Not a Hollowing Out, a Stretching: Trends in U.S. Nonmetro Wage Income Distribution, 1961-2003

Angle, John

Inequality Process Institute

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NOT A HOLLOWING OUT, A STRETCHING: TRENDS IN U.S. NONMETRO WAGE INCOME DISTRIBUTION, 1961-2003[1]

by

John Angle
angle@inequalityprocess.org
Inequality Process Institute
http://www.inequalityprocess.org
Post Office Box 215
Lafayette Hill, Pennsylvania 19444-0215
USA

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ABSTRACT

Much of the U.S. labor economics literature asserts that U.S. wage income inequality increased in the last half of the 20th century. These papers point to two trends: 1) the increasing dispersion in U.S. wage incomes, and 2) the rapid growth in the relative frequency of large wage incomes of fixed size in constant dollar terms. A subset of the labor economics literature interprets these trends as a hollowing out of the wage income distribution. A hollowing out would yield fewer middling wage incomes. Since nonmetro wage incomes have, historically, been smaller than metro wage incomes, a hollowing out might disproportionately displace nonmetro wage incomes into the left mode of the hollowed out distribution, that of small wage incomes. However, there was no hollowing out of the nonmetro wage income distribution between 1961 and 2003. While trends #1 and #2 exist in U.S. nonmetro wage income data, they are aspects of the stretching of the distribution of nonmetro wage incomes to the right over larger wage incomes as all its percentiles increased between 1961 and 2003. This stretching means that all nonmetro wage income percentiles increase simultaneously with greater proportional growth in the smaller percentiles. The literature focused on the greater absolute gains of the larger percentiles and took them as evidence of growing inequality. This paper shows for nonmetro wage incomes in the U.S. that those gains are but one aspect of the stretching of the distribution and that other aspects of this transformation might as easily be taken as evidence of growing equality.

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A Hollowed Out Wage Income Distribution in the U.S.?

Many contributors to the literature on wage income trends in the U.S. in the past several decades have asserted that the relative frequencies of large and small wage incomes have been growing at the expense of the relative frequency of middling wage incomes, a transformation known as the "hollowing out" of the distribution. See figure 1 for a conceptual illustration of the hollowing out of an income distribution. For example, the September 1992 issue of **The Journal of Economic Literature** featured an essay that, after reviewing 68 books and articles about trends in U.S. wage income, concluded that the U.S. distribution of wage income was being hollowed out[2]. The evidence cited in support of the hollowing out thesis is a) the dispersion of wage incomes was increasing steadily, and b) the relative frequency of wage earners with large wage incomes was increasing rapidly. See Appendix A for some of the better known contributions to the literature on the hollowing out of the U.S. wage income distribution. A hollowing out of an income distribution also goes by the names "shrinking middle class", "disappearing middle (class)", polarization, and the "emerging bimodality" of the wage income distribution. The finding was not universal. Wolfson and Murphy (1998) found no "disappearing middle class" in Canada or the U.S. up to 1995.

The Nonmetro Wage Income Distribution 1961-2003

Federal rural economic development policy since the New Deal has been concerned with raising low rural wage incomes. There is reason for concern. Historically, residents of nonmetropolitan[3] (nonmetro) areas of the U.S. have had lower levels of educational attainment,

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[2] Frank Levy and Richard Murnane. 1992. "U.S. Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations." **Journal of Economic Literature**. 30 (3): 1333-1381.

[3] The term 'rural' has a specific meaning in the Federal statistical system different from what most people mean by 'rural' in, for example, the expression 'rural America'. This latter concept is best measured in terms of the Federal statistical system by the concept 'nonmetropolitan' or 'nonmetro' for short. A

lower wage incomes, and higher rates of poverty than residents of metro areas. See, for example, Fuguitt, Beale, and Brown (1989), Duncan (1992), Rural Sociological Society, (1993), Lichter, Johnston, and McLaughlin (1994), Brown and Hirschl (1995), RUPRI Rural Welfare Reform Panel (1999), and Weber, Duncan, and Whitener (2002). If there is a U.S. trend toward a hollowed out wage distribution, its left mode, the relative frequency bulge over small wage incomes, might reasonably be expected to have a disproportionately large number of nonmetro wage incomes. Karl Stauber, formerly an Undersecretary of the U.S. Department of Agriculture, and president of the Northwest Foundation, an advocacy group for rural economic development on the northern Great Plains and in the Pacific Northwest, perceived a hollowing out of wealth and income distributions in this area. He wrote in an article published in the **Economic Review** of the Federal Reserve Board of Kansas City (Stauber, 2001: 35, 36):

> On our current trajectory, we are headed for significant portions of rural America that are largely populated by the poor and the rich, and the small middle class that serves both groups. A fundamental goal of rural development must be the survival of the middle class ….

Figure 1 about here

However, in the nonmetro U.S. as a whole the distribution of wage income has not been hollowed out in recent decades as a glance at figure 2, an estimate of that distribution in each year between 1961 and 2003 inclusive, shows. Figure 2 graphs the distribution of nonmetro annual wage income in the U.S., 1961-2003 (in constant 2003 dollars), as estimated from March Current Population Survey data. See Appendix B for a description of the data. The hollowing out discussed in the labor economics literature cannot be seen in U.S. nonmetro wage income

nonmetropolitan county is a county not in a Metropolitan Statistical Area (MSA) as defined by the Office of Management and Budget. MSA's include core counties containing a city of 50,000 or more people or having an urbanized area of 50,000 or more and total area population of at least 100,000. Additional contiguous counties are included in the MSA if they are economically integrated with the core county or counties. The metropolitan status of every county in the U.S. is re-evaluated following the Decennial Census. While there has been a net decline in counties classified as nonmetro over the decades, the definition of nonmetro has remained roughly constant. A nonmetro wage income is defined here as the wage income of a wage earner whose principal place of residence is in a nonmetro county.

data 1961-2003. Figure 2 shows that the relative frequency of small nonmetro wage incomes decreased from 1961 to 2003, the reverse of what would need to be shown to sustain the hollowing out thesis.

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Figure 2 about here

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On the other hand, figure 2 does show the right side of the nonmetro wage distribution, the relative frequency of large wage incomes, thickening, which is what one would expect for the right side of the distribution in a hollowing out scenario. So figure 2 alone may not be sufficiently convincing evidence that there was no hollowing out of the U.S. nonmetro wage income distribution. Even after scanning figure 2, one might still perhaps wonder whether a subtle hollowing out has occurred, a simultaneous thickening, perhaps recent, in both the left and right tails of the distribution too small to be readily detected by visual examination of the wage income distribution. The essence of the hollowing out thesis is that the relative frequencies of small and large wage incomes covary positively, i.e., together.

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Figure 3 about here

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But, contrary to the hollowing out thesis, figure 3 shows that the relative frequencies of nonmetro small and large wage incomes vary inversely in near lockstep. Specifically, figure 3 shows the correlations of the relative frequencies of nonmetro wage incomes that fall into two income ranges, one a range of small incomes, the other a range of large incomes. One of the curves of figure 3 shows the correlations over the years 1961 through 2003 between the relative frequency of nonmetro annual wage incomes in the bin, $50,001-$60,000 (in 2003 dollars), a wage income well above the median nonmetro wage income from 1961 through 2003, with

relative frequencies in bins of larger and smaller wage incomes[4]. The relative frequency of nonmetro wage incomes in the bin $50,001-$60,000 has a large positive correlation with the rest of the right tail of the nonmetro wage income distribution. It has a large negative correlation with relative frequencies of wage incomes below the median, those of the left tail. Perfect linear inverse correlation is indicated by a correlation coefficient of -1.0. The correlation between the relative frequency of wage incomes $50,001 to $60,000 in size with those $1-$10,000 in size, the smallest nonmetro wage incomes, is negative, nearly -1.0.

The other curve of figure 3 is composed of the correlations of the relative frequency of wage incomes in the bin $1-$10,000 with larger wage incomes. Its pattern is the near mirror image of those of the correlations of wage incomes $50,001-$60,000 in size. It tells the same story: the relative frequency of nonmetro wage incomes $1-$10,000 in size varies inversely in near lockstep (as indicated by a negative correlation of large absolute value) with the relative frequencies of wage incomes in the right tail, the opposite of what the hollowing out thesis requires.

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Figure 4 about here

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Figure 3 may be too concentrated a form of information to alone be entirely convincing. Figures 4 and 5 show less information than figure 3 but tell the same story in a simpler way. Figure 4 shows the relative frequency of nonmetro wage incomes $1-$10,000 in constant 2003 dollars decreasing between 1961 and 2001, while figure 5 shows the relative frequency of nonmetro wage incomes $50,001-$60,000 in constant 2003 dollars increasing from 1961 through 2001. The decrease in the former has nearly a perfect inverse correlation with the increase in the latter. Figure 3 shows all such correlations. Figures 2, 3, 4, and 5 all tell the same story: as the left tail of the nonmetro wage income decreased, net, 1961-2003, its right tail increased, net, leaving

[4]Lest wage incomes $50,001-$60,000 not seem large to affluent urban readers, it will be shown in figure 6 that $60,000 in 2003 dollars is greater than the 90th percentile of nonmetro wage incomes in every year 1961-2003.

no doubt that the hollowing out thesis does not apply to nonmetro wage incomes.

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Figure 5 about here

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The Two Trends That Give Plausibility to the Hollowing Out Thesis

While the nonmetro U.S. wage income distribution was not hollowed out 1961-2003, a hollowing out scenario might seem to be a plausible explanation of two trends in nonmetro wage income. One trend is that nonmetro wage incomes became more dispersed, that is, for example, the 90th percentile of nonmetro wage income was farther away from the 10th percentile in 2003 than it had been in 1961. See figure 6. The 90th percentile of wage incomes is a wage income often taken in the literature as an example of a large wage income. Similarly, the 10th percentile is often taken as an example of a small wage income. The difference between the two is called the "90-10 difference" and is a measure of the dollar difference between large and small wage incomes and the dispersion of all wage incomes over dollar amounts. Measures of dispersion such as the 90-10 difference are often used as a measure of inequality of wage income in the enormous literature in labor economics and sociology on trends in U.S. wage income. See Appendix C, a sample of the first sentences of articles on wage inequality, articles that use a measure of dispersion to indicate inequality.

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Figure 6 about here

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Figure 1 illustrates how there may be greater dispersion and a greater 90-10 difference in a hollowed out distribution than there is in a distribution with the same median that has not been hollowed out. A hollowing out of the distribution might explain an increase in the dispersion of wage income. The other observed trend in wage income statistics that might have made the hollowing out thesis seem a plausible explanation is the rapid growth in the relative frequency of large wage incomes. The hollowing out thesis predicts a rapid growth in the

relative frequency of large wage incomes, a thickening of the right tail of the distribution. This paper documents such a trend in nonmetro wage incomes. The larger the nonmetro wage income, the faster its relative frequency grew from 1961 to 2003, evidence that has been adduced to support the hollowing out thesis. The hollowing out thesis is an attempt to provide an explanation of both trends in terms of a simple geometric transformation of the wage income distribution. There is such a geometric interpretation of wage income distribution dynamics that explains the trend toward greater wage income dispersion. It is not, however, a hollowing out of the distribution, as will be shown.

The evidence of a trend toward greater dispersion at the U.S. national level is mirrored by evidence of the same trend in nonmetro wage incomes. Figure 6 shows that the 90th percentile of nonmetro wage incomes has risen farther than the 10th percentile of nonmetro wage incomes in the period 1961 through 2003 and consequently, the 90-10 difference, a measure of dispersion, increased 1961 through 2003. While the Gini concentration ratio may be conceptually preferred as a measure of inequality by most economists, the 90-10 difference is so much more easily and more reliably estimated that convenience pushes researchers toward defining inequality as dispersion.

Figure 7 about here

The Rapid Rate of Growth of the Relative Frequency of Large Nonmetro Wage Incomes

Figure 7 shows the relative frequencies of all nonmetro wage incomes represented by wage incomes in three income ranges, each range greater than the nonmetro mean wage income (in constant 2003 dollars), from 1961 through 2003. These ranges are $40,001-$50,000, $50,001-$60,000, and $60,001-$70,000. The larger the income, the smaller is its relative frequency, a fact evident in figure 2. Notice that all three relative frequencies grew 1961-2003, particularly in the 1960's and 1990's, with growth in the relative frequency in the lower range, $40,001-$50,000, slowing sooner than that in the upper range, $60,001 - $70,000. In figure 7, it is hard to compare

the time-series of relative frequencies in the three different ranges of income because they have different "bases", values at the beginning of the time-series. Figure 8 standardizes these bases by dividing the relative frequencies in each of the three wage income ranges of figure 7 by its respective basis, its relative frequency in 1961. Figure 8 makes the growth in the relative frequencies of figure 7 comparable. Figure 8 shows that the bigger the wage income, the faster its relative frequency grew from 1961 through 2003. The evidence of figures 6, 7, and 8 has been used in the literature to justify the hollowing out thesis, which predicts the growth of a bulge in the far right tail of the wage income distribution (e.g., Morris, Bernhardt, and Handcock. 1994) but we will see that it is evidence of a different transformation of the nonmetro wage income distribution.

