

Luxembourg Income Study Working Paper No. 208

Earnings Inequality in International Perspective

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June 1999

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This version: June, 1999

Abstract

The increase in dispersion of personal earnings in the USA has received considerable attention and has been analyzed extensively. The evidence for other countries is less systematic. There are a few comparative studies, but they tend to focus on descriptions of the overall distribution of income or earnings.

This paper compares the USA with other countries in order to understand whether the US experience is relatively unique or is instead part of a global (or perhaps industrial countries) phenomenon.

The paper is mainly descriptive and relies on the empirical evidence from the micro-data of the Luxembourg Income Study (LIS), spanning a period of about twenty years from the mid 1970s to the mid 1990s. It focuses on personal earnings, as opposed to personal or household income, and looks at two main determinants of the changes in the distribution of earnings at the aggregate level, namely changes in between-group and within-group dispersion, as well as the relationship between changes in relative wages and in relative employment. Grouping of the population is based on gender, age and educational attainments.

Our main empirical finding is that most of the stylized facts known to hold for the USA also hold for a large majority of the countries included in the LIS database. Therefore, far from being unique, the US experience appears to be part of a phenomenon that is common to many developed countries.

*An earlier version of this paper was presented to the Conference *Increasing Inequality in America*, Texas A&M University, March 12–13, 1999. I wish to thank Angus Deaton and Finis Welch for helpful comments.

1 Introduction

The increase in dispersion of personal earnings in the USA has received considerable attention and has been analyzed extensively (see e.g. the review paper by Levy and Murnane (1992) and the recent symposium in the *Journal of Economic Perspectives*). The stylized facts, on which there is a broad consensus, may be summarized as follows (see e.g. Murphy and Welch (1997)). First, inequality has increased both within and between groups defined by gender, age, schooling and race. Second, the increase in between-group inequality is entirely due to the increase in age and schooling differentials, whereas gender and race differentials have instead declined. Third, the increase in between-group inequality accounts for a smaller share of the growth in inequality relative to increased dispersion within groups. Fourth, changes in relative wages and in relative employment are positively correlated: relative employment tends to fall whenever relative wages have fallen.

The evidence for other countries is less systematic. There are only a few comparative studies, focusing mostly on descriptions of the overall distribution of income or earnings and largely based on evidence from the 1980s. From these studies, a kind of “consensus view” has emerged (see e.g. the review papers by Gottschalk (1997) and Gottschalk and Smeeding (1997)) which classifies countries into four groups. One extreme would be occupied by the UK and the USA, with very large increases in inequality, the other by Germany, with no changes at all. In between, the consensus view puts two groups of countries: those which experienced large but not extreme increases in inequality (Canada, Australia, New Zealand and Israel) and those which experienced small but positive changes in inequality (the Nordic countries, Netherlands, Italy and Japan). Notice that the USA appear to be the only country which experienced increases in inequality both between education and experience groups and within groups.

This paper reconsiders the available cross-country evidence. The main novelties with respect to previous studies are twofold. First, we compare a broader set of countries using a common methodology and micro-data that have been pre-processed in order to make them more suited for cross-country comparisons. Second, we include data from the early and mid 1990s. Our main interest is to understand whether the US experience is indeed unique or is instead part of a more general phenomenon. The implications would be quite different in the two cases. In the first case, any proposed explanation would have to focus on whatever makes the US labor market unique, whereas in the second case it would have to concentrate on worldwide trends in tastes and technology.

The paper is mainly descriptive and relies on the empirical evidence from a period of about

twenty years from the mid 1970s to the mid 1990s. It focuses on personal earnings, as opposed to personal or household income, and looks at the two main dimensions of changes in the distribution of earnings at the aggregate level, namely changes in between-group and within-group dispersion, as well as at the relationship between changes in relative wages and in relative employment. Grouping of the population is based on gender, age and educational attainments.

The remainder of the paper is organized as follows. Section 2 describes the data. The next two sections summarize our empirical findings. Section 3 presents descriptive statistics on the structure of earnings, while section 4 presents descriptive statistics on the structure of employment. Finally, Section 5 draws some conclusions and offers some speculations.

2 The data

The paper is based on micro-data from two different sources. The data for the USA are from the March files of the Current Population Survey (CPS). The CPS is a labor force survey conducted monthly by the U.S. Bureau of Census for the U.S. Bureau of Labor Statistics. Its March survey contains the Annual Demographic File and Income Supplement, which reports detailed information on work experience and income in the previous calendar year. The version of the March CPS files used in this paper has been produced and distributed by Unicon Research Corporation (Unicon Research Corporation 1999), and span the whole period from 1962 to 1998.

The data for all other countries are instead from the person files of the Luxembourg Income Study (LIS). These data consist of repeated household surveys from several industrialized countries, with the notable exception of Japan. LIS contains a historical database for 5 countries (Canada, Germany, Sweden, the UK, and the USA), covering the period from the late 1960s to the mid 1970s, and four waves of data covering the subsequent period. The reference year for the first wave is about 1980, for the second is about 1985, for the third is about 1990, and for the fourth is about 1995. The data for the USA are also from the March CPS but LIS does not provide the full set of available years. The number of countries included in the database has been growing over time and is now 27. As of writing, the most complete wave is the third one, covering 23 countries, whereas the fourth wave is not yet complete.

The remainder of this section describes the criteria for selecting our sample of countries and the main data problems encountered.

2.1 Countries/survey/year considered

The set of countries considered in this paper consists of the USA plus 12 other countries selected from the LIS database. Our selection criteria exclude LIS countries for which comparability over time is problematic (e.g. France), or the number of surveys available is too few (e.g. Austria, Denmark, Spain and several Eastern European countries), or the period spanned is too short (e.g. Belgium), or the sample size is too small (e.g. Luxembourg). Specifically, for each country we require that: (i) the data are obtained from the same repeated survey, (ii) they are available for at least three different survey years and span a period of at least eight years, and (iii) for each available year, the sample size in the 25–59 age range exceeds 3,000 people. Because of problems with the early surveys in the LIS historical data base, we also decided to exclude data prior to 1974.

Table 1 lists our final set of 13 countries and, for each of them, the first and last survey year considered. Of the countries selected, 7 are from Western Europe (Finland, Germany, Italy, Netherlands, Norway, Sweden, United Kingdom), 2 from North America (Canada and the USA), and one each from Eastern Europe (Poland), the Middle East (Israel), the Far East (Taiwan), and Oceania (Australia). The period spanned by the data varies across countries. The longest span is for the UK and the USA (21 years, from 1974 to 1995). For the all countries, the available data cover shorter periods of about 11 years on average, starting from the early or mid 1980s. The shortest span (8 years, from 1987 to 1995) is for Finland.

Table 1 also reports the name of the survey from which the data come from. Most data files are from cross-sectional household budget surveys or represent the cross-sectional information from a household panel survey. Although most surveys are representative of the civilian noninstitutional population, some of them (Australia, 1981; Canada, 1981; Israel, 1979; Netherlands, 1983; Norway, 1979) are incomplete in their coverage and only include information on the household head and the spouse. Notice that the German data for 1994 also include the Eastern *Länder*.

Finally, the table presents, for each country, the sample size of the first and last survey considered. Because of our sample selection criteria (see Section 2.4 below), we only report the number of sample participants in the 25–59 age range. The largest sample size is for Canada and the USA in 1994 (about 51,000 and 71,000 people, respectively), the smallest for Israel in 1979 (little over 3,000 people).

2.2 Definition of key variables

Not all variables listed in the LIS database are available for each country/year. In particular, the early LIS waves contain very limited information on education, usual hours per week, and weeks

worked per year. Thus, for example, education is not available for Norway and the UK until 1986, and for Sweden until 1992.

Prior to inclusion into the LIS database, each survey goes through a “lissification” process that, in principle, should enhance comparability across countries and over time. In fact, comparability remains a problem because, except for a few variables (such as age, marital status and relationship to the household head), definitions or codings are not standardized. Key variables such as earnings, labor force status and education are defined and coded differently in the various countries or over time, with LIS making little attempts at harmonizing them.

2.2.1 Earnings

Our earnings measure is total wages and salaries earned by a person in the calendar year before the survey. It consists of all forms of cash wage and salary income, including employer bonuses, 13th month bonus, etc., and, in general, is gross of taxes and social insurance contributions paid by the employee, but net of taxes and social insurance contributions paid by the employer. Gross wages and salary income is not available for Italy and Poland, and net wage and salary income is supplied instead.

In general, reported wages exclude self-employment income. For Norway, Sweden and Taiwan, however, the definition is broad and also includes self-employment income. Given the difficulty of separating the two components, whenever possible we exclude the self-employed from our “wage sample”.

Although some countries also report hourly wages, this variable is typically available only for the earliest LIS waves, and so we do not use it here. Because of the limited information available on hours and weeks worked, we do not follow the standard practice of computing weekly or hourly wages by dividing annual earnings by weeks or annual hours worked (proxied by the product of weeks worked and usual hours per week). To partially control for the effect of differences in annual hours of work, we focus instead on the distribution of annual earnings of those working as full-time workers, with full-time defined as usually working at least 35 hours per week or, when the information on usual hours of work is not available, on self-reported labor force status. We do not use the information on weeks worked because this is only available for a few countries.

Finally, earnings are top-coded in some countries (for example, Australia and the USA). This suggests using measures of dispersion based on sample quantiles rather than sample moments.

2.2.2 Labor force status

Employment is defined on the basis of self-reported employment status. The alternative of defining employment on the basis of the number of hours worked was excluded because of the lack of information on hours worked for some of the countries. Indeed, only a few countries (Canada, Germany and the USA) consistently report both usual hours of work per week and weeks worked per year. Most countries report only one of these measures (typically weekly hours), and there are countries for which none is available (Italy, Norway, Poland, and Sweden). In some cases, usual hours of work per week and weeks worked per year are reported in broad classes. Sometimes (e.g. Sweden), classes are based instead on annual hours of work.

