it has increased in the United States. However, in spite of the positive and rising correlation in spouses earnings, family earnings are more equally distributed than husband's earnings alone. Thus, if the difference between the distributions with and without wives' earnings is taken as a measure of wives' contribution to inequality, then wives' earnings equalize the *level* of inequality in the United States, while they are disequalizing with respect to the *trend* in inequality.

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[83]This study and a similar one for the United Kingdom by Harkness et al. (1996), refers only to inequality among married couple families not the entire population. Because the impact of wives' earnings may affect inequality among married couple families differently, then they effect inequality as a whole, it is difficult to draw inferences for the entire population from these studies.

[84]Comparing decompositions across studies of different countries is further hampered by differences in measures of inequality, which make it impossible to impose a consistent (though arbitrary) method of decomposing changes in inequality. Cancian and Schoeni (1992) use consistent measures across a variety of countries.

While the overall tax and transfer system in the United States is progressive, changes in taxes and transfers during the 1980s reduced progressivity.[85] However, changes in taxes and transfers account for only a small part of the trend in inequality during the 1980s and early 1990s. While the real value of unemployment compensation, welfare benefits and other cash transfers aimed at the poor in the United States fell relative to GDP from 1980 to 1990, this can account for only a small proportion of the trend in post-tax and transfer inequality (OECD 1994a, Table 1c and Chart 1). Changes in taxes also account for little of the trend in inequality in the United States. This might be expected since lower marginal tax rates at the top of the distribution were offset by a higher zero bracket amount and higher personal income tax exemptions which helped the working poor after the 1986 tax reforms. Furthermore, increases in the Earned Income Tax Credit during the 1980s and into the 1990s raised the post-tax earnings at the bottom of the distribution. These changes were, however, much smaller than the impact of the increase in earnings inequality in the United States (Gramlich, Kasten, and Sammartino 1993).

Factors Associated with Changes in Other OECD Countries

Table 4 contrasts the trends in inequality in market income and disposable income in the United States with the experiences of a number of OECD countries. Market income includes the earnings of all persons in the household and all income from interest, dividends, rents and other market sources. Because disposable income is equal to market income plus transfers minus taxes, taxes and transfers have two effects. They lead to behavioral adjustments in labor supply that may affect market income inequality and they add (or subtract) income to yield the distribution of disposable income.

Since earnings constitute the majority of market income for most households and since earnings among family members tend to be positively correlated, it should come as no surprise that our ranking

[85]The difference between the pre- and post-fisc distributions is, however, small compared to other modern nations. See Smeeding and Coder (1995).

of trends in market income in Table 4 closely mirrors the ranking on the basis of individual earnings in Table 2, though not completely so. France, The Netherlands, Belgium, Norway, and Portugal had small increases in the dispersion of market income as well as individual earnings, at least until 1990. But not all nations followed this pattern. For instance, overall earnings inequality in Canada increased less than the distribution of individual earnings (Beach and Slottsve 1994).

Increased receipt of capital income (including deferred capital income from private pensions) and a growing correlation between high capital income and high earnings acted to increase market income inequality in the 1980s in the United Kingdom, Japan, Australia, and New Zealand. However, this factor was not nearly as important as changes in earned income inequality in any of these countries.[86]

Demographic and social change also played a role in accounting for the rise in inequality in OECD countries since 1970, though the relative importance of these changes is still unsettled. Most find the role of demographic factors to be smaller than economic factors (Jenkins 1995; Jantti and Danziger 1994; Fritzell 1993; Gottschalk and Danziger 1995). Burtless and Karoly (1995) and Lerman (1996) attribute a larger role to demographic and social factors than do others.[87] The aging

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[86]On Australia and New Zealand, see Saunders (1994); on the United Kingdom, see Atkinson (1996a) and Jenkins (1995b); on Japan, see Bauer and Mason (1992); and for the United States, see Cowell and Jenkins (1993) and Duncan, Smeeding, and Rogers (1994). Part of the reason why annual income inequality measures do not permit a greater role for changes in capital income is because they report only realized interest, rents and dividends received, ignoring interest paid and both realized and unrealized capital gains. Because of nonrealization and deferral of most asset income, annual income statistics ignore most changes in net worth and thus true capital income (or loss).

[87]The importance of demographic change in the United States is larger if we limit our analysis to working age families or to families with children. But even then, they account for less than half of the difference between 1971 and 1989 with most of their effect coming during the 1970s (Lerman 1996; Karoly and Burtless 1995). The increased level and correlation of women's earnings with men's earnings accounts for a large fraction of the change in family income inequality during the 1980s (Karoly and Burtless 1995).

of the population and policies that have encouraged early retirement helped reduce adjusted income inequality in many advanced countries because the level of adjusted income inequality among the aged is generally less than that found among the non-aged.[88]

Demographic change during the 1970s and 1980s also led to a sharp increase in the fraction of single parent families. In Germany, the United Kingdom, and The Netherlands, during the 1980s these changes were particularly large.[89] Since single parent families have low average income, this demographic shift served to increase inequality.[90]

In summary, changes in earned income inequality appear to be the prime force behind changes in market income during the 1980s in most countries. With earnings more than 70 percent of market income it should not be surprising that increased individual earnings inequality and other changes in earnings within the household would be important factors in accounting for changes in income inequality. Other market forces (such as capital income) and demographic changes also affected market income inequality, though to a lesser degree.

But market income changes and demographic factors do not tell the whole story. More than 25 percent of all households in major OECD nations depend on something other than earnings as the primary source of their gross incomes. In nations such as the United Kingdom, The Netherlands, and Sweden, this figure reaches 30 percent of income (Atkinson, Rainwater, and Smeeding 1995b).

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[88]Exceptions are the United States and Germany. See Smeeding, Rainwater, and Torrey (1993); and Atkinson and Sutherland (1993).

[89]The percent of single parent families with at least one child under 15 out of all families with children under 15 rose from 9.4 percent to 14.6 percent in Belgium, 9.8 to 15.4 percent in Germany, 7.9 to 12.2 percent in The Netherlands, and 13.7 to 19.0 percent in the United Kingdom from 1981/82 to 1990/91. Commission of the European Community (1994).

[90]Births out-of-wedlock also rose in these countries. See the Commission of the European Community (1994). However, out-of-wedlock birth does not necessarily indicate low income in countries such as Sweden where many high income parents live together for long periods outside of marriage.

Countries differed dramatically both in the amount of social protection they offered working families at the beginning of the 1980s and the changes in expenditures on these programs.[91] Chart 2, which shows public cash expenditures on social protection for the nonaged as a percentage of GDP in 1980, 1985, and 1990, illustrates the diversity of experiences.[92] Countries are ranked according to spending in 1980. While these expenditures do not cover all forms of transfers to the non-aged population, they show the same general patterns that would be found using alternative definitions. Sweden, The Netherlands, Denmark, and Finland all spent 10 percent or more of the GDP on social protection for the non-aged in 1980, and increased their expenditures between 1980 and 1990. While Norway spent less than 10 percent of GDP on these programs in 1980, this fraction had risen to 14 percent by 1990. In contrast, Japan spent only 2.4 percent of GDP on these programs in 1980 and even less in 1990. Likewise, expenditures on these programs fell from only 4.5 percent of GDP in 1980 in the United States and from 3.4 percent in Italy. Thus, both the level and trends in expenditures varied widely across countries. The Nordic and northern European countries, which had the lowest levels of inequality and then some of the smallest increases in income inequality, were also the countries with the greatest social protection.

The growth in transfers during the 1980s partially reflects increased take-up rates as many of these countries experienced greater demands on social protection programs as a result of widening inequality of market income. In fact, in the more "activist" European and Nordic social welfare states, social expenditure trends in the 1980s can be better described as adaptions to changing

[91]This includes legislated discretionary changes and the automatic response to changing market income circumstances of households.

