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IS THE INCREASE IN ANNUAL EARNINGS INEQUALITY LINKED TO INCREASING LIFETIME EARNINGS INEQUALITY?

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Summary

Evidence of increased dispersion in the distribution of annual earnings in the U.S. from the late 1970s at least through calendar year 2000 has been presented by numerous authors (for example, Goldin and Katz 2007, Katz and Autor 1999, and Eckstein and Nagypál 2004). The behavior of lifetime earnings inequality – or, at least inequality as measured over many years – has received little attention, no doubt due to the limited availability of appropriate data. The current study uses the U.S. Social Security Administration's Continuous Work History Sample, which documents the earnings histories of 3.2 million workers spanning 1937-2004 to examine changes in the annual distribution of earnings during 1981-2004 for male and female wage and salary workers. We then look for differences in the distributions of long-run earnings during consecutive 12-year time periods (1981-92, 1993-2004) for white men and white women aged 31-50 at the start of each period. The results indicate an increase in long-run earnings inequality among white men, but the evidence is inconclusive for white women. If calculations are restricted to a sample of white women who work every year of the observation period, a finding of increased earnings inequality emerges.

We also examine the trend in the distribution of prime-age (ages 36-55) career earnings for 20 birth cohorts of white men born in 1930-49. Increases in both the Gini coefficient and coefficient of variation support the view that long-run economic inequality rose, particularly beginning with the 1940 cohorts; however, the quantile ratios give a more mixed message. Although the 90/50 quantile ratio tends to increase from the oldest to youngest cohorts, the 90/10, 80/20, and 75/25 ratios are lower for youngest cohorts than they are for the oldest cohorts.

Introduction

The distribution of lifetime earnings – or at least earnings over the course of many years – is often of greater interest than the distribution of earnings during shorter periods such as a year. Economic well-being is determined more by average (permanent) earnings over an extended period than by earnings during a relatively short interval, such as a year, that may reflect a temporary (transitory) deviation from a longer term average. An important aspect of lifetime earnings is their role in determining the resources eventually available to retirees. Lifetime earnings generate much of the capacity that workers and their families have to save for retirement, either privately or through employer-sponsored defined-contribution pension plans. Aside from those forms of individually managed retirement saving, private and public pension plans often determine benefit amounts through formulas based on earnings during a number of years from a worker's earnings history. One example is the U.S. Social Security program, where monthly retired-worker benefits depend on the highest 35 values of (wage-indexed) annual earnings. A progressive benefit formula (concave in average indexed monthly earnings) ensures that replacement rates decline as lifetime earnings increase within any given birth cohort. An implication of this benefit calculation is that while lifetime earnings determine benefit amounts, alternative distributions of lifetime earnings can affect the extent to which the program redistributes income both within and across cohorts.

A very large number of studies – too numerous to review here – has examined the annual distribution of earnings and trends in that distribution over time in the United States and other developed countries. The results for the United States (for example, Levy and Murnane 1992, Katz and Autor 1999) and for other OECD countries (for example, Atkinson 2008) show increasing dispersion in annual earnings distributions since around 1980. Although details vary among countries regarding the amount of increased dispersion, the parts of the distribution where change is most pronounced, and the timing of those changes, the outlines of the various country histories are often quite similar. Real earnings have declined or stagnated in the lower tail of the distribution, have increased modestly in the middle of the distribution, and have risen substantially in the upper tail.

In contrast with the attention given to the distribution of annual earnings, there has been relatively little research on the dispersion of lifetime earnings, no doubt a result of more demanding data requirements. With individual earnings histories often spanning four decades or longer, it is unusual to have longitudinal microdata that can fully document lifetime earnings for a single birth cohort, let alone multiple cohorts that would allow a trend to be identified. That

obstacle has not deterred researchers from making inferences about lifetime earnings by using one or usually both of two strategies. The first strategy takes a more descriptive approach to the data that acknowledges the time span covered by a longitudinal data set. It directly calculates long-run earnings, with the age range or time interval circumscribed by the sampling rules and the data set's observation period. In that way, a good-sized panel data set that samples many cohorts for a dozen or more years can yield information on completed multi-year periods for multiple birth cohorts. In a U.S.-based study, Buchinsky and Hunt (1999) use data for men and women from the National Longitudinal Survey of Youth to find an upward trend in the inequality of real earnings for three overlapping 4-year periods (1980-83, 1983-86, and 1987-90) during 1980-90. The authors note the sensitivity of their specific measures to sample inclusion rules and, in particular, the treatment of observations with zero-earnings amounts. Haider (2001) finds an increase in long-run earnings inequality for U.S. male household heads by comparing 10-year totals of real earnings for 1969-78 and 1982-91. The comparison is made for men aged 30-44 at the start of each 10-year period using data from the Panel Study of Income Dynamics. He notes a decline in several measures of earnings inequality when the sample is restricted to workers with positive earnings in every year of the reference period. Björklund (1993) provides another example of this approach using Swedish data for 1951-89, but the paper's main results are for a broader definition of income than just earnings. He concludes that lifetime income inequality nearly as large as annual income inequality during ages 30-64. It is income prior to age 30 is largely responsible for the finding that lifetime inequality is 35-40 percent lower than given by annual measures.

The second widely used approach to measuring long-run earnings inequality requires that the analyst specify a statistical earnings-generating process that can be used to derive the properties of earnings histories that are only partially observed. Once the missing portions of the earnings histories have been estimated, it is then straightforward to calculate discounted totals and the moments of their distribution. A recent example of this work is Aaronson's (2002) investigation of the increase in the dispersion of U.S. male earnings in the first decade of work after the completion of schooling using synthetic cohort data constructed from 1968-2000 Current Population Survey data. During 1967-90, men's real earnings during the first decade of their careers fell except for the most highly educated group, and the coefficient of variation increased by one-third. Blomquist's (1981) study of Swedish lifetime income, which mostly focuses on earnings and the value of leisure is an important earlier contribution to this literature. Gittleman and Joyce's (1996) finding of increased U.S. inequality of earnings for 4-year

intervals during the 1980s, especially among less educated workers, is widely cited.[1] Finally, no investigation of the relationship between annual and lifetime earnings can ignore the large body of work by Creedy (1974, 1977, 1991), whose work we have found highly useful in thinking about these issues.

The current paper investigates how the distribution of long-run pre-tax earnings for U.S. workers has evolved as annual earnings inequality has risen during the past three decades. The results are derived from a large longitudinal data set, the Social Security Administration's Continuous Work History Sample (CWHS), a collection of files representing the earnings histories of 3.2 million workers drawn from the Agency's administrative records on earnings. A large sample of high-quality earnings data enables us to adopt a descriptive approach with little imposition of economic or statistical structure. Many of the results are shown separately for both men and women. Although the paper begins by presenting a set of annual earnings inequality measures that facilitate comparison with results in recently published work, it then moves to the measurement of changes in the distribution of long-run earnings during 12-year periods during 1981-2004. Much of the previous research on changes in the distribution and variability of earnings for time periods that exceed one year restrict the analysis to workers who have few, if any, zero-earnings years. Our results for long-run earnings cover virtually all workers who display a multi-year pattern of earnings that indicates at least some long-run attachment to the labor force, and exclude only those people with very low lifetime earnings. The paper's final set of results is for total real earnings over 20-year periods (ages 36-55) for 20 birth cohorts (1930-49). The paper's findings are consistent with the increase in annual earnings inequality reported by other authors using other data sources. We find evidence of increased long-run earnings inequality during 1981-2004, although the increase does not appear to be nearly as large as has occurred for annual earnings. The cohort analysis provides evidence of increasing long-run earnings inequality for white men beginning with the 1940 birth cohort.

Preliminary considerations

At the heart of most empirical work on age-earnings profiles is the investigator's decision about which data to include in the estimation. Samples are often selected in order to control for

[1] Two closely related research areas to note are the extensive study of earnings mobility, a key link between the differences in the dispersion of earnings as measured over time periods of differing lengths, and the large literature on the variability of individual earnings over time. Atkinson, Bourguignon, and Morrison (1992), Burkhauser, Holtz-Eakin, and Rhody (1997), and Fields and Ok (1999) are representative of the mobility literature, while Haider (2001), Baker-Solon (2003), Shin and Solon (2008), and a series of papers by Moffitt and Gottschalk (1993, 1998, 2002) and Gottschalk and Moffitt (1994) are important recent contributions to the study of earnings variability.

factors that can have substantial effects on earnings such as labor force entry and exit, job changes, part-time employment, multiple jobs, unemployment, and other aspects of labor market activity that add complexity to models. As a result, the literature is replete with evidence of smooth, continuous, age-earnings profiles that gradually rise to a peak in a worker's late 40s or early 50s, and then decline until retirement. No doubt that this pattern is often a good characterization of the earnings histories of continuously employed full-time, full-year, white male workers.

Perhaps the most striking feature of a representative sample of actual earnings histories is the large percentage that does not resemble the textbook case. These include sparse earnings histories, profiles that decline rather than increase with age, others that are U-shaped, ones with multi-year sequences of zero- or low-earnings amounts, those that have large discontinuities between earnings amounts in adjacent years, and the like. It is possible to characterize and sort earnings histories to determine the fraction that more or less conforms to the classic case.[2] Depending on the specific sorting rules that are used, it is reasonable to conclude that, excluding those people who show no history of paid employment, perhaps no more than half of actual earnings histories resemble the stylized version familiar to analysts. The diversity of individual earnings histories is an important consideration in choosing the sample used to calculate the distribution of multi-year earnings.

The distribution of annual earnings typically excludes people with zero earnings, and sometimes those with very low earnings, but those excluded cases may be included in calculations of multi-year earnings because of earnings in at least some years. Exclusion of workers with more erratic earnings histories is likely to affect the values of inequality measures for multi-year periods, as evidenced in Haider (2001). In this project, the population of interest is adults who are able to work over an extended observation period and, through their earnings histories, demonstrate more than token, if not substantial, labor force attachment over a number of years. We implement these considerations by applying a small set of rules for all multi-year calculations:

- There can be no history of disability as indicated by participation in either Social Security's Disability Insurance program or in the Supplemental Security Income program.
- The person must survive through the last year included in any multi-year earnings calculation.

[2] A good example is Bosworth, Burtless, and Steuerle (1999) that uses a simple taxonomy devised by Grundmann and Bye (1976).

- The person must be fully insured for Social Security retired-worker benefits by age 62, or if younger during the final year of a multi-year earning calculation, must exhibit an earnings history that is on track to attain full insurance status by age 62.

Although eligibility for retired-worker benefits at age 62 does not require very high earnings in any year, it does require the equivalent of modest earnings in 10 different years or, at the other extreme, sufficient annual earnings to be awarded 1 Social Security credit in each of 40 years.[3] This requirement eliminates large numbers of men and women with low lifetime earnings.

Data

All samples are drawn from the 2004 CWHS 1% Active file. The primary strengths of the CWHS data are an unusually large sample size and high degree of accuracy relative to the self-reported earnings amounts in most surveys. Those advantages do, however, come with a number of limitations, which we address where possible. Three shortcomings that merit mention are the lack of data for the usual covariates found in earnings equations, changes over the years in the proportion of jobs covered by the Social Security program, and annual earnings amounts that are often limited to Social Security-taxable earnings. We briefly discuss each problem in turn.

First, as is often the case with administrative record data, there is little of the economic and demographic information typically used in economic studies of earnings. Other than date of birth, sex, race, and date of death, the file content is more or less limited to annual earnings amounts and information about any benefits received from the Social Security Administration's programs.

