EARNINGS INEQUALITY
WITHIN THE URBAN UNITED STATES
2000 TO 2006

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Summary

This report examines inequality in hourly labor earnings for a set of nearly 300 U.S. metropolitan areas between 2000 and 2006. On the whole, the data indicate that the dramatic rise in inequality seen in the United States between 1980 and 2000 continued through 2006. Some of the primary findings can be summarized as follows:

1. Overall inequality in the United States as a whole continued to expand. Between 2000 and 2006, the ratio of the 90th percentile of the distribution of hourly earnings to the 10th percentile increased from 5.2 to 5.7.

2. Workers with high levels of education saw their wages rise faster than workers with less formal schooling. In 2000, individuals with a bachelor's degree were paid approximately 50 percent more, on average, than a high school graduate, whereas workers with a master's, doctoral or professional degree were paid 69 percent more. By 2006, these premia had risen to, respectively, 54 percent and 78 percent.

3. The widening of the earnings scale also was driven by increasing differences in the labor incomes of workers with similar observable characteristics (e.g., age, gender, race, education). Widening "residual" inequality accounted for as much as half of the rise in the overall degree of dispersion in the wage distribution between 2000 and 2006.

4. Among four metropolitan areas within the Eighth Federal Reserve District—Little Rock, Louisville, Memphis and St. Louis—all experienced rising inequality during this period. While the increases in Little Rock, Memphis and St. Louis mimicked that of the nation as a whole, Louisville's increase was somewhat smaller because the bottom end of Louisville's wage distribution experienced better-than-average growth.

5. Based on the analysis of inequality within 298 metropolitan areas, some of the major correlates of rising inequality between 2000 and 2006 were identified. These quantities include the decline in manufacturing's share of total employment, the rising number of foreign-born workers in the labor force, a general economic downturn as indicated by rising unemployment and an increasing supply of workers with a post-baccalaureate degree.

These results provide support for several prominent explanations for the rise in inequality.

Introduction

One of the most striking trends characterizing the economy of the United States over the past three decades is the rise of inequality in income and labor earnings. Some individuals, particularly those with high levels of education, have seen their financial well-being improve dramatically. Others have not fared as well, falling far behind those at the top of the earnings scale.

The following calculation, based on data from the monthly Current Population Survey, illustrates this point.[1] In 1971, the worker at the 90th percentile of the earnings distribution (i.e., the worker earning more than 90 percent of all other workers) received 3.66 times as much as the worker at the 10th percentile. In 1995, the difference between these workers had grown to a factor of 4.66 (Acemoglu, 2002). Put differently, if the 10th percentile in both 1971 and 1995 were $7 per hour, the corresponding 90th percentile would have risen from $25.62 per hour in 1971 to $32.62 per hour in 1995. Over time, of course, these differences can add up to sizable differences in the resources available to individuals at different points of the wage distribution.

To be sure, some people may not view this trend as a problem, seeing it as the natural outcome of a competitive labor market in a primarily capitalistic economy. In fact, the rise in earnings inequality may partially reflect a rise in the return to hard work, productivity or talent, all of which should be rewarded.

Yet, the majority of economists and much of the remainder of society have expressed concerns about rising wage dispersion. In part, these concerns are based on the idea that rising inequality might reflect a growing inability among the poor to maintain even a basic standard of living. Falling behind the relatively well-to-do may be a result of slow earnings growth, which makes it increasingly difficult for households to purchase basic necessities, including housing, transportation, utilities, medical care and education.

Many also argue that rising inequality in the labor market may create perceptions of unfairness which, in turn, could lead to social conflict. In testimony given to Congress in 2005, for example, the former chairman of the Federal Reserve, Alan Greenspan, described the problem as follows:

> In a democratic society, such a stark bifurcation of wealth and income trends among large segments of the population can fuel resentment and political polarization. These social developments can lead to political clashes and misguided economic policies that work to the detriment of the economy and society as a whole.[2]

For these reasons, understanding both the extent to which labor earnings have become more unequal across American workers and why they have followed this trend is worthwhile. This report examines some of the recent trends in earnings disparities in the United States, with an emphasis on four metropolitan areas of the Federal Reserve's Eighth District: Little Rock, Louisville, Memphis and St. Louis.

Basic Facts about Inequality Trends in the United States

Research over the past two decades has described the evolution of the earnings and income distributions in the United States. Although there are many details, broad trends can be summarized by three fundamental patterns.

First, the overall extent of dispersion in the distribution of labor earnings has risen since the mid- to late-1970s. Prior to this time, relative wages earned by workers at different points of the earnings distribution had been stable. Indeed, from 1967 to 1980, the standard deviation of the distribution of hourly earnings among full-time male workers rose by less than 2 percent (Card and DiNardo, 2002). Between 1980 and 2000, however, the standard deviation rose by nearly 20 percent, with the majority of the rise taking place between 1980 and 1990.

Second, the rise in overall inequality can be tied, in part, to the increase in the wage gaps between individuals with different observable measures of skill, such as education and experience. For example, between 1979 and 1999, the hourly wages of college graduates (i.e., workers with a bachelor's degree or more) rose substantially relative to the earnings of workers with only a high school diploma. At the beginning of this period, college graduates earned approximately 30 percent more than high school graduates. At the end, they earned between 45 and 50 percent more (Card and DiNardo, 2002).

Third, despite increasing differences in the earnings of individuals of different educational levels, a substantial fraction of the increase in inequality is the result of rising earnings differentials between workers with similar characteristics, including age, experience and education. Estimates, once again based on the Current Population Survey, suggest that as much as half of the rise in the standard deviation of the hourly earnings distribution between 1979 and 2000 can be tied to a growing variation in the wages of "observationally identical" workers (i.e., those of the same age, gender, race, education, etc.) (Card and DiNardo, 2002). Therefore, the overall distribution of hourly wages grew wider because workers with different levels of education and experience began earning

different amounts and because workers with the same levels of education and experience began earning different amounts.

Recent Developments: 2000 to 2006

To provide a sense about how the distribution of earnings has evolved since 2000, this study examines data drawn from two sources: the 5 Percent Sample of the 2000 Census of Population and Housing and the 2006 American Community Survey.[3] The 5 Percent Sample of the 2000 Census includes detailed information, such as age, education and (where appropriate) labor earnings, for more than 14 million individuals.

The American Community Survey is a program created by the U.S. Census Bureau to provide information similar to that collected in the decennial U.S. census, but to do so on an annual basis. The first American Community Survey was conducted in 2000, and the most recent sample available (at the time this report was being written) was 2006. The 2006 American Community Survey includes information on nearly 3 million individuals, or roughly 1 percent of the U.S. population.

Both the decennial census and the American Community Survey also provide indicators for place of residence for individuals residing in sufficiently large metropolitan areas. This feature, in addition to the large sample sizes of each survey, allows earnings inequality calculations to be performed for a number of local markets.

To calculate inequality, this study uses a standard measure of compensation: wage and salary income, expressed in hourly terms.[4] Expressing earnings on an hourly basis is common in studies of wage inequality because it expresses compensation on a unit of time that allows different individuals to be compared reasonably with one another. Using a longer period of time, say a week or year, is more problematic because the amount of time that different individuals actually work in a week or year might be substantially different. For instance, inequality between two people might be enormous when comparing their annual compensation simply because one individual works twice as many hours as the other. Using hourly compensation largely eliminates this problem.