Figure 8 about here

Bigger Nonmetro Wage Percentiles Grow By Bigger Absolute Increases

Nonmetro U.S. wage incomes increased between the beginning and end of each of the last four decades of the 20th century. All percentiles of nonmetro wage income increased substantially in the last four decades of the 20th century. The increases in these percentiles, however were not uniform either over time or over the size of percentiles. The increases are concentrated in the 1960's and the first half of the 1970's and the 1990's. See Table 1. The dollar figures in Table 1 are all in terms of constant 2003 dollars. Table 1 averages annual nonmetro wage income percentiles in half decade intervals, starting with 1961-1965.[5] As you can see in Table 1, whenever the mean of nonmetro wage incomes increased between half decades, the percentiles of nonmetro wage income all increased. It is also clear in Table 1 that when the mean and all percentiles increased, the larger percentiles had the bigger increases. For example, the

[5] Most people give rounded answers to the March Current Population Survey question about annual wage and salary income. Consequently, there are only about three significant digits in most of these responses. Consequently, most percentiles are tied with many other responses at a particular round income amount, a frequency spike in the distribution. Frequency spikes act as attractors for percentiles, holding them for several years before they "jump" to a higher round number, when nominal wage incomes

10th percentile of nonmetro wage incomes increased from an average of $1,369 in the first half of the 1960's in constant 2003 dollars to $2,261 in the second half of the 1960's, an increase of $892. The 90th percentile, on the other hand, increased from $35,451 to $42,191, an increase of $6,740, in the second half of the decade.

Table 1

The literature infers a trend toward greater wage income inequality from the evidence in table 1: larger percentiles increased by greater amounts than smaller percentiles. As you have seen in figure 6, the 90-10 difference widened considerably from 1961 through 2003. Figure 6 shows the 90th percentile racing up and away from the 10th percentile. The increase in the difference between the percentiles is largely due to the increase in the 90th percentile. Table 1 shows that, in general, larger nonmetro wage income percentiles have larger increases over time than smaller percentiles.

Figure 9 about here

The standard errors of the percentiles of table 1 are trivially small. The number of observations from which they are estimated is large. See Appendix B. From 1960 through 2003, the 10th percentile of nonmetro wage income increased by $4,960 in constant 2003 dollars from $1,369 to $6,329. The 90th percentile increased much more, $20,624, from $35,451 to $56,075. Table 1 shows that, given any pair of percentiles, the larger one increased more between 1961 and 2003 than the smaller one, and the bigger the difference between percentile ranks (e.g., the 90-10 difference is the maximum difference in percentile rank in table 1), the bigger the divergence of the larger percentile from the smaller. Figures 9 and 10 illustrate the same point. In figure 9 the difference between the 80th and 90th percentiles of wage income is greater in 2003

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are increasing. Averaging percentiles in five year periods smooths these "jumps" of percentiles over time. See Angle (1994).

than it was in 1961 and it is the larger percentile, the 90th, that has risen the more steeply over time. Similarly, in figure 10 it is the larger percentile, the 20th, that has risen more steeply than the 10th percentile. It is on evidence like that in Table 1 and figures 6, 9 and 10 that the literature about a trend toward greater wage income inequality rests.

Figure 10 about here

The Data That Show Larger Nonmetro Wage Income Percentiles Diverging Up and Away Also Show Them Converging Proportionally, 1961-2003

While the literature perceives increasing inequality in the increasing dispersion of wage incomes over the period 1961-2003, it is possible to interpret the pattern of the increasing 90-10 difference in figure 6 as something other than an increase in inequality. Table 2 gives the ratios of a particular average percentile in later five year periods to the average of that percentile in the first five year period, 1961-1965. The ratios show the rate at which a given percentile, 10th, 20th, etc. grows. The ratios of later percentiles to that percentile in 1961-1965 tell a story that is different from that told by the absolute differences of percentiles, just discussed, in Table 1, even though both tables are based on the same data. See Table 2 and figure 11.

Table 2 and Figure 11 about here

Table 2 shows that the 10th percentile of nonmetro wage incomes more than quadrupled between 1961 and 2003, whereas the 90th percentile increased by just 58%. Intermediate percentiles have intermediate proportional increases. Table 2 is calculated from estimates in Table 1, i.e., the evidence on which the literature about the inequality trend in U.S. wage incomes rests also shows smaller wage incomes growing faster in proportional terms than larger incomes. The fact that higher percentiles are diverging up and away from smaller percentiles in absolute terms - causing the dispersion of wage incomes to increase - conceals the fact that the smaller percentiles of wage income are growing faster proportionally, i.e., they are catching up

and converging to the larger percentiles as their absolute difference becomes smaller proportionally to both the larger and smaller percentile. A rough extrapolation of figure 12 suggests that the logarithm of the 10th percentile will be in substantial convergence with the logarithm of the 90th percentile in the second half of the 21st century if nonmetro wage growth in the 21st century economy resembles that in the period 1961-2003. Because taking the logarithm of different dollar amounts does not change their order, the logarithm of an income percentile is the percentile of the logarithm of income. Consequently this extrapolation of the convergence of the log 90th percentile and the log 10th percentile is consistent with the extrapolation that the 90-10 difference will be much greater then than now.

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Figure 12 about here

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Figure 11 graphs table 2's data against time. Every data point in table 2 and figure 11 is a multiple of the corresponding percentile in 1961-1965 (in table 1) so figure 11 graphs proportional growth of all percentiles against time. All the data points in figure 11 begin at 1.0 for 1961-1965. Notice how quickly the percentiles fan out over time. The smaller ones rise more quickly, the smallest the fastest. Among percentiles larger than the median, the smaller of these larger percentiles also rise more quickly, but, as can be seen in table 2 and figure 11, the size of the percentile makes little difference in its growth over time among percentiles greater than the median. For example the 90th percentile does grow more slowly than the 60th percentile but not much more slowly. The big differences in percentile growth rates are among the smallest percentiles. The biggest contrast between percentiles is between the smallest and largest estimated, here the 10th and 90th percentiles.

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Figure 13 about here

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Is Inequality Increasing or Decreasing?

Another way of seeing that the smaller percentiles of nonmetro wage incomes are growing much faster than the larger percentiles in proportional terms, is the time-series graph of the logarithm of the percentiles. It looks in figure 6 like the 90th percentile is leaving the 10th percentile behind, but in figure 12, the time-series of the logarithms of the 10th and 90th percentiles, shows the opposite: the log 90th percentile rising slowly and the log 10th percentile rising more rapidly, converging toward the 90th in the long run. In terms of proportional growth, the 90th percentile of wage income grew much more slowly than the 10th percentile, an odd situation to label increasing wage income inequality. The evidence of greater dispersion, the larger percentile increasing more in absolute terms than the smaller percentile in figure 13, is also the evidence that the smaller percentile grows faster proportionally than the larger percentile and is closing in on it in the sense that the absolute difference between them is becoming a smaller multiple of the smaller percentile. See figure 14. One might easily call the evidence of table 2 and figures 12 and 14, growing nonmetro wage income equality, although it is the same evidence that has been the basis of the thesis that nonmetro wage income inequality has been increasing. Figures 13 and 14 show that there is a smooth transition from small to large wage income percentiles in how they have changed over the period 1961 through 2003.

Figure 14 about here

While all percentiles of nonmetro wage incomes increased between the years 1961 and 2003, not all differences between succeeding five year averages in this period were increases. All percentiles of nonmetro wage income decreased between the second half of the 1970's and the first half of the 1980's. There were also many decreases between the first and second half of the 1980's. All other comparisons between consecutive five year periods show simultaneous increases in all percentiles.

Table 1 shows that the dispersion of nonmetro wage incomes increases when the percentiles of nonmetro wage income increase. These percentiles increase and decrease with apparent simultaneity. A related pattern has been found in the U.S. in the first half of the 20th

century. Goldin and Margo (1992) study U.S. wage income in the 1930's, the era of the Great Depression, and the two decades thereafter, using data from the Decennial Censuses of 1940, 1950, and 1960. Their study's findings are consistent with wage income dispersion covarying with median wage income: both dispersion and the median were smaller in the 1930's than in the two succeeding decades. They note the smaller dispersion of wage incomes during the Great Depression in the title of their article: "The Great Compression: The Wage Structure in the United States at Mid-Century". Their term 'compression' is a good label for the transformation of the nonmetro wage income distribution when its percentiles simultaneously shrink. The transformation looks like a compression of the wage income distribution to the left over small wage incomes. Compression is the inverse transformation to the stretching of the nonmetro wage income distribution to the right in the latter half of the 20th century occasioned by the simultaneous growth of the percentiles of nonmetro wage income during most of this period.

Goldin and Margo (1992) attribute the lower dispersion of wage incomes in the 1930's to the New Deal and the relative strength of the union movement at the time instead of to the Depression itself with its lower wages income percentiles. Goldin and Margo see the greater wage dispersion of the latter part of the 20th century not due to the increase in wage incomes during the last half of the 20th century but as the effect of the weakening of the union movement and the institutions of the New Deal. Goldin and Margo (1992) paper find that there has been divergence in absolute terms of larger percentiles from smaller percentiles concomitant with rising wages for decades in the U.S., the same empirical finding for the national labor force as the present paper makes for the nonmetro labor force. Goldin and Margo interpret wage compression as greater equality, and the reverse, the stretching of the wage income distribution to the right in the last half of the 20th century as greater inequality.

The present paper interprets Goldin and Margo's evidence in a different way: larger wage income percentiles diverge upward from smaller ones in constant dollars whenever mean median wage income increase since all wage income percentiles experience proportional growth simultaneously. And vice versa when they decrease, as for example, during the Great Depression. It is important to understand the transformation of the whole distribution rather

than to label one or the other aspect of it as increasing or decreasing inequality, since the label depends on which particular inequality statistic one chooses to pay attention to.

The Gini of Nonmetro Wage Income Has No Trend 1961-2003

The U.S. Bureau of the Census is the official U.S. government interpreter of trends in wage income in the U.S. A Census Bureau report in its P-60 series (#240) (Jones and Weinberg, June 2000), entitled "The Changing Shape of the Nation's Income Distribution" might be construed as supporting a sudden surge of wage income inequality in the 1990's - if all it receives is a casual glance at the graph on its front page. Reading that figure's footnote corrects the misimpression. The statistic plotted against time in the graph on the first page of Jones and Weinberg (2000) is

$$\frac{G_t - G_{1967}}{G_{1967}}$$

where G_t is the Gini concentration ratio of wage income in year t. The graph on the first page of Jones and Weinberg (2000) shows the forward proportional change in the Gini of wage income trending upward since the early 1970's for male workers. Most of the increase in this graph occurs in the mid-1990's. A footnote to the figure on the front page of Jones and Weinberg (2000) explains that "Change in data collection methodology suggests pre-1993 and post-1992 estimates are not comparable." (Jones and Weinberg, 2000:2). A further footnote refers the reader of Jones and Weinberg (2000) to a description of changes in Census Bureau questions and data collection methods that greatly increased the reporting of large incomes after 1992. Jones and Weinberg (2000:1) write that "A small change that may affect only a small number of cases (particularly those at the upper end of the income distribution) can have a considerable effect on inequality measures, like the Gini coefficient ...., while making little or no change to the median." Jones and Weinberg (2000) report that the actual change in the unconditional Gini of wage incomes between 1967 and 1992 was a .02 increase from .34 to .36. A change of .02 in a

Gini over a quarter century of changes in the design and operation of the Current Population Survey, any one of which might affect estimates of the Gini, is substantively insignificant. No standard error of estimate of the Gini is offered so there is no way of telling whether a difference of .02 in the Gini is even statistically significant. Most of the large wage incomes reported after 1992 that would not have been reported in 1992 and earlier were apparently reported by metro residents, since figure 15 shows the Gini concentration ratio of nonmetro wage income remained almost flat from 1961 through 2003.

Figure 15 about here

Contrast the lack of trend in the Gini concentration ratio of U.S. nonmetro wage income in the period 1961-2003 in figure 15 with the pronounced trend upward in the 90-10 difference in the same period. The Gini concentration ratio of nonmetro wage and salary income from 1961 through 1994, graphed in figure 15, is estimated five ways. Each one of these five ways is a different treatment of the topcode of wage income. The treatments are the multiplication of the minimum topcodeable income by 1.0, 1.25, 1.5, 2.0, or 3.0 as estimates of the mean of wage incomes in excess of the topcode. The mean of topcoded wage incomes is their maximum likelihood estimator. The March 1996 CPS, which reports 1995 annual income, takes as its topcode for annual wage income the mean of topcoded wage incomes in a particular demographic category into which a respondent falls. With 1994 and earlier data, the Census Bureau used the minimum topcodeable income as the topcode, an underestimate of the mean of topcoded incomes. The minimum and maximum estimates in figure 15 are almost certain to enclose the true Gini concentration ratio of nonmetro topcoded wage incomes. The fact that all five estimates tell the same story of no trend means that topcoding does not affect that conclusion.