A second limitation is that the CWHS documents only earnings covered under the Social Security program for years prior to 1978; however, the file contains earnings for noncovered employment for 1978-present.[4] During 1951-77, Social Security coverage rates among civilian workers rose from 61 percent in 1951, to 82 percent in 1955, to 86 percent in 1960, before reaching 90 percent in the late 1970s. The increasing coverage rate clouds the interpretation of earnings histories that include years prior to 1978, a problem that is larger for earlier birth cohorts who have more working years during 1951-77. In the pre-1978 period, we are unable to distinguish between nonparticipation in the labor force and work in non-covered employment in

[3] Social Security insured-status rules have evolved over many decades. Since 1990 it has been necessary to accumulate 40 Social Security credits to qualify for retired-worker benefits. A credit is awarded for earning a specified amount that is adjusted annually for average wage growth in the economy. The 2008 figure is $1,050 per credit, with a maximum of 4 credits that can be earned each calendar year.

[4] A worker's employment is said to be covered under Social Security if earnings are creditable for the retirement and disability programs and payroll taxes are paid accordingly.

the case of zero-earnings years.[5] We plan to address this problem in future work,[6] but for now restrict most analysis to 1981-2004. The paper's final set of results extend as far back as 1966 (76 percent coverage) where the problem is encountered. Any effect on our results for lifetime earnings is probably not large due to the exclusion from the sample of all people who do not appear to be fully insured by Social Security (although that could be obtained through other employment) and the fact that most of the earnings histories for the earliest birth cohort analyzed occur post-1977.

A third shortcoming of the earnings data is that the CWHS records annual amounts only up to the maximum earnings that are subject to Social Security payroll taxes each year prior to 1978.[7] This aspect of record keeping causes a censoring problem in the earnings data which we address by imputing above-threshold earning amounts. This issue and other aspects of data set preparation are discussed in the Appendix.

All of the paper's analysis is limited to money earnings from wages and salaries (W&S). Nominal annual earnings are converted to real values denominated in year 2000 dollars using the GDP implicit price deflator for Personal Consumption Expenditures (PCE).[8] In years that a worker has both W&S and self-employment earnings, only the W&S component is counted. Further note that some W&S amounts during the 1980s and early 1990s are understated due to the omission or undercounting of employee-elected deferred compensation. The paper's earnings data include elective deferrals for 1994-2004. Because deferrals were a relatively minor phenomenon before the 1980s, the data problem occurs mainly in the 1980s and extends to a lesser degree through 2003, with the largest understatements affecting earners in the upper tail of the annual distribution.[9] The effect on the paper's results would be to overstate any increase in earnings inequality attributable to high earners during that time period, but the effect should be quite small.

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[5] The problem also occurs in cases where the primary job is not covered, but secondary jobs may be. What appears to be a low-earnings year may reflect only partial earnings.

[6] Industry codes are often available for employer-reported earnings in Social Security's administrative files. Historically, some industries have been more likely to be associated with non-covered employment. Workers with many years of earnings in those industries are more likely than others to have been in noncovered employment during years when no earnings are recorded in the administrative data. Because the timing of legislated changes in coverage is known, a combination of industry codes and marked changes in the annual earnings amounts would support an informed guess about noncovered employment for workers prior to 1978.

[7] More precisely, earnings up to the taxable maximum are available for each job during the year and the CWHS records total earnings for all jobs. Therefore, multiple job holders can have reported earnings that exceed the taxable maximum for the year.

[8] Because we examine earnings histories that span many decades, this deflator is preferable to the Consumer Price Index, which measures price increases for a fixed consumption pattern.

[9] See Pattison and Waldron (2008) for an assessment of the growing importance of elective deferrals in total compensation based on data from the Social Security Administration's Master Earnings File.

Distribution of annual earnings, 1981-2004

Trends in the distribution of annual earnings in recent decades have most frequently been documented using data from the March Supplement to the Current Population Survey. Calculations are usually done for full-time, full-year workers and require the use of the survey's information on both wage rates and hours of work. Hours of work are not available in the CWHS data, so the choice of which workers to include in the analysis must be made solely on the basis of earnings histories and the small set of personal characteristics available (year of birth, race, and sex).

We begin by examining the annual distribution of W&S earnings during 1981-2004. Earnings amounts during those years are uncensored and there has been little change in Social Security coverage during this period.[10] The population of interest is broader than full-time, full-year workers, who cannot be identified with any accuracy in the data. The aim was to include anyone with more than token earnings during the year. Among a number of arbitrary earnings criteria that could be used, the rule adopted is to require that real earnings be at least $5,000, a round number chosen because it approximates half-time work (1000 hours) at the Federal hourly minimum wage during 1996-2004.[11] Application of this selection rule yields average annual sample sizes of 577 thousand observations for men and 472 thousand for women.

Tables 1 and 2 present calculations for 9 inequality measures (Gini coefficient, variance of the logarithm of earnings (VLN), coefficient of variation (CV), and 6 quantile ratios) that confirm substantial increases in annual earnings inequality for both sexes (all races included). The lower panels of the two tables show the percentage change in the inequality measures with respect to their 1981 values. Those changes are displayed graphically in Charts 1 and 2.

For men (Table 1), the Gini and VLN measures show similar percentage increases over the 24-year reference period (23 versus 30 percent); the CV shows a considerably larger increase (251 percent). Consistent with the conclusions of previous studies, the Gini coefficient increases by 11 percentage points during 1981-88, remains about the same during 1989-91, then increases

[10] We also avoid the use of earnings recorded for 1978-80 that are thought to be subject to an unusual number of errors associated with the Agency's change from quarterly to annual wage reporting adopted in 1978. Note that those years are included in many of the 20-year earnings totals that are discussed in the final set of results. The assumption is that any errors during those three years will have a minor effect on total earnings for a 20-year period.

[11] During 1981-2004, the minimum wage increased from $3.35 to $5.15. Although our annual cut-off for sample inclusion could be more precisely tied to the prevailing minimum wage, its real value would change annually, as would those implied by other similar rules (for example, the earnings required for 1 or more Social Security credits).

by another 12 percentage points (relative to its 1981 value) by 2000. The 2004 value of the Gini coefficient is a little lower than in 2000, with a dip in 2001-2. The behavior of VLN during 1981-2004 is similar.

The quantile ratios for men clearly attribute the increased inequality to the greater relative earnings growth at the top of the earnings distribution. The 30 percent increase in the 90/10 ratio occurs while the 80/10 ratio increases by 16 percent. The 90/50 ratio rises by 24 percent compared to a 5 percent increase for the 50/10 ratio. Moving away from the distribution's upper and lower tails, the 75/25 ratio increases by 8 percent.

Most of the inequality measures for women (Table 2) indicate greater increases in annual earnings dispersion than for men, the two exceptions being the CV and 90/50 ratio. Comparison of the behavior of the 6 quantile ratios for the 24-year period shows that the increase in women's earnings inequality is not as predominately driven by higher earnings in the uppermost part of the distribution, as is the case for men. Although the 90/10 ratio increases by 45 percent, the 50/10 ratio rises 20 percent while the 90/50 ratio increases 21 percent.

A set of dispersion measures for the annual distribution of earnings masks what may be a very different distribution of multi-year earnings for the same workers. The paper now presents a similar treatment of the distribution of long-run earnings.

Distribution of long-run earnings, 1981-2004

We examine real earnings over 12-year segments of earnings histories. Prior to age 30, earning histories can be difficult to compare because of frequent voluntary absences from the labor force to pursue education and training, and frequent job changes associated with starting careers. Beyond age 60, and earlier for some workers, retirement begins to have large effects on observed earnings patterns. For these reasons, we now focus on earnings during ages 31-62.

To keep all calculations within the 1981-2004 period, during which the CWHS earnings data are of higher quality, we subdivide the 24 years into two 12-year intervals, 1981-92 and 1993-2004. We then calculate total real earnings for workers aged 31-50 in the first year of each reference period and compare the distributions of long-run real earnings in the two periods. In addition to the three longitudinal sample restrictions – no disability, fully insured status, and survivorship – we eliminate all workers with self-employment earnings and require that workers earn at least $5,000 in one of the 12 reference years. Finally, the 12-year real earnings totals were calculated three ways: as a simple sum, and as present values using real discount rates of 3 and 5 percent. Results are derived from a 10-percent random sample of eligible CWHS observations.

The findings for men are displayed in Table 3 for the undiscounted total earnings.[12] The sample mean, 7 quantile values, and 5 inequality measures are provided for each of the two periods. These calculations exclude both zero-earners and very-low earners (less than $5,000 in earnings every year). The table also contains a set of calculations restricted to "positive earners," defined as those workers who have earnings in all 12 years – about 69 percent of "all workers." All 5 inequality measures increase across the two periods, more attributable to falling real earnings in the lower half of the distribution than to increases in the upper half. The increase in inequality also applies to the subgroup of "positive earners," although there is one notable difference in detail. With the exception of a small (0.4 percent) increase for the 75th percentile, all quantiles show declines in total real earnings. Although the real earnings declines in the lower part of the distribution are consistent with some previous research, falling real earnings at the 90th and 95th percentiles of long-run earnings is an unexpected result that we continue to investigate. One possibility is that there is more downward mobility in the upper tail of the long-run distribution of W&S earnings than we suspect. Second, self-employment is a more important source of earnings in the upper portion of the distribution of total earnings. The omission of all men with any self-employment earnings during 1981-2004 may have biased downward the higher long-run earnings values if there is a positive correlation between self-employment and W&S earnings either within or across years.

The increase in long-run inequality is not as large as one might expect from the trends in annual earning inequality. Foremost is the role played by earnings mobility. Long run inequality measures will be lower than the highest inequality value for any subperiod if workers change relative positions in the earnings distribution over time.

The findings for women (Table 4) are notably different from those for men. There are large gains in total real earnings throughout the distribution of long-run real earnings. For "all workers" there is no clear trend in dispersion. Among "positive earners," there is an increase in earnings inequality as measured by all 5 measures, but again, all quantiles show substantial gains in real earnings.

For both men and women, there are notably different consequences of changing the sample restriction from "earnings must be at least equal to $5,000 in at least one year" to that condition augmented by "earnings in all years." The male samples are reduced by 27 and 23 percent, the women samples by 45 and 33 percent. A comparison of changes in the quantile

[12]Results for the two discounted versions were very similar to the undiscounted case and are consequently not shown. A similar table design is used in Haider (2001).

values in both tables attributable to changing the sample composition indicates that the excluded cases (more intermittent workers) are disproportionately drawn from the lower tail of the long-run earnings distribution. Restricting the calculations to workers with more steady labor force participation does not appreciably change the conclusion about increased long-run earnings inequality for men. In contrast, for women the finding of increased inequality emerges only after the sample is restricted in this way.

This treatment of the data has the advantage of comparing long-run earnings distributions during the 1980s and 1990s, a period for which there is a professional consensus about the trend in annual earnings inequality. Although it is possible to draw some conclusions about how long-run earnings inequality may have changed during those years, the multi-year earnings distributions are the product of a mix of age, cohort, and longitudinal effects. We examine this point in the following section.

Distribution of lifetime earnings for the 1930-49 birth cohorts

We now consider real earnings during ages 36-55 for 20 cohorts of white men born in 1930-49. The earliest of these cohorts (1930) is observed during years 1966-85, the latest (1949) during 1985-2004. The latter half of the oldest cohort's observation window occurs during years when the increase in annual earnings inequality began. Each successive cohort's long-run earnings increasingly occur during the period of rising annual earnings inequality. Zero- and low-earners (less than $5,000 in all years) are again excluded from the calculations. Total real earnings for ages 36-55 are calculated as an undiscounted sum and as present values using 3 and 5 percent real interest rates.