Computing an hourly earnings figure for every individual in the Census and American Community Survey samples who report some labor income is straightforward. Each person's annual wage and salary earnings are divided by the total number of hours worked over the last year. Therefore, even though not all workers are paid on an hourly basis, an hourly rate of pay can be estimated for everyone.[5] To compare figures from 2000 and 2006, all wages calculated in 2000 have been converted to year 2006 dollars using the Personal Consumption Chain Type Price Index.[6]

As with much of the literature on wage inequality, the sample in this report is limited to individuals between the ages of 18 and 65, who are not in school and who worked at least 14 weeks in the past year. This is intended to focus the analysis on workers who have a relatively strong tie to the labor force. Including workers with only weak ties to the work force may spuriously increase the degree of inequality emerging from the calculations by including a large number of workers with extremely low earnings. In many cases, these workers have deliberately chosen to remain (mostly) out of the labor force and earn relatively little (e.g., students). They do not represent an appropriate comparison group to workers whose primary activity during the week is going to work.

OVERALL INEQUALITY

To begin, consider some basic measures of overall inequality (i.e., measures that use data for all workers, not controlling for any characteristics such as race, age, education, gender) for the years

2000 and 2006 given in Table 1. In particular, we can see that the differences between three percentiles of the distribution of hourly earnings—the 90th, 50th and 10th—grew larger during this period. The 90th percentile rose 8 percent, from $35.84 to $38.70, whereas the median grew by 3 percent ($15.50 to $15.96) and the 10th percentile decreased by 1.7 percent ($6.89 to $6.77).

Just as in the decades leading up to the year 2000, the overall wage distribution continued to widen as the top end grew faster than the middle, which itself grew faster than the bottom. Clearly, there has been no tendency for the long-run increase in earnings dispersion to change course in recent years.

CONDITIONAL PATTERNS

Because overall measures of inequality are based on the earnings of all workers and do not account for differences in some basic characteristics that might influence wage earnings, such as education, let us look at some measures of conditional inequality (i.e., inequality that is conditional on, or takes as fixed, certain characteristics).

To do so, consider first the remainder of the figures in Table 1. These reflect percentiles of the distributions of earnings for workers belonging to groups defined by gender, race, education and age. Comparing the median hourly earnings (i.e., the 50th percentile) for one group with that of another provides a sense of how much inequality there is between people with different characteristics.

Starting with gender, we see that, although men tend to earn more on average (or at least in a median sense) than women, the differential between their median earnings decreased between 2000 and 2006. In 2000, median earnings among men exceeded those among women by roughly 27 percent. By 2006, the figure was closer to 20 percent.

There has, by contrast, been some increase in wage dispersion across groups defined by race. Table 1 reports wage percentiles for five racial groups: white, black, Native American, Asian and all others. Across these groups, Asians tend to earn the most in terms of median hourly earnings. In 2006, for example, the median hourly wage for Asian workers was $18.87, while whites earned $16.25, blacks earned $13.56, Native Americans earned $12.44 and all others earned $14.51.

Between 2000 and 2006, Asians gained relative to all other groups. In 2000, Asians earned approximately 8 percent more than whites, 25 percent more than blacks, 37 percent more than Native Americans, and 27 percent more than all other groups. By 2006, these figures had risen to 16 percent relative to whites, 39 percent relative to blacks, 52 percent relative to Native Americans and 30 percent relative to all others. There was also a rise in inequality between whites and both blacks and Native Americans. Whites saw their relative earnings rise from 116 percent of black earnings and 127 percent of Native American earnings in 2000 to 120 percent of black earnings and 131 percent of Native American earnings in 2006.

As noted previously, the literature studying wage inequality in the United States has found widening gaps between what highly educated workers earn relative to the less educated. Based on the results in Table 1, this pattern has continued in recent years.

To see this trend, first note that there is a direct relationship between median hourly compensation and educational attainment. Higher educational attainment quite clearly corresponds to higher median wages. In 2000, for example, individuals with no high school earned $9.76 per hour; high school dropouts took in $11.03; individuals with only a high school diploma earned $13.12; individuals with some college or an associate's degree earned $15.72; workers with only a bachelor's degree earned $21.75; and workers with a master's, doctoral or professional degree earned $27.79.

Table 1: U.S. Hourly Earnings Distribution						
	2000			2006		
Percentiles	**90th**	**50th**	**10th**	**90th**	**50th**	**10th**
Total	**35.84**	**15.50**	**6.89**	**38.70**	**15.96**	**6.77**
Male	40.19	17.52	7.55	42.57	17.41	7.26
Female	30.33	13.79	6.50	33.28	14.51	6.29
White	36.39	15.93	7.11	38.70	16.25	6.97
Black	30.33	13.77	6.15	30.23	13.56	6.05
Native American	27.72	12.55	5.74	29.02	12.44	5.80
Asian	42.46	17.21	7.01	46.58	18.87	7.21
Other	30.88	13.57	6.11	33.54	14.51	6.29
No high school	21.67	9.76	5.14	19.35	9.43	5.03
Some high school	23.16	11.03	5.46	22.11	10.45	5.22
High school graduate only	26.47	13.12	6.40	26.16	12.76	6.11
Some college or associate's degree	31.71	15.72	7.56	32.70	15.96	7.33
Bachelor's degree only	45.16	21.75	10.03	48.37	22.36	9.77
Master's, professional, doctoral degree	61.03	27.79	12.25	69.66	30.19	13.16
18 to 34 years of age	26.96	12.74	6.04	27.64	12.58	5.80
35 to 49 years of age	38.23	17.21	7.65	41.12	17.66	7.55
50 + years of age	42.67	17.92	7.72	44.27	18.45	7.74

Note: Figures represent earnings per hour expressed in year 2006 dollars.

Inequality has increased dramatically between these groups in recent years. If one calculates the rate of growth for each of the median earnings figures of these six education groups during the 2000-2006 period, it is apparent that wages have risen faster among those with higher levels of schooling.

Indeed, median wage growth has been negative for individuals in the bottom three education categories: –3.4 percent for those with no high school, –5.3 percent for those with some high school and –2.7 percent for high school graduates.

On the other hand, workers with some college or an associate's degree saw their median wages increase by 1.5 percent, whereas workers with a bachelor's degree saw 2.8 percent growth. Workers at the absolute top end of the education scale have done even better. Between 2000 and 2006, the median wage for workers holding a master's, doctoral or professional degree rose by 8.6 percent.

There also has been some increase in the relative earnings of workers of different age categories, although the rise is not as striking as that witnessed between education groups.

Older workers, of course, tend to earn more than especially young workers. In 2006, for instance, workers 18 to 34 years of age had a median wage of $12.58, workers 35 to 49 had a median wage of $17.66, and those 55 or older had a median wage of $18.45 per hour. This pattern is a well-established result in studies of earnings during a worker's career path, which begins with relatively low earnings and gradually rises as workers gain experience, earn promotions or find better paying jobs.

The data suggest that older workers—those at least 35 years of age—have seen their median earnings rise relative to the youngest group. For example, in 2000, workers 55 or older earned 41 percent more than workers 18 to 34. In 2006, they earned 47 percent more. Interestingly, the relative earnings of workers 34 to 49 and 55 or older were stable over this period.

Table 2 provides a different categorization of workers. Instead of dividing workers into groups defined by basic demographic characteristics, it provides a breakdown by occupation. Because hundreds of occupational categories appear in the U.S. Census and American Community Survey, for the sake of conciseness, this study limits what is reported in the table to 30 occupations: the top 15 and bottom 15, based on median hourly earnings in the year 2000.