Because of the limited information on weeks worked, the distinction between full-year and part-year worker is even more difficult to make and will not be adopted in this paper.

Finally, self-employment status has been determined combining the information from two variables, namely self-reported labor force status and type of worker.

2.2.3 Education

The issue of comparability across countries and over time is especially serious for educational attainments, for which at least three different definitions are used in the LIS data. Added complications are the fact that definitions sometimes change over time for the same country (the USA is one such example), and the presence of a substantial fraction of missing values on education in some countries.

In Canada, Israel, Norway and the USA (until 1991), educational attainments are measured by the number of years of schooling attended or completed. In the UK they are measured by the age when continuous full-time education was completed. In all other cases, they are measured by the educational level achieved, classified in ways that are not easily comparable but roughly follow the International Standard Classification of Education (ISCED). The latter distinguishes four levels of educational attainments: (1) completed at most primary education, (2) completed first stage of secondary level education but not second stage, (3) completed second stage of secondary level education but no third-level qualification, (4) university degree or other third-level qualification.

The classification adopted in this paper is rather coarse and only distinguishes three levels of educational attainments: the first one (“primary education”) corresponds to the first level of ISCED or less than 10 years of schooling, the second level (“secondary education”) corresponds to secondary education (with no distinction between first and second stage) or 10–15 years of schooling, and the last one (“college”) corresponds to the fourth level of ISCED or more than 15 years of schooling. We warn the reader, however, that despite our efforts, comparability of education, both across

countries and over time, is problematic and so our results must be taken with a grain of salt.

2.3 Movements in price levels and exchange rates

Income variables in our data are all recorded in national currency amounts at current prices. Cross-country comparisons are therefore complicated by differential movements in both price levels and exchange rates.

For each country, the nature of the trends in real wages depends to some extent on what price index is used. A common choice is the consumer price index (CPI), but there is considerable skepticism on the ability of the CPI, as is currently defined, to adequately capture changes in the cost of living (Boskin *et al.* 1998).

The difficulties are only compounded when some index of purchasing power is used to compare different countries (Schultz 1998). We tried to avoid all these problems by working only with wage ratios, such as female/male, or old/young, etc., thus focusing on movements of relative wages rather than movements of wage levels.

2.4 Sample selection

Following a standard practice (see e.g. Murphy and Welch 1997), we consider two subsamples: one to estimate employment rates (the “employment sample”) and another to analyze the structure of earnings (the “wage sample”). Both samples only include people aged 25–59. Thus, we focus on the segment of the population that has definitely completed its investment in schooling and has not yet started (or is only just about to start) its retirement period.

As a general rule, we exclude from the wage sample those who work part-time and the self-employed. In the case of Italy, Norway and Poland, however, we were only able to exclude the self-employed and not the part-time workers.

3 Changes in the structure of earnings

This section illustrates our findings about earnings. Changes in the structure of employment will be discussed in the next section. Before presenting the empirical results, we make some brief remarks about our methodology.

Since we are mainly interested in regression relationships (the distribution of earnings conditional on a set of observed individual characteristics) and not in population totals, we only present unweighted estimates that do not rely on the person weights supplied by the various surveys. In order to reduce the impact of top-coding, we work with quantiles as opposed to moments. An important additional advantage of quantiles is their robustness to outliers and gross-errors.

We measure between-group inequality by the ratio of the same quantile Q_u for two different population groups. The quantiles that we typically consider are the lower decile $Q_{.10}$, the lower quartile $Q_{.25}$, the median $Q_{.50}$, the upper quartile $Q_{.75}$, and the upper decile $Q_{.90}$.

By analogy with the coefficient of variation, we measure relative (not absolute) dispersion within a given group by the ratio $CV_u = (Q_{1-u} - Q_u)/Q_{.5}$, with $0 < u < .5$. When $u = .10$ we obtain the ratio of the interdecile range to the median, or decile CV. When $u = .25$ we obtain the ratio of the interquartile range to the median, or quartile CV. The ratio between the decile CV and the quartile CV is also of interest as it provides a measure of the weight in the tails of the earnings distribution. Notice that

$$CV_u = \frac{Q_u}{Q_{.5}} \left(\frac{Q_{1-u}}{Q_u} - 1 \right),$$

where Q_{1-u}/Q_u is another frequently used measure of within-group inequality. As shown in the Appendix, for u not too far from $1/2$, the quantile-based coefficient of variation CV_u is essentially equivalent to the logarithm of Q_{1-u}/Q_u .

A major drawback of quantiles, however, is the fact that we no longer have nice decompositions such as the law of iterated expectations (“the unconditional mean is equal to the mean of the conditional mean”) and the law of total variance (“the unconditional variance is equal to the mean of the conditional variance plus the variance of the conditional mean”). In particular, we have no simple way of decomposing changes in our inequality measures into a between-group and a within-group component (Champernowne and Cowell 1998). This makes it hard to assess the relative contribution of these two components to the total variation.

Finally, we follow most of the existing literature and treat sample estimates as if they were true population parameters. This is of course not fully satisfactory because, at least for some countries, the observed changes in our measures of dispersion may be due to sampling noise and need not reflect genuine changes in dispersion at the population level.

3.1 Differences by gender

Table 2 shows the ratio between female and male earnings at selected quantiles for the first and last survey year considered. These gender ratios provide alternative measures of the male/female earnings gap.

Although one must be careful in reading the table, as the first and last survey year are not the same across countries, the broad picture is fairly clear. No matter what measure is used, for most countries we observe an increase of the gender ratio, that is, a reduction of the male/female gap. Figure 1 illustrates the trends at the median (to facilitate comparisons, the vertical axis is

on logarithmic scale). Interestingly, the data seem to indicate a sort of “catching up” effect, with the gender ratio growing faster in countries (such as Norway and the USA) where it was initially lower. As a result, cross-country dispersion in the gender ratio has been declining over time.

Our first conclusion, therefore, is that trends in male/female differentials do not contribute to increasing earnings dispersion, neither between nor within countries. In looking for evidence of increasing earnings inequality one must therefore concentrate, for both men and women, on within-group dispersion.

For each country/year considered, dividing the column of labelled “upper quartile” in Table 2 by the one labelled “lower quartile” gives the quartile ratio for women relative to the quartile ratio for men. Similarly, dividing the column labelled “upper decile” by the one labelled “lower decile” gives the decile ratio for women relative to the decile ratio for men. These ratios are of interest because they provide measures of within-group dispersion for women relative to within-group dispersion for men. They show that, in general, earnings dispersion tends to be higher for women than for men. Notice, however, that gender differences have narrowed through time and, in some cases (e.g. Sweden and the USA), they have even changed sign.

Turning now to within-group inequality, Table 3 provides a summary of the changes in the distribution of male earnings over time. It shows, for each country considered, the upper and lower quartile and the upper and lower decile of earnings, all expressed as a fraction of median earnings. To simplify the presentation, we again report only the first and last available year for each country.

The table summarizes in a compact way several aspects of the distribution of earnings. In particular, for each country/year considered, the difference between the column labelled “upper quartile” and the one labelled “lower quartile” is equal to the quartile CV, whereas the ratio of the two values is equal to the quartile ratio $Q_{.75}/Q_{.25}$. Similarly, the difference between the column labelled “upper decile” and the one labelled “lower decile” is equal to the decile CV, whereas the ratio of the two values is equal to the decile ratio $Q_{.90}/Q_{.10}$. Further, subtracting the number one from the columns labelled “upper quartile” and “lower quartile” and then taking the ratio of their absolute values gives the statistic $(Q_{.75} - Q_{.50})/(Q_{.50} - Q_{.25})$, which provides a measure of asymmetry of the earnings distribution. An analogous measure could be based on the ratio $(Q_{.90} - Q_{.50})/(Q_{.50} - Q_{.10})$.

It is clear from the table that, in most countries, male wages at the bottom of the distribution have been falling relative to the median, while at the top of the distribution they have been rising relative to the median. As a result of these trends, relative dispersion of male earnings (as measured by the quantile or the decile CV) has been increasing in most countries. Notable exceptions are Taiwan on the one hand, and Netherlands and the Nordic countries (Finland, Norway and Sweden) on the

other hand. In Taiwan, male wages at the bottom of the distribution have been rising relative to the median, whereas in the Nordic countries relative dispersion of male earnings has actually been falling.

Among the countries which share the same basic trends, there are important differences in the intensity of the process. In particular, in Italy wages at the bottom of the distribution have been falling only mildly or not at all, whereas in Australia wages in the upper part of the distribution have been rising only very little. These differences may reflect the role of institutional factors, such as differences in wage setting mechanisms.

Although Israel and the USA do not seem to display the fastest increase in relative dispersion of male earnings, they are nevertheless the countries with the largest quantile and decile CV. Netherlands, instead, is the country with the smallest. Notice that both tails of the distribution contribute to the relatively large dispersion of male earnings in Israel and the USA. This result differs from the evidence reported by Blau and Kahn (1996) (based on a different set of data), who find that the higher level of inequality in the USA reflects a larger degree of inequality at the bottom of the distribution but not at the top.

For women (Table 4), the patterns are more mixed. In general, female wages at the bottom of the distribution have fallen (relative to the median) less than male ones, and have actually been increasing in several countries (Australia, Canada, Norway, Poland, Taiwan and the UK). On the other hand, female wages at the top of the distribution show a clear upward trend relative to the median only in Israel, Italy, Poland and the USA, whereas in all other countries they have remained stable or even declined.