[92]Social protection is a classification used by the OECD. It includes disability and disability services, employment promotion benefits, unemployment compensation, family allowances, welfare benefits, and other miscellaneous items. Social protection in Chart 2 excludes all cash benefits to the aged and survivors, health benefits, and education benefits.

circumstances than as alterations in the basic systems of social protection (Ploug and Kvist 1994; Commission of the European Community 1993; Gardiner 1993). While limitations on some types of social insurance benefits (e.g., unemployment, disability) were introduced, and indexation formulae were made less generous in some European and Scandinavian countries, there were also increases in family benefits and welfare benefits for the long-term unemployed and for single parents in Australia, Denmark, France, Germany, Norway, and Finland.

Perhaps even more important were changes in the composition of spending and its effectiveness in replacing lost market income due to unemployment and disability.[93] For instance, in nations such as Canada and Finland, generous long-term unemployment benefits significantly dampened the effects of higher unemployment on disposable income inequality. As a result of increased take-up rates and other policy changes, the decade ended with the vast majority of countries spending more on social protection programs than ten years earlier.

While the level of social spending is negatively correlated with changes in income inequality, there is little relationship between retrenchment and increases in inequality in most countries. This undoubtedly reflects the fact that some countries that reduced their expenditures on the non-aged (Belgium, Germany, and Italy) experienced few new demands in their programs since inequality of market income grew only modestly. Some of the nations with small- to medium-sized social protection systems whose transfer systems automatically reacted to the rising tide of market income inequality with higher outlays (Australia and Ireland) were unable to stem that tide. And in two nations (the United Kingdom and New Zealand), reductions in benefit levels for the nonaged helped

[93]See Gottschalk, Gustafsson, and Palmer (1996); OECD (1994a); Gardiner (1993); Ploug and Kvist (1994); and the Commission of the European Community (1993). All deal with this and similar issues.

to exacerbate inequality, even though overall social expenditures increased in both nations during the 1980s (Atkinson 1993; Jenkins 1996; Hills 1995).

There were equally large changes in tax policies during the 1980s. The lowering of top income tax rates was not limited to the United States. The top income tax rates were cut in 26 of the 28 industrialized countries surveyed in Messere (1993). These reductions were not only widespread but large in many of these countries. Top federal income tax rates fell from 50 to 28 percent in the United States, 70 to 40 percent in the United Kingdom, 48 to 14 percent in Norway, and from 78 to 50 percent in Sweden, though some rose again by small amounts (e.g., from 28 to 32 percent in the United States in 1993, and 50 to 55 percent in Sweden in 1993). Additional tax progressivity was introduced by changes such as the family benefit in the United Kingdom and the Earned Income Tax Credit in the United States, and taxable income definitions were broadened in many nations.

Reductions in the top marginal tax rates did not necessarily lead to declines in taxes collected on families at the top of the distribution. Many of these families paid higher taxes as a result of increased income subject to tax and an increase in other taxes that make up for income tax reductions. In fact, overall tax revenues rose in most OECD countries, owing mainly to increased payroll taxes for social retirement, disability and health care, increased VAT for general revenue, and increased employment-related taxes levied on employers to cover higher unemployment outlays (Messere 1993; OECD 1994).

Chart 3 shows the average federal income and payroll tax rates paid by families in the top and second decile groups of the distribution of disposable income in the early 1980s and late 1980s early 1990s. These figures show that in most countries (The Netherlands, Sweden, West Germany, and Canada), average tax rates increased for families at both ends of the distribution, with the larger increases occurring at the top. In Australia, France, and the United Kingdom, average tax rates

increased at the top and decreased at the bottom. It is only in the United States and Norway that average federal tax rates declined at the top and increased at the bottom of the distribution.

Our reading of the limited cross-national information on changes in tax and transfer structures is that changes in taxes paid and transfers received were largely offsetting to the changes in the distribution of pre-tax and transfer incomes. This would occur automatically in countries with progressive tax and transfer systems. How much of these changes came from explicit policy changes as compared to changes in economic behavior of households is an important question that remains to be answered.[94] The links between changes in tax and transfer policy and changes in the distribution of disposable income in different countries are certainly not well understood at this stage.

In nations with weak safety nets and less activist governments, changes in market incomes were dominant. Here, the United States, Australia, and Japan stand out as the three best examples. In the United Kingdom there appears to have been such a massive change in market income inequality that the British tax and transfer system was not able to overcome these forces and may even have contributed to them. While income and other tax changes have benefitted the well-to-do in a small number of countries, means tested benefits were increased in some nations to cushion reductions in other types of benefits (e.g., unemployment), producing some offset to the disequalizing trend in market income, but also reducing work effort.[95] And there are clearly exceptions. Finland, Canada, and Norway experienced smaller increases in inequality of disposable income than would be suggested by their changes in inequality of earnings and market incomes, and Sweden and New Zealand experienced large increases compared to the small increase in earnings inequality.

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[94]See Auerbach and Slemrod (in press) for a survey of behavioral effects of the United States 1986 Tax Reform.

[95]See Johnson and Webb (1993) and Gardiner (1993). It may also be true that expansion of the safety net for single parents produced a marked decline in their labor market activity. See Moffitt (1992) for a review of United States evidence on this topic.

A pressing area for future research is to isolate the impact of changes in tax and transfer policies on the distribution of family income. This will require an explicit model of the endogenous increases in transfers that accompany declines in earnings at the bottom of the distribution and an explicit model of the impact of changes in tax and transfers on the distribution of pre-tax income. Only then will it be possible to isolate the relative importance of exogenous changes in the distribution of pre-tax income from both exogenous and endogenous changes in taxes and transfers.

V. Summary and Conclusions

Concerns about earnings inequality and joblessness have moved to the top of the social agenda in many OECD countries. The growing internationalization of the economy and labor market and government reactions to social and economic issues such as population aging, divorce , and increased female labor force participation rates, have added to our interest in how successful different economies are in dealing with these issues.

Over the past decade, new data resources have expanded to meet these interests. Much has been learned from studies of annual cross-sectional household income microdata. New frontiers will include increased usage of national household income panel datasets which will follow the same individuals over longer time horizons, and greater usage of cross-national labor force surveys and surveys that focus on expenditures and wealth.

Yet, while great strides have been made to provide a factual basis for cross-national studies, much less progress has been made in providing a tight theoretical framework to analyze these data. Better structural models of income distribution and redistribution that can be applied across nations are badly needed. Ideally, an overall framework would simultaneously model the generation of all sources of income (labor income, capital income, private transfers, public transfers, and all forms of

taxation) as well as the formation of income sharing units. While most of the components of such a model were identified as early as the mid-1960s, our progress toward building such a model has been slow (Meade 1964). Atkinson (1996b) has made a first step at one component of such a model, and has hinted at other components. If we are to understand why we observe the extent and pattern of inequality levels and trends that are extant in this review, an overall conceptual framework with empirically testable components is the next big step that must be taken.