From the results, it is apparent that there is tremendous variation in the median hourly pay received by workers in different jobs. In the year 2000, the top of the pay scale included dentists ($53.77 per hour), physicians ($50.13 per hour) and chief executives ($38.23 per hour), all of whom are widely recognized to be among the highest-paid individuals in the country. At the bottom of the wage distribution were child-care workers ($8.27 per hour), farm workers ($8.06 per hour), kitchen workers ($8.03 per hour) and miscellaneous food preparation workers ($7.74 per hour). Just based on these figures, workers in occupations at the top of the scale earned from five to seven times per hour more than workers in occupations at the bottom of the scale.

These differences, as it turns out, grew wider between 2000 and 2006. Table 2 also reports median earnings for each of these occupations in 2006, along with the corresponding rate of growth in the median wage between 2000 and 2006. What is by far the most striking aspect of these growth rates is how they differ between the top and bottom 15 occupations. Each of the top 15 occupations (again, based on the median wage in 2000) witnessed an increase in its median wage. On average, median wages among these 15 job categories rose by 13.4 percent.

The bottom 15 occupations experienced something very different. Only two saw their median wages rise: graders and sorters of agricultural products (the fifth lowest-paid occupation in 2000) and farm workers (the third lowest). On average, median wage growth among these 15 jobs was –1.7 percent.

Table 2: Median Earnings Per Hour—Entire United States			
	2000 Wage ($)	2006 Wage ($)	Growth 2000-06 (%)
Top 15 Occupations			
Dentists	53.77	60.47	12.5
Physicians	50.13	55.90	11.5
Chief executives and public administrators	38.23	40.31	5.4
Optometrists	37.28	37.73	1.2
Lawyers	35.91	42.22	17.6
Podiatrists	35.84	44.23	23.4
Actuaries	35.29	39.67	12.4
Pharmacists	35.09	45.69	30.2
Physicists and astronomers	33.64	41.80	24.3
Aerospace engineers	33.29	37.73	13.4
Chemical engineers	33.09	36.28	9.7
Petroleum, mining and geological engineers	33.09	37.15	12.3
Civil engineers	31.43	33.86	7.7
Computer software developers	30.33	33.86	11.6
Other engineers	30.33	32.89	8.5
Bottom 15 Occupations			
Hotel clerks	9.37	9.25	–1.3
Cooks	9.01	8.75	–2.9
Laundry workers	8.93	8.71	–2.5
Pressing machine workers	8.82	8.49	–3.8
Textile sewing machine operators	8.82	8.71	–1.3
Waiter/waitress	8.82	8.62	–2.2
Waiter's assistant	8.67	8.22	–5.1
Garage and service station related occupations	8.60	8.58	–0.3
Housekeepers, maids, butlers, stewards and lodging quarters cleaners	8.36	8.27	–1.1
Cashiers	8.29	8.04	–3.1
Graders and sorters of agricultural products	8.27	8.71	5.3
Child-care workers	8.27	8.22	–0.6
Farm workers	8.06	8.07	0.07
Kitchen workers	8.03	7.74	–3.6
Misc. food preparation workers	7.74	7.55	–2.5

Note: Hourly wages are expressed in year 2006 dollars.

Such a result is perhaps not surprising given what we have already seen. Again, in the overall inequality results, the top end of the wage distribution has clearly pulled away from the bottom. Moreover, better educated workers have seen their earnings rise substantially relative to the less educated.

One of the difficulties associated with simply looking at median earnings for broad categories of groups defined by age, education, race, occupation or any other single characteristic is that doing so still provides only limited information about the wage gaps between individuals with different characteristics.

In particular, workers differ with respect to so many characteristics that it becomes difficult to determine why different groups see their wages behave differently. For example, Asians might have seen their wages rise relative to all other groups because they tend to have more schooling than all others, not because they are Asian per se. Similarly, workers with different levels of schooling might also differ in terms of age and gender. Therefore, rising education differentials might be driven in part by basic demographics.

A common way to circumvent some of these hurdles is to estimate simultaneously the associations between hourly wages and each of these characteristics, using regression analysis. Doing so helps to compare, for instance, the wages of men and women, holding all other personal characteristics constant. To this end, suppose that we model a worker's hourly earnings as a linear function of gender, race, education and age.[7] The resulting associations appear in Table 3.

Interpreting the results is relatively straightforward. In each case, one of the groups has been omitted—for example, males, whites, high school graduates and workers 55 and older. These groups serve as reference groups against which the reported categories can be compared. So, in 2000, the coefficient –0.25 for females can be interpreted as implying that women in that year earned, on average, 25 percent less per hour than men, holding all of the other characteristics in the table constant.

With this interpretation in mind, we can see that wage gaps between workers based on race, gender and age have, for the most part, not grown wider since 2000. All but two of the seven coefficients for these groups either remained constant or decreased in magnitude between 2000 and 2006. The results only indicate rising inequality between blacks and Asians relative to whites over this period.

Why, then, do the results in Table 1 suggest a different interpretation? As suggested above, the most likely explanation is that much of the between-group inequality seen in Table 1 can be attributed to educational attainment. Therefore, Asians earn more than all other races not because they are Asian, but because they tend to complete more schooling than other groups.

The results in Table 3 do, however, indicate that there has been a significant increase in the wage gaps between workers with different levels of education. In 2000, for instance, workers without any education at the high school level earned 28 percent less than high school graduates. In 2006, they earned 32 percent less. In 2000, workers with a bachelor's degree earned 50 percent more than high school graduates. By 2006, they earned 54 percent more.

By far the most striking change is that for workers with a post-baccalaureate degree. Workers with a master's, doctoral or professional degree earned 69 percent more than high school graduates in 2000. In 2006, they earned 78 percent more. Although all workers with a bachelor's degree or more have experienced wage gains relative to individuals with less formal schooling, clearly the largest gains have come from workers with education beyond the college level. This result is similar to those reported by Goos and Manning (2007), who find that the economic return to especially high levels of education outpaced that at the college level in Great Britain.

Clearly, this rise in the earnings gap between workers who belong to different educational groups has contributed to the widening of the

Table 3: Conditional Earnings Inequality Measures — Entire United States		
	2000 Estimate	2006 Estimate
Female	–0.25 (0.0005)	–0.23 (0.001)
Black	–0.04 (0.0008)	–0.076 (0.002)
Native American	–0.11 (0.003)	–0.11 (0.007)
Asian	–0.016 (0.001)	–0.02 (0.003)
Other	–0.06 (0.002)	–0.046 (0.005)
No high school	–0.28 (0.001)	–0.32 (0.003)
Some high school	–0.15 (0.001)	–0.17 (0.002)
Some college or associate's degree	0.18 (0.0006)	0.21 (0.001)
Bachelor's degree only	0.5 (0.0007)	0.54 (0.002)
Master's, professional, doctoral degree	0.69 (0.0009)	0.78 (0.002)
18 to 34 years of age	–0.28 (0.0007)	–0.28 (0.001)
35 to 49 years of age	–0.045 (0.0006)	–0.02 (0.001)

Note: Statistics represent percentage differences in hourly earnings from the omitted reference group (males, whites, high school graduates only, individuals 50 years of age or older). Standard errors are reported in parentheses.

overall wage distribution. Most workers at the bottom end of the earnings scale have low levels of education, whereas most at the top have high levels. As the wage differential between the top and bottom of the education distribution rises, the overall wage distribution tends to widen.