Figure 2 summarizes our evidence on the behavior of within-group dispersion by plotting the average annual variation in the quartile CV of women against the analogous measure for men. To construct the figure, we regressed the quartile CV on a linear time trend separately for men and women and each country considered. We then plotted the estimated slopes for women against the estimated slopes for men.

With the exception of Italy, the evidence of increased earnings dispersion is weaker for women than for men, although the figure suggests that trends in earnings dispersion of men and women tend to be positively correlated. The most frequent case (8 out of 13 countries) is increased within-group dispersion for both genders. Notice that neither the UK nor the USA appear in any way exceptional. As far as the remaining five countries is concerned, in Taiwan (and to much less extent Norway) we observe increased dispersion for men but not for women, whereas in Finland, the Netherlands and Sweden we observe essentially no trend towards increasing dispersion. If anything, trends in these three countries are negative rather than positive.

Our second main conclusion, therefore, is that the Netherlands and the Nordic countries do distinguish themselves from the other countries considered as they show hardly any evidence of a trend towards increasing earnings dispersion, neither for men nor for women.

In the remainder of this section we look in more detail at the sources of within-group inequality, by concentrating on trends in earnings differentials by age and educational attainments.

3.2 Differences by age group

Tables 5 and 6 compare selected quantiles of the earnings distribution of younger (aged 25–34) and older workers (aged 50–59) with those of workers in the middle of their career (aged 35–49).

The data for men are consistent with concavity of age-earnings profiles, as earnings of younger men are always below those of mid-career male workers who, in turn, tend to have higher earnings than older workers. Age differentials among women are not as sharp as among men. Further, the evidence of concavity of age-earnings profiles is much weaker in this case, as middle aged women often have lower earnings than younger women, especially at the beginning of our sample period.

The time trends over the period considered are summarized in the top panels of Figure 3 which show, separately for men (top-left panel) and women (top-right panel), the average annual variation of earnings differentials between young and mid-career workers (on the horizontal axis) and between older and mid-career workers (on the vertical axis), the differentials being measured by the ratio of median earnings. Notice that, at least for men, an increase in the old/mid-career earnings ratio and a decline in the young/mid-career ratio correspond to an increase in the spread of the earnings distribution, whereas a decline in the old/mid-career ratio and an increase in the young/mid-career ratio correspond to a trend towards decreasing dispersion.

In most countries, earnings of younger workers (both male and female) have fallen relative to those of mid-career workers, whereas relative earnings of older workers have generally increased, especially for men. As a consequence, younger workers have lost ground relative to older workers. This result is in fact quite general and holds for both men and women at all quantiles considered.

Our third conclusion, therefore, is that most countries seem to have experienced an increase through time in the “returns to age”, which has modified the shape of age-earnings profiles, making them look steeper for men and less convex for women. This process has generally contributed to increasing earnings dispersion for men and to reduced earnings dispersion for women.

Compared to all other countries, the USA stand apart for the relatively high returns to age enjoyed by its male workers. On the other hand, returns to age for female workers and the general trends for both genders during the period considered do not distinguish the USA from the other countries.

There are several ways of interpreting our findings. The first one is that the increasing returns to age really reflect increasing returns to labor market experience. Unfortunately, this hypothesis is hard to verify on the basis of our data since we have no direct measure of labor market experience and the use of proxy variables, such as potential labor market experience (namely age minus some prespecified number of years which depend on schooling attainments), would be subject to a substantial amount of measurement error, especially in the case of women. An alternative hypothesis is that the increasing returns to age is a supply phenomenon that reflects an excess supply of younger workers (signalled by the rising youth unemployment rates) together with a relative shortage of older workers (signalled by the falling labor force participation rates and stable unemployment rates among people aged 50 and older).

3.3 Differences by education

Table 7 reports, separately for men and women, “high-school premia” defined as the ratio of earnings of workers with at most secondary education and workers with at most primary education. Table 8 reports instead “college premia” defined as the ratio of earnings of college graduates and workers with at most secondary education. These education premia have been computed at the lower quartile, the median and the upper quartile of the distribution of earnings. Because of poor quality or lack of information about educational attainments, the data for Germany refer to the period 1989–1994, those for Norway and the UK to the period 1986–95, whereas for Sweden only data for the year 1992 are available.

Education premia vary considerably across countries, partly reflecting problems of comparability of educational attainments. For the same country, however, they are remarkably similar across quantiles, indicating that higher education implies a uniform shift to the right in the distribution of earnings. Israel and the USA are among the countries where education premia are initially highest.

The time trends over the period considered are shown in the bottom panels of Figure 3 which present, separately for men (bottom-left panel) and women (bottom-right panel), the average annual variation of the college premium (on the vertical axis) against the one of the high-school premium (on the horizontal axis), both measured at the median. Notice that increases in both the high-school premium and the college premium correspond to an increasing spread of the earnings distribution, whereas declines in both the high-school and the college premium correspond to a trend towards decreasing dispersion.

Our evidence suggests that education premia tend to move in the same direction. It also suggests classifying countries in three groups. The first one (Australia, Finland, Germany, and Norway) contains the countries where we observe no increase in the education premia, neither

for men nor for women. The second group (Canada, Poland, and the USA) contains instead the countries where all education premia have increased, both for men and for women. Finally, the third group (Israel, Italy, the Netherlands, Taiwan and the UK) contains countries where the patterns are mixed. It is worth pointing out, in any case, the extremely high growth in college premia recorded for Italy.

Notice that, according to our estimates, the average annual increase in the high-school premium for USA males has been the highest among all countries considered, whereas the increase in the college premium in the USA remains below the one observed for other countries such as Italy and Poland.

4 Changes in the structure of employment

This section illustrates the main changes in the structure of employment by gender, age group and education. It focuses on trends in between-group inequality, as measured by the ratio between employment rates of different groups, and on the nature of the correlation between changes in relative wages and changes in relative employment rates.

4.1 Differences by gender

Table 9 shows the trends in the employment rates of men and women aged 25–59. These trends look basically the same across countries: male employment rates have fallen (especially in Canada, Poland, Israel, Italy, and the UK), while female employment rates have risen (especially in Germany and Sweden). Partial exceptions to this general trend are the Netherlands and Norway, where male employment rates actually rose. The Dutch case may reflect the active labor market policies put in place starting with the mid 1980s, which have been very successful in lowering unemployment (Nickell and van Ours 1999).

As a result of these trends, the ratio between female and male employment rates has been rising in all countries considered (Figure 4). The fastest increase is observed for Canada, Germany and Sweden. In this last country, women have almost reached the same employment rate as men, in sharp contrast with Italy, Netherlands and Taiwan where, despite their growth, female employment rates remain low.

If we now put together this result with our second finding from Section 3.1 we get our fourth conclusion that, in almost every country, the trends in relative employment rates of women parallel the ones in relative earnings: with the only exception of the Netherlands, employment rates of women trend up relative to men in all countries where female earnings trend up relative to male

earnings (Figure 5).

4.2 Differences by age group

Tables 10 shows trends in employment rates of men and women for our three age groups: young (aged 25–34), mid-age (aged 35–49) and older people (aged 50–59).

The table indicates that the negative correlation between male and female employment trends also holds true within age groups: in most countries, male employment rates have fallen for all age groups, whereas female employment rates have risen for all age groups. This correlation is somewhat weaker at older ages, where female employment rates have not always been rising.

These results are summarized in the top panels of Figure 6, which represents the analogue for employment trends of Figure 3. The figure shows, separately for men (top-left panel) and women (top-right panel), the average annual variation of employment differentials between the young and the mid-aged (on the horizontal axis) and between the old and the mid-aged (on the vertical axis).

It is interesting to notice that employment rates have generally fallen more rapidly for older men than for younger men. As a consequence, the ratio of employment rates of older and younger men has been declining in almost all countries. The only exception is Norway, where employment rates of older men have actually risen.

The relationship between changes in age-related earnings and employment differentials is presented in the top panels of Figure 7 which show, separately for men (top-left panel) and women (top-right panel), the average annual variation of employment differentials between older and younger people (on the vertical axis) against the earnings differential between older and younger workers (on the horizontal axis).

The main conclusion that we draw from this figure is that, in most countries, relative employment rates of older men fell while their relative earnings increased. A simple explanation for this phenomenon may be supply shifts, possibly due to the increased generosity of Social Security systems and the availability of private pensions.

4.3 Differences by education

Our last table (Table 11) shows the employment rates of men and women by education level for the first and last year available.

In most countries, male employment rates have fallen for all education levels. The main exceptions are Dutch and US college graduates, whose employment rates have actually increased. Turning to females, the picture is less clear-cut. Although employment rates have mostly been rising in this case, they have remained stable or even declined among women with lower education

and, in some cases (Finland, Israel, Norway and Poland), also among women with college degree.

This set of results is summarized in the bottom panels of Figure 6 which show, separately for men (bottom-left panel) and women (bottom-right panel), the average annual variation of employment differentials between people with secondary and primary education (on the horizontal axis) and between people with college and secondary education (on the vertical axis).

The figure indicates that education-related employment differentials have definitely widened among men. Among women we tend instead to observe, on the one hand, a narrowing of the distance between women with college degree and with secondary education and, on the other hand, a widening of the distance between this group and women with lower education.

Finally, the bottom panels of Figure 7 show the relationship between changes in education-related earnings and employment differentials. The figure presents, separately for men (bottom-left panel) and women (bottom-right panel), the average annual variation of employment differentials between college graduates and people with lower education (on the vertical axis) against the earnings differential between college graduates and lower educated workers (on the horizontal axis).

The evidence in this case is not very clear-cut, although for women the correlation coefficient between changes in relative employment and changes in relative wages is positive and close to 50 percent.

5 Conclusions

This paper focuses on international trends in the structure of earnings and employment over the last two decades, leaving aside the question of what explains the observed differences in the level of earnings inequality at any given point in time.

