The State(s) of Inequality:
Changes in Income Distribution in the U.S. States and the District of Columbia, 1976-2008

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ABSTRACT

We study the changes in the distribution of household income from 1976 to 2008 in the 50 states and the District of Columbia, using annual data from the Current Population Survey. Most jurisdictions experienced an increase in household income inequality, although there are considerable differences in the precise patterns of disequalization. Many of the jurisdictions with the largest increases in inequality were in the Northeast, while many of the jurisdictions with small increases in inequality (or even small decreases) were in the South, the Plains, and the Mountains. In most jurisdictions, we document a pattern of divergence between the top and the middle of the income distribution, but we do not find a similar degree of divergence between the middle and bottom of the distribution. Thus the increases in overall inequality in most jurisdictions were dominated by changes in the upper half of the income distribution.

Regression analysis indicates that an increase in the proportion of the population who are high-school graduates tends to be associated with a *decrease* in income inequality, while an increase in the proportion of people with education beyond a Bachelor's degree tends to be associated with an *increase* in inequality. An increase in the unemployment rate tends to be associated with an increase in inequality, as does an increase in the proportion of families headed by a single parent. An increase in the percentage of income in the jurisdiction that comes from transfer payments tends to be associated with a reduction in income inequality, as does an increase in the percentage of the jurisdiction's economy in manufacturing.

Jurisdictions that started with a higher level of inequality tended to have lower rates of inequality growth. Many of these jurisdictions had very low levels of high-school attainment at the beginning of the period, but experienced relatively rapid increases in high-school attainment over the ensuing decades.

JEL Codes: D63, R11, R12

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I. Introduction

Since the 1970s, the distribution of income has become dramatically more unequal in the United States and in many other countries. This trend has been documented in a large literature,[1] much of which has focused on income-distribution trends at the national level. Much less attention has been paid to inequality trends at the sub-national level. In this paper, we focus on the changes in the distribution of income in the 50 states and the District of Columbia, using annual household data from 1976 to 2008 from the Current Population Survey. In the United States, with its long history of federalism, a wealth of data is available for these 51 jurisdictions. Moreover, since state governments wield considerable power in the United States, a substantial amount of policy analysis is carried out at the state level. Thus information about the trends in income inequality in these 51 jurisdictions is of considerable interest to policy analysts.

We seek to answer two central questions: First, during a time when the income distribution for the entire U.S. changed considerably, what are the similarities and differences between the trends in income inequality in the different jurisdictions? Labor, capital, and information move relatively freely within the United States. On that basis, we might expect fairly similar trends in different parts of the country. However, the 50 states and D.C. exhibit

[1] For example, see Acemoglu and Autor (2011), Atkinson (1996), Autor, Katz, and Kearney (2008), Bound and Johnson (1992), Gottschalk and Smeeding (1997), Karoly (1996), Kopczuk, Saez, and Song (2010), Lemieux (2006a, 2006b), Levy and Murnane (1992), Piketty and Saez (2003), and Wolff (2009). Much of this literature is focused on widening inequality of wages and earnings. Lemieux (2008) provides a detailed summary of the literature on wage inequality. There were substantial increases in the wage differences between those with different levels of educational attainment, but within-group inequality also rose. Wage-setting institutions (such as unions, minimum-wage laws, and social norms in the setting of executive pay) also played an important role. Atkinson, Piketty, and Saez (2011) provide an excellent summary of the literature that focuses on the very top of the distribution.

substantial differences in terms of history, political institutions, educational attainment, race and ethnicity, and industrial structure, so that it would not be surprising to see important differences in the patterns of income inequality.

In fact, over this period of one-third of a century, most jurisdictions did follow the national trend toward increasing income inequality, but the variation in the degree of disequalization is quite large. In addition, some states in the South, the Plains, and the Mountains avoided the national trend toward strong disequalization. Even for researchers and policy analysts who are primarily interested in the trends at the national level, it is important to understand that the disequalization was not a uniform nationwide phenomenon. Instead, different regions of the United States experienced decidedly different patterns of change in income inequality.