RESIDUAL PATTERNS

Despite rising wage gaps between workers with different characteristics, including education, much of the rise in overall inequality during the final decades of the 20th century can be tied to rising wage dispersion among workers with similar characteristics. Indeed, a study by economists Chinui Juhn, Kevin Murphy and Brooks Pierce (1993) shows that, during the 1970s, nearly two-thirds of the rise in overall inequality can be linked to rising differences between what "observationally equivalent" workers earned (e.g., individuals of the same age, gender, race, educational level and occupation). During the 1980s, when the overall level of earnings inequality increased enormously, nearly half of the rise was associated with rising residual inequality.[8]

On the surface, we can see some of these patterns in Table 1, which reports three percentiles of the hourly earnings distribution for workers

falling into specific demographic groups. Recall, while the overall 90th percentile grew relative to the 10th percentile between 2000 and 2006, a similar pattern characterizes the percentiles applying strictly to men, women, all five racial categories, all three age groups and all but two of the educational categories. (The 90-10 differential decreased among workers with no high school and those with some high school.) Among workers 35 to 49 years of age, for instance, the 90th percentile was five times the 10th in 2000. Six years later, the 90th percentile was nearly 5.5 times the 10th percentile.

Even though the gap between workers with a master's degree and those with only a high school diploma increased between 2000 and 2006, the highest-paid workers with each educational credential gained relative to the lowest-paid workers.

Again, there is considerable overlap in the characteristics in the table and, based on such simple statistics, making inferences about the sources of rising wage dispersion is difficult. Therefore, I formally calculate residual inequality using a technique similar to what was used in the previous section.

In particular, I perform a statistical regression of hourly earnings on each of the characteristics shown in Table 1, predict each worker's earnings based on his or her characteristics and the estimated associations in Table 1, and then take the difference between this predicted wage and the worker's actual wage. This procedure yields a residual wage that reflects the remainder of a worker's earnings after accounting for his or her characteristics.

Inequality can then be calculated by taking differences between the 90th, 50th and 10th percentiles of the distribution of these residual wage earnings. To summarize the results, in 2000, the 90th percentile was roughly 1.9 times the median and 3.8 times the 10th percentile. Six years later, these factors had risen to 1.96 and 3.97. Comparing these figures with the overall inequality figures, the 90-50 ratio was 2.3 in 2000 and 2.4 in 2006 while the 90-10 ratio was 5.2 in 2000 and 5.7 in 2006.

Two implications can be drawn from these findings. First, in each year, a substantial amount of the variation in hourly earnings can be associated with inequality among workers with similar observable characteristics. Approximately 70 percent of the 90-10 difference and 80 percent of the 90-50 difference can be attributed to earnings gaps between workers of the same race, gender, age, educational group, occupation and industry of employment.

Second, a substantial fraction of the change in inequality between 2000 and 2006 can be linked to rising inequality between like-workers. In particular, 42 percent of the increase in the 90-50 differential and 50 percent of the increase in the 90-10 differential are associated with rising gaps between observationally equivalent workers. Thus, while much is often made of the rising earnings differentials between workers with different fundamental characteristics, a substantial part of the rise in inequality in the United States in recent years has been driven by widening gaps between workers with similar characteristics.

Recent Patterns in the Eighth District

This section reports some results on earnings inequality within four metropolitan areas in the Eighth Federal Reserve District: Little Rock, Louisville, Memphis and St. Louis. Wage percentiles, both overall and by demographic group, appear in tables 4-7. Estimates of conditional inequality (i.e., the association between each characteristic and wage earnings, holding all other characteristics constant) are given in tables 8-11.

Beginning with the raw wage percentiles in Tables 4-7, it is evident that the earnings distributions in all four metro areas have grown wider.

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Table 4: Little Rock Hourly Earnings Distribution						
	2000			2006		
Percentiles	**90th**	**50th**	**10th**	**90th**	**50th**	**10th**
Total	**31.86**	**14.30**	**6.61**	**34.94**	**14.51**	**6.48**
Male	35.29	15.69	7.28	47.99	15.48	7.04
Female	27.57	12.68	6.25	29.02	13.25	6.29
White	33.09	14.89	7.14	37.73	15.48	7.04
Black	25.26	11.49	5.51	25.15	12.09	6.05
Native American	22.06	11.67	7.31	25.64	10.48	6.91
Asian	35.84	16.54	7.14	30.48	10.78	5.31
Other	41.36	14.61	7.17	20.12	10.14	6.1
No high school	20.07	9.82	5.51	14.51	7.26	4.66
Some high school	20.10	10.48	4.78	18.34	8.80	4.70
High school graduate only	23.16	11.97	6.05	21.77	11.34	5.80
Some college or associate's degree	27.94	13.79	7.17	27.09	14.51	7.27
Bachelor's degree only	39.70	19.85	9.71	49.99	20.25	9.37
Master's, professional, doctoral degree	50.73	24.81	11.60	74.98	26.12	12.9
18 to 34 years of age	22.47	11.47	5.74	22.98	11.02	5.90
35 to 49 years of age	34.50	15.88	7.55	36.76	16.45	7.23
50 + years of age	37.50	16.54	7.56	49.99	16.77	7.26

Note: Figures represent earnings per hour expressed in year 2006 dollars.

Table 5: Louisville Hourly Earnings Distribution						
	2000			2006		
Percentiles	**90th**	**50th**	**10th**	**90th**	**50th**	**10th**
Total	**32.77**	**14.88**	**7.17**	**34.94**	**15.61**	**7.26**
Male	36.76	16.67	7.94	39.99	17.36	7.74
Female	27.57	13.23	6.69	30.10	14.51	6.77
White	33.09	15.38	7.46	36.76	16.12	7.55
Black	29.41	12.52	5.85	29.02	13.55	6.07
Native American	30.33	12.35	5.63	18.29	7.43	3.35
Asian	35.84	15.29	5.74	36.22	15.72	9.70
Other	28.89	14.33	5.74	26.88	11.38	5.59
No high school	23.19	10.50	4.81	19.83	10.37	6.04
Some high school	22.06	11.03	5.51	20.96	11.85	5.80
High school graduate only	25.57	12.68	6.62	24.19	12.58	6.10
Some college or associate's degree	29.87	14.89	7.72	31.44	15.96	7.74
Bachelor's degree only	40.44	20.29	9.93	49.88	20.96	10.05
Master's, professional, doctoral degree	54.14	25.03	11.93	64.24	27.73	12.58
18 to 34 years of age	24.81	12.41	6.34	26.20	12.58	5.79
35 to 49 years of age	34.41	16.32	8.02	36.76	16.93	8.22
50 + years of age	38.82	17.09	7.89	40.81	17.29	8.34

Note: Figures represent earnings per hour expressed in year 2006 dollars.