We draw attention to one further aspect of the calculations. This analysis requires earnings data from the 1966-80 period for some cohorts (1930-44). Our 1978-80 earnings data are subject to error in the CWHS total compensation measure which we do not address. Those errors are more likely to be important for workers who earn more than Social Security's annual taxable maximum during those years. Pre-1978 earnings are subject to a censoring problem discussed earlier. The earliest cohort (1930) is subject to censoring during the first 12 years of the 20-year observation window and experiences censoring rates as high as 45 percent at age 40. The average amount of censoring generally declines for each cohort, both in terms of number of potentially censored years and the incidence of censoring during those years. The earnings histories used in the calculations incorporate the imputations described in the paper's Appendix.

A set of lifetime earnings inequality measures is presented in Table 5. Discounting has little effect on the qualitative conclusions, so we limit the following remarks to the undiscounted results. There is some evidence of an increase in long-run real earnings inequality across cohorts. A 16 percent increase in the Gini coefficient and a 78 percent increase in the coefficient of variation support a conclusion of increased inequality, but there is little change in the variance of log earnings (displayed in Chart 3). The Gini and CV trends are apparent, but the estimated amount of change is sensitive to choice of reference years. The time path of the Gini measure indicates a persistent upward shift beginning with the 1940 cohort (similar effects are captured by VLN and CV). The 90/10 quantile ratio exhibits no clear trend, but the 90/50 ratio increases by 13 percent; the 80/20 and 72/25 ratios decline.

We also explore whether there has been any noticeable change in inequality at various ages for these cohorts. The 20-year observation window is divided into four 5-year age groups: 36-40, 41-45, 46-50, and 51-55. A set of inequality measures for the distributions of total real earnings (undiscounted) by age group is shown in Table 6.[13] Five-year earnings inequality is highest by most measures for the oldest (51-55) age group, where it also trends upward by cohort. In fact, with the exception of the CV measure, there is not much compelling evidence to support a case for increased long-run earnings inequality in any of the youngest three age groups. Only when data for those 15 years are summed and added to the age 51-55 total does a case for rising long-run earnings inequality emerge.

Finally, each cohort's distribution of 5-year earnings as it passes through the four age intervals can be assessed using Table 6 information. Simple plots of 3 inequality measures (Gini, VLN, and CV) are shown for each cohort (Chart 5). A covariance analysis for this information draws attention to the following conclusions, some of which can be easily verified in Chart 5. All 20 cohorts experience statistically significant increases (0.95 confidence level) in the Gini coefficient when moving from the first to the fourth age interval. The trend becomes larger beginning with the 1940 cohort. There is not much evidence of any trend in VLN until the 1938 cohort, but beginning with the 1940 cohort there is a more pronounced upward trend in the earnings dispersion moving from the lowest to highest age group. The CV measure has no trend for the 1930-31 cohorts, but trends upward for all subsequent cohorts.

Findings for the three quantile ratio measures (no graphs included) are more mixed. There is little evidence of trend in any of the three measures for the first 10 cohorts. The 90/50

[13] The 90/10 quantile ratio is not shown because the total earnings calculation during 5-year age intervals often produces a zero or very small value for the 10th decile.

ratio trends upward for the 1942 and all subsequent cohorts. The 80/20 ratio exhibits a positive trend for the 1940-49 cohorts. Consistent positive trends for the 75/25 ratio begin with the 1941 cohort. Thus, behavior of all three quantile ratios provides some evidence of increasing earnings dispersion with age for 1940-49 cohorts, but not for the earlier ones.

Final remarks

Using a large sample of earnings histories drawn from the Social Security Administration's restricted-access record data, we find evidence of increasing annual earnings inequality during 1981-2004 for both men and women, consistent with the findings of previous research conducted using other data sets. The paper's results pertain solely to the annual distribution of wage and salary earnings and ignore earnings from self-employment.

We then turn to the major focus of the paper, the distribution of long-run real earnings. One set of results looks at how the distribution of earnings over 12-year periods (1981-92, 1993-2004) changed for white men and white women. The results for white men indicate an increase inequality associated with declining real earnings in the lower part of the distribution and increased real earnings in the upper portion of the distribution. There is no conclusive trend in long-run real earnings inequality for women. Our research, only some of which is presented here, underscores the importance of the rules by which the sample of workers is selected on the value of inequality measures and assessing any trend.

The paper's final section presents a cohort analysis of changes in the distribution of earnings during ages 36-55 for white men born in 1930-49. Long-run real earnings inequality appears to have risen from the earliest to the last of the 20 cohorts – about 16 percent as measured by the Gini coefficient. A look at subperiod inequality for the 20 cohorts confirms that measured inequality for the longer time period is less than the largest value for the subperiods, reflecting the role played by earnings mobility as the reference period lengthens.

Because empirical work on lifetime or long-run earnings distributions is very much constrained by the availability of large and long longitudinal data files, there is much useful research to be done in this area. Our immediate goal is to pursue two issues that may help explain the results in this paper. The first is the role of earnings mobility in determining where an individual ends up in the final long-run earnings distribution. Most mobility studies emphasize the path by which a person changes position in a series of short-term earnings distributions. We

are more interested in how that path relates to relative position in the distribution of earnings over all periods.[14]

A second issue is to introduce self-employment earnings into the distribution of earnings, which may resolve some questions about our findings concerning the upper tail of the earnings distribution. Although self-employment earnings raise more practical problems in terms of using the CWHS file, we should be able to make some progress on this front.

[14] An interesting look at aspects of this question that also uses CWHS data is contained in Kopczuk, Saez, and Song (2007).

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Appendix

Data processing details

The Continuous Work History Sample's 1% Active file documents earnings histories based on a 1-percent sample of all Social Security Numbers issued since the program's inception (see Smith 1989). The file currently contains records for 3.2 million workers. Wage and salary (W&S) data are obtained from the Social Security Administration's Master Earnings File. Annual earnings amounts prior to 1978 are limited to Social Security taxable earnings – that is, earnings from employment covered by the Social Security program that were subject to payroll taxes.

Creation of the earnings variable and data cleaning

All reported results in this paper pertain solely to W&S earnings; all self-employment income is excluded. In cases where both W&S and self-employment earnings are reported, the observation is kept, but only the W&S earnings component is included.

The CWHS contains three variables that measure W&S earnings: FICA earnings (that is, Social Security taxable earnings), Medicare-taxable earnings, and total compensation. FICA earnings are available for each calendar year during 1951-2004, but cannot exceed the maximum taxable earnings amount applicable in each year, except in the case of multiple jobs (see censoring discussion that follows). Prior to 1977, the FICA earnings variable is the data set's only source of W&S data. Since 1978, the CWHS also contains information on total compensation for W&S employment as reported on W-2 statements prepared by employers for purposes of Federal income taxation. That amount is not top-coded, but does not contain elective deferred compensation. It is also subject to some error due to the process by which the CWHS is updated annually from the Agency's Master Earnings File to incorporate the latest available year's data.[15] The Medicare-taxable earnings variable was added to the file in 1983. During 1983-91, the Medicare- and Social Security-maximum taxable earnings amounts were the same, but starting in 1991 the Medicare maximum was higher, with no maximum from 1994 onward. Both of those earnings measures include deferred compensation.[16]

The measure of annual earnings used throughout the paper is a variable deduced from the three CWHS earnings variables. Generally, prior to 1978 we use the FICA earnings measure. During 1978-1993, we use the maximum value of the three reported earnings variables. From 1994 onward, the Medicare earnings variable is used. Once this preliminary earnings variable was created to construct the individual earnings histories used in the research, we conducted consistency checks, such as setting negative earnings values to equal zero and checking for outlier earnings values. Any annual earnings amount that exceeded three times the Social Security annual maximum taxable earnings amount was compared with values in nearby years. If no nearby earnings amount exceeded one-third the suspect value, an imputation was made by averaging the nearby positive earnings amounts.

[15] Most errors in the total compensation variable are due to employer reporting errors. Subsequent corrections are made in the Master Earnings File but not in the CWHS. In contrast, corrections for initial errors in the FICA- and Medicare-taxable earnings amounts are made in the CHWS.

[16] A few workers (some government employees at the Federal and state levels) pay payroll taxes for Medicare but not Social Security.

Finally, all nominal earnings values were converted to real dollars using the GDP implicit price deflator for Personal Consumption Expenditures (PCE) with calendar year 2000 as the base period.

Censoring in the data

The amount of earnings subject to Social Security payroll taxes has varied over time. Until 1972, the annual maximum taxable earnings amount was increased on an *ad hoc* basis every few years; after 1972, the taxable maximum increased each year in proportion to the growth in average earnings in the economy (with a few minor exceptions).[17] Over the period 1951-2004, the proportion of workers in the economy whose earnings attained the taxable maximum each year declined from 25 percent to 6 percent, and has been as high as 36 percent (1965). This feature of the data causes annual earnings amounts prior to 1978 to be right-censored. (In 1978-2004, information on total compensation and Medicare-taxable earnings can be used to determine uncensored earnings amounts.) Because women's earnings have generally been lower than men's, the censoring problem is far more prevalent in the men's data. For example, in 1951, 35 percent of male earners reached the taxable maximum but only 3 percent of women. Through the mid-1970s, typically 40 percent or more of men had annual earnings that attained the taxable maximum in a given year.

In the body of the paper, we usually circumvent the censoring problem by limiting analysis to 1981-2004. Nonetheless, the calculations for the 1930-49 cohorts require the use of segments of earnings histories that extend into years prior to 1978. In a relatively small number of cases, the reported annual taxable earnings amount exceeds the year's taxable maximum, which can occur when a worker has more than one employer, none of whom may be a source of earnings that reaches the threshold. In the absence of further information, we assume that those observations are uncensored. In instances where the earnings amount lies within $1 of the threshold, we impute a higher value by applying a procedure outlined in Gartner [2005] based on an assumption that the distribution of annual earnings is lognormal. The predicted values and estimated error variance from a censored regression are used to randomly select an imputed value from the missing tail of the censored distribution. The natural logarithm of real earnings was regressed on age and its square, work experience since age 30, and a lagged indicator of censored earnings. Separate regressions were performed for each birth cohort. The imputation draw is restricted to lie in an interval bounded by that year's annual maximum taxable earnings amount and 10 times its value.

[17] Those exceptions are detailed in Myers (1993), pages 214-16. The 1973-74 adjustments were legislated in 1972. Adjustments in 1979-81 were mandated by 1977 legislation.

Table 1.--Inequality of annual earnings, men, 1981-2004.