Table 1. Earnings Distributions in Selected OECD Countries in the Mid-1980s and Early 1990s: Percentile of Median and Decile Ratios[a]

Country (1)	Year (2)	Percent with Zero Earnings[b] (3)	Full-Year, Full-Time Workers[c] P10 (4)	P90 (5)	P90/P10 (6)	P80/P20 (7)	All Workers[d] P10 (8)	P90 (9)	P90/P10 (10)	P80/P20 (11)
Males										
Australia	1989	20.8	56.8	160.6	2.8	1.9	54.0	161.6	3.0	1.9
Canada	1987	13.2	38.0	174.9	4.6	2.3	36.3	176.0	4.7	2.6
Finland	1987	15.1	---	---	---	---	28.1	169.7	6.0	2.1
Germany	1984	16.3	63.9	162.0	2.5	1.8	58.0	163.9	2.8	1.9
Israel	1992	28.3	---	---	---	---	47.5	216.5	4.7	2.7
The Netherlands	1987	22.3	71.5	172.8	2.4	1.4	69.3	168.7	2.4	1.7
Sweden	1992	11.1	48.2	166.4	3.5	1.8	43.4	167.0	3.9	1.8
United Kingdom	1986	29.5	61.4	188.1	3.1	2.1	60.7	186.3	3.1	2.1
United States	1991	16.7	33.6	193.1	5.7	3.0	28.1	203.7	7.2	3.5
Females										
Australia	1989	35.9	49.2	156.3	3.2	1.9	23.2	183.0	5.7	3.4
Canada	1987	30.6	34.7	179.1	5.2	2.6	27.9	181.8	6.5	3.2
Finland	1987	16.8	---	---	---	---	32.8	152.2	4.6	2.3
Germany	1984	47.9	45.9	156.0	3.4	2.0	23.1	180.6	7.8	3.4
Israel	1992	47.4	---	---	---	---	35.3	228.3	6.5	3.0
The Netherlands	1987	62.0	72.6	173.5	2.4	1.7	29.9	185.1	6.2	3.1
Sweden	1992	12.3	37.9	153.2	4.0	2.2	30.7	156.6	5.1	2.4
United Kingdom	1986	50.1	64.9	181.0	2.8	2.0	34.6	223.0	6.4	3.5
United States	1991	25.7	40.0	190.0	4.8	2.5	17.7	206.0	11.6	4.0

[a]Persons aged 25 to 54, living in households with zero self-employment income. Wages are net of employer contributions to social insurance (payroll taxes), but gross of employee payroll taxes.

[b]Percent of all persons aged 25 to 54 with zero earnings.

[c]Full Year: 50 full-time weeks or more a year; Full-Time: 35 or more working hours a week. Full year full-time workers cannot be identified in the data for Finland or Israel.

[d]All workers with nonzero wage and salary income.

Source: Authors' tabulations of Luxembourg Income Study database.

Table 2. Changes in Male Earnings Inequality Over the 1980s in Industrialized Countries[a]

Country (1)	Authors (2)	Years (3)	Overall Earnings Inequality (4)	Returns to Experience (5)	Returns to Education or Occupation[b] (6)	Earnings Inequality Within Group (7)
Australia	*Borland (1992)	1981-89	+	++	mixed	++
	Gottschalk and Joyce (1995)	1981-85	++	+++	-	+++
	Gregory (1993)	1976-90	+++	na	-	na
Canada	Blackburn and Bloom (1994)	1979-87	++	+++	-	+++
	Gottschalk and Joyce (1995)	1981-87	++	++	+	++
Finland	*Eriksson and Jantti (1994)[c]	1980-90	0	0	0	0
	Gottschalk and Joyce (1995)	1987-91	+	-	-	0
France	Katz, Loveman and Blanchflower (1995)	1976-87	+	+	(0)	mixed
	Gottschalk and Joyce (1995)	1979-84	++[a]	+++[b]	(-)	+
Germany	*Abraham and Houseman (1995)	1983-88	0	0	0	na
Israel	Gottschalk and Joyce (1995)	1979-86	++	+++	++[a]	0
Italy	Erickson and Ichino (1995)	1978-87	0[c]	0[c]	0[a]	-[c]
Japan	Katz, Loveman and Blanchflower (1995)	1974-90	+[b]	mixed	+	na
The Netherlands	*Hartog, Oosterbeek and Teulings (1992)	1979-89	0	0	-	+
	Gottschalk and Joyce (1995)	1983-87	+[b]	+++	-	+
Sweden	*Edin and Holmlund (1995)[d]	1984-91	++	+	++	+++
	Gottschalk and Joyce (1995)	1981-87	+[b]	-	(+++)	+++
United Kingdom	Katz, Loveman and Blanchflower (1995)	1979-90	+++	++	(++)	+++
	Gottschalk and Joyce (1995)	1979-86	+++	+++	(+++)	+++

[a]Classification for studies that compare country to United States in same time period (for measures, see Apendix A):
+++ increase in inequality at least 80 percent as large as in the United States
++ increase 50 to 80 percent as large as in the United States
+ increase 10 to 50 percent as large as in the United States
0 increase from -10 to +10 percent of change in the United States
- decrease greater than -10.

[*]Classification for other countries based on authors' qualitative comparison.

[b]Parenthesis signify returns to higher paid occupations (e.g., non-manual). Wherever possible returns to education are for recent labor market entrants.

[c]Small changes over decade reflect decline followed by sharp increase after 1985.

[d]Inequality was constant from 1974-84 in this study.

Table 3. Trends in United States Income Inequality: 1979-1993
Percentiles of Adjusted Disposable Personal Income

	Relative						
Year	**P10/P50**	**P20/P50**	**P80/P50**	**P90/P50**	**P90/P10**	**P80/P20**	**Gini**
1979	40.4	57.3	154.6	190.2	4.71	2.70	0.313
1980	39.9	56.7	154.2	189.7	4.75	2.72	0.310
1981	39.2	55.6	155.2	192.7	4.92	2.79	0.318
1982	37.7	54.3	159.0	200.2	5.31	2.93	0.331
1983	36.7	53.1	161.8	203.3	5.55	3.05	0.339
1984	36.5	53.1	162.2	204.4	5.60	3.06	0.340
1985	36.5	53.3	162.9	205.0	5.61	3.05	0.342
1986	35.5	52.9	162.6	204.7	5.77	3.07	0.341
1987	34.8	52.3	161.4	201.2	5.78	3.09	0.342
1988	35.1	52.5	162.4	205.0	5.85	3.10	0.347
1989	35.8	52.6	162.1	205.9	5.75	3.08	0.351
1990	35.9	53.1	163.6	207.6	5.79	3.08	0.352
1991	35.5	52.8	162.9	207.7	5.79	3.09	0.350
1992	34.7	52.0	164.6	209.2	6.03	3.16	0.357
1993[a]	34.4	51.9	167.9	214.1	6.22	3.23	0.363
1991/1979*100	86	92	109	113	131	119	116

[a]1993 income is topcoded at the 1983-1991 level of $299,000 per household and reflects population weights from the 1990 census.

Source: U.S. Department of Commerce, Bureau of the Census (1995b).

Table 4. Changes in Market and Disposable Income Inequality[a]

Country	Source	Years Change	Market Income Inequality[b]	Disposable Income Inequality
United Kingdom	Goodman and Webb (1994) Atkinson (1993)	1981-91	+++	++++
United States	U.S. Bureau of the Census (1995a)	1980-93	+++	+++
Sweden	Gustaffson and Palmer (1993) Statistics Sweden (1995)	1980-93	+++	+++
Australia	Saunders (1994)	1980-81 1989-90	++	++
Denmark	Aaberge et al. (1995)	1981-90	++	++
New Zealand	Saunders (1994)	1981-89	+	++
Japan	Tachabanaki and Yagi (1995) Bauer and Mason (1992)	1981-90	+	++
The Netherlands	Atkinson, Rainwater, and Smeeding (1995a) Muffels andNellisen (1996)	1981-89	+	+
Norway	Epland (1992)	1982-89	+	+
Belgium	Cantillon et al. (1994)	1985-92	+	+
Canada	Beach and Slottsve (1994) Statistics Canada (1994)	1980-92	+	0
Israel	LIS (1995)	1979-92	+	0
Finland	Uusitalo (1995)	1981-92	+++	0
France	Concialdi (1996)	1979-89	0	0
Portugal	Rodrigues (1993)	1980-90	0	0
Spain	LIS (1995)	1980-90	na	0
Ireland	Callan and Noland (1993)	1980-87	+	0
West Germany	Burkhauser and Poupore (1996) Hauser and Becker (1993)	1983-90	+	0
Italy	Brandolini and Sestito (1993) Eriksson and Ichino (1995)	1977-91	--	--

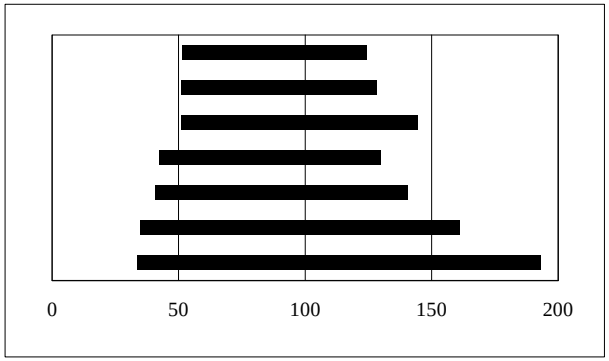
[a]Degree of change is based on Appendix Table B-1 and is coded as follows:

Designation	Interpretation	Range of Change in Gini
--	small decline	-5 percent or more
0	zero	-4 to +4 percent
+	small increase	5 to 10 percent
++	moderate increase	10 to 15 percent
+++	large increase	16 to 29 percent
++++	extremely large increase	30 percent or more

[b]Most studies show changes in market income inequality, whilke still others do not discuss market income changes at all. The latter are marked “na.”