We consider four measures of income inequality. These are the 90/10 Ratio (*i.e.*, the ratio of the income of the household at the 90th percentile to the income of the household at the 10th percentile), the 90/50 Ratio, the 50/10 Ratio, and the Gini Ratio. The patterns of change in inequality are broadly similar for 90/10 Ratio, the 90/50 Ratio, and the Gini Ratio, with increased inequality in most jurisdictions. However, the 50/10 Ratio actually *decreased* in most jurisdictions. Thus, in most jurisdictions, the increases in overall inequality were driven by changes in the upper half of the income distribution—the top pulled away from the middle, but the middle did not pull away from the bottom.[2]

The second key question is this: What economic and social factors contribute to an explanation of these important differences in the trends of inequality among the 51 jurisdictions? In an effort to answer this question, we regress our measures of inequality against a wide variety

[2] This is consistent with Lemieux (2008), who documents the divergent patterns of the 90/50 and 50/10 Ratios for men's wages.

of covariates, using panel-data estimation techniques. We control for jurisdiction fixed effects and a full set of year dummies, and we adjust the standard errors for clustering by jurisdiction. In many specifications, an increase in the fraction of the population with at least a high-school diploma is associated with a reduced level of inequality. Also, an increase in the fraction of a jurisdiction's income that comes from transfer payments tends to be associated with a decrease in measured inequality. In addition, we find that an increase in the fraction of a jurisdiction's economy that is in the manufacturing sector tends to be associated with a decrease in income inequality.

Although an increase in the extent of high-school completion is associated with *reduced* inequality, an increase in the fraction of the population with education beyond a Bachelor's degree is associated with *increased* inequality. We also find that increased inequality is often associated with increased rates of unemployment, and an increased fraction of families with a single parent.

When we control for jurisdiction fixed effects, the fraction of the population that is African American does not have a statistically significant effect on inequality.

We also find that jurisdictions with a higher initial level of inequality tended to have lower rates of inequality growth. For example, several northeastern states were among the most *equal* in the 1970s, but they experienced such rapidly growing inequality that they were among the most *unequal* by the end of the period of our study. Conversely, several southern states were among the most unequal jurisdictions at the beginning of the period under study, but they experienced relatively little, if any, subsequent growth in inequality. Changes in educational attainment play an important role in explaining this relationship. At the beginning of our period of study in the 1970s, the rate of high-school completion was much lower in many southern

states than in much of the rest of the country. This appears to have contributed to the high degree of inequality in the South in the 1970s. Many of those same states experienced unusually rapid increases in high-school attainment over the next several decades, and this appears to have reduced the rate of growth of inequality in those states.

We describe our data in the next section. In Section III, we describe the trends in our measures of inequality in the different regions of the country. Section IV contains the discussion of our regressions. The relationship between the initial level of inequality and the growth rate of inequality is described in Section V, and Section VI is a brief conclusion.

II. Data

We use data on incomes for every year from 1976 to 2008, from the March Current Population Survey (CPS).[3] This data set has been widely used by others (*e.g.*, Karoly (1996) Katz and Autor (1999), and Autor, Katz, and Kearney (2008)) to analyze the income distribution and wage distribution for the entire United States.

We use the household as the unit of analysis for our income measures. In future work, we will investigate the ways in which the inequality trends are affected when we adjust for differences in household size and structure. (See Blundell and Lewbel (1991) for a discussion of household equivalence scales.)

[3] The CPS is a joint effort of the Bureau of Labor Statistics and the Census Bureau. For more information on the CPS, see http://www.census.gov/cps/. We use the CPS Utilities, which are available from Unicon Research Corporation. We begin our study with the data for 1976, even though CPS data are available for earlier years. We choose 1976 as our starting point for two reasons. First, it is generally agreed that the increase in income inequality for the U.S. as a whole began in the late 1970s and early 1980s. Second, we have less confidence in the quality of the CPS data in the earliest years of the survey.