Year	Gini	90/10	90/50	80/10	80/50	50/10	75/25	VLN	CV
					Levels				
1981	0.381	6.517	2.078	5.253	1.675	3.137	2.716	0.529	0.950
1982	0.387	6.593	2.109	5.292	1.693	3.127	2.730	0.537	0.983
1983	0.389	6.642	2.096	5.363	1.692	3.169	2.769	0.546	1.017
1984	0.394	6.752	2.132	5.430	1.715	3.167	2.809	0.555	1.059
1985	0.397	6.829	2.154	5.460	1.722	3.171	2.810	0.562	1.095
1986	0.405	6.975	2.179	5.558	1.736	3.202	2.830	0.578	1.164
1987	0.412	6.981	2.167	5.549	1.723	3.221	2.812	0.584	1.384
1988	0.421	7.025	2.189	5.582	1.739	3.209	2.845	0.593	1.508
1989	0.420	7.065	2.212	5.574	1.745	3.194	2.839	0.593	1.419
1990	0.423	7.037	2.222	5.549	1.752	3.167	2.840	0.594	1.473
1991	0.426	7.328	2.325	5.580	1.770	3.152	2.885	0.603	1.457
1992	0.436	7.441	2.349	5.652	1.784	3.168	2.915	0.618	1.669
1993	0.438	7.520	2.387	5.661	1.797	3.150	2.921	0.621	1.565
1994	0.442	7.524	2.425	5.631	1.815	3.103	2.898	0.624	1.645
1995	0.443	7.544	2.442	5.612	1.817	3.089	2.877	0.625	1.731
1996	0.449	7.622	2.459	5.638	1.819	3.099	2.869	0.632	2.432
1997	0.456	7.759	2.475	5.699	1.818	3.135	2.876	0.644	2.670
1998	0.460	7.873	2.491	5.730	1.813	3.161	2.862	0.655	3.092
1999	0.467	8.010	2.510	5.801	1.818	3.191	2.866	0.665	3.444
2000	0.472	8.134	2.539	5.851	1.826	3.204	2.857	0.673	3.475
2001	0.468	8.226	2.548	5.917	1.833	3.229	2.880	0.675	3.306
2002	0.462	8.307	2.550	5.997	1.841	3.257	2.907	0.676	2.687
2003	0.465	8.393	2.565	6.050	1.849	3.272	2.920	0.681	2.704
2004	0.470	8.493	2.582	6.117	1.860	3.289	2.946	0.690	3.331
					Percent difference from 1981				
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1982	1.499	1.167	1.496	0.739	1.067	-0.324	0.496	1.538	3.476
1983	2.211	1.919	0.886	2.081	1.047	1.024	1.931	3.139	7.123
1984	3.395	3.600	2.615	3.365	2.383	0.960	3.412	4.916	11.528
1985	4.295	4.793	3.673	3.938	2.828	1.080	3.444	6.210	15.335
1986	6.372	7.027	4.866	5.797	3.661	2.061	4.179	9.196	22.592
1987	8.278	7.114	4.322	5.619	2.866	2.676	3.518	10.310	45.700
1988	10.563	7.787	5.358	6.248	3.854	2.305	4.728	12.156	58.759
1989	10.232	8.415	6.493	6.107	4.226	1.804	4.498	12.016	49.436
1990	11.172	7.985	6.955	5.627	4.619	0.963	4.532	12.179	55.069
1991	11.862	12.438	11.899	6.212	5.704	0.481	6.221	13.968	53.357
1992	14.548	14.176	13.044	7.579	6.512	1.002	7.317	16.784	75.722
1993	14.874	15.387	14.911	7.753	7.308	0.415	7.521	17.385	64.731
1994	16.089	15.447	16.727	7.191	8.380	-1.097	6.698	17.850	73.221
1995	16.415	15.757	17.550	6.830	8.485	-1.526	5.900	18.141	82.273
1996	17.780	16.957	18.380	7.319	8.624	-1.202	5.622	19.521	156.015
1997	19.697	19.051	19.114	8.478	8.536	-0.054	5.878	21.766	181.110
1998	20.776	20.806	19.878	9.067	8.230	0.774	5.343	23.709	225.504
1999	22.530	22.901	20.810	10.416	8.536	1.731	5.495	25.616	262.607
2000	23.819	24.809	22.211	11.371	9.052	2.126	5.184	27.262	265.848
2001	22.785	26.230	22.641	12.639	9.436	2.927	6.037	27.661	248.090
2002	21.398	27.460	22.754	14.154	9.939	3.834	7.013	27.739	182.902
2003	22.210	28.783	23.462	15.174	10.415	4.310	7.511	28.727	184.729
2004	23.368	30.318	24.299	16.436	11.058	4.842	8.443	30.468	250.711

Source: Authors' calculations from the 2004 Continuous Work History Sample, 1% Active file. All inequality measures are restricted to wage and salary earnings of workers who earn at least $5,000 (denominated in year 2000 dollars) during a calendar year. Sample sizes for each year range from 487,099 (in 1982) to 646,930 (in 2001), with an average sample size of 577,644.

Tables 2.--Inequality of annual earnings, women, 1981-2004.

Year	Gini	90/10	90/50	80/10	80/50	50/10	75/25	VLN	CV
					Levels				
1981	0.313	4.738	2.002	3.790	1.601	2.367	2.309	0.331	0.635
1982	0.318	4.855	2.021	3.882	1.616	2.402	2.352	0.344	0.641
1983	0.322	4.971	2.040	3.958	1.625	2.436	2.381	0.354	0.651
1984	0.330	5.135	2.074	4.073	1.645	2.476	2.441	0.370	0.677
1985	0.334	5.257	2.106	4.147	1.661	2.496	2.480	0.381	0.681
1986	0.342	5.433	2.130	4.276	1.676	2.551	2.527	0.398	0.710
1987	0.342	5.488	2.123	4.335	1.677	2.585	2.547	0.402	0.736
1988	0.347	5.546	2.142	4.367	1.687	2.589	2.565	0.409	0.799
1989	0.349	5.602	2.164	4.386	1.694	2.589	2.570	0.414	0.803
1990	0.352	5.664	2.191	4.413	1.707	2.585	2.583	0.420	0.796
1991	0.358	5.772	2.222	4.477	1.724	2.597	2.615	0.431	0.796
1992	0.363	5.865	2.241	4.529	1.730	2.618	2.628	0.440	1.028
1993	0.366	5.939	2.265	4.566	1.741	2.622	2.642	0.447	0.919
1994	0.367	5.918	2.267	4.538	1.738	2.610	2.637	0.447	0.849
1995	0.370	5.986	2.286	4.581	1.750	2.618	2.649	0.454	0.917
1996	0.374	6.047	2.296	4.618	1.753	2.634	2.655	0.461	0.954
1997	0.379	6.155	2.308	4.699	1.762	2.666	2.674	0.472	1.010
1998	0.383	6.265	2.318	4.762	1.762	2.702	2.682	0.483	1.053
1999	0.387	6.321	2.327	4.803	1.769	2.716	2.692	0.491	1.053
2000	0.392	6.421	2.339	4.858	1.770	2.745	2.698	0.501	1.214
2001	0.393	6.547	2.352	4.937	1.774	2.783	2.713	0.508	1.108
2002	0.393	6.673	2.369	5.025	1.784	2.817	2.742	0.515	1.083
2003	0.396	6.783	2.390	5.086	1.792	2.839	2.765	0.523	1.104
2004	0.399	6.853	2.413	5.120	1.803	2.840	2.779	0.530	1.181
					Percent difference from 1981				
1981	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1982	1.503	2.472	0.970	2.421	0.919	1.488	1.858	3.667	0.879
1983	2.894	4.919	1.935	4.444	1.474	2.927	3.101	6.974	2.447
1984	5.153	8.371	3.617	7.472	2.758	4.587	5.709	11.618	6.519
1985	6.583	10.961	5.212	9.431	3.761	5.464	7.396	14.866	7.162
1986	8.986	14.665	6.404	12.815	4.688	7.763	9.431	20.225	11.699
1987	9.161	15.834	6.088	14.390	4.766	9.186	10.320	21.462	15.894
1988	10.575	17.045	7.024	15.232	5.366	9.364	11.103	23.442	25.796
1989	11.408	18.243	8.115	15.723	5.811	9.368	11.324	24.972	26.320
1990	12.445	19.543	9.471	16.449	6.638	9.201	11.883	26.668	25.335
1991	14.081	21.823	11.033	18.114	7.653	9.718	13.244	30.087	25.201
1992	15.687	23.784	11.939	19.499	8.064	10.581	13.801	32.692	61.813
1993	16.816	25.342	13.144	20.481	8.756	10.780	14.434	34.985	44.693
1994	16.966	24.916	13.274	19.732	8.573	10.277	14.195	34.849	33.673
1995	18.185	26.334	14.208	20.874	9.271	10.618	14.743	36.922	44.231
1996	19.308	27.628	14.697	21.845	9.501	11.273	14.987	38.984	50.074
1997	20.929	29.911	15.332	23.979	10.066	12.641	15.800	42.321	58.986
1998	22.368	32.226	15.819	25.646	10.056	14.165	16.168	45.792	65.716
1999	23.552	33.407	16.275	26.736	10.460	14.735	16.595	48.176	65.745
2000	25.128	35.533	16.871	28.190	10.539	15.968	16.826	51.172	91.084
2001	25.256	38.182	17.527	30.268	10.795	17.576	17.488	53.333	74.412
2002	25.246	40.840	18.354	32.582	11.415	18.999	18.769	55.271	70.502
2003	26.382	43.168	19.386	34.191	11.900	19.920	19.763	57.938	73.812
2004	27.407	44.649	20.571	35.084	12.598	19.970	20.373	59.912	85.913

Source: Authors' calculations from the 2004 Continuous Work History Sample, 1% Active file. All inequality measures are restricted to wage and salary earnings of workers who earn at least $5,000 (denominated in year 2000 dollars) during a calendar year. Sample sizes for each year range from 343,667 (in 1981) to 568,420 (in 2001), with an average sample size of 472,487.

Table 3.--Distribution of long-run earnings, white men, 1981-2004

	All workers			Positive earners		
	1981-1992	1993-2004	Change (%)	1981-1992	1993-2004	Change (%)
Quantiles:						
5th	$60,020	$55,408	-7.7	$220,589	$199,947	-9.4
10th	130,886	118,532	-9.4	276,395	254,844	-7.8
25th	283,900	272,364	-4.1	384,412	360,352	-6.3
50th	456,590	448,485	-1.8	538,164	518,590	-3.6
75th	664,757	669,791	0.8	733,405	736,650	0.4
90th	945,340	980,674	3.7	1,060,511	1,054,295	-0.6
95th	1,280,537	1,291,196	0.8	1,448,968	1,398,793	-3.5
Mean	559,019	558,191	-0.1	667,000	647,402	-2.9
Inequality:						
Gini	0.405	0.417	3.0	0.345	0.354	2.5
90th/10th	7.22	8.27	14.5	3.84	4.14	7.8
75th/25th	2.34	2.46	5.0	1.91	2.04	7.1
VLN	0.861	0.882	2.4	0.350	0.371	5.9
CV	113.009	128.476	13.7	103.150	115.318	11.8
Zero earners	399	700		0	0	
Very low earners	271	324		5	10	
n	12,929	18,148		8,921	13,195	

Notes: Based on 10% random sample from 1% 2004 CWHS-Active file. "All workers" refers to everyone with enough quarters of coverage to be insured, or on track (in the last year of a period) to be insured for retired-worker benefits. "Positive earners" refers to everyone with earnings in all years of a period. The table excludes anyone dead by the last year of a period, with any self-employment during a period, or ever disabled.
Earnings are denominated in year 2000 dollars, not subject to discounting.
90th/10th = ratio of the 90th to the 10th percentile of earnings.
75th/25th = ratio of the 75th to the 25th percentile of earnings.
VLN = variance of log earnings.
CV = coefficient of variation.
Zero earners have no earnings during the 12-year period. Very low earners never earn more than $5,000 in any year during the period. Zero and very low earners are not included in the calculation of any statistics.
Sample size (n) includes the zero and very low earner counts.