Our empirical evidence shows that most of the stylized facts listed in the Introduction also hold for a large majority of the countries included in the LIS database. Therefore, far from being unique, the US experience appears to be part of a phenomenon that is common to most developed countries. The intensity of the trends does differ across countries, but not their nature.

The general trends are, in fact, remarkably similar. First, for most countries considered we observe a steady increase of the ratio between female and male earnings. Thus, trends in male/female differentials do not contribute to increasing earnings dispersion: the observed increases in earnings inequality are entirely due to increased earnings dispersion within-gender.

Second, the Netherlands and the Nordic countries do distinguish themselves from the other countries considered as they show hardly any evidence of a trend towards increasing earnings dispersion, neither for men nor for women.

Third, most countries considered seem to have experienced an increase in the “returns to age”, which has modified the shape of age-earnings profiles, making them look steeper for men and less convex for women. This process has generally contributed to increasing earnings dispersion for men and to reduced earnings dispersion for women.

Fourth, the trends in relative employment rates of women parallel the ones in relative earnings: with the only exception of the Netherlands, employment rates of women trend up relative to men in all countries where female earnings trend up relative to male earnings. With some important exception, this positive correlation between changes in relative wages and relative employment rates also holds within finer groups.

This finding lends support to the view that trends in earnings inequality reflect increases in the relative demand for high-skill workers triggered by technological progress or by international trade. Some of the differences across countries, however, are also likely to reflect institutional factors, such as the decline of unionization, industrial deregulation, falling real minimum wages, etc. (Fortin and Lemieux 1997), although a detailed analysis country by country would be required in order to identify their role.

Fifth, the main exception to the positive correlation between changes in relative wages and relative employment are the older males. For this population group, relative employment fell whereas relative wages rose.

Some of our conclusions differ from the ones reached by Atkinson et al. (1995), Gottschalk (1997) and Gottschalk and Smeeding (1997), who regard the US experience as extreme. Our results show that it is not. It is certainly true that the overall level of dispersion and some of the differentials (most notably the ones by age and education among men) are larger in the USA than in most other countries. However, the general trends for the USA are far from being exceptional or extreme if compared with those experienced by other developed countries during the same period.

One possible explanation for the differences with respect to the previous literature may be the fact that our data include the early and mid 1990s, thus capturing an increase in earnings inequality that was not yet present in the data for the 1980s. This raises the interesting question of why the USA has been leading the other developed countries. The issue of timing may also help discriminate between alternative explanations for the observed trends.

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Table 1: Countries, first and last survey year considered, and sample size (aged 25–59).

Country		Survey	Years		Sample size	
			First	Last	First	Last
Australia	AS	Australian Income and Housing Survey	1981	1994	18736	8865
Canada	CN	Survey of Consumer Finances	1981	1994	17122	50644
Finland	FI	Income Distribution Survey	1987	1995	16970	12780
Germany	GE	German Social Economic Panel Study	1981	1994	3501	8223
Israel	IS	Family Expenditure Survey	1979	1992	3111	7434
Italy	IT	The Bank of Italy Survey	1986	1995	11993	11628
Netherlands	NL	Socio-Economic Panel	1983	1991	5904	5273
Norway	NW	Income and Property Distribution Survey	1979	1995	10487	12514
Poland	PL	Household Budget Survey	1986	1995	15550	47393
Sweden	SW	Income Distribution Survey	1975	1992	14948	14845
Taiwan	RC	Survey of Personal Income Distribution	1981	1995	29710	27077
UK	UK	The Family Expenditure Survey	1974	1995	8088	7770
USA	US	March Current Population Survey	1974	1995	54027	70636

Table 2: Ratio of female and male earnings at selected quantiles. Full-time workers aged 25–59, not self-employed. First and last available survey.

Country	Lower decile		Lower quart.		Median		Upper quart.		Upper decile	
	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	.65	.81	.77	.84	.75	.79	.75	.80	.73	.77
Canada	.48	.68	.57	.67	.62	.70	.64	.72	.68	.75
Finland	.81	.84	.77	.81	.72	.76	.67	.72	.62	.69
Germany	.63	.67	.70	.76	.74	.81	.74	.78	.71	.74
Israel	.63	.70	.62	.69	.60	.66	.57	.65	.59	.63
Italy	.44	.51	.72	.67	.80	.86	.79	.86	.75	.70
Netherlands	.85	.68	.87	.79	.85	.80	.82	.76	.75	.68
Norway	.08	.41	.22	.50	.44	.64	.55	.66	.43	.61
Poland	.70	.82	.72	.80	.73	.77	.72	.73	.66	.73
Sweden	.72	.49	.79	.77	.78	.78	.68	.74	.56	.66
Taiwan	.47	.60	.51	.58	.56	.63	.69	.67	.73	.73
UK	.54	.72	.54	.74	.56	.73	.58	.74	.56	.72
USA	.27	.67	.41	.68	.50	.70	.54	.68	.53	.66

Table 3: Summaries of the distribution of male earnings. Ratios to the median for full-time workers aged 25–59, not self-employed. First and last available survey.

Country	Lower decile		Lower quart.		Upper quart.		Upper decile	
	First	Last	First	Last	First	Last	First	Last
Australia	.64	.57	.80	.75	1.25	1.28	1.58	1.59
Canada	.57	.39	.77	.68	1.29	1.35	1.59	1.70
Finland	.65	.68	.79	.80	1.37	1.30	1.94	1.73
Germany	.68	.58	.83	.79	1.26	1.30	1.66	1.70
Israel	.52	.49	.72	.66	1.42	1.55	1.95	2.29
Italy	.60	.50	.83	.82	1.20	1.27	1.47	1.82
Netherlands	.72	.70	.83	.83	1.27	1.25	1.68	1.65
Norway	.61	.33	.82	.78	1.30	1.27	2.04	1.67
Poland	.65	.60	.81	.76	1.26	1.38	1.63	1.89
Sweden	.66	.56	.80	.81	1.42	1.29	2.07	1.72
Taiwan	.56	.61	.76	.79	1.26	1.35	1.59	1.78
UK	.66	.58	.81	.74	1.25	1.36	1.59	1.85
USA	.45	.40	.73	.64	1.35	1.50	1.75	2.17

Table 4: Summaries of the distribution of female earnings. Ratios to the median for full-time workers aged 25–59, not self-employed. First and last available survey.

Country	Lower decile		Lower quart.		Upper quart.		Upper decile	
	First	Last	First	Last	First	Last	First	Last
Australia	.55	.59	.82	.80	1.25	1.29	1.55	1.56
Canada	.45	.38	.71	.65	1.34	1.38	1.74	1.82
Finland	.72	.75	.85	.86	1.27	1.22	1.65	1.58
Germany	.58	.48	.78	.73	1.26	1.24	1.61	1.55
Israel	.55	.52	.74	.69	1.37	1.51	1.91	2.18
Italy	.33	.29	.75	.63	1.19	1.26	1.38	1.47
Netherlands	.72	.60	.84	.82	1.21	1.18	1.46	1.40
Norway	.11	.21	.40	.60	1.61	1.31	1.99	1.57
Poland	.62	.64	.79	.78	1.23	1.31	1.48	1.78
Sweden	.61	.35	.82	.80	1.24	1.21	1.49	1.45
Taiwan	.47	.59	.70	.74	1.54	1.44	2.08	2.08
UK	.65	.58	.78	.75	1.28	1.39	1.59	1.84
USA	.25	.38	.61	.62	1.47	1.46	1.87	2.05

Table 5: Ratios of earnings of younger (aged 25–34) and mid-career (aged 35–49) workers. Full-time workers, not self-employed. First and last available survey.

Country	Men						Women					
	Lower quart.		Median		Upper quart.		Lower quart.		Median		Upper quart.	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	.96	.93	.92	.89	.88	.85	1.10	1.00	1.07	.97	1.06	.92
Canada	.95	.71	.92	.77	.90	.79	1.07	.85	1.02	.89	1.01	.85
Finland	.83	.86	.77	.83	.72	.79	.93	.92	.89	.94	.83	.93
Germany	.86	.89	.86	.86	.81	.83	1.05	.90	1.04	.96	.96	.93
Israel	.96	.76	.92	.71	.90	.67	1.03	.87	1.04	.79	1.02	.69
Italy	.86	.75	.93	.79	.84	.78	.79	.60	.85	.76	.97	.80
Netherlands	.92	.84	.85	.85	.75	.77	.89	.94	.83	.83	.77	.81
Norway	.88	.65	.85	.80	.77	.78	.73	.69	.93	.86	.95	.93
Poland	.88	.93	.90	.93	.92	.92	.85	.94	.85	.90	.86	.86
Sweden	.92	.86	.84	.84	.71	.76	.90	.46	.91	.83	.87	.81
Taiwan	.90	.86	.88	.80	.87	.76	1.19	1.07	1.16	1.02	1.10	.85
UK	.97	.90	.95	.85	.92	.80	1.05	1.01	1.11	1.02	1.09	.92
USA	.84	.71	.83	.70	.82	.70	.86	.86	.97	.89	.97	.85

Table 6: Ratios of earnings of older (aged 50–59) and mid-career (aged 35–49) workers. Full-time workers, not self-employed. First and last available survey.