Figure 1. Real Earnings Distribution Comparison for Full-Time Full-Year Males

(all figures in 1991 United States dollars)[a]

	Low Earnings (P10)	Length of bars represents the gap between high and low income individuals	High Earnings (P90)	Ratio of High to Low Earnings (Decile Ratio)	Ratio of Real National Median To Real United States Median
The Netherlands 1987	51		124	2.40	72
Germany 1984	51		128	2.50	79
Australia 1989/90	51		144	2.82	90
United Kingdom 1986	42		130	3.10	69
Sweden 1992	41		140	3.50	84
Canada 1987	35		161	4.60	92
United States 1991	34		193	5.70	100
Average[b]	44		146	3.52	84

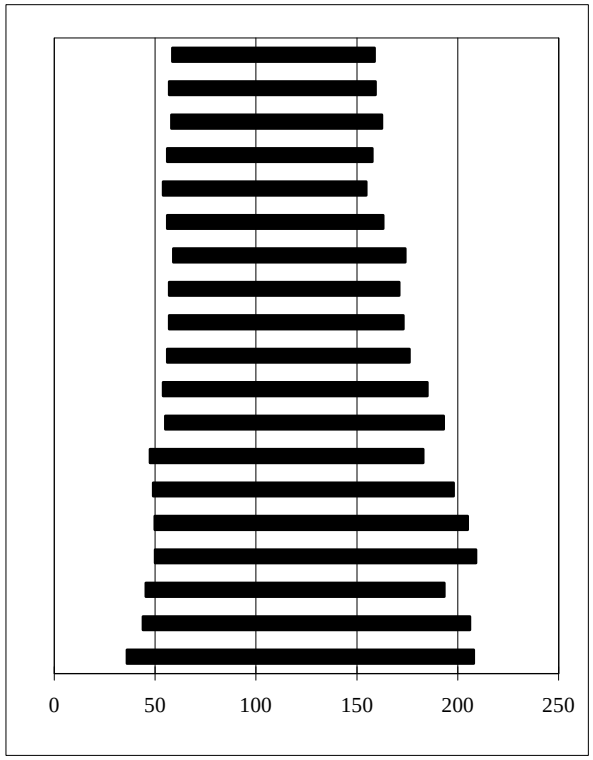
Source: Authors' calculations using the Luxembourg Income Study database.

[a]Numbers give real earnings (1991 United States Dollars) as a percent of the United States median.

[b]Simple 7 nation average.

Figure 2. Comparisons of Levels of Income Inequality: The Gap Between Low and High Income[a] Individuals
(numbers given are percent of median in each nation and Gini coefficient)

	Low[b] (P10)	Length of bars represents the gap between high and low income individuals	High[c] (P90)	Ratio of High to Low[d] (Decile Ratio)	Gini Coefficient[e]
Finland 1991	58		158	2.74	0.227
Sweden 1992	57		159	2.78	0.229
Belgium 1992	58		163	2.79	0.230
Norway 1991	56		158	2.80	0.230
Denmark 1992	54		155	2.86	0.239
Austria 1987 [f]	56		163	2.89	0.227
Luxembourg 1985	59		174	2.95	0.238
Germany 1984	57		171	3.01	0.249
The Netherlands 1991	57		173	3.05	0.268
Italy 1991	56		176	3.14	0.255
Switzerland 1982	54		185	3.43	0.311
France 1984	55		193	3.48	0.294
Canada 1991	47		183	3.90	0.285
Spain 1990	49		198	4.02	0.306
Israel 1992	50		205	4.12	0.305
Ireland 1987	50		209	4.23	0.328
Australia 1989/90	45		193	4.30	0.308
United Kingdom 1991	44		206	4.67	0.335
United States 1991	36		208	5.78	0.350
Average[g]	53		180	3.52	0.274



Source: Authors' calculations using the Luxembourg Income Study database.

[a]Income is household disposable income per equivalent adult using an equivalence scale factor of E=0.5.

[b]Relative income for individuals who are lower than 90 percent of the individuals in the country and higher than 10 percent of the individuals, as a percent of national median.

[c]Relative income for individuals who are higher than 90 percent of the individuals in the county and lower than 10 percent of the individuals, as a percent of national median.

[d]Ratio of 90th to 10th percentiles, or decile ratio.

[e]Gini coefficients are based on incomes which are bottom coded at 1 percent of disposable personal income and top coded at 10 times the median income.

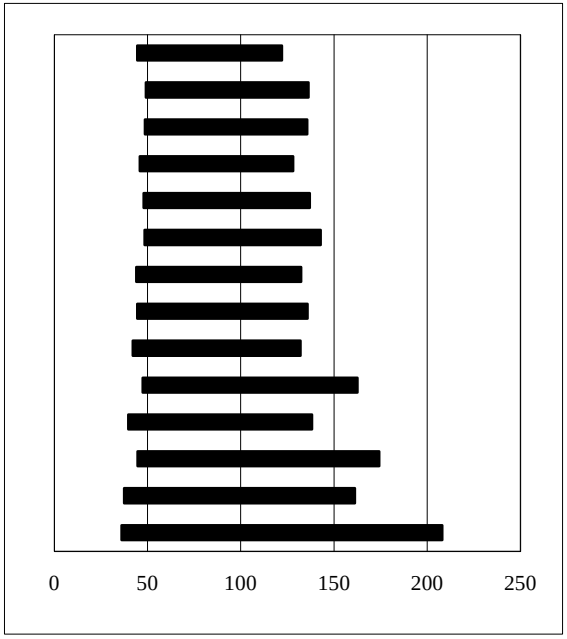
[f]Austria excludes self-employment income in its survey.

[g]Simple 19 nation average.

Figure 3. Real Income Distribution Comparison

(numbers given are percent of United States median income in 1991 United States dollars)[a]

	Low Disposable Income[b] (P10)	Length of bars represents the gap between high and low income individuals	High Disposable Income[c] (P90)	Ratio of High to Low Incomes (Decile Ratio)	Ratio of Real National Median To Real United States Median
Finland 1991	44		122	2.74	77
Sweden 1992	49		136	2.78	86
Belgium 1992	49		136	2.79	83
Norway 1991	46		128	2.80	81
Denmark 1992	48		137	2.86	89
Luxembourg 1985	48		143	2.95	83
Germany 1984	44		132	3.01	77
The Netherlands 1991	45		136	3.05	83
Italy 1991	42		132	3.14	75
Switzerland 1982	47		163	3.43	88
France 1984	40		138	3.48	72
Canada 1991	45		174	3.90	95
Australia 1989/90	38		161	4.30	83
United States 1991	36		208	5.78	100
AVERAGE[d]	44		146	3.36	84



Source: Authors' calculations using the Luxembourg Income Study database.