Conclusions

The labor economics literature has documented 1) the increasing dispersion of U.S. wage

incomes, and 2) the rapid growth in the relative frequency of large wage incomes in the U.S. in recent decades. The thesis advanced by a subset of this literature that these trends can be accounted for by a "hollowing out" of the wage income distribution is an attempt to explain these trends with a simple geometric transformation of the wage income distribution. See figure 1 for a conceptual illustration of the hollowing out of an income distribution. A hollowing out is a shift of the relative frequency of wage incomes of middling size into the left and right tails of the distribution, the relative frequencies of small and large wage incomes, i.e., middling incomes are replaced over time by those either larger or smaller. Given the historic disadvantage of nonmetro wage earners, they might reasonably be expected in a hollowing out scenario to be disproportionately displaced into the bulging left tail of the hollowed out distribution of figure 1. In 2001 a prominent public intellectual concerned with the welfare of rural America considered that scenario an ominous likelihood (Stauber, 2001).

A hollowing out of the nonmetro wage income distribution implies that the relative frequencies of small nonmetro wage incomes and large nonmetro wage incomes grow simultaneously. But the relative frequency of small nonmetro wage incomes, those $1 to $10,000 in constant 2003 dollars, declined from 1961 to 2003 (figure 4), and the relative frequencies of small and large nonmetro wage incomes are negatively correlated over this period (figure 3). Thus the data do not support the hollowing out thesis. Nevertheless, nonmetro wage income data support the empirical findings in the literature that were taken as indicating a hollowing out of the distribution of wage income. These are trends toward increasing wage income dispersion and the surging relative frequency of large wage incomes. See table 1 and figures 6, 9, 10, 11 and 13 for evidence of increasing nonmetro wage income dispersion. Figures 3, 5, 7, and 8 provide evidence of the surging relative frequency of large wage incomes. While the nonmetro wage income distribution was not hollowed out, there is a simple geometric transformation of the nonmetro wage income distribution that does imply greater wage income dispersion and a surging relative frequency of large wage incomes: a stretching of the distribution to the right over larger wage incomes. In fact, the nonmetro wage income distribution was stretched to the right over large wage incomes, net, between 1961 and 2003.

This Paper's Findings

This paper makes eight detailed findings about the trends toward the greater dispersion of nonmetro wage income and the surging relative frequency of large wage incomes in the U.S. from 1961 through 2003:

- Finding 1

  As far as can be determined with annual data and data that have been topcoded, the first through the ninth deciles (10^{th} to 90^{th} percentiles) of nonmetro wage income increase simultaneously when they increase. Spot checks indicate that what is true of deciles of nonmetro wage income holds for all its percentiles. See tables 1 and 2 and figure 6, 9, 10, and 13.

- Finding 2

  When the percentiles of nonmetro wage income increase, the larger a percentile is, the greater is the absolute increase of that percentile at time t+1 over its value at time t. See table 1 and figures 6, 9, 10, and 13.

- Finding 3

  When the percentiles of nonmetro wage income increase, the smaller a percentile, the greater is its increase from time t to time t+1 in proportional terms. Since the logarithm of a percentile of wage income is the percentile of the logarithm of wage income, finding 3 is equivalent to the finding that the smaller the log percentile of nonmetro wage income, the greater is the absolute increase of that log percentile between times t and t+1. See table 2, figure 11, 12, and 14.

- Finding 4

  Findings 1, 2, and 3 are equivalent to the finding that the nonmetro distribution of wage income is stretched to the right when its percentiles increase such that the farther to the right (the larger) a percentile is, the more it is stretched in absolute terms to the right (the greater its increase in absolute terms). However, the farther to the right in the distribution a percentile is, the less it is stretched farther to the right in proportional terms. See figures 1 and 2.

- Finding 5

  Changes in relative frequencies in the left and right tails of the distribution of nonmetro wage income are inversely correlated. When all nonmetro wage income percentiles increase, relative frequencies of the left tail (small incomes) decrease, and relative frequencies of the right tail (large incomes) increase. See figures 3, 4, and 5.

- Finding 6

  As relative frequencies grow in the right tail of the nonmetro wage income distribution in synchrony with increases in all percentiles of wage income, the larger the

nonmetro wage income, the greater is the proportional growth of its relative frequency. Hence the rapid increase in the relative frequency of the largest nonmetro wage incomes. See figure 8.

- Finding 7

When all percentiles of nonmetro wage income increase, mean nonmetro wage income necessarily increases and, as it moves right (i.e., a larger mean is farther to the right on the x-axis of the distribution), growth in the relative frequency of any particular wage income in the right tail slows. So the rate of growth of the relative frequency of a particular large nonmetro wage income depends on the difference between that particular large nonmetro wage income and mean nonmetro wage income. See figure 7.

- Finding 8

The Gini concentration ratio of nonmetro wage income is little affected by the increase in the percentiles of nonmetro wage income and the surging relative frequencies of large nonmetro wage incomes.

Concentration v. Dispersion as Inequality Concepts

The measure of income inequality preferred by most economists and statisticians who study income inequality is concentration (Nygard and Sandstrom, 1981). 'Concentration' refers to the fraction of total income that is concentrated in the largest k incomes . The Lorenz Curve of income is a generalization of how much of total income the top recipients ordered by size of income received, a geometric interpretation of inequality that is widely understood and accepted as a measure of inequality. It is well known that societies with very high Gini concentration ratios of wealth or income, e.g., greater than .6, are not democratic and are largely relics of a past almost no one would want to return to. Wolfson (1994:353) calls the Gini concentration ratio the "gold standard" of measures of inequality. However, while there is wide agreement that concentration is inequality and that the Gini concentration ratio and the related Lorenz Curve are valid measures of inequality, estimating a Gini concentration ratio of wage income and its related Lorenz Curve from data such as the March CPS is interfered with by several problems. There is the topcoding of large wage incomes, that is, the deletion of information on incomes over a certain large amount. There is greater sampling error in observations on large wage incomes than those nearer the mean. The CPS's sampling frame is not optimized to sample large wage incomes. Because the distribution of income is right

skewed and its right tail is thin, i.e., the fraction of the dollar total in the far right tail is greater than its relative frequency. Topcoding and greater sampling error in observations on large wage incomes thus introduce a downward bias into estimates of the concentration of income. The nonmetro distribution of wage income has a smaller mean than the U.S. national distribution, partially alleviating the problem with topcoding. However, the greater right skew of the nonmetro distribution of wage income exacerbates its problem with the sampling error of large wage incomes. Furthermore, non-sampling error, in particular under-reporting, is great for large wage incomes. See the Census Bureau's own dismal assessment of the fraction of true income reported by recipients of large wage incomes (Roemer, 2000: 17-20).

Consequently, readily estimated robust measures of dispersion dominate the literature on the inequality of wage incomes in the U.S. Particularly popular is the 90-10 difference, the difference between the 90^{th} and 10^{th} percentiles of wage income, whose estimation avoids the issues that bedevil the estimation of the Gini concentration ratio and the Lorenz Curve. Figure 15 takes the novel approach of estimating the mean of nonmetro topcoded wage incomes by a wide range of multiples of the minimum topcodeable income, a range so wide enough to include with near certainty the true mean of nonmetro topcoded wage incomes. Figure 15 shows that the minimum topcodeable wage income is sufficiently high to greatly bias downward estimates of the Gini concentration ratio of nonmetro wage incomes.

The 90-10 difference is a measure of dispersion. There is some question whether dispersion is a measure of inequality of wage incomes. Other researchers have encountered finding 8, increases in wage income dispersion not closely associated with an increase in the Gini concentration ratio. See Blackburn and Bloom (1987), Karoly (1992), Wolfson (1994), and Lerman (1997). Increased dispersion of incomes due to equal proportional increases was specifically excluded by Dalton (1920), in a widely accepted foundational discussion of measures of inequality, as a measure of inequality. He calls this exclusion the "principle of proportionate additions". When dispersion of nonmetro wage income increases, it is smaller nonmetro wage incomes that have larger proportional increases than bigger wage incomes (finding 3). Thus, according to Dalton (1920), nonmetro wage income inequality has not been

increasing. Rather nonmetro wage income inequality has been decreasing to the extent that smaller nonmetro wage incomes have received larger proportional increases than larger nonmetro wage incomes.

Strict Egalitarianism and the Dispersion of Wage Income

Perhaps rather than being understood as increasing inequality, the increasing dispersion of nonmetro wage income and the associated rapid rate of growth of the relative frequency of large nonmetro wage incomes, should be understood as concomitants of something beneficial: rising nonmetro wage incomes across the board. This interpretation of trends is consistent with the long-standing recognition in economics that all wage workers have a community of interest in a prosperous economy and rising wages, a belief expressed in the saying, "A rising tide lifts all boats.", meaning that all workers profit from an economy expanding fast enough to lift wages regardless of the size of their "boat", their wage income (Danziger and Gottschalk, 1986). This paper suggests that a better, but not exact, metaphor would be to say that it is the logarithm of the boat's size that rises with the tide of rising wage incomes.

For strict egalitarians a utopia is a society in which everyone has about the same adequate amount of income and wealth, but since such a society does not exist and attempts to create one in the past have all failed, most strict egalitarians focus on criticizing further departures from their ideal distribution, a frequency spike at the mean with no dispersion. Greater dispersion of wage income in a population is a departure from that ideal. So one might presume a strict egalitarian would not welcome a paper showing that, in the case of the nonmetro U.S. from 1961 through 2003, greater dispersion of wage income occurred simultaneously with beneficial outcomes: a) an increase in all percentiles of wage income, b) a decrease in the relative frequency of small wage incomes, c) decreased dispersion in log wage income (i.e., proportional convergence), without d) an increase in the Gini concentration of wage income or e) the feared hollowing out of the wage income distribution. The present paper suggests that greater dispersion of wage income is always associated with a rising mean and percentiles of wage income and thus that the strict ideal of equality of wage income can only be approximated by lowering the mean and percentiles of wage income.

A strict egalitarian might counter that although the dispersion of wage incomes was smaller in the Great Depression than in the post-World War II prosperity, the utility of wage income was greater in the Great Depression and its inequality was probably greater because so many people were desperately poor. But think of the converse of this counter-argument: greater dispersion with rising wage income percentiles and a falling utility of a fixed increment to wage income may represent little or no increase in the inequality of the utility of wage income. The present paper invites egalitarians to consider the possibility that a greater dispersion of wage income with a rising mean and percentiles of wage income - without an increase in its concentration - may not offend egalitarianism. And if so, a surge in wage income nouveaux riches will also not offend egalitarianism, however paradoxical that might seem, because, as the present paper finds for the nonmetro U.S. from 1961 through 2003, rapid increase in the relative frequency of wage income nouveaux riches is closely associated with rising mean and percentiles of wage income and a falling relative frequency of small wage incomes.

This paper shows that in the nonmetro U.S. the increasing dispersion of wage income and the rapidly increasing relative frequency of large wage incomes are bound up with the benefits of raising wage incomes. The great harm that labeling increasing dispersion of wage income and the rapidly increasing relative frequency of large wage incomes as 'inequality' does is that it may mislead policy makers into diverting economic development funds away from investments that result in increasing wage income dispersion and a rapidly increasing relative frequency of large wage incomes. These are but indicators of good things happening simultaneously, rising wage incomes across the board and a falling relative frequency of small wage incomes.

The Theory Underlying the Empirics

Two newspaper articles have recently raised the question of whether, in general, there is an intrinsic relationship between rising wage incomes and measures of inequality such as growing wage dispersion and a surging number of rich people. Roger Lowenstein's article in the June 10, 2007 **New York Times Magazine** asks that question for the U.S. and a front page story of the May 24, 2007 (Davis et al.) **Wall Street Journal** poses the same question for developing

countries. These articles do not draw distinctions between wage income, income from assets, and a stock of assets, wealth. Assets and income from assets have long been known to be more concentrated than wage income. The present paper only deals with wage income.

But most of most people's income is wage income, so the question of whether there is an intrinsic relationship between rising wage incomes and measures of inequality such as wage dispersion and a rapidly increasing relative frequency of large wage incomes is important. Has this paper shown that they are intrinsically related? The author anticipates two potential lines of criticism of this paper's evidence that they are. One line is that the present paper's findings are peculiar to the U.S. wage earners with a nonmetro residence. Nonmetro wage earners are just a fraction of all U.S. wage earners (See the table in Appendix B), a fraction that fell over the course of the data examined in this paper, 1962 to 2003, by about a third. The second line of criticism is that, even if this paper's findings characterize the whole U.S., findings 1 to 8 do not necessarily show intrinsic statistical relationships. One might argue that showing that a statistical relationship is intrinsic requires a mathematical model, a model with a wide range of other implications that have been tested and confirmed. The present paper presents no such model. Both criticisms are addressed in other papers (Angle, 2007b).

. Angle (2007b) "The macro model of the Inequality Process and the surging relative frequency of large wage incomes", generalizes the model of Angle (2003) and tests it on data for the whole U.S., 1961-2003. The model of wage income distribution dynamics in Angle (2007b) is the macro model of the Inequality Process . The macro model of the Inequality Process approximates the stationary distribution of the micro model of the Inequality Process, a stochastic interacting particle system (Angle, 1986).