Table 6: Memphis Hourly Earnings Distribution						
	2000			2006		
Percentiles	**90th**	**50th**	**10th**	**90th**	**50th**	**10th**
Total	**32.77**	**14.88**	**7.17**	**34.94**	**15.61**	**7.26**
Male	40.10	17.65	7.94	41.92	16.37	7.22
Female	28.68	13.79	6.62	31.44	14.51	6.53
White	38.99	17.65	8.19	43.98	18.58	7.97
Black	27.08	13.17	6.18	26.61	12.21	5.80
Native American	30.59	15.44	5.29	39.07	12.01	6.72
Asian	35.84	17.78	7.17	36.28	16.40	7.04
Other	26.47	14.12	7.06	48.98	15.52	5.95
No high school	23.71	11.03	5.29	16.93	10.06	5.24
Some high school	23.30	10.59	5.13	20.81	9.95	4.55
High school graduate only	24.81	12.79	6.52	24.67	12.09	5.87
Some college or associate's degree	30.33	15.77	8.03	30.84	15.29	7.26
Bachelor's degree only	45.88	21.51	10.29	48.30	21.77	10.64
Master's, professional, doctoral degree	61.27	26.96	11.76	70.14	29.02	13.37
18 to 34 years of age	25.59	12.68	6.17	26.61	11.81	5.50
35 to 49 years of age	37.22	17.09	7.77	41.12	16.45	7.42
50 + years of age	41.79	17.98	8.28	41.31	18.38	8.05

Note: Figures represent earnings per hour expressed in year 2006 dollars.

Table 7: St. Louis Hourly Earnings Distribution						
	2000			2006		
Percentiles	**90th**	**50th**	**10th**	**90th**	**50th**	**10th**
Total	**32.77**	**14.88**	**7.17**	**34.94**	**15.61**	**7.26**
Male	40.44	19.30	8.27	43.34	19.35	7.86
Female	28.68	13.79	6.86	31.44	15.00	6.71
White	35.84	17.04	7.79	38.70	18.29	7.83
Black	28.43	13.23	6.07	27.29	13.06	5.46
Native American	25.59	13.79	7.65	19.35	11.06	5.92
Asian	44.12	16.54	7.35	45.96	18.09	7.26
Other	29.78	12.48	5.76	35.31	15.20	6.08
No high school	23.16	10.48	4.96	19.35	10.45	6.08
Some high school	24.47	11.03	5.51	23.22	11.01	5.42
High school graduate only	27.55	13.60	6.62	27.09	13.73	6.29
Some college or associate's degree	30.51	16.10	8.18	31.44	16.35	7.29
Bachelor's degree only	44.12	21.66	10.24	46.44	22.74	10.38
Master's, professional, doctoral degree	56.15	27.01	12.74	62.89	27.95	12.04
18 to 34 years of age	26.38	13.23	6.55	27.41	13.06	5.87
35 to 49 years of age	36.76	18.11	8.27	40.63	19.35	8.29
50 + years of age	41.36	18.75	8.16	43.54	19.35	8.47

Note: Figures represent earnings per hour expressed in year 2006 dollars.

Table 8: Conditional Earnings Inequality Measures — Little Rock		
	2000 Estimate	2006 Estimate
Female	–0.22 (0.01)	–0.23 (0.02)
Black	–0.11 (0.02)	–0.15 (0.03)
Native American	–0.14 (0.1)	–0.21 (0.15)
Asian	–0.02 (0.06)	–0.28 (0.09)
Other	0.002 (0.06)	–0.2 (0.11)
No high school	–0.21 (0.05)	–0.42 (0.08)
Some high school	–0.14 (0.02)	–0.23 (0.05)
Some college or associate's degree	0.15 (0.01)	0.2 (0.03)
Bachelor's degree only	0.48 (0.02)	0.54 (0.03)
Master's, professional, doctoral degree	0.66 (0.02)	0.79 (0.04)
18 to 34 years of age	–0.31 (0.02)	–0.33 (0.03)
35 to 49 years of age	–0.04 (0.01)	–0.04 (0.03)

Note: Statistics represent percentage differences in hourly earnings from the omitted reference group (males, whites, high school graduates only, individuals 50 years of age or older). Standard errors are reported in parentheses.

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The ratio of the 90th percentile to the 10th increased from 4.82 to 5.39 in Little Rock, 4.57 to 4.81 in Louisville, 4.82 to 5.36 in Memphis and 4.72 to 5.24 in St. Louis.

It is interesting to note that levels of inequality calculated for the entire United States are somewhat higher than those of each metro area in either year (5.06 in 2000, 5.71 in 2006). This result likely stems from the fact that there is considerably more heterogeneity between workers throughout the entire country than in any given metropolitan area (e.g., workers in New York City compared with workers in rural Kansas). Nevertheless, the rate of change in the 90-10 ratio was essentially the same in the United States as a whole as in Little Rock, Memphis and St. Louis. In each case, the ratio of the 90th percentile to the 10th increased by 11 percent to 12 percent. Only Louisville saw a smaller increase, 5.3 percent, in this measure of overall earnings dispersion.

As with the aggregate U.S. trends, some of the rise in overall inequality in the Eighth District can be tied to increasing differentials between workers with different levels of education.

In Little Rock, median earnings for workers with a high school degree or less fell between 2000 and

Table 9: Conditional Earnings Inequality Measures — Louisville		
	2000 Estimate	2006 Estimate
Female	–0.25 (0.008)	–0.22 (0.02)
Black	–0.06 (0.01)	–0.1 (0.02)
Native American	–0.1 (0.07)	–0.59 (0.21)
Asian	–0.15 (0.04)	–0.14 (0.06)
Other	–0.07 (0.04)	–0.1 (0.09)
No high school	–0.21 (0.03)	–0.19 (0.08)
Some high school	–0.14 (0.01)	–0.1 (0.03)
Some college or associate's degree	0.18 (0.01)	0.26 (0.02)
Bachelor's degree only	0.45 (0.01)	0.52 (0.03)
Master's, professional, doctoral degree	0.62 (0.01)	0.74 (0.03)
18 to 34 years of age	–0.28 (0.01)	–0.27 (0.02)
35 to 49 years of age	–0.06 (0.01)	–0.015 (0.02)

Note: Statistics represent percentage differences in hourly earnings from the omitted reference group (males, whites, high school graduates only, individuals 50 years of age or older). Standard errors are reported in parentheses.

2006, while they grew for workers with some post-secondary education. The experiences of Louisville, Memphis and St. Louis were mostly similar, although there are some notable differences.

In Louisville, for instance, median hourly wages declined for workers with zero to eight years of schooling and those with only a high school degree, but the declines were small. All other educational groups saw their median wages rise.

Memphis saw median wages rise only for workers belonging to the top two educational categories. Yet, those with a bachelor's degree only saw modest increases between 2000 and 2006. Their median wages increased by 1.2 percent. Workers with a professional degree, however, saw their median hourly wages rise by 7.6 percent. Therefore, in Memphis, the absolute top end of the wage distribution really took off relative to the remainder.

St. Louis witnessed only a modest drop in the median hourly earnings of workers with no education at the high school level ($10.48 to $10.45) and of high school dropouts ($11.03 to $11.01). All other education groups gained between 2000 and 2006, with the largest gains coming among college graduates rather than workers with professional degrees.

Table 10: Conditional Earnings Inequality Measures — Memphis		
	2000 Estimate	2006 Estimate
Female	–0.23 (0.009)	–0.21 (0.02)
Black	–0.13 (0.01)	–0.17 (0.02)
Native American	–0.14 (0.09)	–0.23 (0.2)
Asian	–0.125 (0.03)	–0.27 (0.06)
Other	–0.19 (0.05)	–0.27 (0.14)
No high school	–0.19 (0.03)	–0.33 (0.07)
Some high school	–0.14 (0.02)	–0.18 (0.04)
Some college or associate's degree	0.176 (0.01)	0.18 (0.02)
Bachelor's degree only	0.47 (0.01)	0.55 (0.03)
Master's, professional, doctoral degree	0.64 (0.02)	0.76 (0.03)
18 to 34 years of age	–0.3 (0.01)	–0.32 (0.02)
35 to 49 years of age	–0.05 (0.01)	–0.06 (0.02)

Note: Statistics represent percentage differences in hourly earnings from the omitted reference group (males, whites, high school graduates only, individuals 50 years of age or older). Standard errors are reported in parentheses.