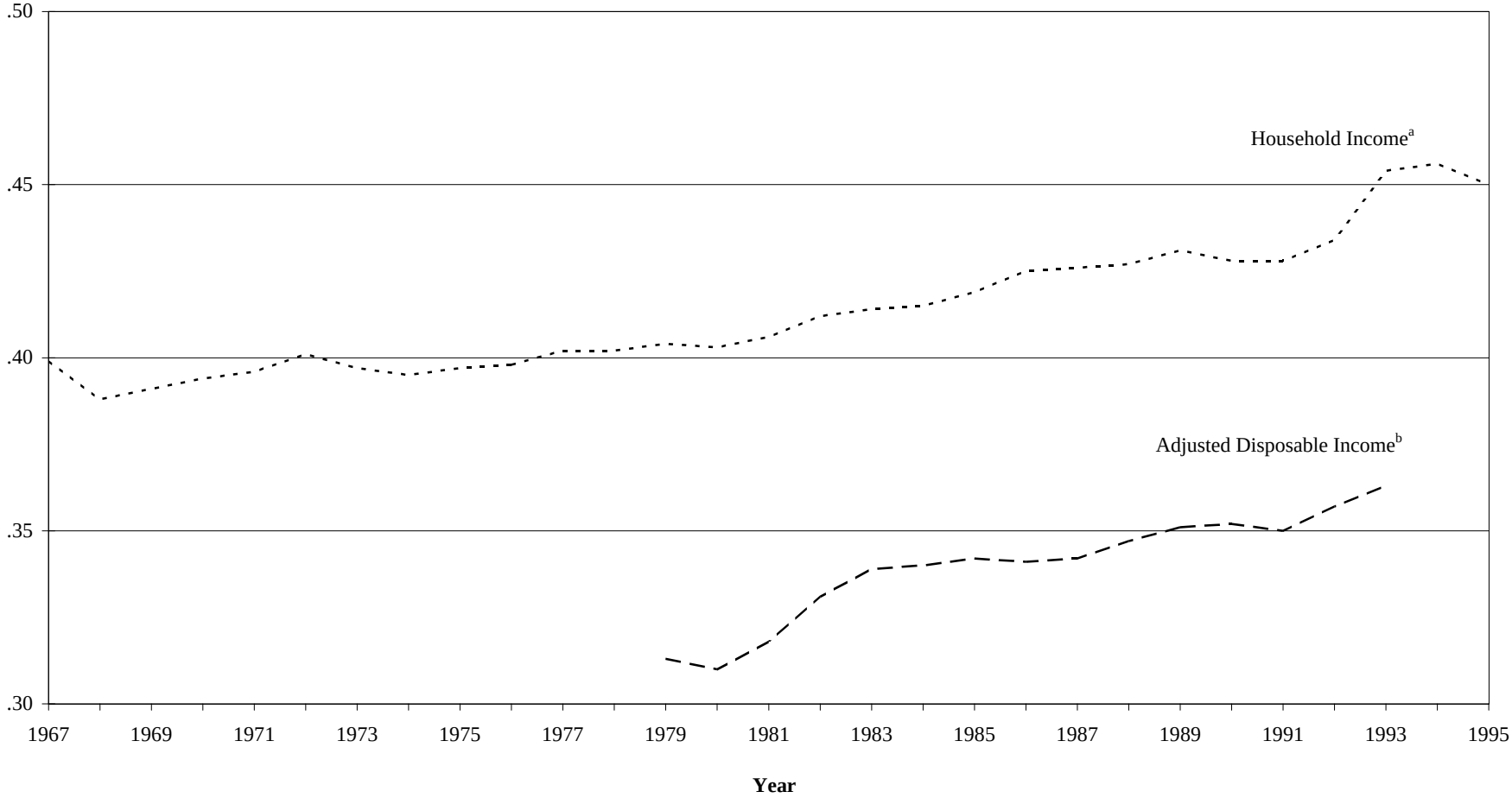
[a]Unit of aggregation is the household and units are weighted by the number of persons in the household. Incomes are adjusted by E=0.5 where adjusted disposable income (DPI)=actual DPI divided by household size (s) to the power E: Adjusted DPI = DPI/s^E.

[b]Relative income for individuals who are below 90 percent of the individuals in the country and more affluent than 10 percent of the individuals in the country. Numbers give real income (1991 United States dollars) as a percent of the United States median.

[c]Relative income for individuals who are more affluent than 90 percent of the individuals in the country and below 10 percent of the individuals in the country. Numbers give real income (1991 United States dollars) as a percent of the United States median.

[d]Simple average, excluding United States.

Figure 4. Income Inequality in the United States: 1967-1995
Gini Coefficient for Family Income and Adjusted Disposable Income

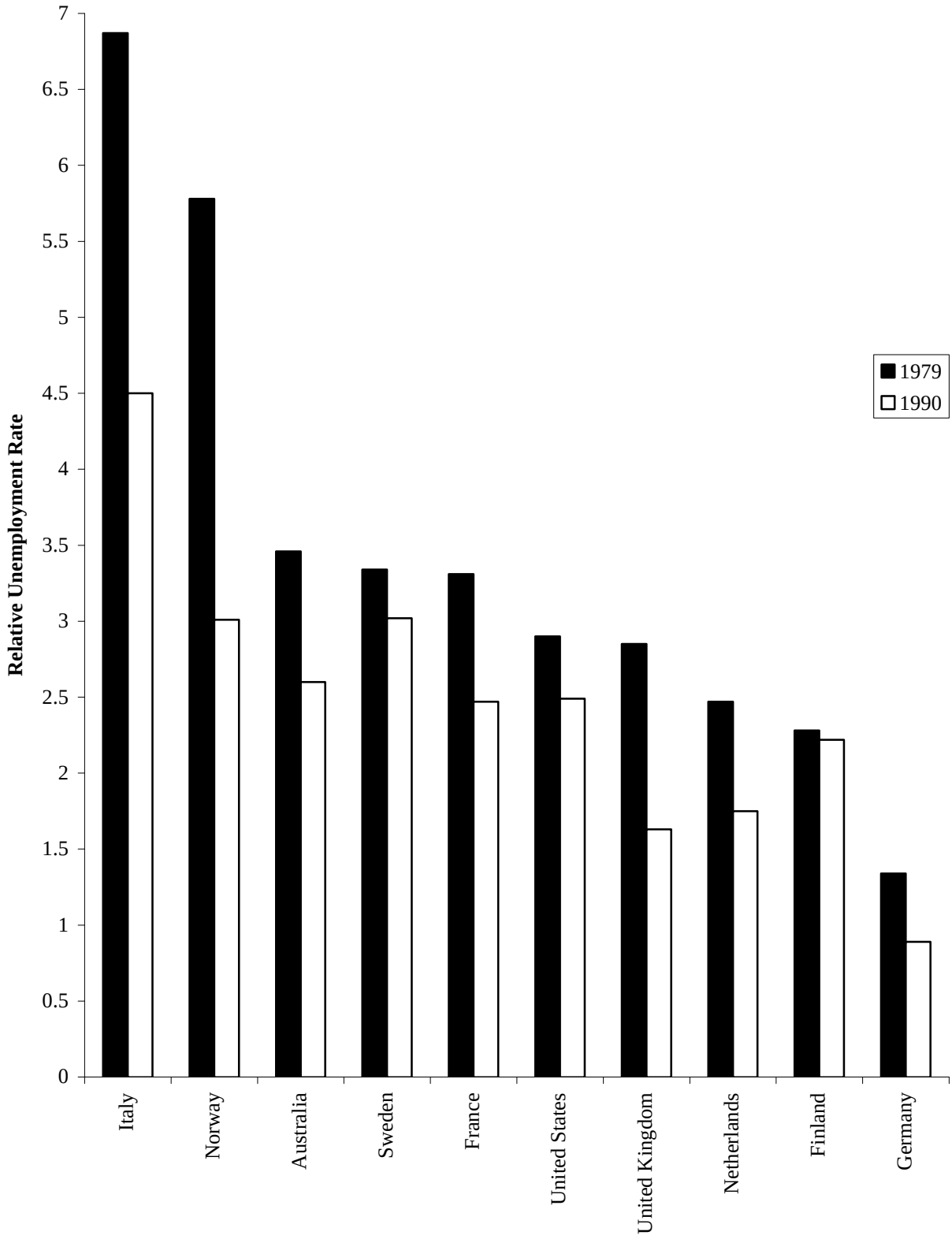


Sources: United States Department of Commerce Bureau of the Census (1996) table B-6; United States Department of Commerce Bureau of the Census (1995b).