Country	Men						Women					
	Lower quart.		Median		Upper quart.		Lower quart.		Median		Upper quart.	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	.96	.92	.91	.91	.92	1.02	1.07	.96	.99	.96	.93	.98
Canada	.94	1.02	.92	1.00	.97	1.04	1.00	.99	.94	.99	.91	.99
Finland	.99	1.08	1.00	1.11	1.07	1.18	.99	1.03	.99	1.04	.99	1.07
Germany	.96	1.05	.95	.98	.98	1.02	1.00	1.02	.95	.96	.98	.96
Israel	.90	.81	.92	.91	1.07	.95	1.06	.91	1.01	.99	1.08	.94
Italy	.92	.95	1.00	1.00	.95	1.07	.96	.99	1.00	1.00	1.03	1.04
Netherlands	.98	1.05	.98	1.11	.95	1.15	1.03	1.07	1.05	1.15	1.23	1.20
Norway	.94	.99	.98	.99	1.05	.98	1.02	.94	1.05	.99	1.03	1.02
Poland	.96	.97	.98	.99	.96	.97	1.01	.99	1.02	1.03	1.04	1.04
Sweden	.96	1.00	.97	1.02	1.04	.99	1.02	1.05	1.01	1.01	1.02	1.02
Taiwan	.94	.83	1.00	.87	1.01	.99	.93	.86	1.12	.82	1.30	.86
UK	.87	.89	.88	.87	.87	.87	.97	.96	1.04	.96	1.04	.84
USA	.93	1.02	.92	1.01	.94	1.04	1.06	.97	1.04	.98	1.00	.97

Table 7: High-school premia (ratios of earnings of workers with at most secondary education and workers with at most primary education). Full-time workers aged 25–59, not self-employed. First and last available survey.

Country	Men						Women					
	Lower quart.		Median		Upper quart.		Lower quart.		Median		Upper quart.	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	1.13	1.09	1.16	1.11	1.14	1.10	1.11	1.05	1.13	1.05	1.24	1.10
Canada	1.18	1.23	1.17	1.19	1.13	1.18	1.30	1.36	1.25	1.39	1.27	1.30
Finland	1.10	1.08	1.15	1.10	1.25	1.10	1.10	1.08	1.15	1.09	1.21	1.12
Germany	1.08	.94	1.11	1.00	1.17	1.14	1.18	1.10	1.11	1.13	1.21	1.15
Israel	1.47	1.29	1.45	1.41	1.48	1.53	1.27	1.31	1.34	1.46	1.29	1.63
Italy	1.18	1.20	1.21	1.10	1.31	1.15	1.22	1.50	1.08	1.25	1.07	1.23
Netherlands	1.24	1.19	1.29	1.17	1.42	1.18	1.19	1.19	1.16	1.22	1.15	1.04
Norway	1.13	1.12	1.19	1.12	1.24	1.17	1.43	1.21	1.22	1.20	1.18	1.18
Poland	1.10	1.20	1.07	1.23	1.12	1.25	1.20	1.19	1.14	1.22	1.11	1.26
Sweden	.	1.06	.	1.10	.	1.18	.	1.08	.	1.06	.	1.10
Taiwan	1.23	1.13	1.25	1.09	1.20	1.15	1.56	1.26	1.52	1.26	1.63	1.36
UK	1.13	1.13	1.17	1.19	1.26	1.22	1.18	1.14	1.26	1.25	1.28	1.29
USA	1.47	1.67	1.35	1.69	1.27	1.68	1.66	1.90	1.38	1.78	1.42	1.73

Table 8: College premia (ratios of earnings of college graduates and workers with at most secondary education). Full-time workers aged 25–59, not self-employed. First and last available survey.

Country	Men						Women					
	Lower quart.		Median		Upper quart.		Lower quart.		Median		Upper quart.	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	1.34	1.34	1.40	1.26	1.38	1.23	1.30	1.38	1.41	1.41	1.37	1.27
Canada	1.26	1.45	1.30	1.38	1.31	1.30	1.69	1.62	1.59	1.57	1.50	1.54
Finland	1.76	1.51	1.76	1.59	1.65	1.65	1.72	1.51	1.73	1.59	1.65	1.65
Germany	1.47	1.44	1.61	1.57	1.64	1.56	1.38	1.38	1.47	1.38	1.51	1.34
Israel	1.46	1.37	1.42	1.53	1.35	1.51	1.25	1.17	1.27	1.40	1.23	1.42
Italy	1.06	1.44	1.06	1.55	1.15	1.81	.91	1.75	1.00	1.33	1.00	1.23
Netherlands	1.35	1.28	1.44	1.37	1.43	1.46	1.09	1.23	1.35	1.17	1.61	1.20
Norway	1.22	1.24	1.21	1.19	1.27	1.27	1.85	1.69	1.58	1.39	1.36	1.24
Poland	1.18	1.43	1.16	1.53	1.20	1.61	1.23	1.39	1.24	1.44	1.23	1.52
Sweden	.	1.39	.	1.41	.	1.53	.	1.43	.	1.33	.	1.26
Taiwan	1.32	1.35	1.25	1.46	1.26	1.48	1.75	1.59	1.64	1.72	1.39	1.73
UK	1.42	1.35	1.33	1.45	1.21	1.47	1.49	1.52	1.50	1.57	1.57	1.46
USA	1.30	1.67	1.35	1.67	1.43	1.65	1.81	1.88	1.63	1.68	1.47	1.64

Table 9: Employment rates of people aged 25–59. First and last available survey.

	Men		Women	
	First	Last	First	Last
Australia	.897	.852	.489	.620
Canada	.914	.778	.574	.662
Finland	.899	.814	.825	.745
Germany	.880	.850	.535	.682
Israel	.935	.857	.475	.560
Italy	.879	.846	.382	.410
Netherlands	.849	.877	.304	.360
Norway	.852	.898	.633	.755
Poland	.805	.719	.509	.518
Sweden	.962	.925	.620	.887
Taiwan	.947	.914	.347	.477
UK	.931	.810	.628	.674
USA	.935	.915	.577	.767

Table 10: Employment rates by age group. First and last available survey.

	Men						Women					
	25–34		35–49		50–59		25–34		35–49		50–59	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	.907	.869	.920	.886	.840	.744	.512	.619	.540	.676	.353	.479
Canada	.938	.769	.927	.810	.856	.712	.626	.677	.596	.707	.457	.524
Finland	.937	.850	.943	.863	.774	.670	.823	.675	.888	.810	.704	.682
Germany	.839	.854	.922	.906	.842	.752	.562	.756	.560	.704	.447	.531
Israel	.950	.828	.935	.897	.908	.805	.549	.550	.455	.597	.358	.482
Italy	.806	.796	.962	.943	.819	.753	.459	.482	.419	.473	.231	.233
Netherlands	.852	.912	.896	.922	.741	.687	.373	.461	.301	.351	.193	.165
Norway	.891	.861	.859	.923	.805	.886	.705	.719	.673	.795	.519	.709
Poland	.858	.780	.876	.780	.613	.487	.523	.505	.627	.622	.301	.281
Sweden	.956	.904	.972	.944	.954	.910	.620	.880	.666	.907	.539	.857
Taiwan	.945	.899	.979	.954	.895	.830	.380	.547	.372	.508	.209	.282
UK	.946	.840	.939	.849	.899	.685	.585	.643	.672	.736	.617	.598
USA	.939	.934	.948	.929	.907	.853	.600	.775	.582	.791	.540	.698

Table 11: Employment rates by education level. First and last available survey.

	Men						Women					
	Primary		Secondary		College		Primary		Secondary		College	
	First	Last	First	Last	First	Last	First	Last	First	Last	First	Last
Australia	.848	.798	.910	.884	.954	.924	.406	.545	.548	.660	.786	.822
Canada	.870	.597	.944	.805	.949	.891	.455	.389	.629	.699	.748	.831
Finland	.838	.718	.939	.847	.979	.931	.764	.659	.864	.763	.950	.913
Germany	.864	.783	.903	.850	.951	.930	.525	.539	.605	.700	.747	.820
Israel	.892	.749	.962	.895	.937	.836	.260	.268	.563	.595	.840	.789
Italy	.843	.777	.966	.870	.950	.865	.368	.206	.477	.484	.420	.766
Netherlands	.816	.689	.888	.877	.909	.931	.207	.153	.430	.328	.786	.602
Norway	.900	.849	.852	.907	.988	.948	.579	.613	.633	.778	.913	.902
Poland	.713	.563	.844	.744	.927	.888	.340	.319	.615	.559	.802	.798
Sweden	.	.912	.	.930	.	.966	.	.815	.	.908	.	.963
Taiwan	.945	.874	.949	.930	.948	.924	.306	.362	.356	.488	.729	.754
UK	.837	.698	.931	.848	.962	.893	.589	.605	.628	.680	.772	.820
USA	.892	.771	.943	.912	.952	.963	.477	.478	.580	.764	.718	.864

Figure 1: Trends in the ratio of female and male median earnings. Full-time workers aged 25–59, not self-employed. The USA correspond to the dotted line.