Some of these features can be seen in tables 8-11, which provide estimates of the associations of each individual characteristic with hourly earnings, holding all other characteristics fixed (as in Table 3 for the United States as a whole). These estimated associations were constructed by performing the statistical analysis separately for each metropolitan area in each year.

These conditional wage associations show that the wage gap between workers with different levels of education grew substantially wider in the Eighth District. Again, however, the extent of widening was not the same across the four metro areas considered.

Little Rock, for example, saw extensive widening throughout the entire education distribution. On average, the wage premium earned by high school graduates relative to high school dropouts rose from 14 percent in 2000 to 23 percent in 2006. The premium earned by holders of a master's, doctoral or professional degree relative to high school graduates rose from 66 percent to 79 percent.

Memphis had a similar experience. Workers at the lowest end of the education scale saw their wages decline relative to the earnings of high school graduates. Workers with no high school and some high school saw their relative wages decrease by 14 and four percentage points between 2000 and

Table 11: Conditional Earnings Inequality Measures — St. Louis		
	2000 Estimate	2006 Estimate
Female	–0.29 (0.005)	–0.245 (0.01)
Black	–0.066 (0.008)	–0.16 (0.02)
Native American	–0.12 (0.05)	–0.34 (0.14)
Asian	–0.07 (0.02)	–0.13 (0.04)
Other	–0.15 (0.03)	–0.12 (0.06)
No high school	–0.26 (0.02)	–0.26 (0.05)
Some high school	–0.14 (0.01)	–0.13 (0.03)
Some college or associate's degree	0.18 (0.007)	0.17 (0.01)
Bachelor's degree only	0.45 (0.008)	0.48 (0.02)
Master's, professional, doctoral degree	0.61 (0.01)	0.66 (0.02)
18 to 34 years of age	–0.29 (0.007)	–0.29 (0.02)
35 to 49 years of age	–0.05 (0.007)	–0.01 (0.01)

Note: Statistics represent percentage differences in hourly earnings from the omitted reference group (males, whites, high school graduates only, individuals 50 years of age or older). Standard errors are reported in parentheses.

2006. Workers at the top end of the education distribution, on the other hand, saw sizable increases in their earnings relative to high school graduates. College graduates and holders of professional degrees saw increases in their relative wages of eight and 12 percentage points.

A somewhat different pattern characterizes Louisville's experience. While workers with less than a high school degree continued to earn substantially less than high school graduates in 2006, they did not see their wages decline relative to those of high school graduates between 2000 and 2006. On the contrary, the degree of inequality among workers at the low end of the education distribution actually narrowed somewhat.

At the top end of the distribution, however, there has been growing inequality in recent years. Relative to the differentials in 2000, workers with some college saw their wages rise by eight percentage points compared with high school graduates. Workers with only a bachelor's degree saw a similar increase, whereas individuals with a professional degree saw their premium relative to high school graduates expand by 12 percentage points.

The data show a different result for St. Louis. Much like Louisville, there was no widening of the wage gaps between workers at the bottom end of the education scale. Hence, while high

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Table 12: Correlates of Overall Inequality		
Variable	**Coefficient Estimate (β)**	**Standard Error**
% No high school	0.68*	0.38
% Some high school	0.15	0.36
% High school	–0.28	0.22
% Some college or associate's degree	–0.6*	0.24
% Bachelor's Degree	0.34	0.27
% Master's, doctoral, professional degree	1.16*	0.3
% White	–0.1	0.15
% Black	–0.18	0.24
% Native American	–0.67	1.35
% Asian	0.36	0.37
% Other race	–0.27	0.55
% Female	–0.32	0.39
% Married	0.35	0.26
% 18 to 34 years old	–0.18	0.24
% 35 to 49 years old	0.06	0.2
% 50 to 65 years old	0.09	0.24
% Union coverage	0.14	0.18
% Foreign born	0.53*	0.31
Unemployment Rate	0.64*	0.37
% Manufacturing	–0.43*	0.25

** denotes statistical significance (relative to a zero correlation) at 10 percent confidence or better.*

Note: Dependent variable is 90-10 wage difference. Sample includes 298 metropolitan areas over two years, 2000 and 2006. Standard errors are adjusted to account for heteroskedasticity.

Table 13: Selected Characteristics of Local Metropolitan Areas			
Metro Area	**Variable**	**2000**	**2006**
Little Rock	% No high school	0.016	0.018
	% Some high school	0.09	0.06
	% High school	0.34	0.3
	% Some college or associate's degree	0.3	0.3
	% Bachelor's	0.17	0.2
	% Master's, doctoral, professional degree	0.08	0.13
	% Foreign born	0.03	0.046
	% Union coverage	0.096	0.085
	% Manufacturing	0.13	0.1
	Unemployment rate	0.047	0.044
Louisville	% No high school	0.016	0.01
	% Some high school	0.09	0.06
	% High school	0.31	0.28
	% Some college or associate's degree	0.3	0.31
	% Bachelor's degree	0.18	0.21
	% Master's, doctoral, professional degree	0.11	0.13
	% Foreign born	0.04	0.043
	% Union coverage	0.15	0.16
	% Manufacturing	0.18	0.16
	Unemployment rate	0.04	0.052
Memphis	% No high school	0.02	0.02
	% Some high school	0.1	0.07
	% High school	0.27	0.27
	% Some college or associate's degree	0.33	0.29
	% Bachelor's degree	0.18	0.22
	% Master's, doctoral, professional degree	0.09	0.13
	% Foreign born	0.05	0.07
	% Union coverage	0.14	0.05
	% Manufacturing	0.13	0.12
	Unemployment rate	0.055	0.07

Table 13: Selected Characteristics of Local Metropolitan Areas			
St. Louis	% No high school	0.016	0.01
	% Some high school	0.08	0.05
	% High school	0.3	0.27
	% Some college or associate's degree	0.33	0.32
	% Bachelor's degree	0.18	0.22
	% Master's, doctoral, professional degree	0.1	0.13
	% Foreign born	0.04	0.047
	% Union coverage	0.19	0.15
	% Manufacturing	0.17	0.15
	Unemployment rate	0.048	0.052

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school graduates earned more than high school dropouts in both 2000 and 2006, the earnings differential was stable during this period.

Earnings inequality did increase at the top end of the education distribution, as workers with at least a bachelor's degree saw wage increases relative to high school graduates. However, these increases were small compared with those in Little Rock, Louisville and Memphis. Relative to high school graduates, holders of a bachelor's degree only saw their wages rise three percentage points (45 percent more than high school graduates in 2000, 48 percent more in 2006), whereas holders of a master's, doctoral or professional degree saw their earnings rise by five percentage points. On the whole, then, while widening gaps between individuals of different educational categories have been the norm in metropolitan areas throughout much of the country in recent years, St. Louis has seen only moderate changes in this aspect of inequality.

A Survey of Theories for Inequality

There are a number of possible explanations for the rise in earnings inequality. This section sketches some of the major ideas that economists have examined over the past two decades.

Among the most prominent is the idea that technological change has been "skill biased" since the late 1970s. That is, the nature of the American workplace has changed in a way that has emphasized the demand for highly skilled individuals while decreasing the demand for the less-skilled.