[a]Household income series is weighted by households (all persons sharing the same living facilities) and includes all sources of money income, including earnings and transfer income.

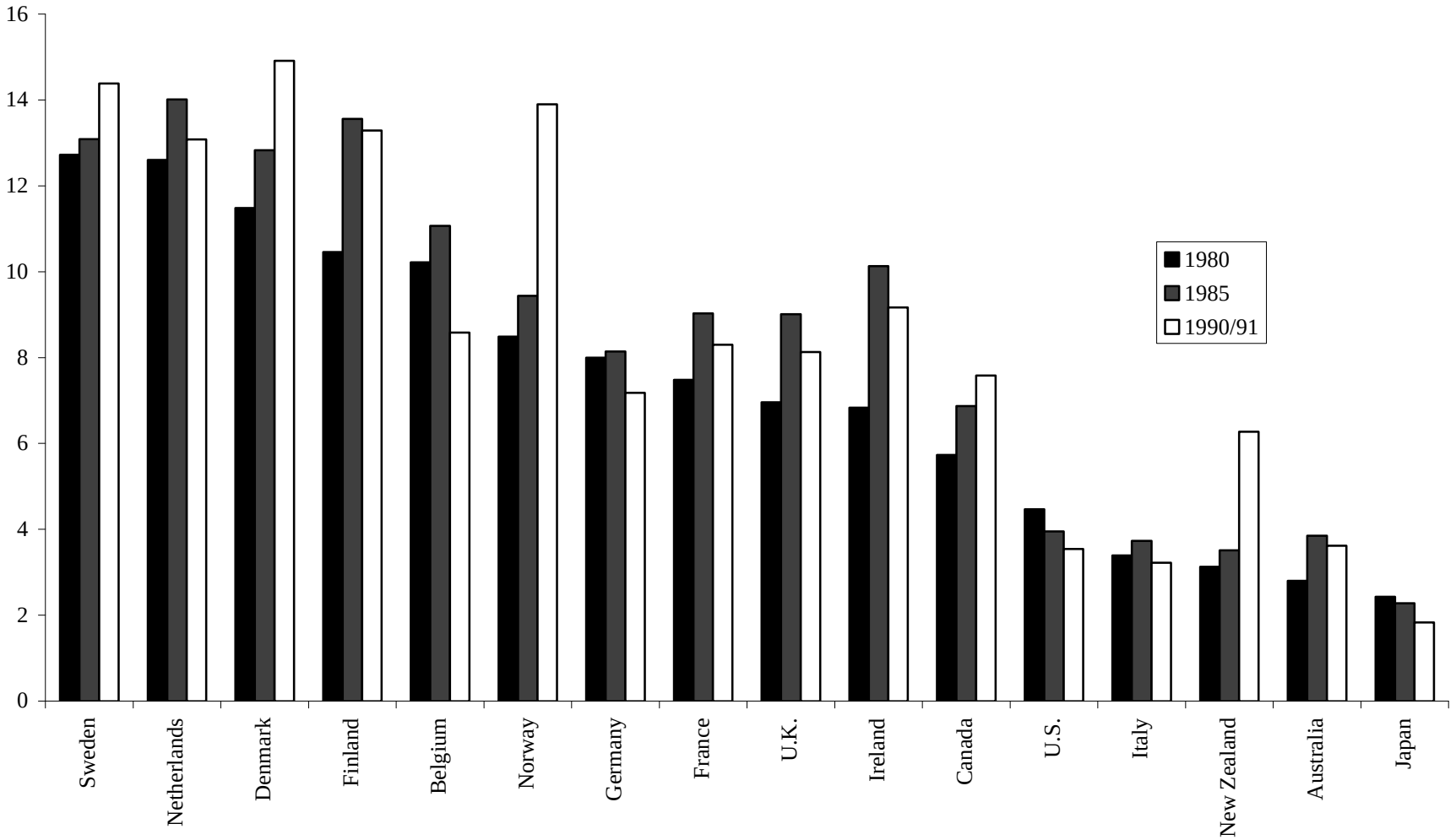
[b]Adjusted disposable income adds food stamps and other cash income components and subtracts federal income and payroll taxes. It is based on households as an income aggregation unit, but weighted by the number of persons in each household, 1979-1993 only. This concept is the same as the one used in LIS. The figures are shown in Table 3.

Chart 1. Youth Unemployment Rates Relative to Adults



Source: OECD (1994c) Job Studies, Table 1.17, p.43

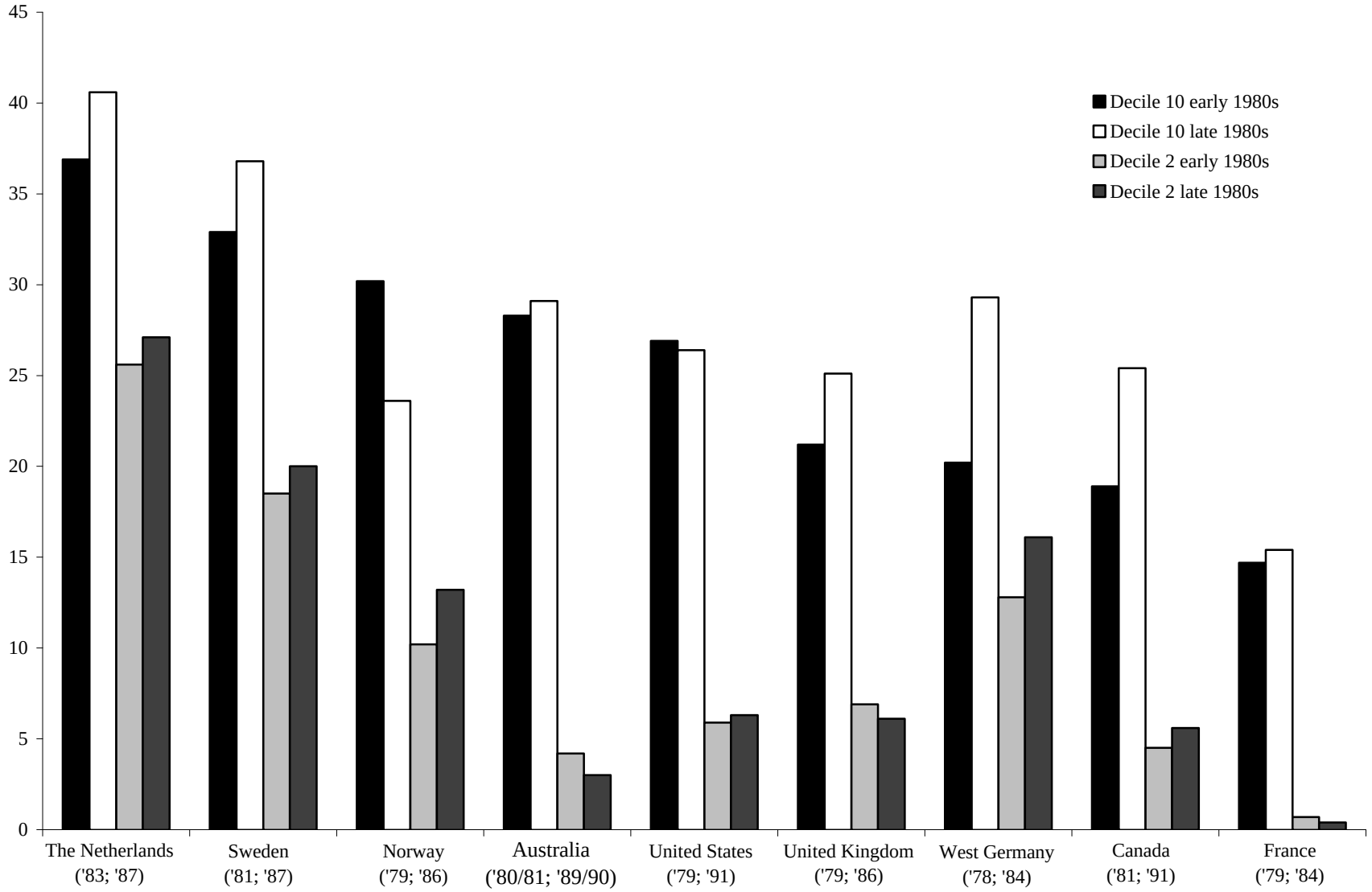
Chart 2. Expenditures on Social Programs Among the Nonaged as Percent of GDP in 1980, 1985, and 1990/91



Source: OECD(1994b), Tables 1b, 1c

Note: These include cash benefits for disability and disability services, employment promotion benefits, unemployment compensation, family allowances, welfare benefits, and other miscellaneous items. Excludes all cash benefits to the aged and survivors, health benefits, and education benefits.