Thanks to Profs. Kleiber and Kotz (2003), Prof. Thomas Lux (2005, 2007) (also in Samanidou, E., E. Zschischang, D. Stauffer, and T. Lux, 2007), Profs. Chakrabarti and Chatterjee of the Saha Institute of Nuclear Physics of Kolkata, India (Chatterjee and Chakrabarti, 2006, 2007), Prof. Enrico Scalas (2006), Prof. Marco Patriarca (2006), and Prof. Victor Yakovenko (2007), the Inequality Process, the micro model and its derived macro model, has become part of econophysics. Both parts of the Inequality Process are likely to be perceived as exotic by most

economists. Angle (2006a) argues that the Inequality Process is paradigmatically compatible with economics. The present paper is intended to show without lengthy exposition of an unfamiliar mathematical model, the Inequality Process, that many of the model's empirical implications for how wage income distributions respond in the short term to increases in mean wage income can be demonstrated by the examination of simple descriptive statistics alone.

Appendix A: Landmarks of the Literature on the "hollowing out" of the U.S. wage income distribution

Robert Kuttner. 1983. "The Declining Middle". **Atlantic Monthly** July:60-72.

Lester Thurow. 1984. "The disappearance of the middle class". **New York Times**. Vol.133(February 5):F3.

Robert Lawrence. 1984. "Sectoral Shifts in the Size of the Middle Class". **Brookings Review** 3: 3-11.

McKinley Blackburn and David Bloom. 1985. "What is happening to the middle class?". **American Demographics** 7(1): 18-25.

Katharine Bradbury. 1986. "The Shrinking Middle Class". **New England Economic Review** September/October, pp. 41-54. The **New England Economic Review** is the journal of the Federal Reserve Bank of Boston.

Michael Horrigan and Steven Haugen. 1988. "The declining middle class thesis: a sensitivity analysis". **Monthly Labor Review**. 111 (May, 1988): 3-13.

John Coder, Lee Rainwater, and Timothy Smeeding. 1989. "Inequality among children and elderly in ten modern nations: the United States in an international context." **American Economic Review** 79(2): 320-324.

Frank Levy and Richard Michel. 1991. **The Economic Future of American Families: Income and Wealth Trends**. Washington, DC: Urban Institute Press.

Greg Duncan, Timothy Smeeding, and Willard Rodgers. 1993. "Why is the middle class shrinking?". In Dimitri Papadimitriou, (ed.), **Poverty and Prosperity in the U.S. in the Late Twentieth Century**. New York: Macmillan.

Martina Morris, Annette Bernhardt, and Mark Handcock. 1994. "Economic inequality: new methods for new trends". **American Sociological Review** 59: 205-219.

Michael Wolfson. 1994. "When inequalities diverge." **American Economic Review** 84(#2) : 353-358.

Michael Wolfson and Brian Murphy. 1998. "New views on inequality trends in Canada and the U.S.". **Working Paper #124, Statistics Canada**. Ottawa: Statistics Canada.

Joan Esteban and Debraj Ray. 1994. "On the measurement of polarization". **Econometrica** 62: 819-852.

Stephen Jenkins. 1995. "Did the middle class shrink during the 1980's?: UK evidence from kernel density estimates". **Economics Letters** 49(October, #4): 407-413.

Charles Beach, Richard Chaykowski, and George Slotsve. 1997. "Inequality and polarization of male earnings in the United States, 1968-1990". **North American Journal of Economics and Finance** 8(2): 135-152.

Michael Wolfson. 1997. "Divergent inequalities." **Review of Income and Wealth** 43: 401-421.

Richard Burkhauser, Amy Crews Cutts, Mary Daly, and Stephen Jenkins. 1999. "Testing the significance of income distribution changes over the 1980's business cycle: a cross-national comparison". **Journal of Applied Econometrics** 14(3): 253-272.

Joan Esteban and Debraj Ray. 1999. "Conflict and distribution". **Journal of Economic Theory**. 87: 379-415.

Duclos, Jean-Yves, Joan Esteban, and Debraj Ray. 2004. "Polarization: concepts, measurement, estimation." **Econometrica** 72(6): 1737-1772.

Appendix B: The March Current Population Survey and the Population Examined by This Paper

The distribution of annual wage and salary income, referred to in this paper as 'wage income', is estimated with data from the March Current Population Surveys (1962-2002). The March Current Population Survey (CPS) is officially called the Annual Social and Economic Supplement (of the monthly CPS, the one conducted in March). The name comes from its supplementary questionnaire which includes questions on types of income received in the previous calendar year. The U.S. Bureau of Labor Statistics commissions the supplementary

questionnaire. The U.S. Bureau of the Census conducts the monthly Current Population Survey (CPS), adding the supplement to the standard monthly CPS questionnaire each March. One of the money income questions asked on the March Supplement is total wage and salary income received in the previous calendar year. See Weinberg, Nelson, Roemer, and Welniak (1999) for a description of the CPS and its history. The CPS has a substantial number of households in its nationwide sample. Much of the labor economics literature on inequality of wage income in the U.S. is based on the March CPS.

The present paper examines the civilian population of the U.S. that is 25 + in age and earns at least $1 (nominal) in annual wage and salary income and which has a residence in a nonmetropolitan county, that is a county not in a metropolitan area. The age restriction to 25+ allows people to complete their education before their wage income is measured. The definition of the labor used here is less restricted than is common in the labor economics literature, where it is conventional to restrict the definition of the labor force to full-time, year round workers, the always-working, always employed core of the labor force. Some labor economic studies restrict the definition of the labor force still further by age and household relationship, perhaps even, in the past, by gender. An example of this genre of restricted labor force definition might be 35-45 year old male heads of household who are full-time, full year workers. Restricting one's definition of labor force to a privileged subset underestimates inequality of labor income. Another reason for a broad definition of the labor force is, as Lerman (1997) points out, that estimates of recent trends in wage income inequality may be sensitive to which subset of the labor force they are measured in.

The data of the March CPS of 1962 through 2004 (with data on annual wage and salary incomes in 1961 through 2003) was purchased from Unicon Research, inc. (Unicon Research, inc, 2004; Current Population Surveys, March 1962-2004). Unicon Research provides the services of data cleaning, documentation of variable and sampling frame definitions, recoding variables to maximize comparability over time, and a database allowing ready access to March CPS data 1962-2004, particularly pooled cross-section time-series.

Dollar amounts in the March CPS are converted to constant 2003 U.S. dollars using the U.S. Bureau of Economic Analysis National Income and Product Account Table 2.4.4 Price indexes for personal consumption expenditure by type of product [index numbers, 2000 = 100] http://www.bea.gov/bea/dn/nipaweb/TableView.asp#Mid [Last revised on 8/4/05].

The numbers of persons in the March Current Population Survey in each year and the number of them meeting the criterion for selection are:

March CPS of	Total number of person records in the March Current Population Survey	people, age 25+, who earned at least $1 in previous calendar year	people, age 25+, who earned at least $1 in previous calendar year, with nonmetro residence
1962	71,745	22,923	7,312
1963	54,282	15,147	4,916
1964	54,543	23,903	7,570
1965	54,516	23,839	7,606

1966	110,055	46,656	15,261
1967	104,902	45,266	14,832
1968	150,913	47,157	15,405
1969	151,848	48,088	15,773
1970	145,023	46,004	15,034
1971	147,189	46,088	15,191
1972	140,432	44,143	12,845
1973	136,221	43,200	12,867
1974	133,282	43,043	12,828
1975	130,124	42,424	12,426
1976	135,351	43,888	12,940
1977	160,799	52,663	14,197
1978	155,706	52,255	14,291
1979	154,593	52,793	13,943
1980	181,488	63,429	16,608
1981	181,358	64,108	16,992
1982	162,703	57,877	15,195
1983	162,635	57,995	15,168
1984	161,167	58,049	15,081
1985	161,362	59,819	15,482
1986	157,661	59,596	11,809
1987	155,468	59,603	11,767
1988	155,906	60,501	11,981
1989	144,687	57,158	11,434
1990	158,079	62,883	12,529
1991	158,477	62,942	12,601
1992	155,796	62,085	12,305
1993	155,197	61,331	12,182
1994	150,943	59,575	11,729
1995	149,642	59,999	12,210
1996	130,476	53,358	9,661
1997	131,854	54,553	9,863
1998	131,617	54,056	9,662
1999	132,324	54,659	9,811
2000	133,710	55,925	9,897
2001	128,821	53,967	9,312
2002	217,219	89,200	15,365
2003	216,424	88,039	15,101
2004	213,241	86,450	14,904

All estimates are weighted estimates. The weight associated with the i^{th} observation in the t^{th} year, ω_{it}, is:

$$\omega_{jt} = \frac{w_{jt}}{\sum_{i=1}^{n_t} w_{it}} \cdot n_t$$

where,

w_{it} = the raw weight provided by the Census Bureau

n_t = the sample size in year t.

In figure 2, this paper estimates the distribution of annual wage and salary income the traditional way, in terms of fractions of the total number of observations falling into income bins of fixed, constant width, a histogram. There are other ways to estimate a distribution but all involve a trade-off between parsimony of model and error of fit. Parsimony is expressed in the amount of smoothing of the estimate. In terms of fixed bins, parsimony means a wider the bin width, thus using fewer bins, and a greater the degree of aggregation yielding a smoother estimate of the distribution.

Appendix C: A Sampler of the Literature on Measures of Inequality In U.S. Wage Incomes

The first sentence or paragraph of each article is quoted because it summarizes the contributor's perception of the consensus of the literature that there is a growing inequality of wage income in the U.S.:

1) "There is substantial evidence of an increase in relative earnings inequality among U.S. males over the last 10-20 years." (Martin Dooley and Peter Gottschalk. 1984. "Earnings inequality among males in the United States: trends and the effect of labor force growth." **Journal of Political Economy** 92: 60-89);

2) "The distribution of income has become a public policy issue due to growing concern that the distribution is becoming less equal." (Lynn Karoly. 1992. "Changes in the distribution of individual earnings in the United States: 1967-1987". **The Review of Economics and Statistics** 74: 107-115);

3) "The 1980's witnessed rapid and massive changes in the structure of wages in the United States. In particular one observes sharp changes in wage inequality, and dramatic increases in wage differentials by education and by experience." (Moshe Buchinsky. 1994. "Changes in the U.S. wage structure 1963-1987: application of quantile regression." **Econometrica** 62: 405-458);

4) "American wages and family incomes have become notably less equal over the past two decades." (Lynn Karoly and Gary Burtless. 1995. "Demographic change, rising earnings inequality, and the distribution of personal well-being, 1959-1989." **Demography** 32: 379-405);

5) "Considerable attention has been paid in recent years to the issue of wage inequality." (Lawrence Kahn. 1998. "Collective bargaining and the interindustry wage structure: international evidence. " **Economica, New Series** 65: 507-534);

6) “A striking feature of the United States labor market experience during the past 20 years has been the dramatic rise in earnings and wage inequality that occurred during the 1980's. Past research has documented the various dimensions of this trend: the sharp rise in wage differences between more- and less-educated workers, the growing wage disparity between more and less-experienced workers, and the rise in wage inequality within groups narrowly defined by ...., education, ... - so-called “within-group” inequality.” (David Lee. 1999. “Wage inequality in the U.S. during the 1980's: rising dispersion or falling minimum wage?” **Quarterly Journal of Economics**, 114(3): 977-1023);

7) “Wage inequality among workers who are similar in education, age, and other characteristics has been growing as fast, and is considered as important, as wage inequality between workers who are dissimilar.” (Leslie McCall. 2000. “Explaining levels of within-group wage inequality in U.S. labor markets.” **Demography** 37: 415-430);

These papers use income dispersion to indicate income inequality. The initial sentence or paragraph of each paper shows the universality of the perception among scholars that wage inequality, i.e., wage dispersion, increased in the U.S. labor force as a whole in the last half of the 20th century. There is, however, no consensus that such is the case with a different wage income inequality concept, concentration, as, for example, measured by the Gini concentration ratio. Blackburn and Bloom (1987), Karoly (1992) and Lerman (1997) while documenting with March CPS data the same increases in the dispersion in wage income that the whole literature reports, find little change in the Gini concentration ratio of U.S. wage incomes in the periods of March CPS data each researcher examines.