Proponents of this idea (e.g., Acemoglu, 2002), believe that the rise in the fraction of highly educated workers in the United States in recent years has made it profitable for employers to structure their workplaces around such workers. The result has been the creation of jobs that have paid the highly educated very well. At the same time, jobs tailored for the less-educated have decreased dramatically in number, leading to an erosion of what workers at the bottom end of the wage scale receive.

As evidence for this hypothesis, economists have pointed to the rise in the fraction of jobs involving the use of information technology. Between 1984 and 1997, for example, the fraction of workers using a computer at work increased from 30 percent to more than 50 percent (Wheeler, 2005). While many might

not consider computers to be a particularly difficult technology to use, a study by economists David Autor, Frank Levy and Richard Murnane (2003) has found that computers tend to provide the largest boost in productivity to the highly educated. They interpret this result as suggesting that information technology tends to be particularly well-suited to work that stresses non-routine creative tasks, which tend to be performed by workers with high levels of education.

A related second explanation for the rise in inequality posits that the changing structure of the U.S. economy has eliminated many jobs that used to fall in the middle of the wage distribution. In particular, jobs in manufacturing (e.g., automobiles, machinery, steel, chemicals) historically have employed workers with relatively little education, yet paid above-average wages. Manufacturing in 1950 accounted for roughly one-third of all non-farm jobs in the United States. As of 2002, that number had fallen to 13 percent.[9] As the manufacturing sector has declined, jobs of this sort have largely disappeared. Moreover, because many former manufacturing employees have moved on to jobs that pay lower-than-average wages, many workers have moved from the middle to the bottom of the wage scale.

International trade is often cited as a reason for this change. As the United States has increased its imports of manufactured items and shifted its own production facilities to lower-cost foreign countries, the demand for domestic workers to staff positions in U.S. factories has decreased. A recent study by economists at the New York Fed (Groshen et al., 2005), however, suggests that the impact of trade on U.S. jobs is probably quite small. Over the past two decades, job losses embodied in U.S. imports might have amounted to as much as 2.4 percent of total U.S. employment in the year 2003, when the labor market was near its most recent bottom (i.e., when the number of jobs lost would have been especially high).[10] While certainly non-negligible, this estimate does not represent a particularly large fraction of U.S. employment.

Moreover, a recent paper (Leamer, 2007) suggests that job losses in manufacturing are primarily the result of technological change, which permits more output to be produced with fewer workers. To arrive at this conclusion, Leamer compares changes in domestic demand for goods with the domestic growth of productivity and the rise of manufacturing imports in order to explain changes in U.S. manufacturing employment.

All else held constant, a rise in domestic demand should increase employment, whereas rising productivity growth and imports should both decrease it. Between 1970 and 2005, the productivity effect on durable manufacturing employment was roughly 11 times larger than the effect associated with rising imports. In the nondurables sector, the ratio was even larger: The estimated productivity effect on employment was 30 times that of the effect from trade. The loss of manufacturing jobs, which has been occurring in the United States for decades, seems to have its roots in the growth of productivity rather than in the rise of imports. Nevertheless, whatever the cause for the loss of manufacturing jobs, the impact on the wage structure has likely been to increase inequality.

Immigration is the third potential explanation for the drop in the relative earnings of workers at the bottom of the wage scale. Because immigrants (either legal or illegal) often possess less formal education than domestic workers, immigration may increase the supply of low-skill labor. Rising supply, all else held constant, tends to decrease wages among already low-wage workers. Evidence on this hypothesis, however, is mixed. While some researchers have found significant effects of immigration on low-skill wages and inequality (Borjas, 2003), others have found no effect (Card, 1990).

There are also explanations that appeal to institutional factors in the United States, namely the minimum wage and union activity. Economist David Lee (1999) estimates that, between 1979 and 1989, the value of the minimum wage relative to the median wage fell by nearly 50 percent,

suggesting that workers earning this wage saw the real value of their earnings decrease dramatically relative to the rest of the earnings scale.

Similarly, unionization tends to boost the wages of many low-skill workers and, for this reason, has been associated with overall wage compression (i.e., less inequality). Therefore, as the fraction of union workers in the United States has decreased, from nearly 30 percent in 1960 to 15 percent by 1995, one would expect that inequality would have risen as workers lose their union wage premia. Evidence that rising inequality can be linked to decreasing union membership has been found in a number of studies (e.g., Fortin and Lemieux, 1997).

Some Correlates of Metropolitan Area Inequality

In this section, I investigate the extent to which some of these theories explain wage inequality across a sample of 298 U.S. metropolitan areas over the years 2000 and 2006. I do so by calculating a summary measure of overall wage inequality given by the difference between the 90th and 10th percentiles of the hourly earnings distribution for each metropolitan area and determine how it correlates with some basic demographic and economic features of the area. More specifically, I estimate a regression of the following form:

$$y_{ct} = \mu_t + \mu_c + \beta x_{ct} + \varepsilon_{ct}$$

where y_{ct} denotes the 90-10 wage difference for metro area c in year t; μ_t is a year effect to capture differences in inequality between 2000 and 2006 across all cities; μ_c is a metropolitan-area-specific term that accounts for the fact that inequality may be fundamentally different between any two metro areas; x_{ct} is a characteristic of interest (e.g., fraction of employment in manufacturing); and ε_{ct} is a residual, designed to pick up everything that the other terms do not.

It should be noted that, because this study accounts for metropolitan-area-specific effects in inequality, the estimation of this equation is based on the analysis of changes over time in inequality within each metro area. Therefore, the results are not based on a comparison of cities with high levels of inequality with those with low levels. Instead, they follow from a comparison of cities where the change in inequality was large with those where the change was small.

Results appear in Table 12. All relationships that are statistically important (i.e., where we are reasonably confident that the relationship is not zero) are denoted by an asterisk. In general, the findings show evidence that is consistent with several of the theories discussed above.

To begin, higher fractions of individuals with low levels of education (no high school) correspond to greater overall inequality, suggesting that a larger presence of low-skill workers depresses the bottom end of the wage scale. On the other hand, a larger fraction of workers with a master's, doctoral or professional degree also tends to be associated with higher inequality. This finding may indicate that, in cities with large populations of highly educated workers, workplaces may be set up with skill-enhancing technologies that boost the earnings of these workers.

We also see that larger fractions of foreign-born workers are associated with higher levels of inequality, which may reflect the influence of an increase in the number of low-skill workers in a city. Admittedly, such a conclusion is somewhat speculative because I do not have direct evidence that rising fractions of foreign-born workers are associated with rising supplies of low-skill labor in this sample of cities.

Unemployment tends to have a direct association with inequality, suggesting that workers at the bottom end of the wage distribution are hardest hit by economic downturns. Finally, manufacturing shows a negative relationship with inequality, indicating that the decline of

manufacturing jobs may have magnified the bottom of the earnings distribution by eliminating jobs at the middle of the distribution.

Interestingly, there is no evidence that the decline of union activity is associated with rising wage dispersion. The estimated correlation between the 90-10 wage difference in a metro area and its level of union coverage (i.e., the fraction of workers whose earnings are determined through union negotiations) is not statistically significant. This result, of course, does not imply that the decline of union activity has played no role in the rise of wage inequality in the United States in the past several decades. On the contrary, numerous studies have indicated that it has. These results merely suggest that unionization has had very little influence on the most recent developments in inequality since the year 2000.

Revisiting the Eighth Federal Reserve District

This section looks at some of the characteristics of Little Rock, Louisville, Memphis and St. Louis, namely, those that show a significant association with overall inequality.