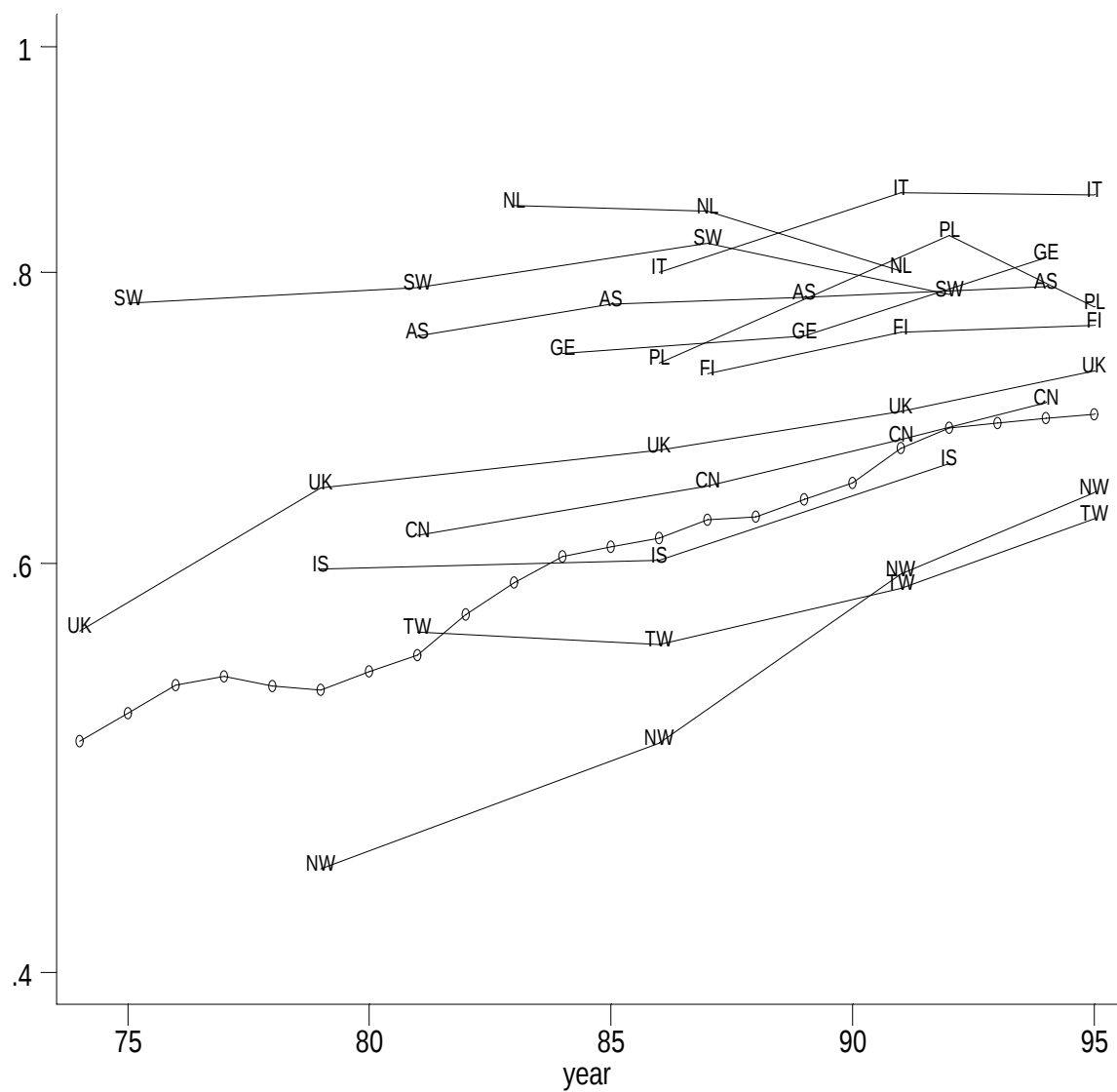


Figure 2: Average annual variation of the quartile CV of male and female earnings. Full-time workers aged 25–59, not self-employed.

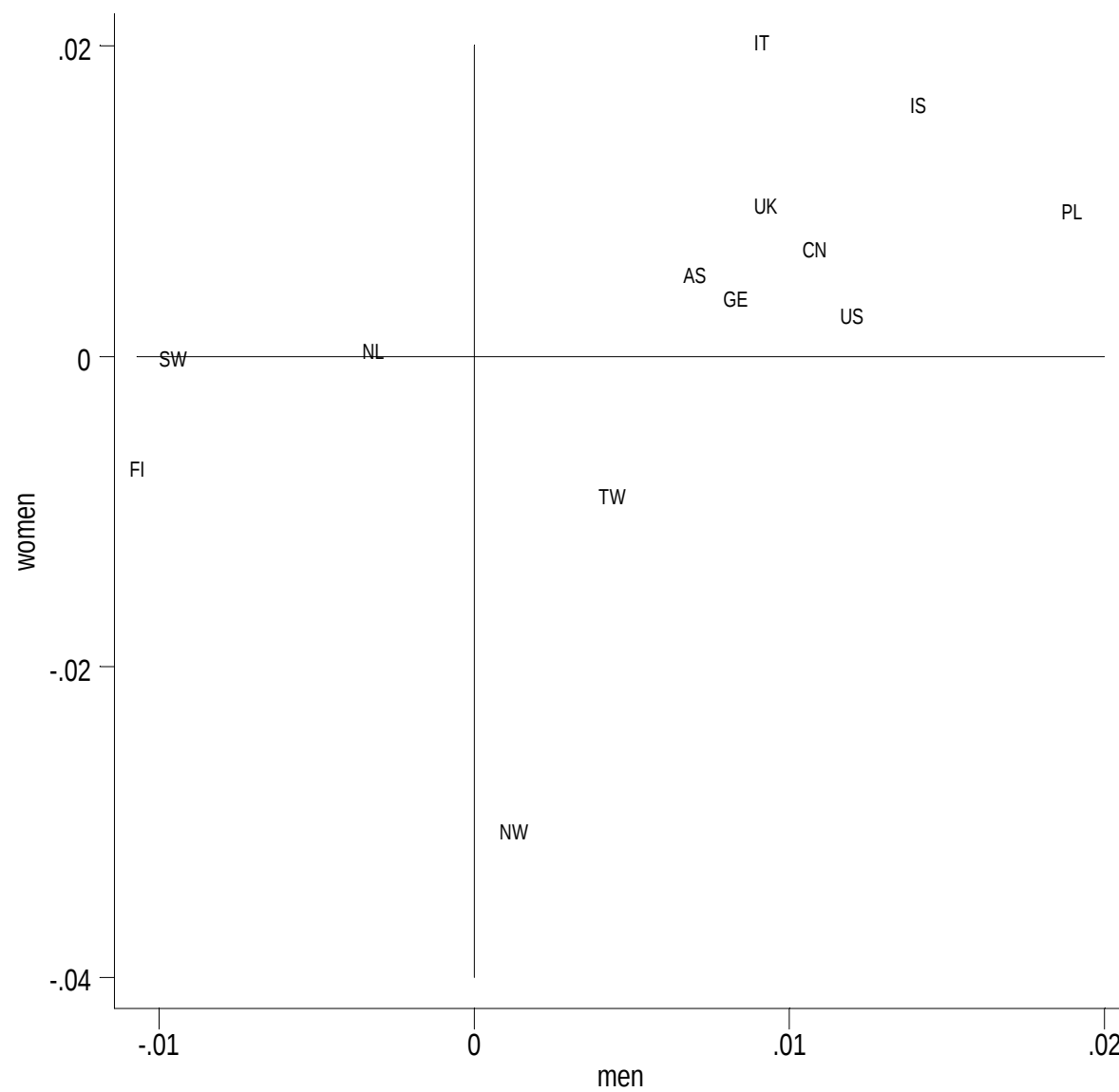


Figure 3: Average annual variation of earning differentials by age (top panels) and education level (bottom panels). Full-time workers aged 25–59, not self-employed.

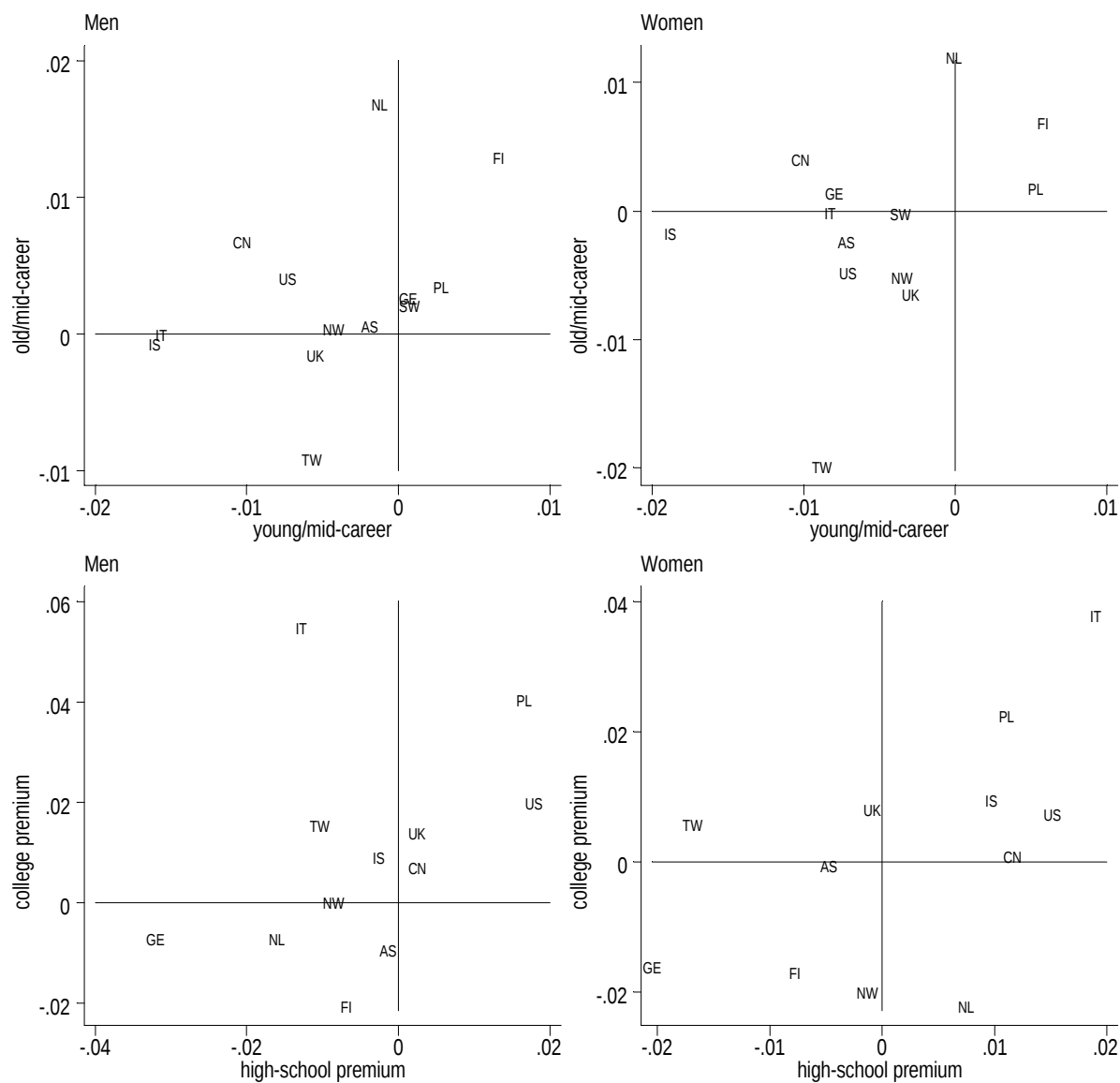


Figure 4: Trends in the ratio of female and male employment rates. The USA correspond to the dotted line.