Table 4.--Distribution of long-run earnings, white women, 1981-2004

	All workers			Positive earners		
	1981-1992	1993-2004	Change (%)	1981-1992	1993-2004	Change (%)
Quantiles:						
5th	$25,992	$33,832	30.2	$97,973	$117,703	20.1
10th	42,545	59,320	39.4	127,294	150,171	18.0
25th	94,038	132,561	41.0	191,038	222,620	16.5
50th	191,435	255,630	33.5	278,376	330,419	18.7
75th	315,891	409,359	29.6	397,222	475,866	19.8
90th	455,504	594,209	30.5	522,373	660,119	26.4
95th	545,013	741,880	36.1	619,887	811,010	30.8
Mean	227,849	307,991	35.2	313,348	386,214	23.3
Inequality:						
Gini	0.410	0.413	0.8	0.297	0.324	9.2
90th/10th	10.71	10.02	-6.4	4.10	4.40	7.1
75th/25th	3.36	3.09	-8.1	2.08	2.14	2.8
VLN	0.868	0.878	1.2	0.315	0.362	14.8
CV	89.571	89.739	0.2	71.418	73.211	2.5
Zero earners	574	781		0	0	
Very low earners	645	673		33	19	
n	13,574	20,160		6,812	12,559	

Notes: Based on 10% random sample from 1% 2004 CWHS-Active file. "All workers" refers to everyone with enough quarters of coverage to be insured, or on track (in the last year of a period) to be insured for retired-worker benefits. "Positive earners" refers to everyone with earnings in all years of a period. The table excludes anyone dead by the last year of a period, with any self-employment during a period, or ever disabled.
Earnings are denominated in year 2000 dollars, not subject to discounting.
90th/10th = ratio of the 90th to the 10th percentile of earnings.
75th/25th = ratio of the 75th to the 25th percentile of earnings.
VLN = variance of log earnings.
CV = coefficient of variation.
Zero earners have no earnings during the 12-year period. Very low earners never earn more than $5,000 in any year during the period. Zero and very low earners are not included in the calculation of any statistics.
Sample size (n) includes the zero and very low earner counts.

Table 5.--Lifetime earnings inequality, white men, 1930-49 cohorts.

Cohort	Gini	VLN	CV	90/10	90/50	80/20	75/25
			Lifetime earnings, not discounted				
1930	0.394	1.204	0.730	13.303	2.042	5.135	3.600
1931	0.397	1.176	0.791	12.855	2.052	4.956	3.605
1932	0.401	1.166	0.785	12.271	2.069	4.988	3.558
1933	0.404	1.121	0.843	11.996	2.090	4.562	3.365
1934	0.408	1.089	0.868	11.055	2.174	4.342	3.174
1935	0.406	1.050	0.878	10.489	2.165	4.237	3.171
1936	0.416	1.069	0.954	10.252	2.202	4.212	3.122
1937	0.414	1.084	0.899	11.162	2.196	3.966	2.986
1938	0.424	1.120	1.019	11.012	2.208	4.117	3.001
1939	0.418	1.114	1.025	10.908	2.173	3.821	2.818
1940	0.448	1.173	1.235	12.253	2.199	4.092	2.920
1941	0.437	1.165	1.266	11.447	2.177	4.011	2.862
1942	0.449	1.170	1.223	11.491	2.213	3.948	2.843
1943	0.445	1.120	1.292	10.706	2.221	3.809	2.789
1944	0.457	1.190	1.363	12.088	2.255	3.984	2.938
1945	0.457	1.167	1.520	11.903	2.232	4.002	2.893
1946	0.454	1.147	1.490	10.873	2.252	3.892	2.829
1947	0.465	1.182	2.007	12.363	2.324	4.059	2.945
1948	0.460	1.186	1.401	12.203	2.311	4.048	2.886
1949	0.457	1.164	1.296	11.610	2.313	4.032	2.919
			Lifetime earnings, 3% discount rate				
1930	0.390	1.205	0.710	14.024	2.033	5.039	3.612
1931	0.393	1.176	0.761	13.074	2.016	5.132	3.580
1932	0.397	1.176	0.753	12.757	2.067	5.089	3.650
1933	0.400	1.120	0.796	12.616	2.069	4.732	3.482
1934	0.404	1.089	0.817	11.500	2.175	4.470	3.289
1935	0.401	1.043	0.835	10.698	2.153	4.403	3.246
1936	0.411	1.053	0.914	10.426	2.225	4.351	3.208
1937	0.410	1.073	0.862	11.063	2.216	4.136	3.079
1938	0.420	1.103	0.964	11.004	2.230	4.171	3.051
1939	0.413	1.095	0.970	10.690	2.172	3.878	2.892
1940	0.440	1.145	1.167	11.655	2.187	4.057	2.933
1941	0.430	1.123	1.194	11.017	2.168	3.937	2.843
1942	0.439	1.120	1.171	10.745	2.178	3.795	2.754
1943	0.436	1.074	1.249	10.179	2.180	3.731	2.740
1944	0.448	1.145	1.291	11.306	2.215	3.888	2.895
1945	0.448	1.123	1.408	11.250	2.179	3.897	2.853
1946	0.444	1.108	1.397	10.620	2.208	3.805	2.783
1947	0.456	1.142	1.753	11.745	2.278	3.937	2.893
1948	0.452	1.146	1.341	11.485	2.275	3.911	2.811
1949	0.449	1.118	1.241	11.064	2.266	3.919	2.855
			Lifetime earnings, 5% discount rate				
1930	0.388	1.220	0.700	14.360	2.024	5.061	3.592
1931	0.391	1.191	0.745	13.636	2.019	5.118	3.575
1932	0.396	1.197	0.737	13.378	2.063	5.182	3.648
1933	0.398	1.133	0.771	12.641	2.071	4.928	3.522
1934	0.402	1.103	0.791	11.596	2.173	4.578	3.357
1935	0.399	1.052	0.811	10.898	2.149	4.495	3.310
1936	0.409	1.057	0.892	10.858	2.240	4.454	3.302
1937	0.409	1.081	0.842	11.242	2.231	4.230	3.128
1938	0.418	1.105	0.933	11.080	2.258	4.204	3.112
1939	0.411	1.096	0.937	10.643	2.191	3.928	2.926
1940	0.436	1.141	1.126	11.509	2.194	4.049	2.935
1941	0.426	1.109	1.161	10.869	2.152	3.954	2.839
1942	0.434	1.099	1.139	10.249	2.143	3.707	2.721
1943	0.431	1.056	1.228	10.047	2.152	3.674	2.707
1944	0.442	1.128	1.247	10.914	2.182	3.853	2.849
1945	0.442	1.106	1.343	11.087	2.155	3.844	2.833
1946	0.439	1.094	1.343	10.427	2.183	3.772	2.757
1947	0.450	1.128	1.613	11.438	2.247	3.911	2.869
1948	0.447	1.132	1.304	11.236	2.241	3.816	2.794
1949	0.444	1.099	1.210	10.758	2.254	3.891	2.816

Source: Authors' calculations from the 2004 Continuous Work History Sample, 1% Active file. Lifetime earnings are defined to be real earnings during ages 36-55. To be included in calculations for the cohort, a worker must have no history of disability and must be fully insured for a Social Security retired-worker benefit (or be on track to attain that status by age 62). Cohort sample sizes range from 5,536 (1930 cohort) to 12,386 (1947 cohort).

Table 6.--Subperiod real earnings for white men, undiscounted, 1930-49 cohorts.

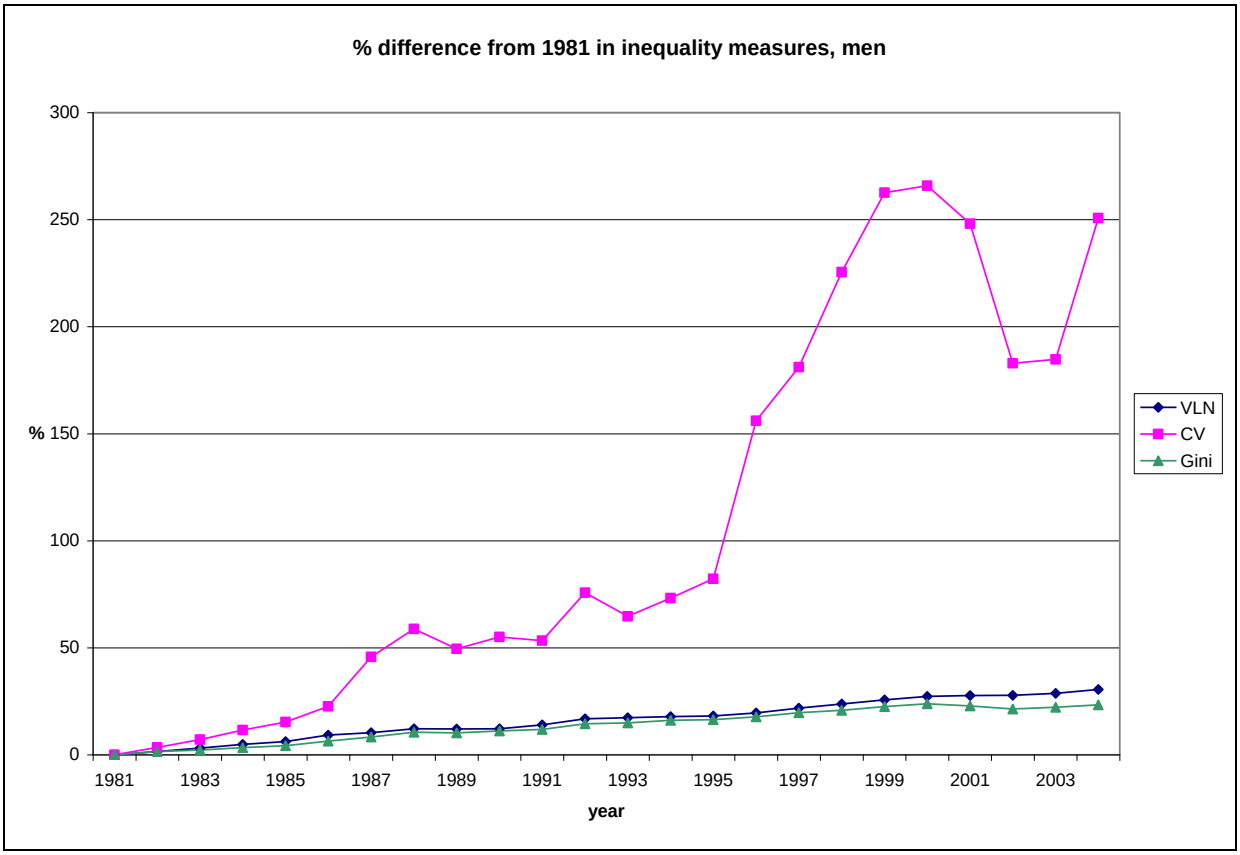
Cohort	Gini	VLN	CV	90/50	80/20	75/25
	Earnings at ages 36-40					
1930	0.428	1.314	0.766	2.346	5.518	3.653
1931	0.426	1.440	0.762	2.360	5.712	3.693
1932	0.427	1.418	0.762	2.337	5.986	3.627
1933	0.425	1.362	0.759	2.320	5.630	3.688
1934	0.430	1.378	0.771	2.385	5.579	3.691
1935	0.429	1.307	0.770	2.394	5.432	3.611
1936	0.446	1.404	0.809	2.662	6.203	3.924
1937	0.456	1.514	0.828	2.780	6.680	3.990
1938	0.454	1.395	0.874	2.747	6.404	3.901
1939	0.440	1.312	0.814	2.558	5.830	3.621
1940	0.445	1.350	1.121	2.370	5.553	3.478
1941	0.444	1.232	1.575	2.151	5.116	3.318
1942	0.418	1.044	1.056	1.954	4.215	2.827
1943	0.421	1.123	1.382	1.948	4.460	2.913
1944	0.423	1.239	0.960	2.000	4.486	3.052
1945	0.424	1.179	0.951	2.034	4.475	3.046
1946	0.419	1.198	0.966	2.016	4.503	2.948
1947	0.431	1.169	1.094	2.081	4.693	3.052
1948	0.429	1.225	1.054	2.060	4.229	2.905
1949	0.427	1.155	1.089	2.055	4.129	2.861
	Earnings at ages 41-45					
1930	0.457	1.672	0.823	2.521	8.644	4.592
1931	0.464	1.752	0.838	2.616	9.842	4.772
1932	0.480	1.633	0.871	2.997	10.636	5.290
1933	0.472	1.697	0.866	2.877	8.577	4.800
1934	0.471	1.419	1.081	2.811	7.554	4.425
1935	0.470	1.445	1.278	2.515	6.813	4.059
1936	0.465	1.332	1.702	2.261	6.515	3.858
1937	0.450	1.236	1.237	1.987	5.783	3.361
1938	0.455	1.352	1.080	2.057	5.477	3.558
1939	0.446	1.336	1.048	2.024	5.036	3.267
1940	0.462	1.377	1.209	2.107	5.690	3.380
1941	0.455	1.349	1.006	2.103	5.787	3.452
1942	0.464	1.454	1.185	2.129	5.078	3.352
1943	0.459	1.394	1.313	2.115	4.534	3.050
1944	0.468	1.384	1.280	2.097	4.795	3.126
1945	0.466	1.425	1.302	2.114	4.597	3.042
1946	0.460	1.390	1.550	2.083	4.391	2.949
1947	0.467	1.408	1.341	2.181	4.826	3.054
1948	0.472	1.419	1.576	2.170	4.852	3.112
1949	0.471	1.359	1.298	2.192	4.706	3.130