We use the standard CPS definition of income.[4] The CPS data do not include information on capital gains. Some researchers, such as Piketty and Saez (2003) have used tax data, which do include *realized* capital gains.[5] Since a disproportionate amount of capital gains is received by high-income households, some measures of inequality (such as the Gini Ratio) are likely to be understated when the CPS is used.[6] In addition, the standard CPS income definition excludes the value of Medicare, Medicaid, and other government programs that provide benefits in non-cash form. Some of these benefits are disproportionately received by low-income households. Estimates of the value of these benefits are available for most of the years of our study, and we plan to consider a variety of different income measures in future research.

While we acknowledge that economic and social conditions in different jurisdictions can induce migration from one jurisdiction to another, we do not attempt to model these flows. We merely study the income distributions in different jurisdictions and in different years, taking the resident populations in those jurisdictions as given.[7]

Using data from individual income tax returns, Piketty and Saez (2003) show that a very large portion of the income growth in the United States in recent years has accrued to the top

[4] CPS income includes wage and salary income, income from non-farm self employment, farm income, Social Security income, Supplemental Security Income, income from public assistance, interest, dividends, net rent, veterans' payments, government pensions, income from retirement funds, alimony and child support, unemployment insurance, workers' compensation, education assistance, and other income.

[5] However, note that the tax data do not include unrealized capital gains, which constitute a substantial fraction of total capital gains.

[6] Moreover, top-coding procedures have the result of understating the income received by the top one percent of the income distribution; this can have an important effect on measured Gini Ratios. See Atkinson, Piketty, and Saez (2011) and Burkhauser *et al.* (2012).

[7] Bernard and Jensen (1997) provide evidence of a lack of integration of labor markets in the short and medium run. The imperfect integration of the labor market probably contributes to interjurisdictional variation in the evolution of income inequality.

one-hundredth of one percent of households.[8] The sample sizes for the 51 jurisdictions in the CPS data set do not allow us to make precise inferences at the level of disaggregation used by Piketty and Saez.[9] If any bias is imparted by our use of the CPS, we believe it is more likely that we have understated the degree of increased inequality, rather than overstated it. In any case, most of the emphasis in this paper is on the 90/10 Ratio, and to a lesser extent the 90/50 Ratio and 50/10 Ratio. These measures are not subject to the problems that may occur for the Gini Ratio, which involves the entire distribution, including the very top.

III. Changes in Summary Measures of Income Inequality for the 50 States and the District of Columbia, 1976-2008

We calculate the 90/10 Ratio, 90/50 Ratio, 50/10 Ratio, and Gini Ratio for each jurisdiction, for every year from 1976 to 2008.

Figure 1 shows the 90/10 Ratios at the beginning of the period of our study. Because the sample sizes in any one year are fairly modest, especially in the smaller jurisdictions, we use the average of the annual 90/10 Ratios from 1976-78. These 90/10 Ratios exhibit wide variation, ranging from 6.11 in New Hampshire to 11.77 in Louisiana.[10] The top part of Figure 1 shows that many of the jurisdictions with the largest 90/10 Ratios in 1976-78 are southern states. On the other hand, most of the jurisdictions with the smallest 90/10 Ratios in 1976-78 are in the Midwest, New England, or the Mountains.

<Figure 1 about here>

[8] The data tables associated with the Piketty-Saez paper have been updated through 2011. The updated tables are available at Saez's website, at http://elsa.berkeley.edu/~saez/.

[9] Of course, no data set is immune to imperfection. As pointed out by Atkinson, Piketty, and Saez (2011), the quality of data based on tax records suffers as a result of tax evasion.