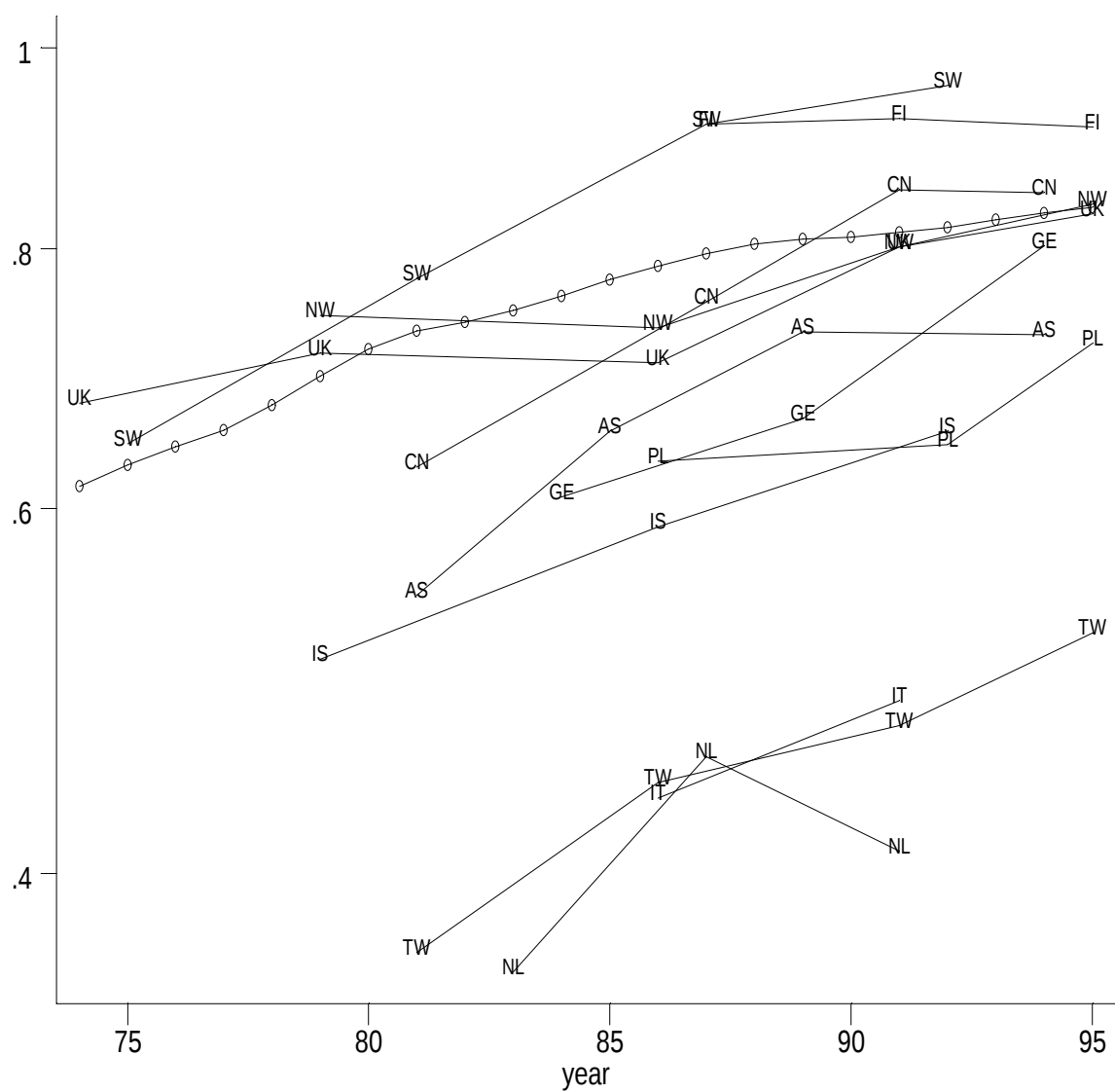


Figure 5: Average annual variation of female/male earnings and employment ratios.

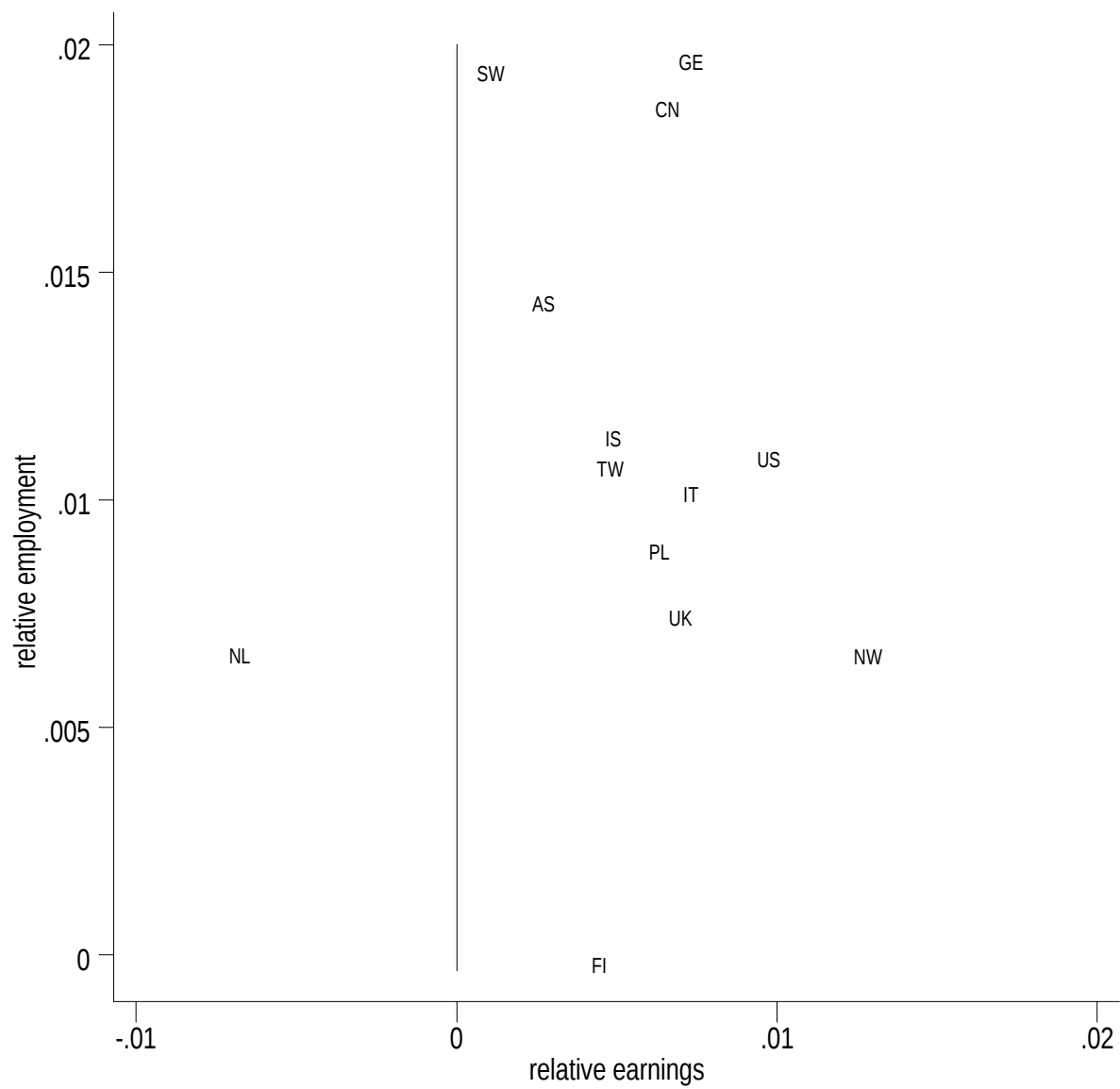


Figure 6: Average annual variation of employment differentials by age (top panels) and education level (bottom panels).