Table 1. Mean Percentile of Nonmetro Wage Income in Five Year Periods (in terms of constant 2003 dollars, all nonmetro wage earners 25+ in age reporting at least $1 in wage income).
Source: Author's estimates from the March Current Population Survey

5 year period	mean 10th percentile in 5 year period	mean 20th percentile in 5 year period	mean 30th percentile in 5 year period	mean 40th percentile in 5 year period	mean 50th percentile in 5 year period	mean 60th percentile in 5 year period	mean 70th percentile in 5 year period	mean 80th percentile in 5 year period	mean 90th percentile in 5 year period
1961-1965	$1,369	$3,912	$7,295	$11,575	$15,585	$19,697	$23,723	$28,536	$35,451
1966-1970	2,261	6,044	10,876	15,141	19,362	23,743	28,429	34,012	42,191
1971-1975	2,857	7,046	11,846	16,206	20,879	25,621	30,930	37,131	46,731
1976-1980	3,319	7,917	12,653	16,847	21,357	26,155	31,303	38,694	48,957
1981-1985	3,294	7,777	12,211	16,312	20,305	25,008	30,426	37,371	48,349
1986-1990	3,237	7,717	12,088	16,191	20,345	24,898	30,180	36,875	47,888
1991-1995	3,963	8,695	12,843	16,869	20,844	25,389	30,618	37,477	48,265
1996-2000	5,310	10,537	15,215	19,425	23,778	28,201	33,516	40,660	52,266
2001-2003	6,329	12,211	16,682	20,685	25,428	30,182	35,775	42,791	56,075

Table 2. Ratio of Mean Percentile of Nonmetro Wage Income in Later Periods (in terms of constant 2003 dollars) to Mean Percentile of Nonmetro Wage Income in Period 1961-1965 (in terms of constant 2003 dollars).

period in numer-ator of ratio	ratio of 10th percentile in current period to that in 1961-1965	ratio of 20th percentile in current period to that in 1961-1965	ratio of 30th percentile in current period to that in 1961-1965	ratio of 40th percentile in current period to that in 1961-1965	ratio of 50th percentile in current period to that in 1961-1965	ratio of 60th percentile in current period to that in 1961-1965	ratio of 70th percentile in current period to that in 1961-1965	ratio of 80th percentile in current period to that in 1961-1965	ratio of 90th percentile in current period to that in 1961-1965
1966-1970	1.652	1.545	1.491	1.308	1.242	1.205	1.198	1.192	1.190
1971-1975	2..087	1.801	1.624	1.400	1.340	1.301	1.304	1.301	1.318
1976-1980	2..424	2..024	1.734	1.455	1.370	1.328	1.32	1.356	1.381
1981-1985	2..406	1.988	1.674	1.409	1.303	1.270	1.283	1.310	1.364
1986-1990	2..364	1.973	1.657	1.399	1.305	1.264	1.272	1.292	1.351
1991-1995	2.895	2.223	1.760	1.457	1.337	1.289	1.291	1.313	1.361
1996-2000	3.879	2.694	2.086	1.678	1.526	1.432	1.413	1.425	1.474
2001-2003	4.623	3.121	2.287	1.787	1.632	1.532	1.508	1.500	1.582

Figures

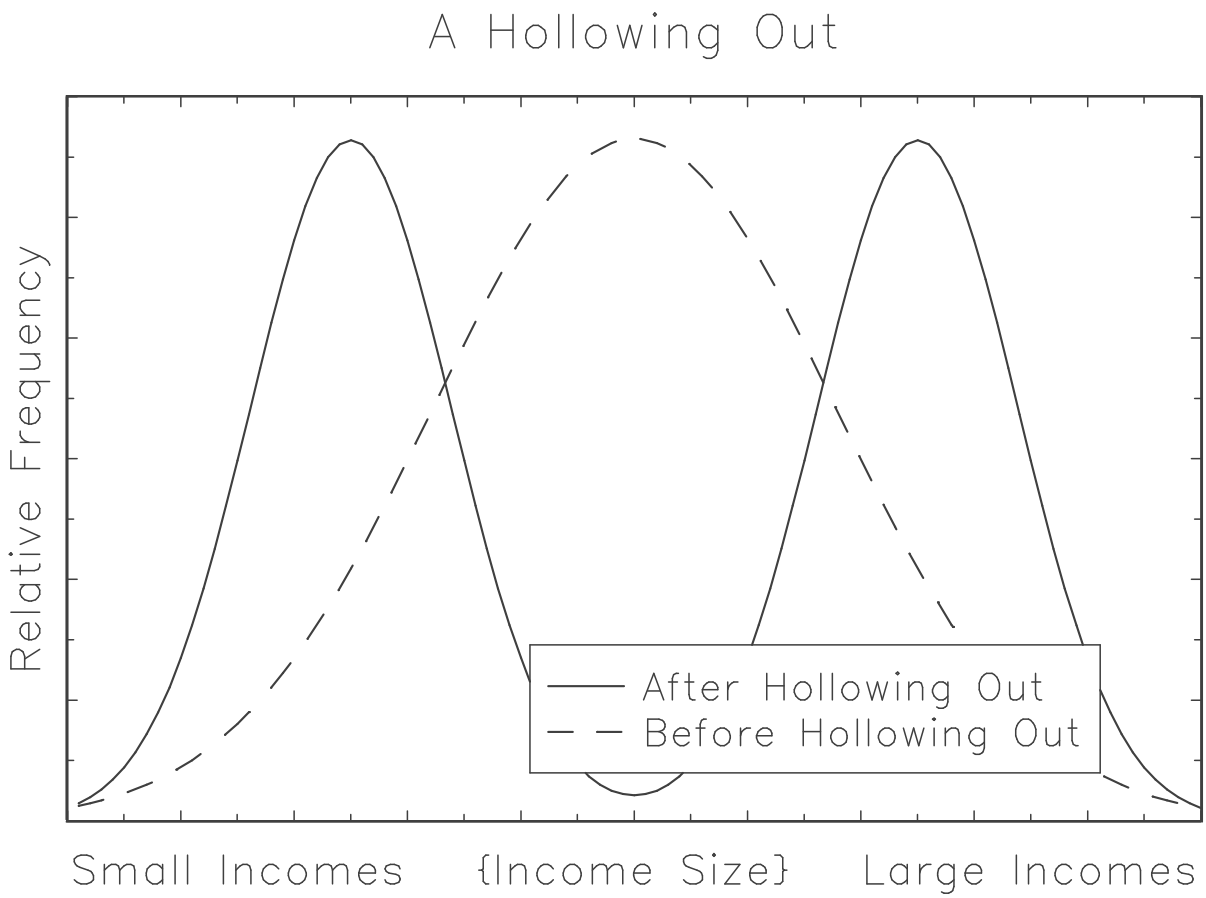

Figure 1: Conceptual illustration of the hollowing out of the wage income distribution

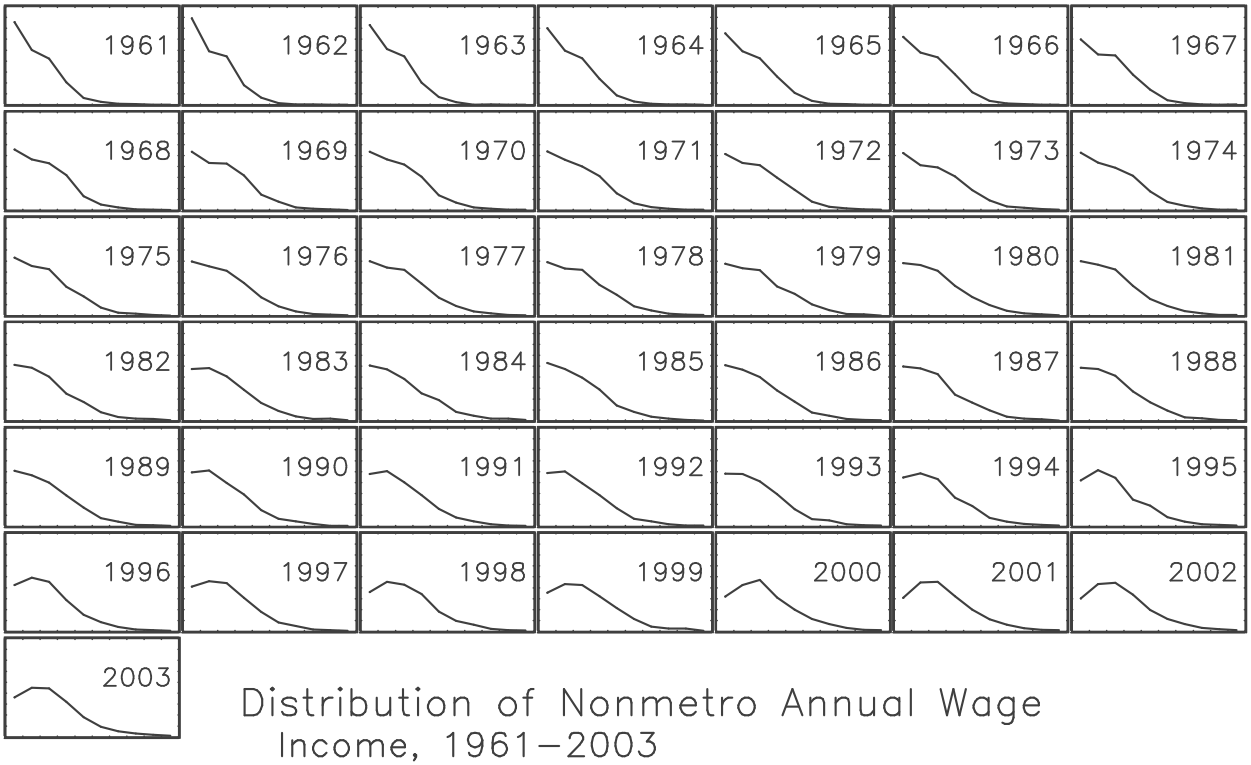

Figure 2: No hollowing out evident in nonmetro wage income distributions 1961-2003
Source: Author's estimates from March CPS data.

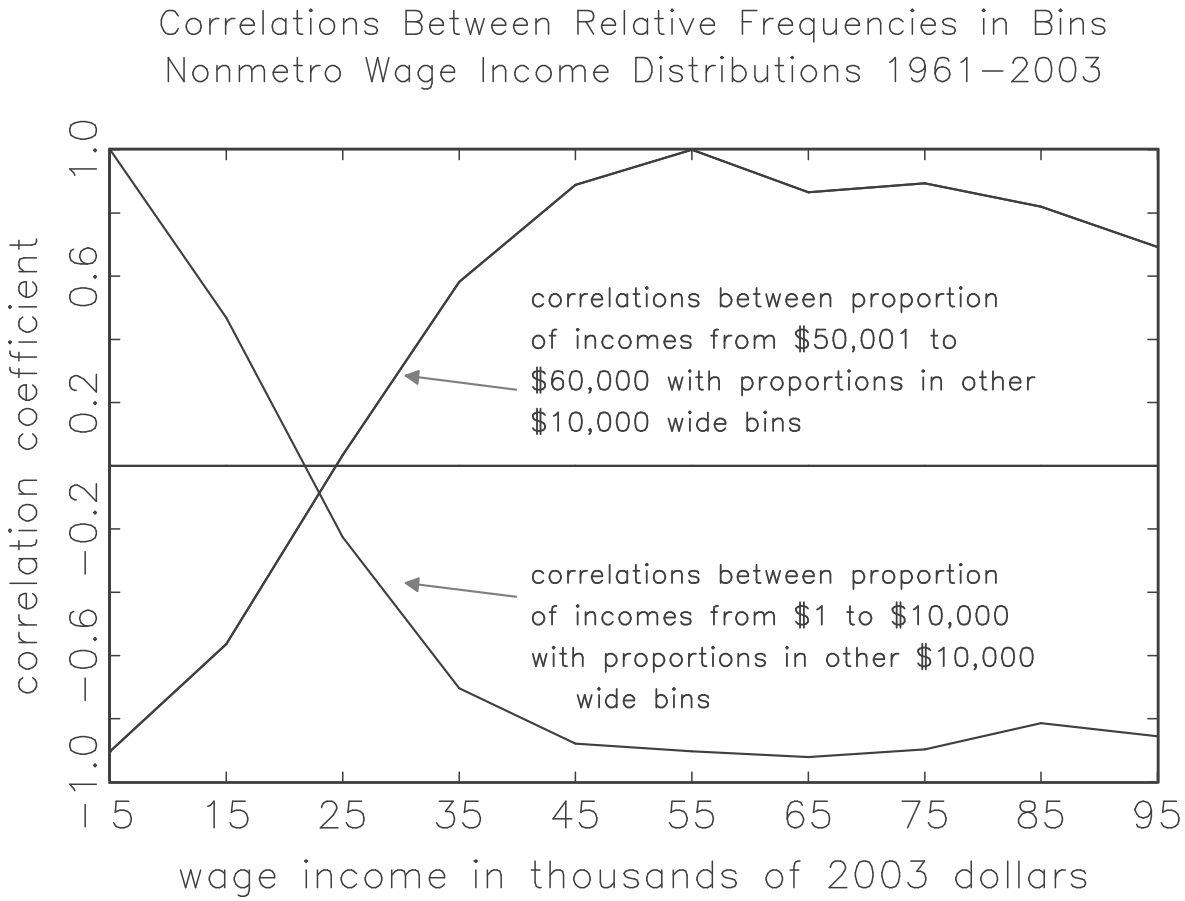

Figure 3: Correlations between relative frequencies in two bins, one of large wage incomes, the other of small wage incomes, and the relative frequencies of wage incomes larger or smaller than these.
Source: Author's estimates from March CPS data.