[10] The exact values of the 90/10 Ratios for the 51 jurisdictions (as well as the exact values of the 90/50, 50/10, and Gini) are in an appendix, available upon request.

The bottom part of Figure 1 shows the 90/10 Ratios for 2006-08. Between 1976-78 and 2006-08, the 90/10 Ratio increased in all 51 jurisdictions, and the 90/10 Ratio for the U.S. as a whole increased from 8.78 to 11.21. The general darkening of the map from the top part of Figure 1 to the bottom part shows that the increase in income inequality was geographically widespread. However, the trend toward greater inequality is especially pronounced in the Northeast. For example, the 90/10 Ratio in Massachusetts was 8.55 in 1976-78, but it rose to 14.55 in 2006-08. Over the same period, the 90/10 Ratio in New Jersey rose from 8.03 to 12.44.

In Figure 2, the 90/10 Ratio for 1976-78 is on the horizontal axis, and the 90/10 Ratio for 2006-08 is on the vertical axis.[11] Figure 2 shows that all jurisdictions experienced an increase in the 90/10 Ratio, and that many of the increases were very substantial.

<Figure 2 about here>

Finally, we take the log of the 90/10 Ratio for each jurisdiction for each year, and then regress the log of the 90/10 Ratio against the year, to estimate the annual percentage growth rate of the 90/10 Ratio for each of the 51 jurisdictions. The results are shown in Figure 3, which shows the geographical distribution of these annual percentage rates of growth. In four jurisdictions, the estimated trend for the 90/10 Ratio is negative, which implies declining inequality. However, these estimated rates of decrease are very small, and none is statistically significant. The highest estimated growth rate is 1.84 percent per year in the District of Columbia, followed by 1.66 percent per year in Massachusetts. The estimated rates of increase are statistically significantly positive in 35 of the 51 jurisdictions.

<Figure 3 about here>

[11] We exclude the District of Columbia from Figure 3, because the value of the 90/10 Ratio for the District in 2006-08 is 19.22, which is such an outlier that it distorts the graph substantially.

New Jersey and New York, along with five of the six New England states, are among the ten states with fastest growth in the 90/10 Ratio. Thus the northeastern states, many of which were among the most equal in the 1970s, experienced notably faster growth in the 90/10 Ratio than the rest of the country. On the other hand, southern states tended to be among the most unequal jurisdictions in the 1970s, but they have tended to disequalize at a relatively slow pace since then. We will investigate this phenomenon further, later in the paper.

Figure 3 showed the estimated annual percentage rates of change in the 90/10 Ratio. Figure 4 provides the same information for the 90/50 Ratio, and Figure 5 shows it for the 50/10 Ratio. The 90/50 Ratio increased in all 51 jurisdictions, and the increase was statistically significant in every jurisdiction except Alaska. Thus in the years studied here, our data indicate that the upper part of the income distribution was pulling away from the middle in nearly every jurisdiction. The changes in the 90/50 Ratio are similar to the changes in the 90/10 Ratio: The largest increases in the 90/50 Ratio are in the Northeast and Midwest, and the smallest increases are in the South, the Plains, and the Mountains.

<Figures 4 and 5 about here>

However, the patterns of change for the 50/10 Ratio are quite different from the patterns for the 90/10 or 90/50. Only 24 jurisdictions experienced an increase in the 50/10 Ratio, and only 13 of these increases were statistically significant. On the other hand, the 50/10 Ratio *fell* in 27 jurisdictions; 13 of these decreases were statistically significant.[12] Only in the Northeast did most jurisdictions experience a significant increase in the 50/10 Ratio. By contrast, the 50/10 Ratio is estimated to have decreased in a majority of the states in the South Census Region and the Mountain Census Division.

[12] The estimated annual percentage rates of change in the 50/10 Ratio ranged from a low of -0.56 percent per year in Idaho to highs of 1.1 percent per year in the District of Columbia and 0.72 percent per year in New York. The exact values of the estimates are available on request.