Chart 3. Average Tax Rates for Households in the Second and Tenth Deciles in Selected OECD Countries



Source: Authors' calculations using the Luxembourg Income Study database.

Note: Average tax rates are total income and employee payroll tax as a percentage of gross cash income for households ranked by household disposable income adjusted for family size (E=0.5).

Appendix Table A-1: Absolute and Relative Changes in Inequality

					Absolute Changes			Relative Changes		
	Source (1)	Inequality Measure (2)	Value in Initial Year (3)	Value in Terminal Year (4)	Change Per Year (5)	U.S. Change Per Year (6)	(5)/(6) (7)	Percentage Change Per Year (8)	U.S. Percentage Change Per Year (9)	(8)/(9) (10
Blackburn and Bloom (1994)										
Canada (1979-87)										
Overall	Table 7.8	In var	.270	.288	.002	.004	.529	.008	.014	.575
Between Ed	Table 7.9	College coef	.475	.465	-.001	.010	-.122	-.003	.017	-.158
Between Ex	Table 7.9	Age coefs eval at 24	.0224	.027	.000	.000	3.080	.015	.004	3.446
Within (univ ed)	Table 7.9	Sd of resid	.485	.501	.002	-.001	-1.778	.004	-.002	-1.732
United States (1979-87)										
Overall	Table 7.8	In var	.286	.320	.004	.004	1.000	.014	.014	1.000
Between Ed	Table 7.9	College coef	.570	.652	.010	.010	1.000	.017	.017	1.000
Between Ex	Table 7.9	Age coefs eval at 24	.028	.029	.000	.000	1.000	.004	.004	1.000
Within (univ ed)	Table 7.9	Sd of resid	.484	.475	-.001	-.001	1.000	-.002	-.002	1.000
Erickson and Ichino (1995)										
Italy (1978-87)										
Overall	Table III.4A	St dev ln(w)	.402	.355	-.005	.012	-.439	-.014	.020	-.677
Between Ed	Table III.3A	College coef	.220	.260	.004	.009	.500	.019	.023	.812
Between Ex	Table III.3A	Exp coefs eval at 2	.037	.026	-.001	.000	-10.036	-.040	.003	-13.914
Within (univ ed)	Table III.4A	Sd of resid	.350	.308	-.005	.010	-.447	-.014	.021	-.690
United States (1978-87)										
Overall	Table III.4A	St dev ln(w)	.531	.638	.012	.012	1.000	.020	.020	1.000
Between Ed	Table III.3A	College coef	.350	.430	.009	.009	1.000	.023	.023	1.000
Between Ex	Table III.3A	Exp coefs eval at 2	.042	.043	.000	.000	1.000	.003	.003	1.000
Within (univ ed)	Table III.4A	Sd of resid	.462	.556	.010	.010	1.000	.021	.021	1.000
Full-Time Workers										
Gottschalk and Joyce (1995)										
Australia (1981-85)										
Overall	Table 1	Coef Variation	.334	.357	.006	.008	.732	.017	.017	.987
Between Ed	Table 2	college coef	.390	.230	-.040	.024	-1.647	-.132	.079	-1.670
Between Ex	Table 2	age coefs eval at 24	.025	.034	.002	.001	1.508	.076	.045	1.686
Within	Table 4	Sd of resid	.500	.620	.030	.014	2.100	.054	.022	2.404

Appendix Table A-1: Continued

					Absolute Changes			Relative Changes		
	Source (1)	Inequality Measure (2)	Value in Initial Year (3)	Value in Terminal Year (4)	Change Per Year (5)	U.S. Change Per Year (6)	(5)/(6) (7)	Percentage Change Per Year (8)	U.S. Percentage Change Per Year (9)	(8)/(9) (10
The Netherlands (1983-87)										
Overall	Table 1	Coef Variation	.304	.315	.003	.008	.350	.009	.017	.527
Between Ed	Table 2	college coef	.400	.280	-.030	.024	-1.235	-.089	.079	-1.128
Between Ex	Table 2	age coefs eval at 24	.030	.036	.002	.001	1.117	.050	.045	1.110
Within	Table 4	Sd of resid	.310	.320	.003	.014	.175	.008	.022	.355
Sweden (1981-87)										
Overall	Table 1	Coef Variation	.276	.298	.004	.008	.467	.013	.017	.758
Between Occ	Table 2	manager coef	.450	.570	.020	.003	7.000	.039	.012	3.308
Between Ex	Table 2	age coefs eval at 24	.029	.022	-.001	.002	-.722	-.048	.048	-.992
Within	Table 4	Sd of resid	.330	.400	.012	.001	8.167	.032	.004	9.089
United Kingdom (1979-86)										
Overall	Table 1	Coef Variation	.329	.377	.007	.008	.873	.019	.017	1.154
Between Occ	Table 2	manager coef	.150	.220	.010	.003	3.500	.055	.012	4.593
Between Ex	Table 2	age coefs eval at 24	.017	.032	.002	.002	1.267	.088	.048	1.813
Within	Table 4	Sd of resid	.400	.410	.001	.001	1.000	.004	.004	1.000
United States (ed) (1979-86)										
Overall	Table 1	Coef Variation	.439	.494	.008	.008	1.000	.017	.017	1.000
Between Ed	Table 2	college coef	.230	.400	.024	.024	1.000	.079	.079	1.000
Between Ex	Table 2	age coefs eval at 24	.028	.038	.001	.001	1.000	.045	.045	1.000
Within	Table 4	Sd of resid	.590	.690	.014	.014	1.000	.022	.022	1.000
United States (occ) (1979-86)										
Between Occ	Table 3	manager coef	.230	.250	.003	.003	1.000	.012	.012	1.000
Between Ex	Table 3	age coefs eval at 24	.029	.041	.002	.002	1.000	.048	.048	1.000
Within	Table 4	Sd of resid	.400	.410	.001	.001	1.000	.004	.004	1.000
All Workers										
Canada (1981-87										
Overall	Table 1	Coef Variation	.421	.464	.007	.010	.687	.016	.021	.761
Between Ed	Table 2	college coef	.280	.340	.010	.023	.438	.032	.078	.414
Between Ex	Table 2	age coefs eval at 24	.038	.044	.001	.001	.724	.025	.034	.747
Within	Table 4	Sd of resid	.600	.700	.017	.021	.778	.026	.030	.854