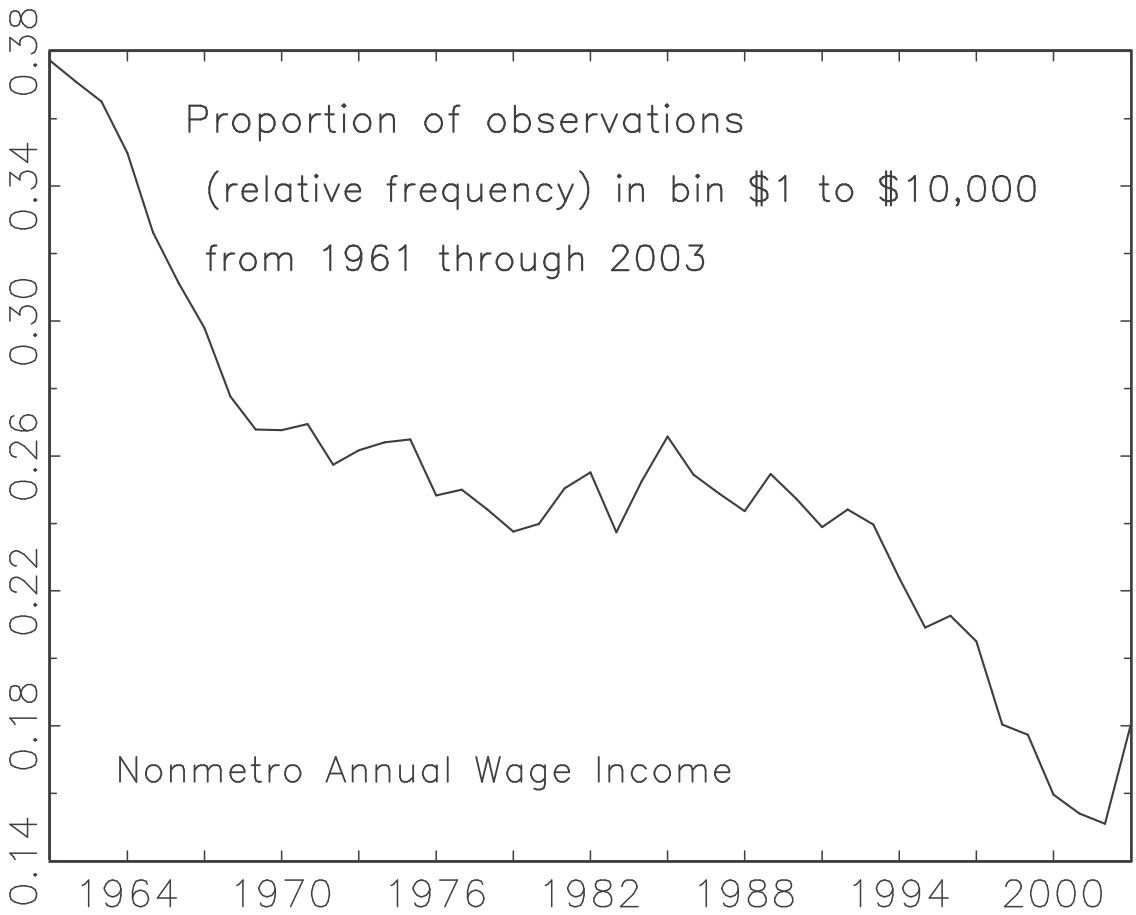

Figure 4: Time-series of the fraction of nonmetro wage incomes, $1 to $10,000 in constant 2003 dollars
Source: Author's estimates from March CPS data

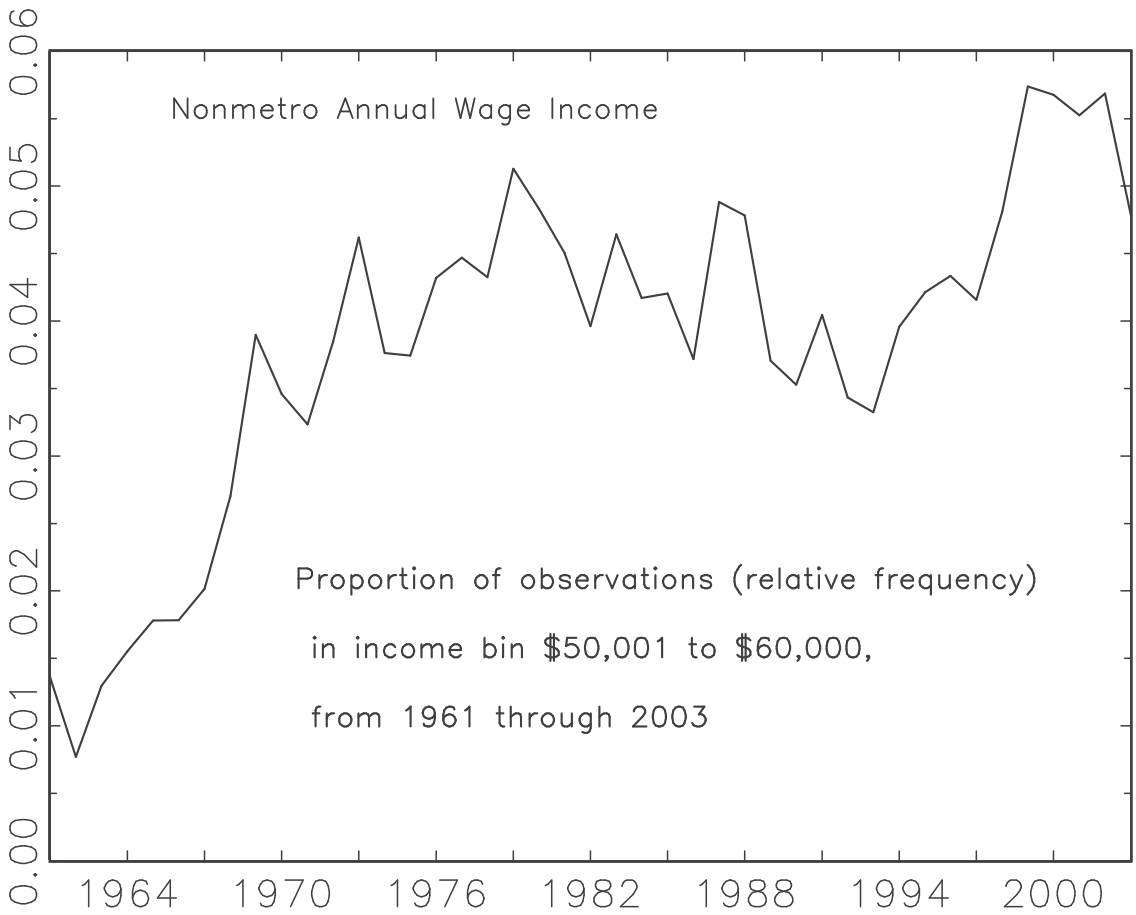

Figure 5: Time-series of the fraction of nonmetro wage incomes, $50,001 to $60,000 in constant 2003 dollars
Source: Author's estimates from March CPS data

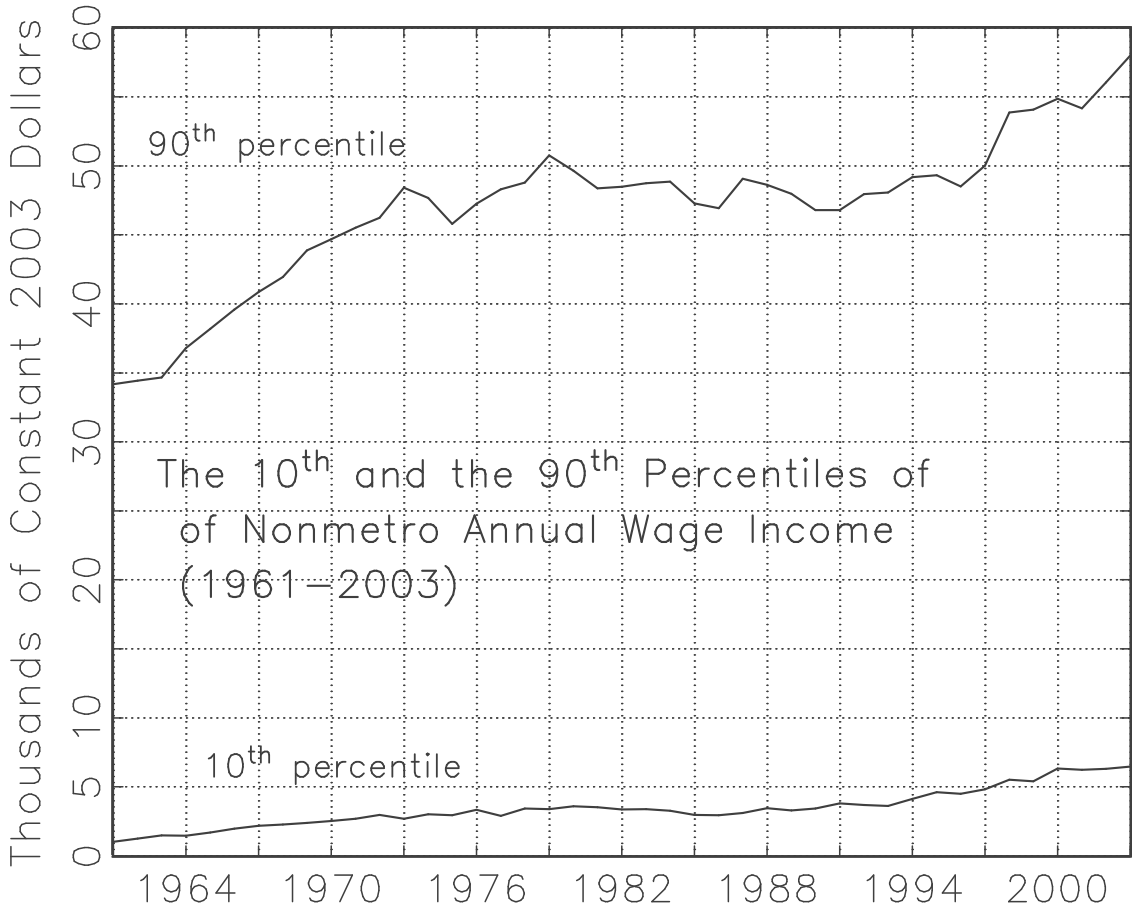

Figure 6: The 90th percentile of nonmetro wage incomes diverges up and away from the 10th percentile, increasing the 90-10 difference, a widely used measure of wage income dispersion.
Source: Author's estimates from March CPS data

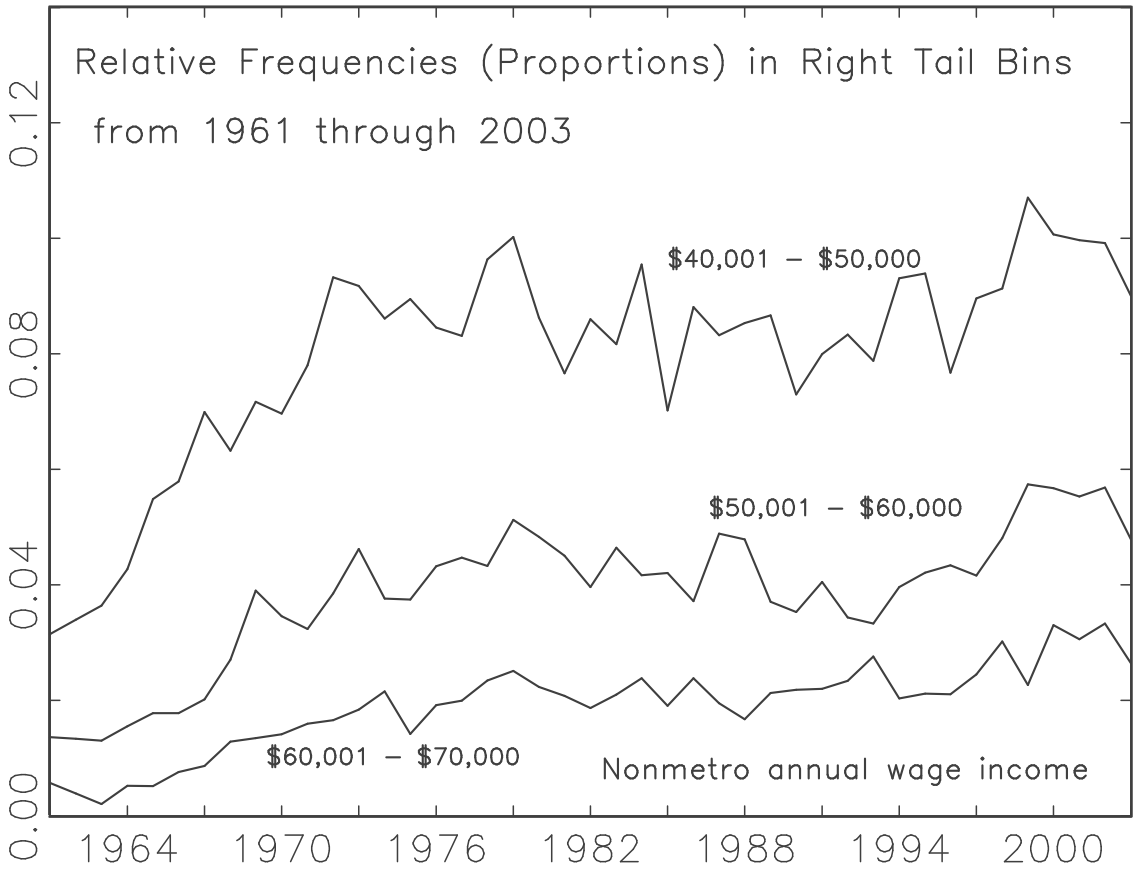

Figure 7: Time-series of fractions of nonmetro wage incomes falling into three income bins in the right tail of the nonmetro distribution
Source: Author's estimates from March CPS data