Thus while the 90/50 Ratio shows a strong nationwide trend of *increasing* income inequality in the top half of the income distribution, the 50/10 Ratio shows a trend of *decreasing* inequality in the bottom half of the income distribution in many parts of the United States.

We estimate that the Gini Ratio increased in 40 of the 51 jurisdictions, although the increases were statistically significant in only 21 jurisdictions. The Gini Ratio decreased in 11 jurisdictions (none significantly). For the Gini Ratio, as for the 90/10 Ratio, the most rapid growth tends to be in New England and the Middle Atlantic states, while the slowest growth in inequality is found in the South, the Plains, and the Mountains.

IV. Regression Analysis of the Determinants of Income Inequality

We use regression analysis to examine the relationships between our four dependent variables and a group of explanatory variables.[13] In the tables shown below, we report the results of regressions using nine explanatory variables, although we have tried a number of other variables in the course of this research. Additional results are available on request.

In each of our regressions, the dependent variable is a measure of income inequality among households. We have chosen our regressors on the basis of the theoretical and empirical literatures on the determinants of income inequality. We begin with the observation that income from the labor market accounts for the large majority of income in the aggregate, as well as the large majority of income for most households. Thus we devote special attention to explanatory variables that could affect the distribution of income through labor-market channels.

[13] We are not the first to consider sub-national trends in income inequality. For example, see Bishop, Formby, and Thistle (1992), Braun (1988), Danziger (1976), Levernier, Rickman, and Partridge (1995), Morrill (2000), and Partridge, Rickman, and Levernier (1996). These researchers use decennial Census data taken from time periods either prior to, or in some cases overlapping, the first half of the historical period covered in our study.

Inspired by the path-breaking work of Becker (1964) and Mincer (1974), economists have long emphasized the role of human capital in income determination. Thus our regressors include three measures of educational attainment. *HIGH SCHOOL*, *BACHELOR*, and *POST BACHELOR* measure the percentage of the population aged 25 and over, in a given jurisdiction in a given year, who have achieved at least a given level of education. (In the Appendix, we describe the data sources on which these and other explanatory variables are based.)

For any given level of educational attainment, workers who become unemployed are likely to suffer a decrease in income. Thus we include *UNEMPLOYMENT*, which is the jurisdiction's unemployment rate for the year, expressed in percentage points. Labor economists have also produced a large literature examining the extent to which labor unions affect the distribution of earnings.[14] Thus we include *UNION* (the percentage of the jurisdiction's work force that is a member of a labor union).[15]

America's long history of slavery and racial discrimination could be expected to affect the incomes of African Americans, both in the labor market and in other ways. Thus our explanatory variables also include *BLACK* (the proportion of each jurisdiction's population who are African American). Family structure has the potential to affect income through several channels, and we also use *SINGLE PARENT*, the percentage of the jurisdiction's families with children that have only one adult. We also control for industrial structure using

[14] For example, both Card (1992) and Freeman (1993) find that the decrease in unionization accounts for a substantial fraction of the increase in wage dispersion for American males in the 1980s.

[15] An alternative would be to use the percentage of the jurisdiction's work force that is *covered* by a union, rather than the percentage that is a *member*. However, in our data, the correlation coefficient between coverage and membership is greater than 0.99, and the regression coefficients are very robust with respect to whether we use membership or coverage.

MANUFACTURING, which is the percentage of the jurisdiction's Gross Product in the manufacturing sector.[16]

All of the variables described above are influenced, in varying degrees, by historical, institutional, and economic factors that can interact with each other in complex ways. Thus we recognize the potential for bias due to endogeneity. Unfortunately, in this context, we are doubtful about the existence of suitable instruments. Thus although we have chosen all of these explanatory variables because they have plausible interpretations in terms of their effects on income inequality, we do not want to claim too much for our results. We do not believe it is appropriate to put too much emphasis on causal interpretations. In the results that follow, we will speak of association rather than causation.