Appendix Table A-1: Continued

					Absolute Changes			Relative Changes		
	Source (1)	Inequality Measure (2)	Value in Initial Year (3)	Value in Terminal Year (4)	Change Per Year (5)	U.S. Change Per Year (6)	(5)/(6) (7)	Percentage Change Per Year (8)	U.S. Percentage Change Per Year (9)	(8)/(9) (10
Finland (1987-91)										
Overall	Table 1	Coef Variation	.460	.474	.003	.010	.336	.007	.021	.352
Between Ed	Table 2	college coef	.610	.560	-.013	.023	-.547	-.021	.078	-.274
Between Ex	Table 2	age coefs eval at 24	.070	.032	-.009	.001	-6.619	-.192	.034	-5.695
Within	Table 4	Sd of resid	1.130	1.130	.000	.021	.000	.000	.030	.000
France (1979-84)										
Overall	Table 1	Coef Variation	.396	.434	.008	.010	.729	.018	.021	.860
Between Occ	Table 2	manager coef	.390	.350	-.008	.009	-.933	-.022	.034	-.628
Between Ex	Table 2	age coefs eval at 24	.034	.041	.002	.003	.493	.041	.078	.526
Within	Table 4	Sd of resid	.450	.480	.006	.020	.300	.013	.028	.457
Israel (1979-86)										
Overall	Table 1	Coef Variation	.470	.512	.006	.010	.575	.012	.021	.574
Between Occ	Table 2	college coef	.100	.210	.016	.009	1.833	.106	.034	3.077
Between Ex	Table 2	age coefs eval at 24	.035	.068	.005	.003	1.554	.096	.078	1.239
Within	Table 4	Sd of resid	.530	.540	.001	.020	.071	.003	.028	.094
United States (ed) (1979-86)										
Overall	Table 1	Coef Variation	.454	.527	.010	.010	1.000	.021	.021	1.000
Between Ed	Table 2	college coef	.220	.380	.023	.023	1.000	.078	.078	1.000
Between Ex	Table 2	age coefs eval at 24	.037	.047	.001	.001	1.000	.034	.034	1.000
Within	Table 4	Sd of resid	.640	.790	.021	.021	1.000	.030	.030	1.000
United States (occ) (1979-86)										
Between Occ	Table 2	manager coef	.220	.280	.009	.009	1.000	.034	.034	1.000
Between Ex	Table 2	age coefs eval at 24	.030	.051	.003	.003	1.000	.078	.078	1.000
Within	Table 4	Sd of resid	.640	.780	.020	.020	1.000	.028	.028	1.000
Katz, Loveman, and Blanchflower (1995)										
France (1979-87)										
Overall	Figure 1	Ln(90/10)	1.200	1.220	.003	.020	.125	.002	.014	.144
Between occ	Figure 6	Ln(Manual/non)	.550	.545	-.001	.024	-.026	-.001	.057	-.020
Between Ex	Figure 6	Ln(41-50/21-25)	.460	.540	.010	mixed		.020	mixed	
Within	Figure 6	Ln(90/10)			mixed	.015		mixed	.012	

Appendix Table B-1: Trend in Income Inequality in OECD and Other Nations: 1970-1993*

Year	AU	CA	IR	SP	JA	NZ	IS	UK	US	BE	DK	FI	FR	GEA/GEB	IT	NL	NO	PO	SWA/SWB
1970								98					109						
1971		106						101				131							
1972		105						102											
1973		105	102					98											
1974		103						95											
1975		104						92					105						112
1976		107						92				105							109
1977		103						90							114				107
1978		105						91							109				105
1979		101					100	96	101				100		110				103
1980		101	100	100				98	100						102			100	102
1981	100	100			100	100		100	103		100	100			100	100			100
1982		101						100	107		99				94		100		102
1983		103						102	109		98			100/100	95	98			102
1984		103			109			103	110		100		102/100	/ 98	98				107
1985	107	102				96		108	110	100	100	97		104/ 96		99			107
1986		103					102	111	110		100	100		/ 98	99		97		112
1987		102	98		108			117	110		102	97		101/ 97	104	104			107
1988		101						124	112	104	105	99				102			107
1989	111	101				110		125	113		106	100	102	/ 97	97	105	104	98	110
1990		101		96	113			130	114		111	99		104/ 97					123/114
1991		102					101	130	113			98			95				129/121
1992		102							115	105		97							/117
1993									117			102							/119

Sources:

Australia (AU)	Saunders (1994), Table 7	United States (US)	U.S. Bureau of the Census (1995a)
Canada (CA)	Beach and Slottsve (1994); Statistics Canada (1994)	Belgium (BE)	Cantillon et al. (1994), Table 30
		Denmark (DK)	Aaberge, et al. (1995), Table A.4
Ireland (IR)	Callan and Nolan (1993), Table 4	Finland (FI)	Uusitalo (1995), Table 2
Spain (SP)	Luxembourg Income Study Database, Fall 1995	France (FR)	Concialdi (1996), Table 13.
Japan (JA)	Tachabanaki and Yagi (1995); Bauer and Mason (1992)	West Germany (GE)	A: Hauser and Becker (1993), Table 7; B: Burkhauser and Poupore (1996), Table 3
		Italy (IT)	Brandolini and Sestilo (1993), Table 2a
New Zealand (NZ)	Saunders (1994)	Netherlands (NL)	Data supplied by Central Bureau of Statistics, See Atkinson, Rainwater, and Smeeding (1995a), chapter 5
Israel (IS)	Luxembourg Income Study Database, Fall 1995		
United Kingdom (UK)	Goodman and Webb (1994), p. A2; Atkinson (1993)	Norway (NO)	Epland (1992), Tabel 4
		Portugal (PO)	Rodriques (1993), Table 3
		Sweden (SW)	A: Gustafsson and Palmer (1993), Annex; B: Statistics Sweden (1995).

NOTE: See discussion in the appendix for description of the income measure of each nation

Appendix: Notes and Sources to Table B-1 and Table 4

Australia (AU)	Saunders (1994), Table 7; income per equivalent adult.
Belgium (BE)	Cantillon et al. (1994), Table 30; equivalence (scale 1.0 for the first adult, 9.7 for the second adult, and 0.5 per child); disposable income with person weights.
Canada (CA)	Statistics Canada (1994), Table VIII; family income after tax, weighted by households, unadjusted for family size.
Denmark (DK)	Aaberge et al. (1995), Table A.4; unadjusted household disposable personal income weighted by person.
Finland (FI)	Uusitalo (1995); equivalence scale 1.0 for the first adult, 0.7 for the second adult and 0.5 per child; disposable income with person weights.
France (FR)	Canceill and Villeneuve (1990), p. 71; Concialdi (1996), Table 13; household income with no adjustment for household size and with household weights.
Ireland (IR)	Callan and Nolan (1993), Table 4; household disposable income with no adjustment for household size and with household weights.
Italy (IT)	Brandolini and Sestito (1993), Table 2a; equivalent disposable income with household weights.
Japan (JA)	Tachabanaki and Yagi (1995); Bauer and Mason (1992). Unadjusted disposable family income; dataset excludes single person families living alone.
The Netherlands (NL)	Data provided by Central Bureau of Statistics, see Atkinson, Rainwater, and Smeeding (1995a), Chapter 5; household disposable income (deducting from net income interest paid, health care and life insurance premiums, wealth tax payments, and alimony paid) with no adjustment for household size and with household weights.
New Zealand (NZ)	Saunders (1994); income per equivalent adult.
Norway (NO)	Epland (1992), Table 4; equivalence scale 1.0 for first adult, 0.7 for second household member and 0.5 for subsequent members; disposable income with person weights.
Portugal (PO)	Rodriques (1993), Table 3; equivalence scale with family size elasticity E+.5; adjusted household disposable income with person weights.

Sweden (SW)	Gustafsson and Palmer (1993), Annex; equivalence scale; Swedish social assistance scale; disposable income (including an allowance for imputed rent on owner-occupied homes) with person weights. Björklund and Freeman (1994).
United Kingdom (UK)	Goodman and Webb (1994), page A2; equivalence scale, British Households Below Average Income scale; disposable household income with person weights.
United States (US)	U.S. Bureau of the Census (1995a, 1995b), special tabulations using disposable personal income as defined in the text, weighted by persons and adjusted using an equivalence scale with E=.5. Some series shown in Table 3.
Spain (SP)	Luxembourg Income Study (1995); disposable income per equivalent adult, person weights, E=.5 equivalence scale.
Israel (IS)	Luxembourg Income Study (1995); disposable income per equivalent adult, person weights, E=.5 equivalence scale.

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