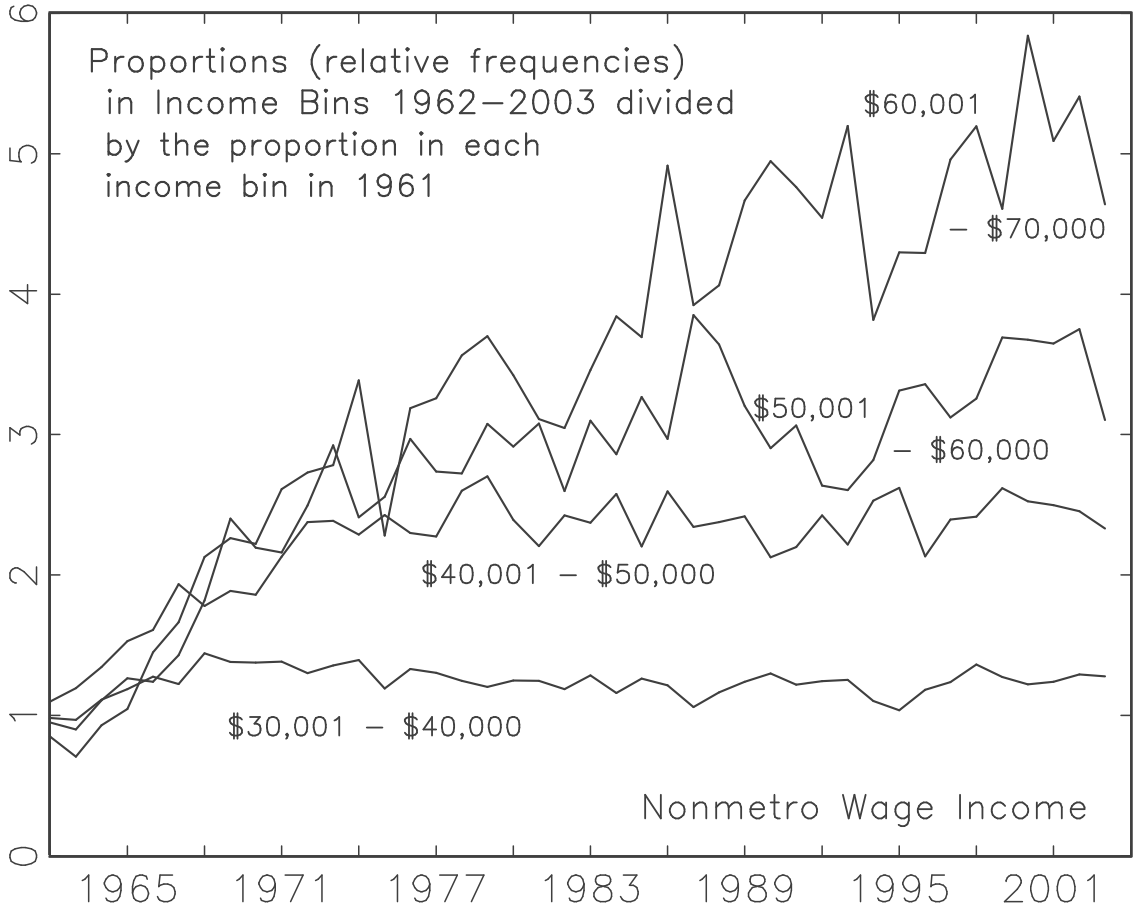

Figure 8: In the right tail of the distribution of nonmetro wage incomes, the fraction of wage incomes that fall into the bin of larger wage incomes grows faster than the fraction falling into the bin of smaller wage incomes. Or, equivalently, the larger a nonmetro wage income is, provided that it is larger than the mean of nonmetro wage incomes, the faster will grow the fraction of nonmetro wage incomes of about that size.
Source: Author's estimates from March CPS data

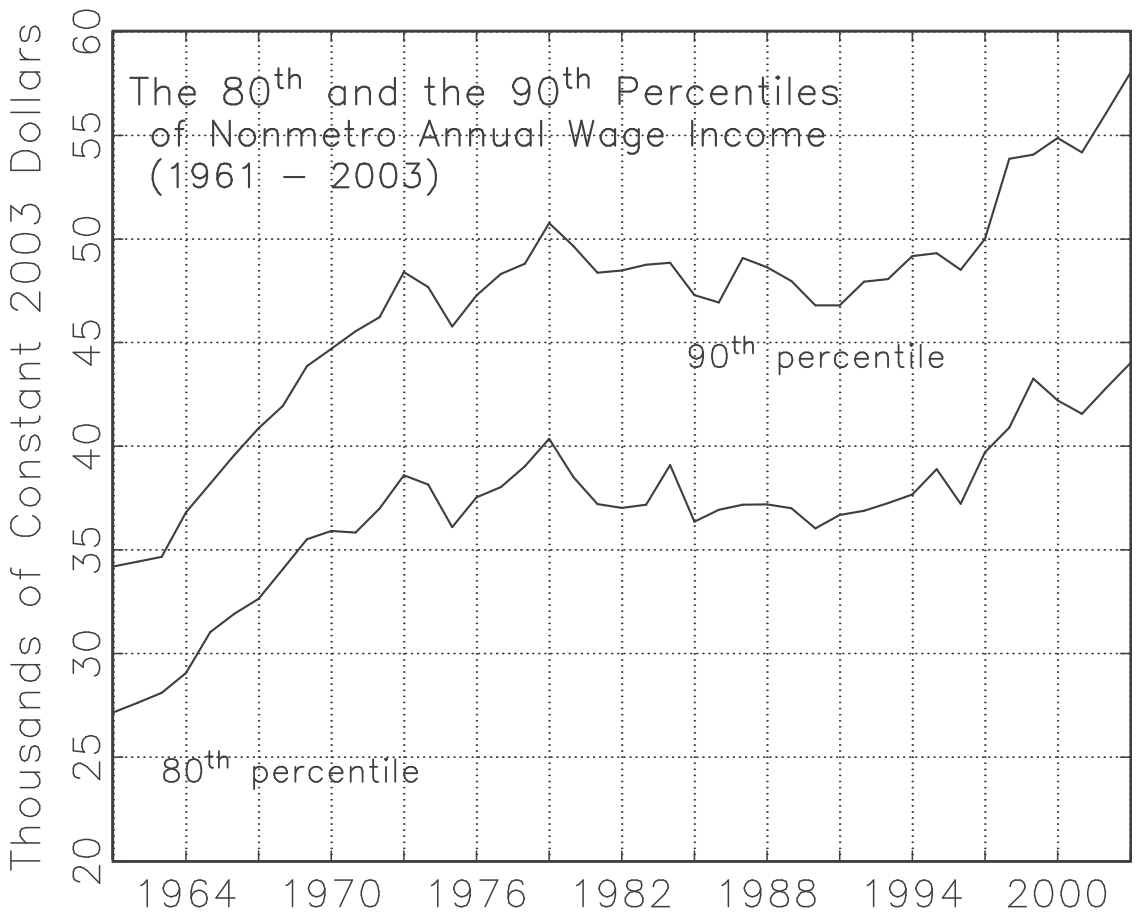

Figure 9: Note that the 90th percentile of nonmetro wage incomes diverges up and away from the 80th percentile too.
Source: Author's estimates from March CPS data

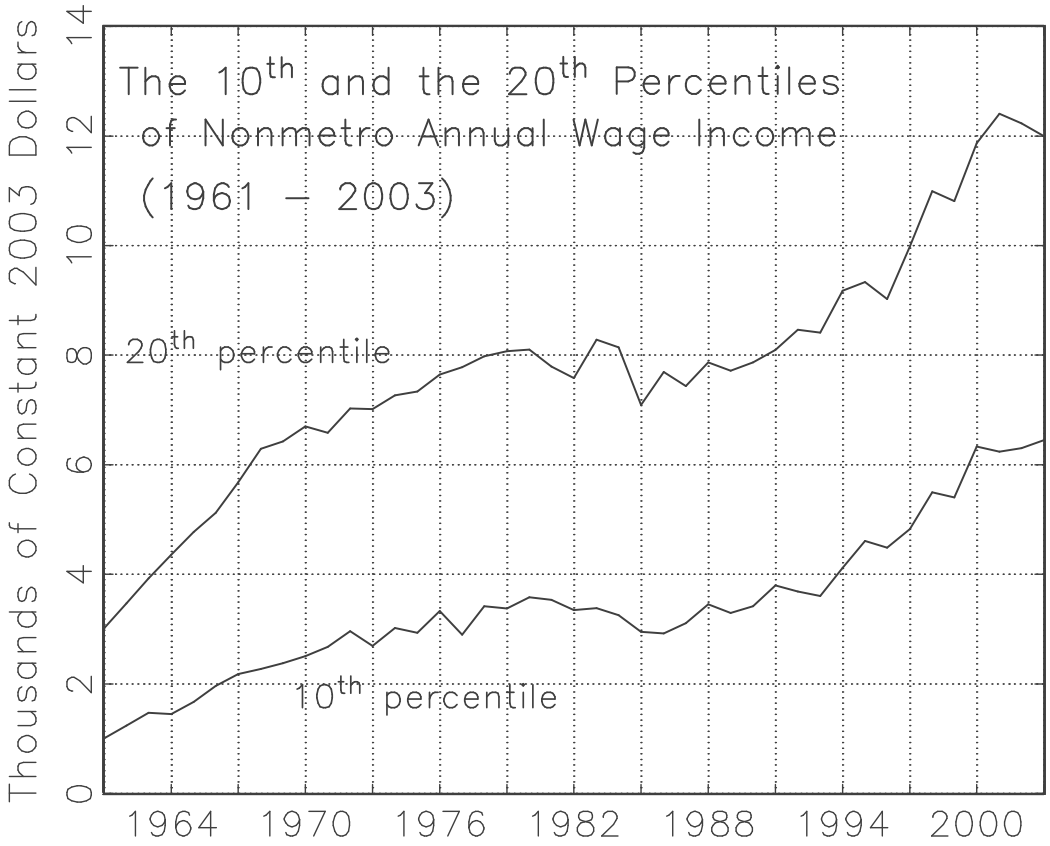

Figure 10: Note that the 20th percentile of nonmetro wage incomes diverges up and away from the 10th percentile too.
Source: Author's estimates from March CPS data

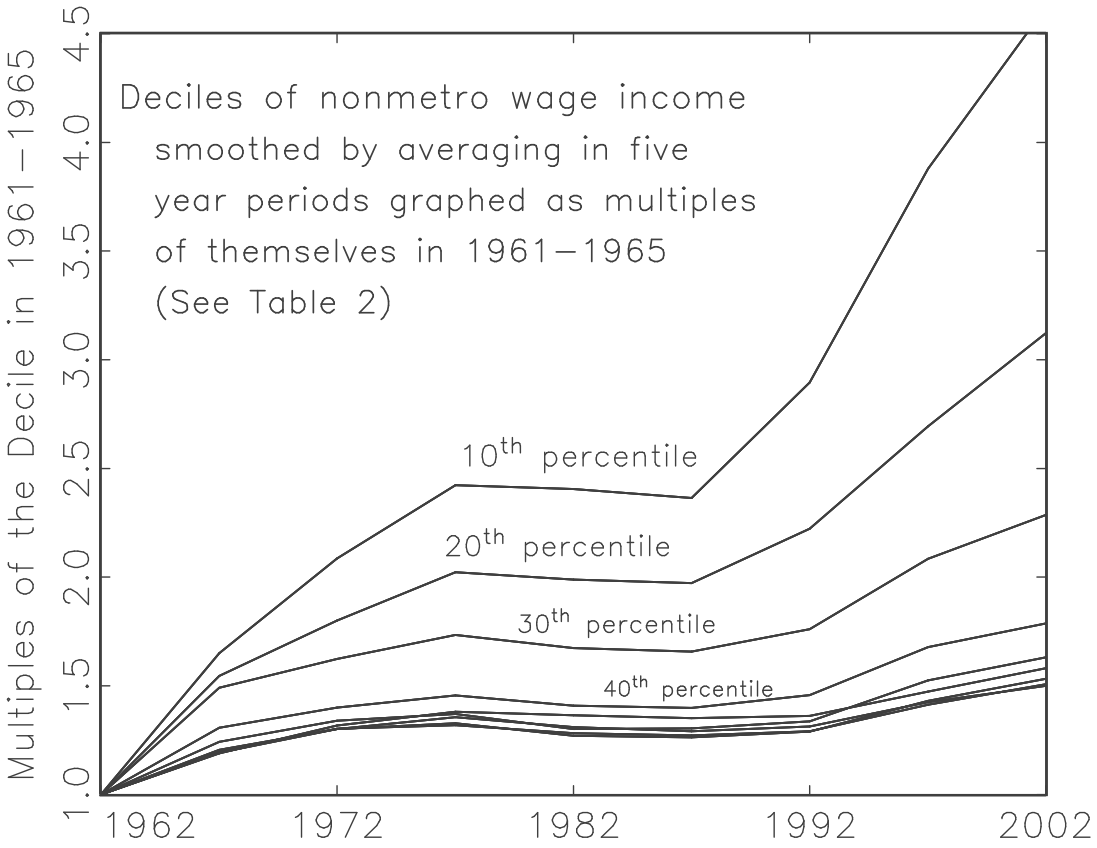

Figure 11: The smaller the percentile, the faster it grew proportionally 1961-2003
Source: Author's estimates from March CPS data.