Table 6.--Subperiod real earnings for white men, undiscounted, 1930-49 cohorts, continued.

Cohort	Gini	VLN	CV	90/50	80/20	75/25
			Earnings at ages 46-50			
1930	0.488	1.612	1.207	2.695	10.657	4.957
1931	0.488	1.446	1.639	2.333	9.270	4.482
1932	0.473	1.371	1.362	2.059	7.428	3.874
1933	0.476	1.458	1.271	2.067	6.329	4.098
1934	0.470	1.432	1.066	2.249	5.937	3.487
1935	0.466	1.385	1.065	2.182	6.067	3.512
1936	0.472	1.376	1.095	2.136	6.344	3.731
1937	0.475	1.522	1.118	2.146	6.244	3.741
1938	0.482	1.486	1.334	2.158	6.012	3.640
1939	0.474	1.338	1.289	2.129	5.558	3.262
1940	0.508	1.564	1.682	2.210	5.927	3.447
1941	0.488	1.498	1.581	2.154	5.493	3.425
1942	0.506	1.575	1.629	2.263	5.493	3.410
1943	0.502	1.578	1.593	2.305	5.289	3.317
1944	0.514	1.498	1.707	2.338	5.943	3.530
1945	0.508	1.627	1.715	2.376	6.070	3.609
1946	0.513	1.533	1.836	2.408	5.603	3.552
1947	0.516	1.660	1.563	2.468	6.556	3.917
1948	0.523	1.632	1.845	2.449	7.045	3.936
1949	0.516	1.575	1.533	2.469	6.423	3.638
			Earnings at ages 51-55			
1930	0.480	1.335	1.061	2.243	7.566	3.861
1931	0.487	1.439	1.136	2.197	7.525	4.107
1932	0.488	1.561	1.269	2.239	7.493	4.174
1933	0.496	1.466	1.384	2.147	7.100	3.910
1934	0.511	1.466	1.589	2.312	6.693	3.695
1935	0.501	1.442	1.466	2.259	6.832	3.846
1936	0.516	1.647	1.559	2.299	7.752	3.924
1937	0.509	1.641	1.362	2.316	6.857	3.847
1938	0.517	1.738	1.595	2.367	7.969	4.275
1939	0.515	1.586	1.618	2.404	6.968	3.788
1940	0.556	1.831	1.892	2.614	9.648	4.619
1941	0.545	1.715	2.225	2.616	9.395	4.508
1942	0.554	1.764	1.666	2.661	9.361	5.042
1943	0.551	1.810	1.830	2.672	11.154	4.722
1944	0.560	1.776	1.995	2.689	10.656	4.893
1945	0.566	1.691	2.639	2.591	10.591	4.714
1946	0.558	1.584	2.585	2.659	8.578	4.179
1947	0.571	1.700	5.397	2.636	9.196	4.340
1948	0.555	1.694	2.125	2.660	8.993	4.440
1949	0.546	1.670	2.033	2.644	8.788	4.289

Source: Authors' calculations from the 2004 Continuous Work History Sample, 1% Active file. Calculations are done for all workers included in Table 5. The 90/10 quantile ratio is not shown because the 10th percentile value for 5-year subperiods is usually zero or very small.

Chart 1.—Changes in inequality measures, men, 1981-2004



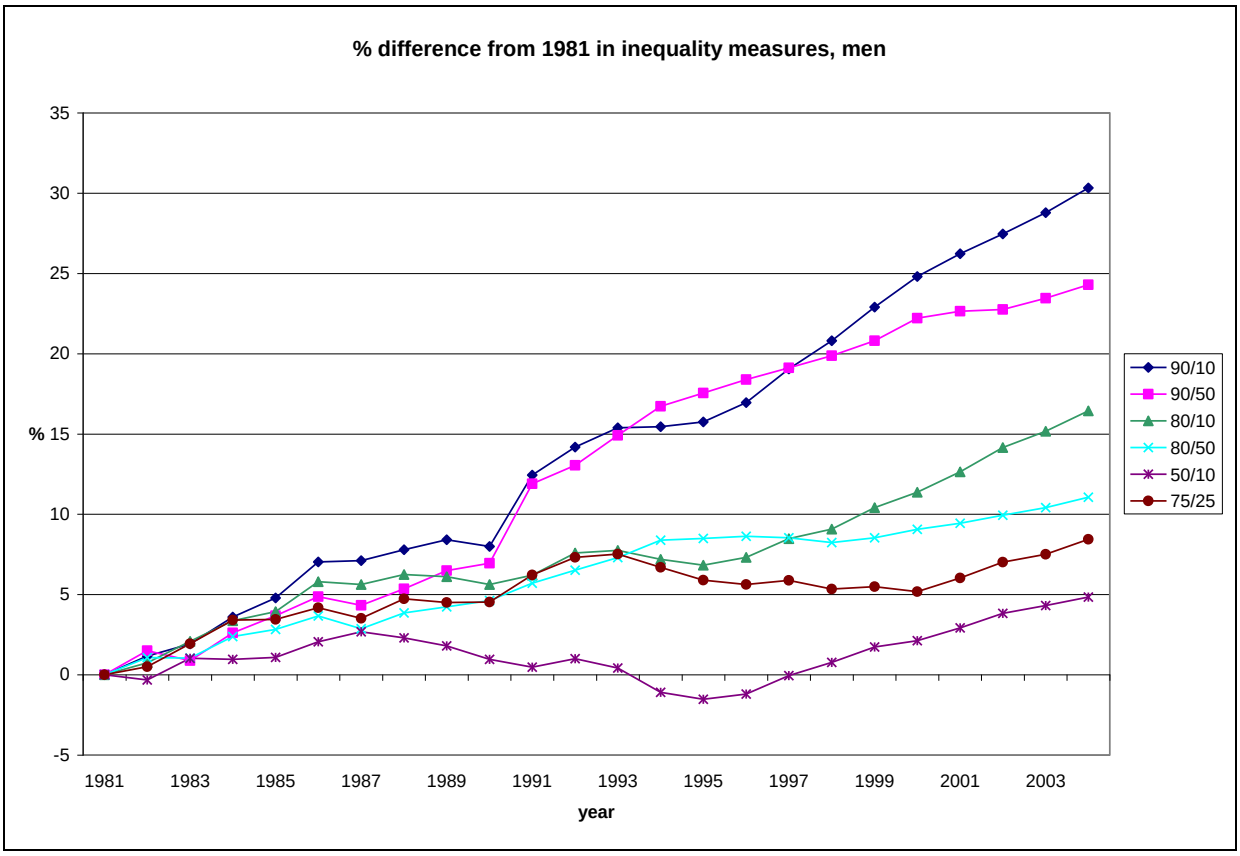
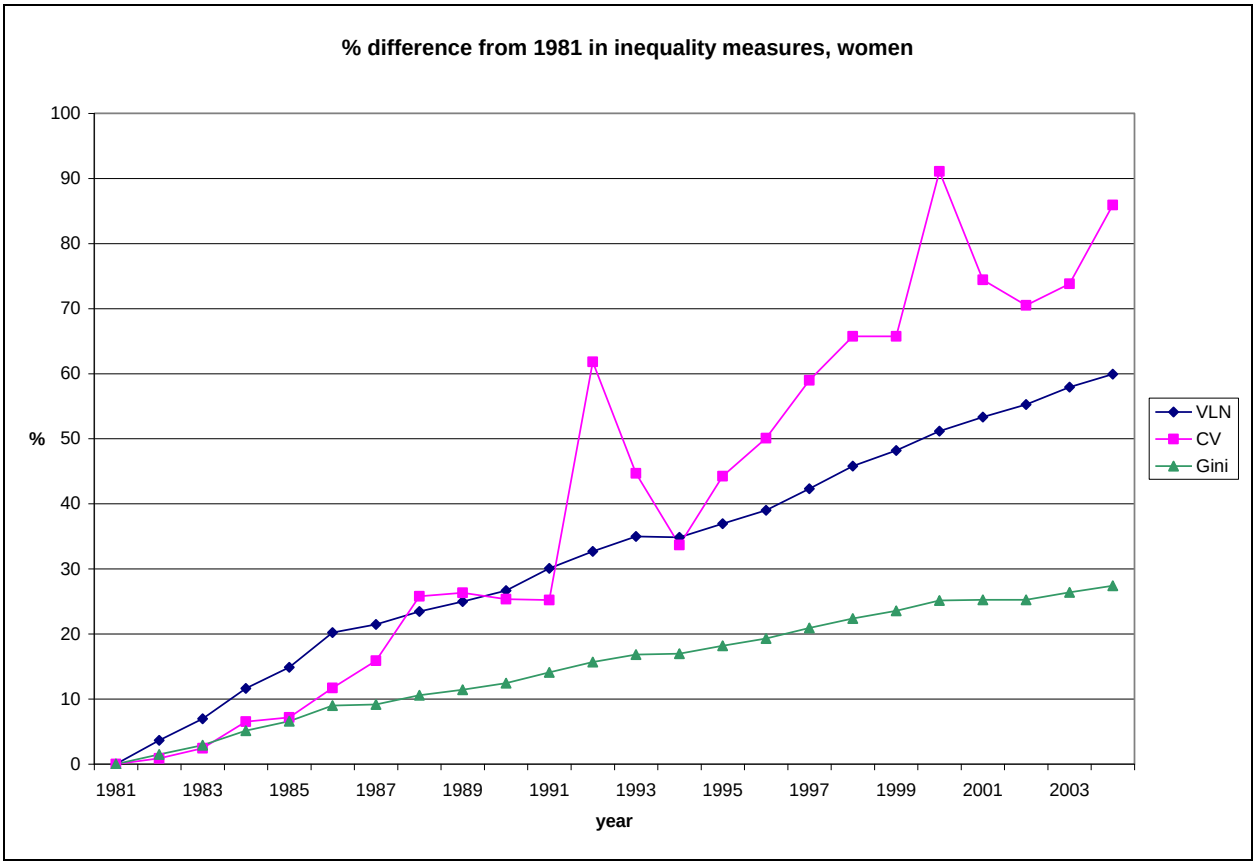