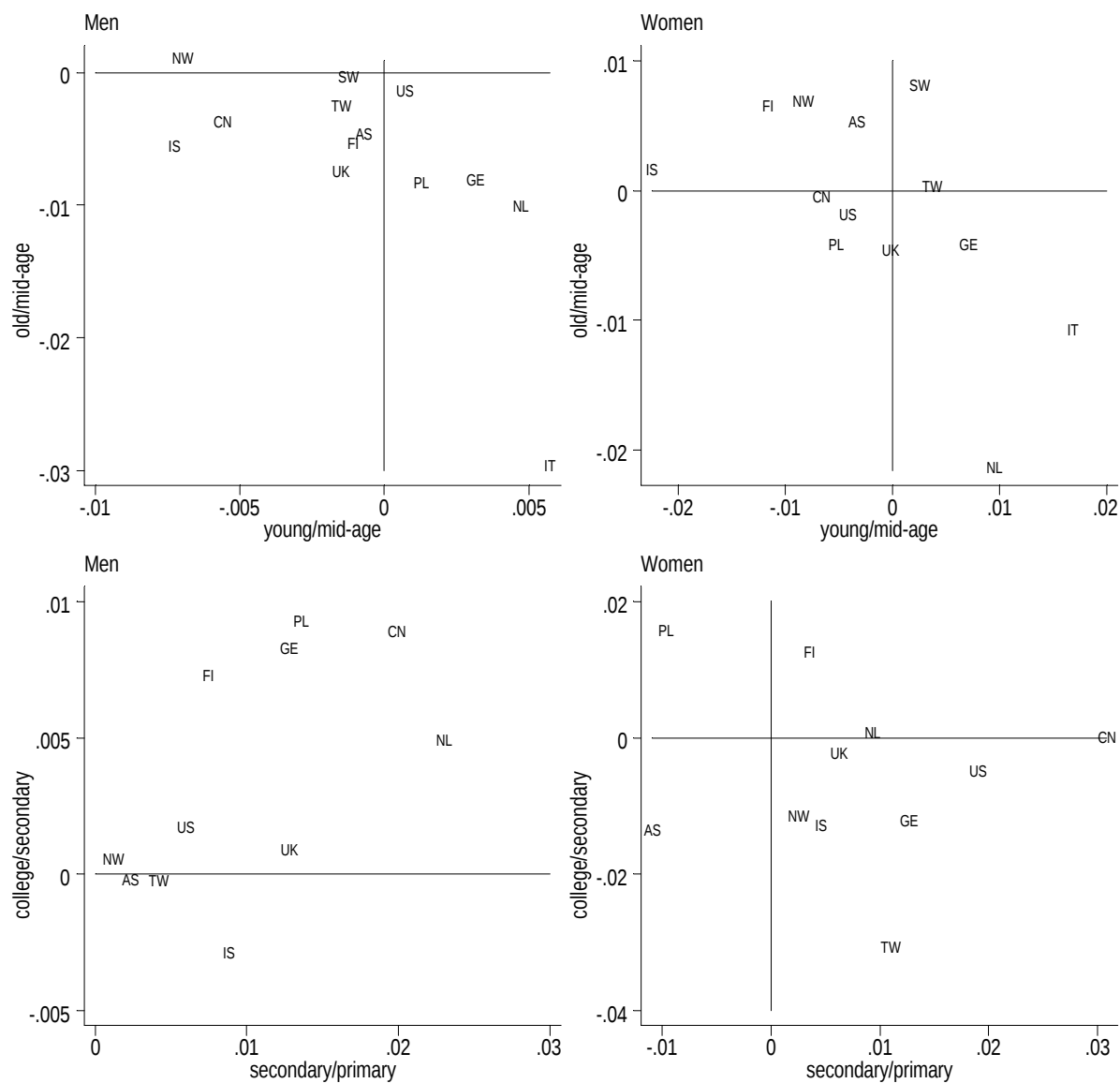
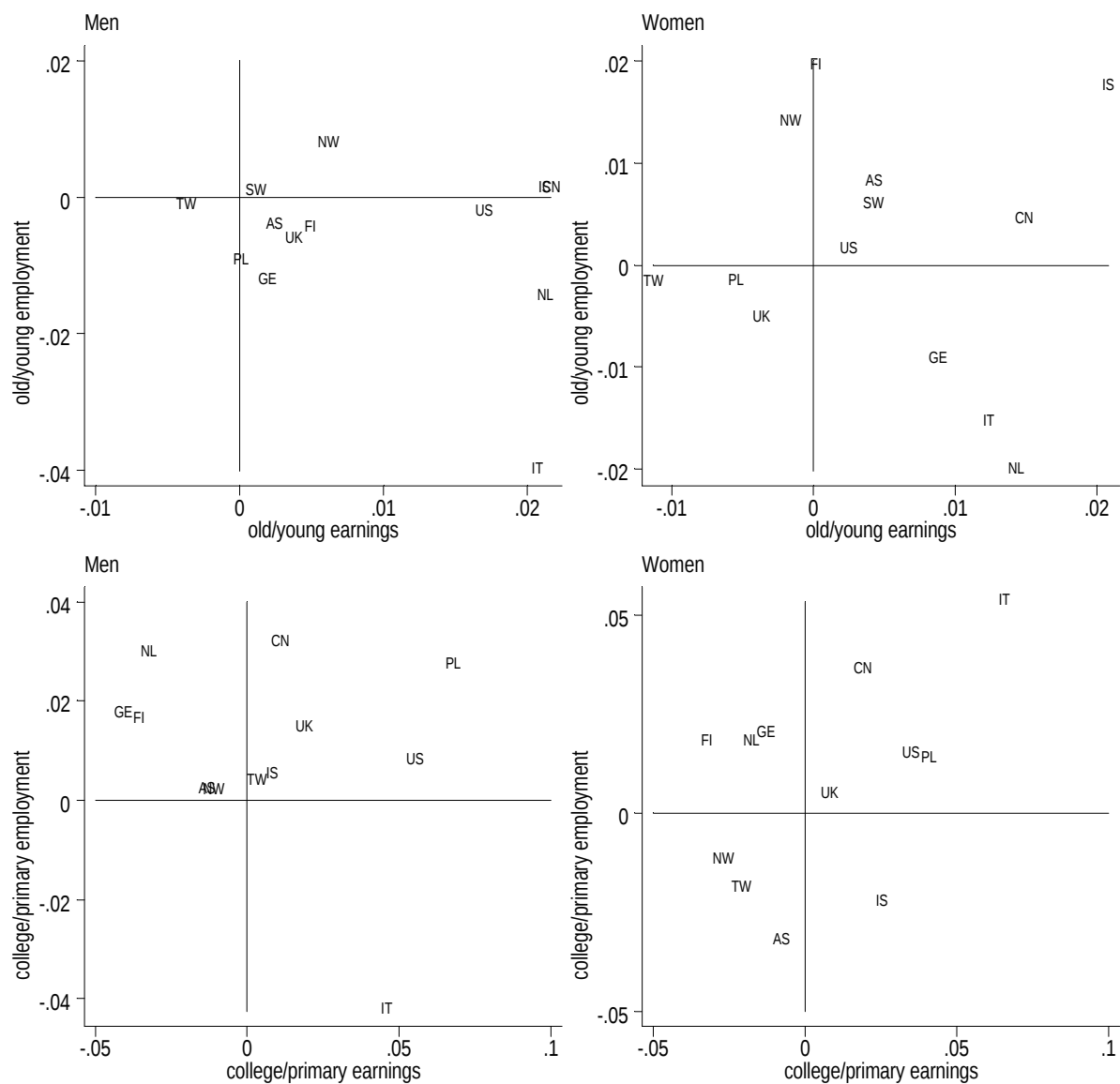


Figure 7: Average annual variation of earnings and employment differentials by age (top panels) and education level (bottom panels).



Statistical appendix

Suppose that the logarithm of earnings Y admits the representation $X = \ln Y = \mu + \sigma V$, where V is some random variable with zero median and distribution function F . This is for example the case when earnings follow a lognormal distribution. The u th quantile of X is then

$$Q_X(u) = \mu + \sigma Q(u), \quad 0 < u < 1,$$

where $Q(u)$ is the u th quantile of V . Hence, by the equivariance of quantiles under monotonically increasing transformations

$$Q_Y(u) = \exp[Q_X(u)] = \exp[\mu + \sigma Q(u)].$$

A standard measure of inequality employed in the literature is

$$R_u = \ln \frac{Q_Y(1-u)}{Q_Y(u)} = Q_X(1-u) - Q_X(u) = \sigma[Q(1-u) - Q(u)] \quad (1)$$

for $0 < u < 1/2$. The log decile ratio corresponds to $u = .10$, whereas the log quartile ratio corresponds to $u = .25$. Thus, the log decile ratio is the interdecile range of log earnings, whereas the log quartile ratio is the interquartile range of log earnings. As shown by (1), both measures are proportional to the scale parameter σ .

The measure of inequality employed in this paper is the quantile-based coefficient of variation

$$CV_u = \frac{Q_Y(1-u) - Q_Y(u)}{Q_Y(.5)}, \quad 0 < u < 1/2.$$

Since $Q(.5) = 0$ under our set of assumptions, simple calculations show that

$$CV_u = \exp[\sigma Q(1-u)] - \exp[\sigma Q(u)].$$

Let $g(u) = \exp[\sigma Q(u)]$. Because g is a smooth function, it follows from Taylor's Theorem that, for u and u_0 sufficiently close to each other,

$$g(u) \approx g(u_0) + g'(u_0)(u - u_0),$$

with

$$g'(u_0) = \exp[\sigma Q(u_0)] \sigma Q'(u_0)$$

and

$$Q'(u_0) = \frac{1}{f(Q(u_0))},$$

where f denotes the density function of V . For u sufficiently close to $1/2$, we then have

$$CV_u \approx \frac{\sigma}{f(0)} (1 - 2u). \quad (2)$$

The comparison of (1) and (2) shows that

$$\frac{R_u}{CV_u} \approx f(0) \frac{Q(1-u) - Q(u)}{1 - 2u},$$

where the right-hand-side depends only on u and the height of the density f at the origin. A change of variable from u to $\delta = .5 - u$ gives

$$\frac{Q(1-u) - Q(u)}{1 - 2u} = \frac{Q(.5 + \delta) - Q(.5 - \delta)}{2\delta}.$$

Since

$$\lim_{\delta \rightarrow 0} \frac{Q(.5 + \delta) - Q(.5 - \delta)}{2\delta} = Q'(.5) = \frac{1}{f(0)},$$

it then follows that

$$\lim_{u \rightarrow 1/2} \frac{R_u}{CV_u} = 1,$$

that is, R_u and CV_u essentially coincide whenever u is close to $1/2$.