To be specific, the fractions of workers with various levels of schooling, the fraction of foreign-born workers, the unemployment rate and the fraction of total employment in manufacturing in both 2000 and 2006 appear in Table 13. Just out of interest, I have also reported the percentage of workers covered by union wage contracts.

All four metro areas have exhibited similar changes in these quantities. In all cases, the share of workers with relatively high levels of education (i.e., at least a bachelor's degree) has risen, the fraction of foreign-born workers in the population has grown and the share of manufacturing in total employment has decreased. Although the levels of these quantities are somewhat different across the four metro areas, they have all changed in a similar fashion during the 2000 to 2006 period.

One indicator that differs somewhat across these cities is the rate of unemployment. Following the United States as a whole, Louisville, Memphis and St. Louis all experienced increases in their unemployment rates from, respectively, 4 percent to 5.2 percent, 5.5 percent to 7 percent and 4.8 percent to 5.2 percent. In Little Rock, the unemployment rate actually fell somewhat, dropping from 4.7 percent in 2000 to 4.4 percent in 2006. Evidently, Little Rock was able to maintain a strong demand for labor while much of the remainder of the nation experienced a modest economic slowdown.

Do these statistics help to explain the trends in overall inequality across these metro areas? Recall, although each city saw its 90-10 earnings differential increase between 2000 and 2006, the increase was larger in Little Rock, Memphis and St. Louis than in Louisville.

Given the evolution of these four metro areas as described by the quantities in Table 13, it is straightforward to see how inequality might have risen in each one. Higher fractions of workers with post-baccalaureate degrees may have been associated with the creation of jobs that have enhanced the earnings of these types of workers. Declining manufacturing and rising shares of foreign-born workers may have further increased the degree of inequality, possibly by eliminating jobs from the middle of the pay scale and increasing the number of workers at the bottom. In at least three of the metropolitan areas, local business cycle conditions—represented by the unemployment rate—may also have caused the earnings distribution to widen.

Why then might Louisville have seen a smaller increase in its inequality? One possibility, quite simply, is that relatively low-skill workers in Louisville faced a relatively strong labor market during this period due, in large part, to the expansion of its largest employer, UPS. The evidence in Table 9, incidentally, is also consistent with this conclusion. The findings reported there indicate that workers who never completed high school actually saw their wages

rise somewhat relative to high school graduates. Although wage gains among the most highly educated continued to rise, the overall 90-10 wage gap was dampened by growth at the bottom of the earnings scale (Table 5).

Conclusions

A vast literature has documented the rise in earnings dispersion in the United States during the last two to three decades of the 20th century. Using recent data, this report shows that this rise in the degree of earnings inequality among workers throughout the United States continued between 2000 and 2006. This pattern also was present at the local level within the Federal Reserve's Eighth District, namely within the labor markets of Little Rock, Louisville, Memphis and St. Louis.

The rise in wage inequality has been driven by both increasing differentials among individuals with different observable characteristics, most notably educational attainment, as well as those with similar characteristics. Among the most striking trends in the years since the turn of the millennium has been the rise in the returns to education beyond the college level. Monetary returns to workers with a master's, doctoral or professional degree have greatly outpaced those experienced by workers with less education, including college graduates.

Based on an analysis of inequality in 298 metropolitan areas, some of the most important correlates of rising inequality between 2000 and 2006 were found to be:

- decreasing manufacturing,
- rising fractions of foreign born workers (which is possibly associated with increased numbers of low-skill workers),
- rising rates of unemployment, and
- increased fractions of workers with advanced degrees.

These findings are generally supportive of theories appealing to changes in industrial structure, rising low-skill labor supply, and skill-biased technological change as the primary culprits in widening wage dispersion.

As noted in the introduction, given that many economists believe that significant levels of inequality are undesirable, what policies could be implemented to address this trend? Evidently, since much of the rise in inequality is associated with the supply of and demand for workers with high levels of skills, inequality is probably best handled by increasing the fraction of workers with high levels of education. The former chairman of the Federal Reserve, Alan Greenspan, made a similar point in 2005 when he gave the following testimony:

> We need to reduce the relative excess of lesser-skilled workers and enhance the number of skilled workers by expediting the acquisition of skills by all students, both through formal education and on-the-job training.

Of course, while helping workers at the bottom end of the distribution acquire human capital would undoubtedly help raise the lower end of the wage distribution, increasing the total supply of highly skilled workers may exacerbate inequality, at least in the short run. If the extent of skill bias in the American workplace varies directly with the number of highly skilled workers in the economy, an increase in the number of workers with advanced degrees may create even greater bias for the highly skilled. This process would further enhance the earnings of these workers, leaving those at the low end of the education distribution behind.

Over time, however, the former Fed chairman is surely correct. As workers with high levels of schooling become the majority of the American labor force, the degree of homogeneity among workers increases. In addition, the extent to which employers are forced to bid for relatively few high-skill employees will

decrease, dampening growth at the top end of the earnings scale.

Policies aimed at influencing the skills that workers possess are probably more desirable than those attempting to affect what types of industries employ American workers (e.g., subsidizing certain sectors, strengthening trade barriers). Indeed, the decline of jobs in manufacturing represents the confluence of forces well beyond the control of government (e.g., the evolution of technology, the decline of transportation costs, the growing integration of markets around the world). Therefore, problems associated with workers who have been displaced from this sector, including falling wages, are probably most effectively addressed through programs that provide workers with job skills that the American economy now demands.

Moreover, by augmenting the human capital of all workers in the United States, we enhance the ability of individuals to make the transition from one line of work to another, with relatively modest losses in earnings. Highly educated workers are better able to work productively in many different types of jobs than those with less education. In a continually evolving and highly unpredictable economy, providing the U.S. work force with a broad set of skills is without doubt the most effective way to ensure that segments of our society are not left behind.

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Endnotes

[1] The Current Population Survey is a national survey of approximately 50,000 to 60,000 households conducted by the Bureau of Labor Statistics. It is primarily used to measure the rates of unemployment and labor force participation, but also includes some data on labor earnings.

[2] Testimony of Chairman Alan Greenspan, Federal Reserve Board's semiannual Monetary Policy Report to the Congress before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, Feb. 16, 2005.

[3] These data files are available at www.ipums.umn.edu.

[4] Income figures are topcoded in both the Census and American Community Survey. To impute wage and salary earnings for these workers, I use a value equal to 1.5 times the topcode, which is a standard procedure for estimating the mean of the upper tail of the earnings distribution.

[5] Due to the nature of the Census and American Community Survey data, this procedure occasionally produces an hourly wage figure that is implausibly low. For this reason, I restrict the sample of workers used in performing the calculations to workers whose computed hourly wage is at least $2 per hour.

[6] These data are available at the St. Louis Fed's web site: www.stlouisfed.org.

[7] Formally, the wage regression is estimated by ordinary least squares using the logarithm of hourly wages as the dependent variable. Transforming earnings into logarithms is quite common in the statistical analysis of earnings as it facilitates the estimation procedure.

[8] The term "residual" denotes whatever remains after controlling for the effects of observable characteristics on wage differentials.

[9] These figures are reported by the U.S. Bureau of Labor Statistics.

[10] This figure is based on a simple calculation of how many American jobs are represented by the U.S. trade balance in goods and services. As the authors note, it is intended to represent a worst-case scenario. In particular, the authors do not account for any jobs that international trade might have created in the United States during this same period.