Chart 2.—Changes in inequality measures, women, 1981-2004



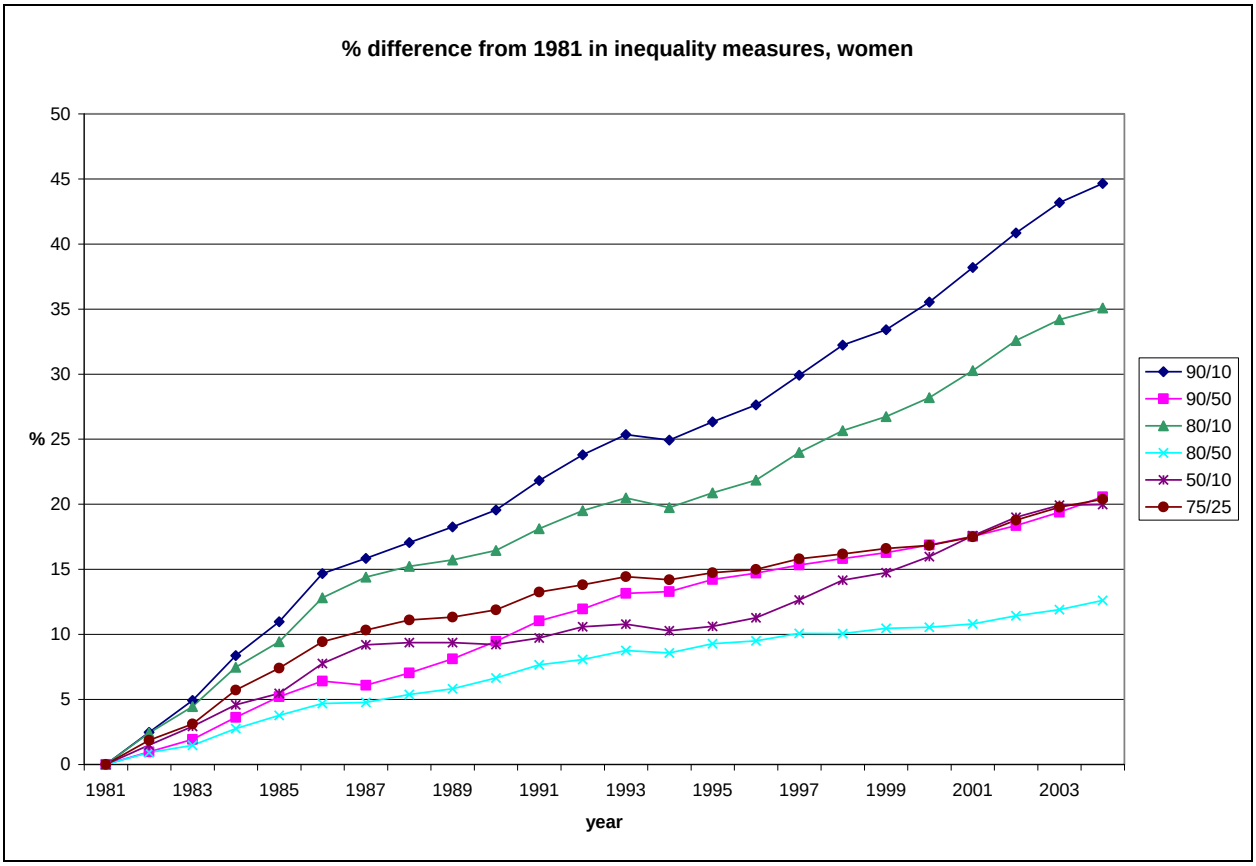


Chart 3.—Lifetime earnings inequality, white men, 1930-49 cohorts

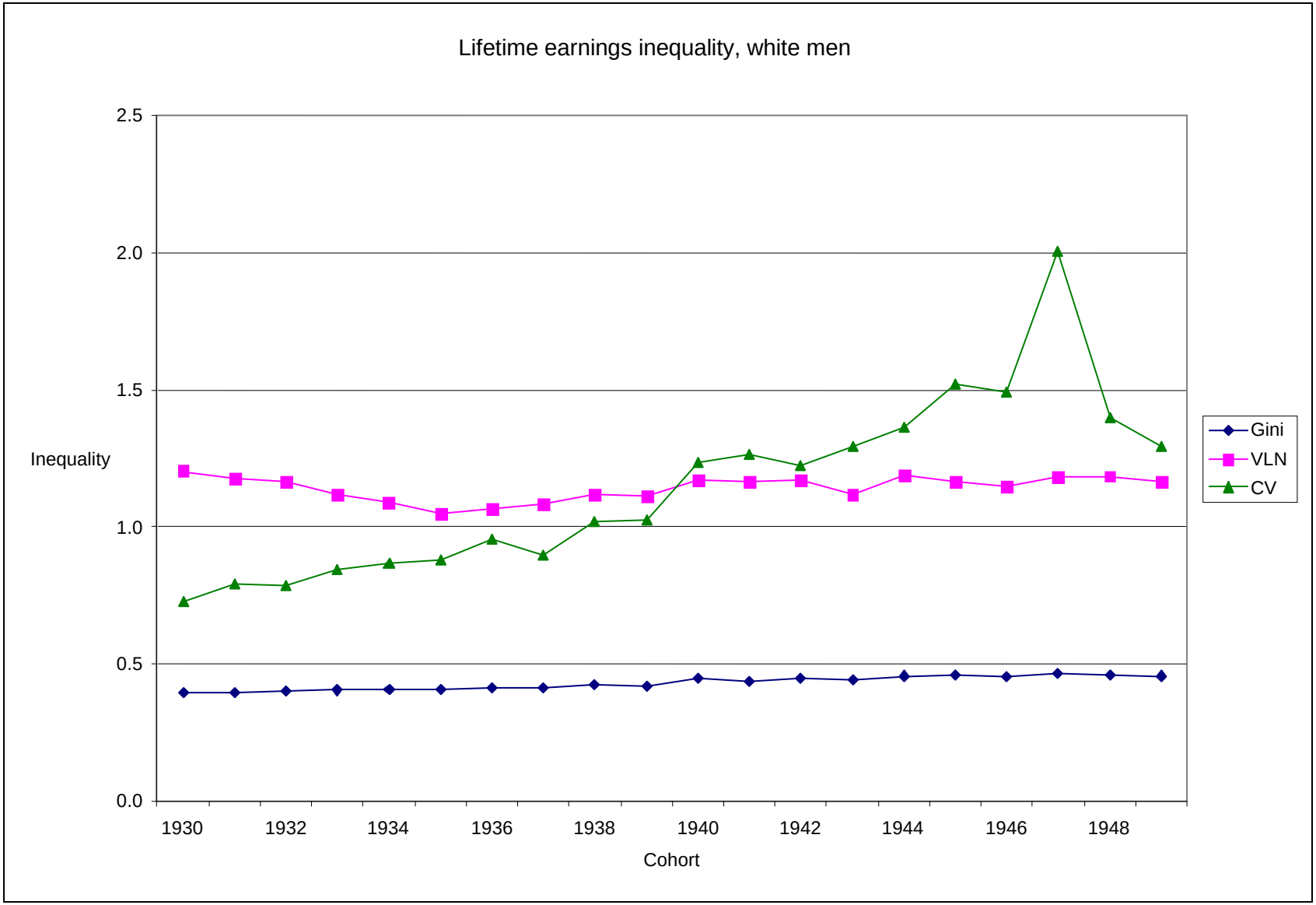
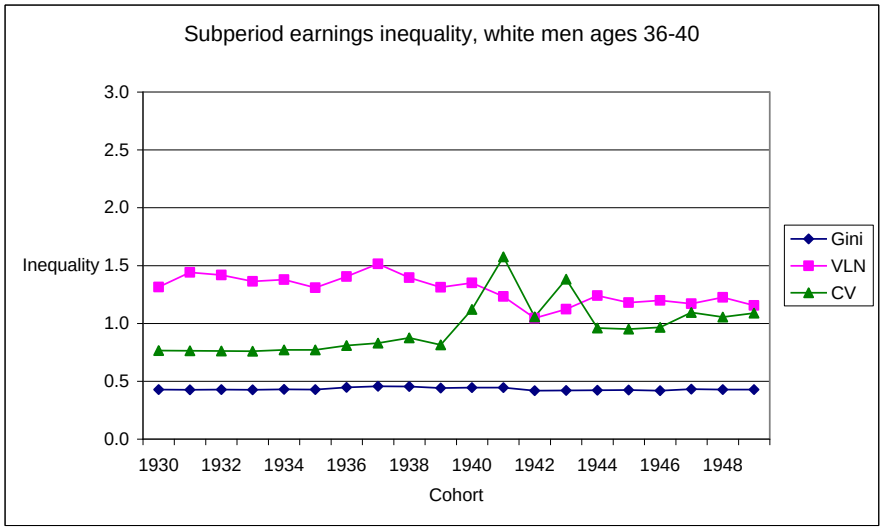
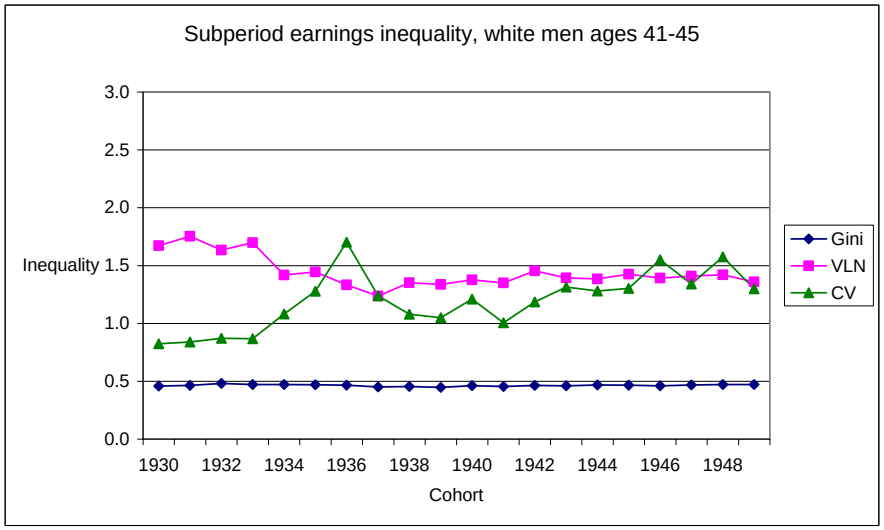


Chart 4.—Real earnings inequality during 5-year age intervals, white men, 1930-49 cohorts