Even though we acknowledge the possibility of endogeneity, we desire to reduce the problem where possible. We are especially concerned about the possibility that endogeneity may arise because of explicit policy choices. We believe it is appropriate to attempt to control for transfer payments, but if our regressions suggest that transfer payments have the effect of reducing inequality, it could be that the transfer payments actually help reduce inequality, by bringing up the incomes of the poor, or it could be that transfer policies are more aggressive in jurisdictions with greater inequality. In an effort to deal with this potential source of endogeneity, we exclude the categories of transfer payments that are at least partly the result of policy decisions at the state and local level. *TRANSFERS* is the percentage of personal income in each jurisdiction that comes in the form of a restricted set of transfer payments. We begin

[16] We also tried some other variables relating to industrial structure. The coefficients for *SERVICES* (the percentage of the jurisdiction's Gross Product in the services sector) were marginally significant in some cases. These coefficients indicate that an increase in the fraction of a jurisdiction's economy that is in services is associated with an increase in inequality. However, the coefficients often fall well short of statistical significance. Consequently, we have chosen not to report them here. These results are available on request.

with all public transfers that are included in the CPS definition of income, including federal, state, and local transfer payments.[17] We then exclude family assistance, other income maintenance benefits, state unemployment insurance compensation, and education and training assistance (which includes state education assistance payments).[18]

During the course of this research, we have experimented with a variety of other explanatory variables. For example, we have used variables representing the age distribution of the population, the percentage of the population that is foreign born, and the percentage that is Hispanic. In many cases, the coefficients for these and other variables we have considered fall short of statistical significance. Consequently, we do not report the results for these variables, although additional results are available on request.

A. Regression Results for the 90/10 Ratio

In all of the results reported here, we use a full set of year dummies, and we adjust the standard errors for cluster sampling within the 51 jurisdictions.

[17] These data are from the U.S. Commerce Department's Bureau of Economic Analysis, at http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=4.

[18] Discussions of wage inequality and income inequality often refer to minimum-wage laws. For example, DiNardo, Fortin, and Lemieux (1996) and Lee (1999) find that the decline in the real value of the minimum wage had a very substantial effect on wage inequality in the 1980s. Some states have a minimum wage that is higher than the federal minimum. Since there is some interjurisdictional variation in the minimum wage, it would be possible to use the minimum wage as an explanatory variable. However, the minimum wage is a *direct* result of policy decisions, and it could suffer from substantial endogeneity bias. Thus, we do not include the minimum wage in the regressions reported here. When we run regressions including the minimum wage, the coefficients are often insignificant. However, when we control for jurisdiction fixed effects in regressions for the 90/10 Ratio and 50/10 Ratio, the coefficients are significantly *positive*, indicating that an increase in the minimum wage is associated with *increased* inequality. It can be argued that this result is an artifact of reverse causation, especially since it runs counter to the results of DiNardo, Fortin, and Lemieux, and Lee. In any event, the results from regressions with the minimum wage are available on request. The signs and significance levels of the coefficients for the other variables (reported below) are highly robust with respect to the inclusion of the minimum wage.

Using the 90/10 Ratio as our dependent variable, the estimating equation is:

$$90/10\ RATIO_{it} = \beta_0 + \beta_1 HIGH\ SCHOOL_{it} + \beta_2 BACHELOR_{it} + \beta_3 POST\ BACHELOR_{it} + \beta_4 UNEMPLOYMENT_{it} + \beta_5 UNION_{it} + \beta_6 BLACK_{it} + \beta_7 SINGLE\ PARENT_{it} + \beta_8 TRANSFERS_{it} + \beta_9 MANUFACTURING_{it} + year\ dummies + u_i, \quad (1)$$

where u_i is an error term. The results for the 90/10 Ratio are shown in Table 1. Later, we will discuss the results of the analogous regressions for the 90/50 Ratio, 50/10 Ratio, and Gini Ratio. For each of these four measures of inequality, we consider two specifications. In the first, we treat the data as a pooled-cross-section-time-series data set. In the second, we control for jurisdiction fixed effects. When we use the fixed-effects specification, we control for unobservable and time-invariant influences on inequality in the 51 jurisdictions.