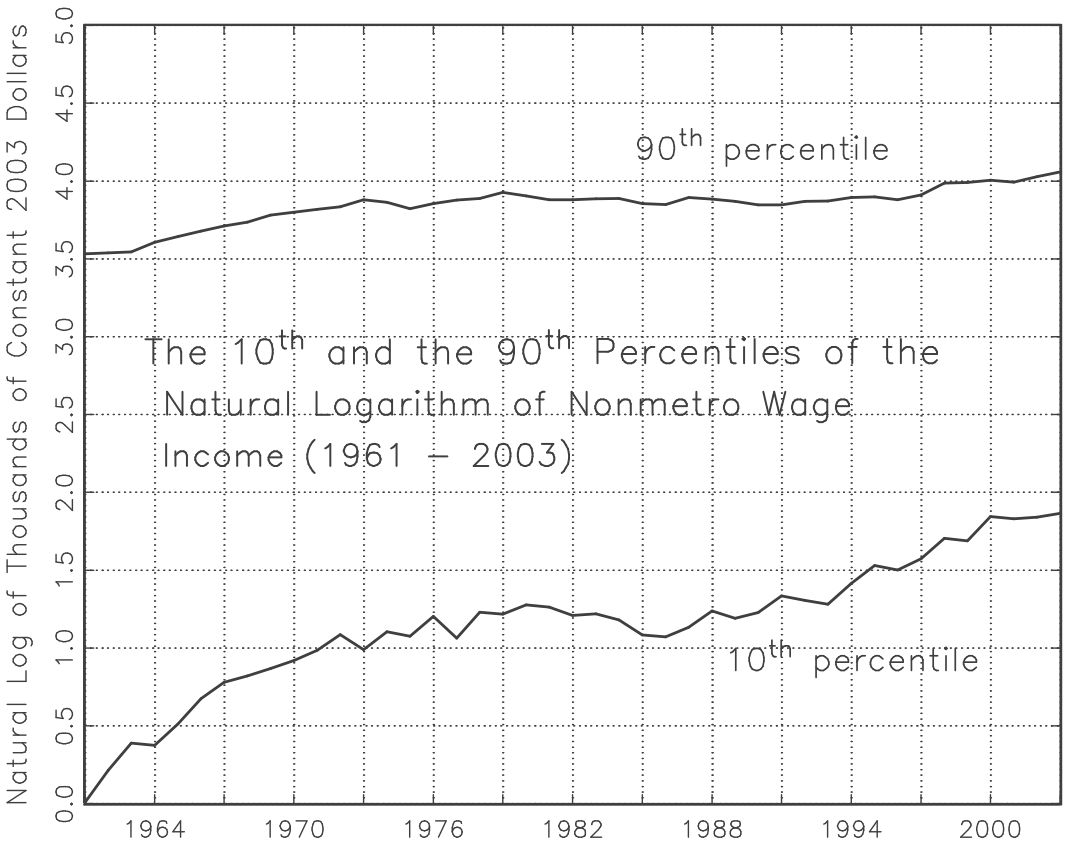

Figure 12: Time-series of the 10th and 90th percentiles of the natural logarithm of nonmetro wage incomes. Note that the 10th percentile rises more steeply than the 90th and converges toward it.
Source: Author's estimates from the March CPS.

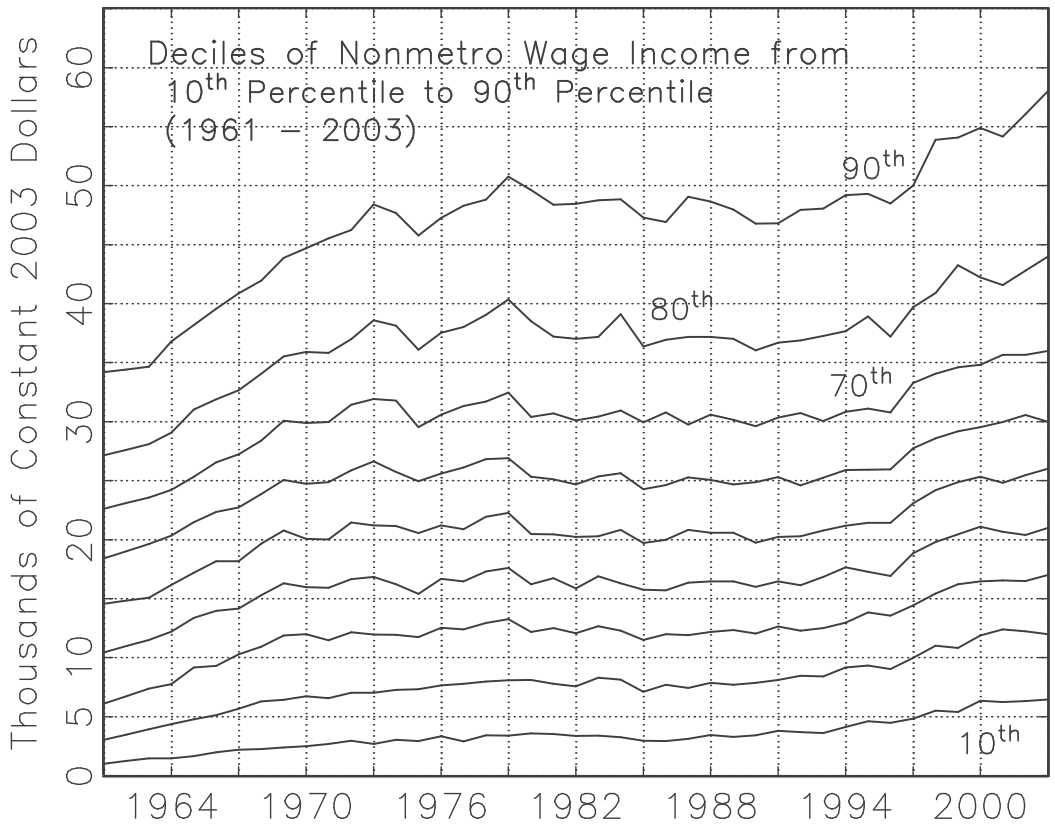

Figure 13
Source: Author's estimates from March CPS data

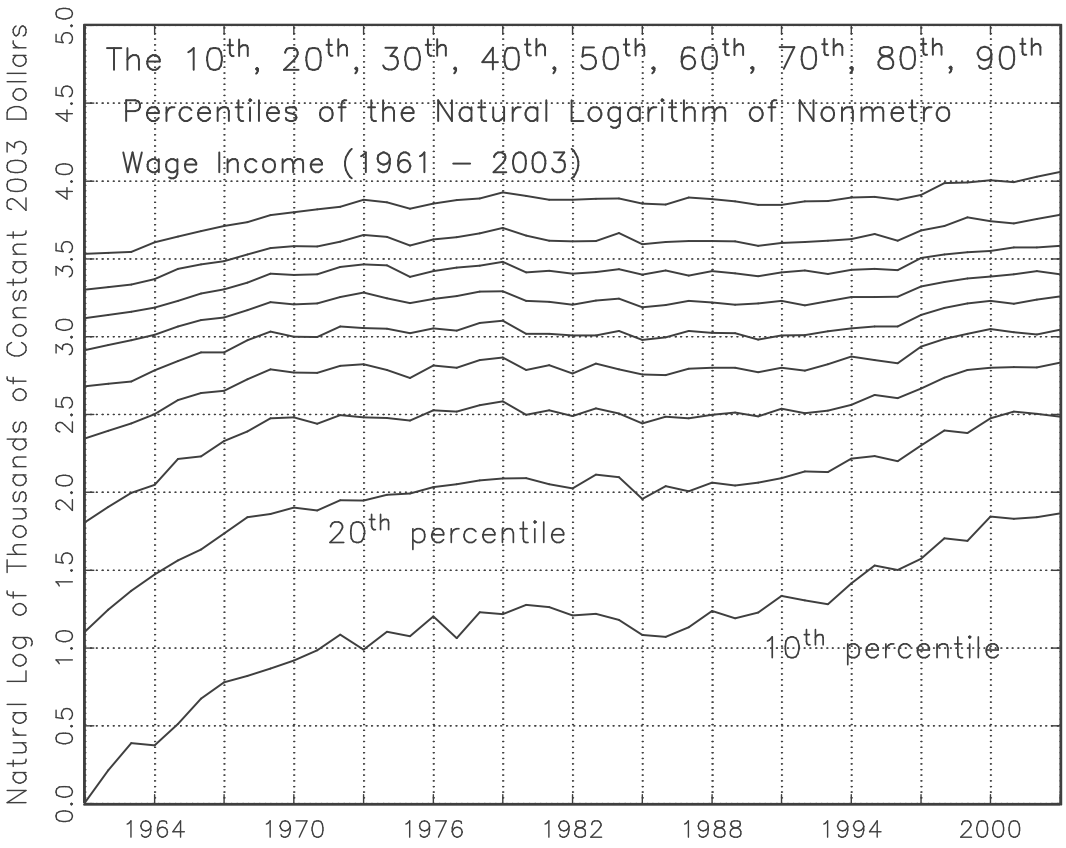

Figure 14
Source: Author's estimates from March, CPS data.

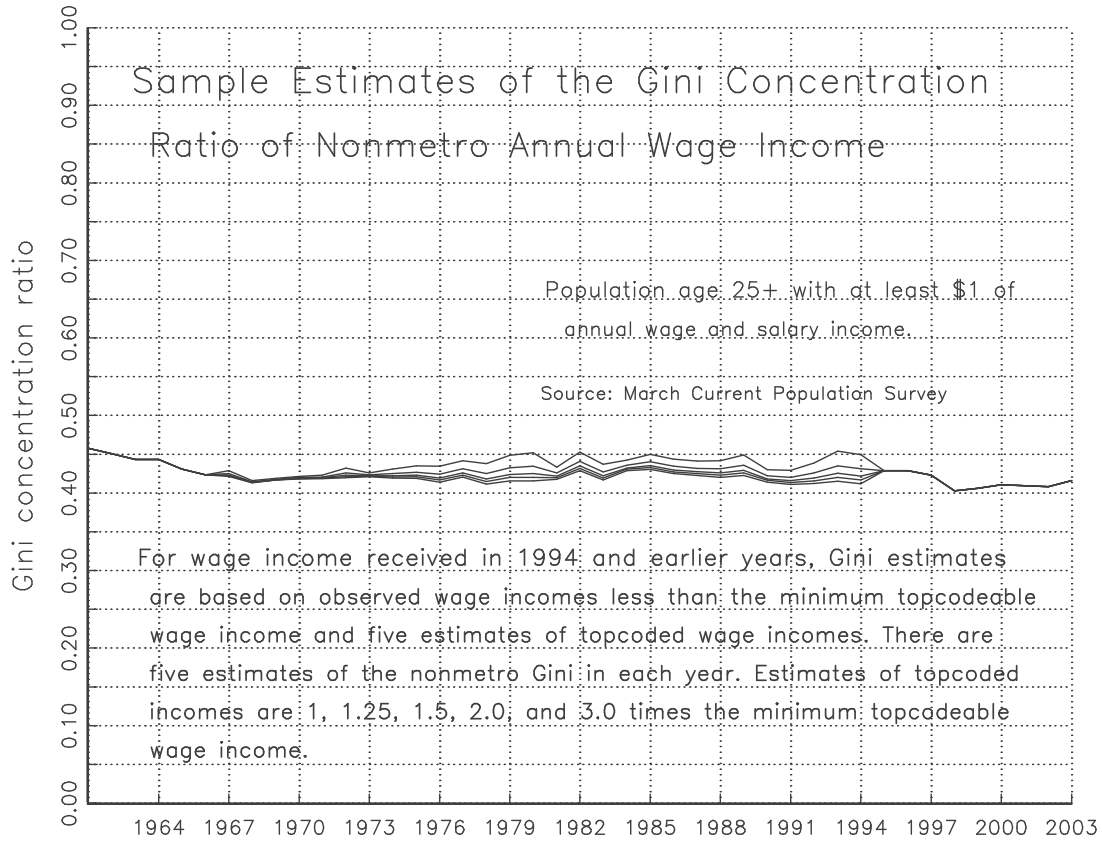

Figure 15. Estimates of the Gini concentration ratio of nonmetro wage income, 1961-2003
Source: Author's estimates from March CPS data.

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