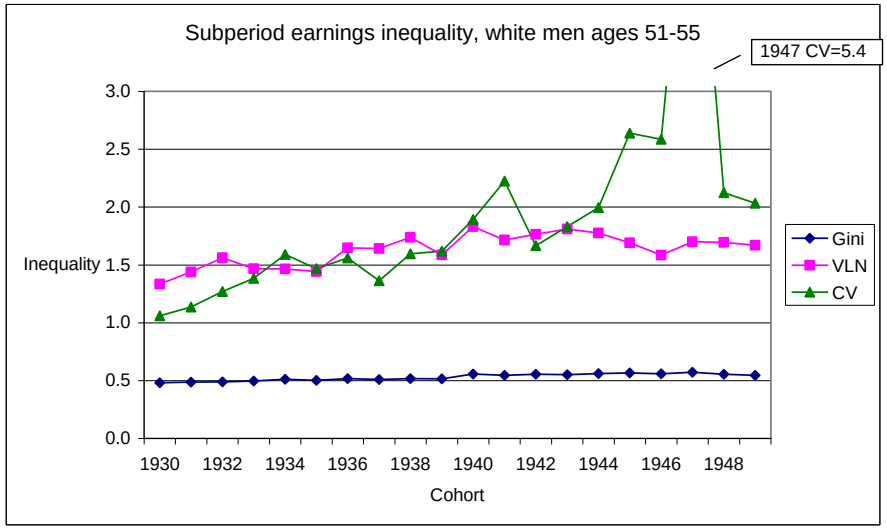
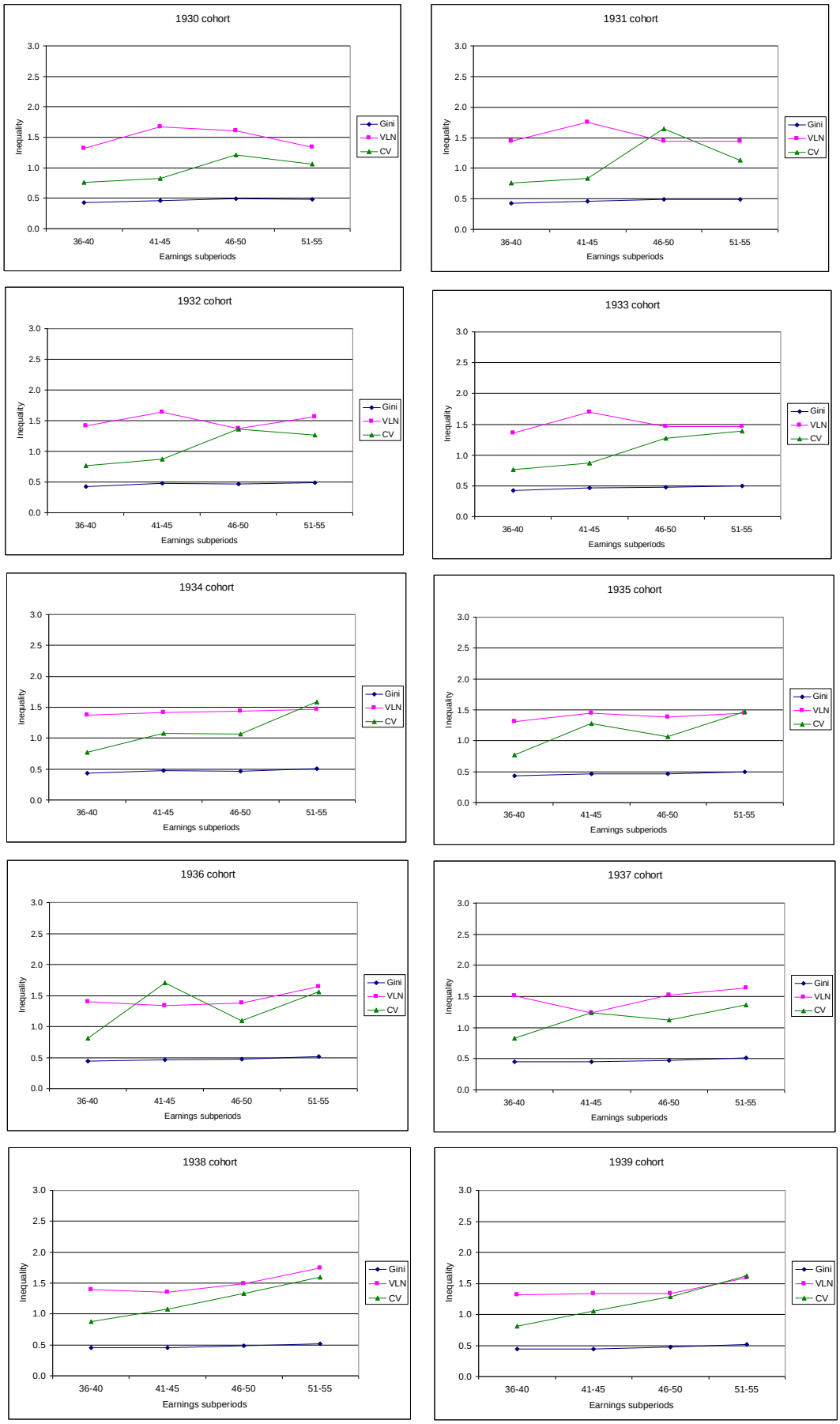
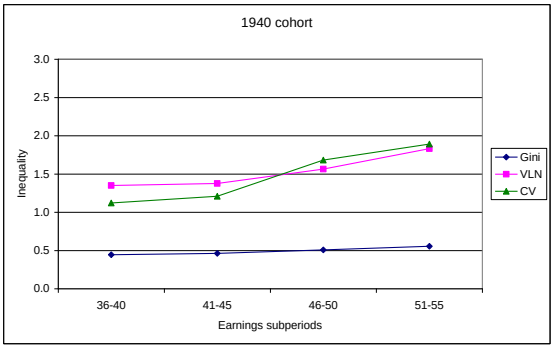


Chart 5.—Earnings inequality during 5-year age intervals, white men, by cohort

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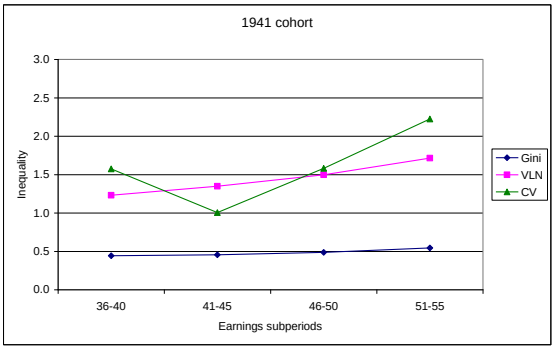
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV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Inequality
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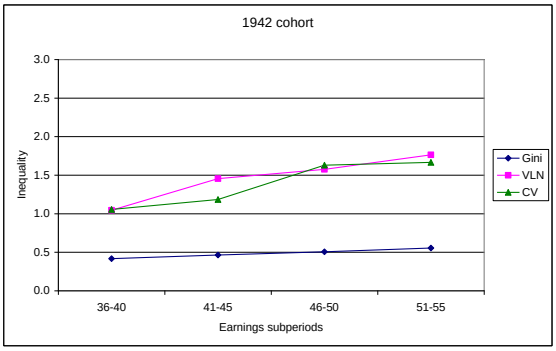
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV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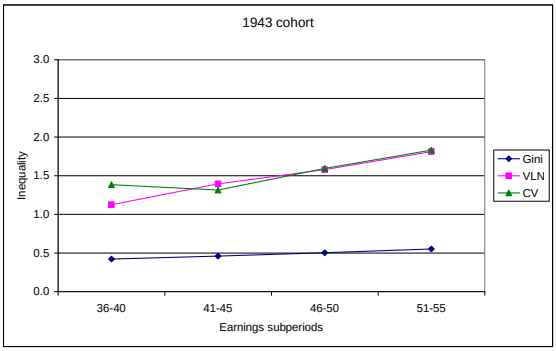
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV


1943 cohort
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2.0
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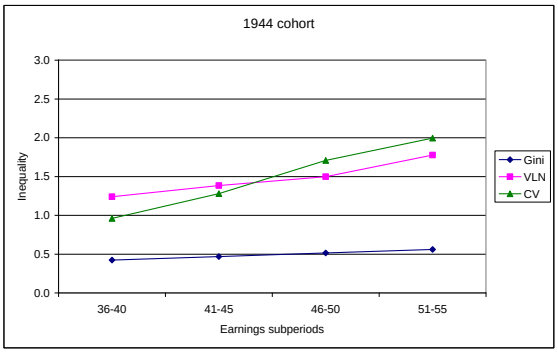
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV


1944 cohort
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36-40
41-45
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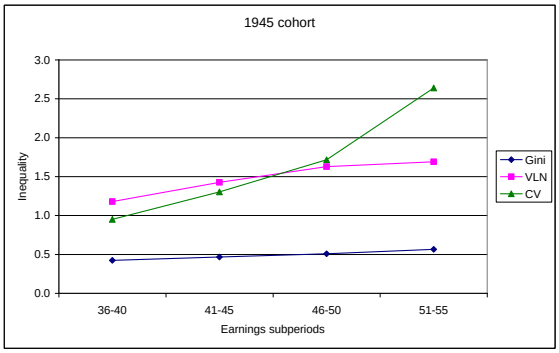
51-55
Earnings subperiods
Gini
VLN
CV


1945 cohort
Inequality
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2.5
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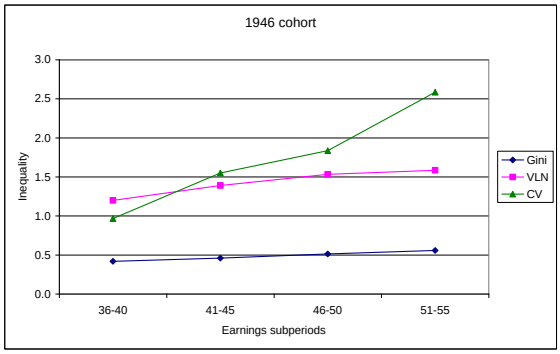
Earnings subperiods
Gini
VLN
CV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Inequality
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2.5
2.0
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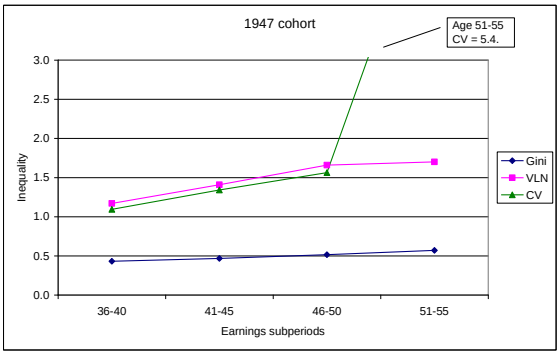
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV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Age 51-55
CV = 5.4.
Inequality
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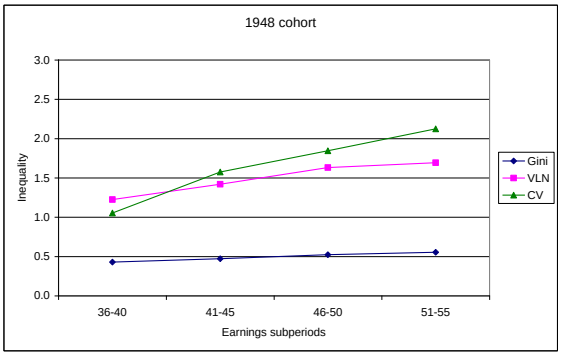
36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV


1948 cohort
Inequality
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36-40
41-45
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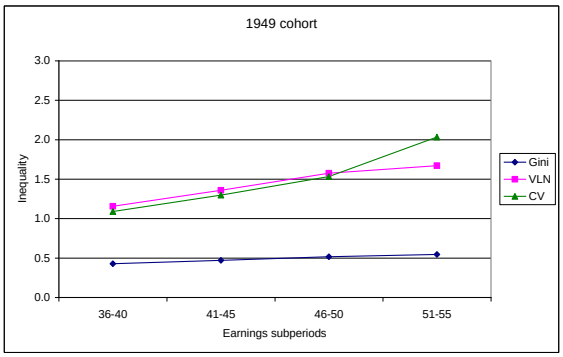
51-55
Earnings subperiods
Gini
VLN
CV


1949 cohort
Inequality
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2.5
2.0
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1.0
0.5
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36-40
41-45
46-50
51-55
Earnings subperiods
Gini
VLN
CV