<Table 1 about here>

We begin our discussion of the results with *HIGH SCHOOL*, *POST BACHELOR*, *UNEMPLOYMENT*, *SINGLE PARENT*, and *MANUFACTURING*, each of which produced statistically significant coefficients in both the pooled-cross-section and fixed-effects specifications. The coefficients for *HIGH SCHOOL* are highly significant and negative, indicating that an increase in the proportion of a jurisdiction's population that has completed high school is associated with a *decrease* in the 90/10 Ratio, holding other influences constant. This suggests that an increase in a jurisdiction's high-school attainment is equalizing, because it helps to raise incomes in the lower part of a jurisdiction's income distribution.

On the other hand, the coefficients for *POST BACHELOR* are significantly *positive*. Holding other influences constant, an increase in the proportion of a jurisdiction's population with educational attainment beyond a Bachelor's degree is associated with an increase in the 90/10 Ratio. We interpret this as suggesting that an increase in a jurisdiction's post-Bachelor's

educational attainment is associated with disequalization during the period under study, because the incomes of the most highly educated workers have pulled away from the incomes of the rest of the population.[19]

The coefficients for *UNEMPLOYMENT* are positive and significant in both the pooled cross section and the fixed-effects specification: Holding other influences constant, an increase in a jurisdiction's unemployment rate is associated with an increase in the 90/10 Ratio. This result is consistent with Blank and Blinder (1986), who show that recessions and periods of high unemployment tend to exacerbate income inequality.

The coefficients for *SINGLE PARENT* are significantly positive in each of the columns of Table 1. The economic challenges facing single-parent households have been well documented.[20] Thus it is perhaps not surprising that an increase in the proportion of single-parent households in a jurisdiction is associated with a larger 90/10 Ratio, holding other influences constant.

Finally, the coefficients for *MANUFACTURING* in Table 1 are negative and significant: Holding other influences constant, an increase in the fraction of a jurisdiction's economy that originates in manufacturing is associated with a lower 90/10 Ratio, *i.e.*, with a decrease in income inequality.[21]

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[19] These results fit with the results of Lemieux (2006b, 2008), who documents the substantial widening of the gap between college post-graduates and groups with less educational attainment, for men for the U.S. as a whole. These results are also consistent with Braun (1988), who finds that states with larger variation in the number of years of schooling tend to have a higher degree of inequality.

[20] For example, see Garfinkel and McLanahan (1994) and Cancian and Reed (2009).

[21] This is consistent with the results of Danziger (1976), who uses Census data for 1969, at the level of the Standard Metropolitan Statistical Area (SMSA). He shows that the Gini Ratio of family income within SMSAs varies inversely with the percentage of workers employed in manufacturing. It also agrees with research by Landauer-Menchik and Menchik (1995), on the changing income distribution in Michigan. Danziger also finds that measured income inequality tends to be larger in SMSAs in which the percentage of the population with a college degree is larger.

Next we turn to the results for the explanatory variables for which the pooled cross-section specification and the fixed-effects specification give weak or contradictory results.

Perhaps the most striking of these results are the ones that pertain to *BACHELOR*. If we exclude *POST BACHELOR* from the set of explanatory variables, *BACHELOR* has coefficients that are positive and significant.[22] In other words, if we do not include a separate variable for the fraction of each jurisdiction's population that has education *beyond* a Bachelor's degree, an increase in the fraction of a jurisdiction's population that has attained *at least* a Bachelor's degree is associated with an increase in the 90/10 Ratio. However, as seen in Table 1, when *POST BACHELOR* is included, *POST BACHELOR* is strongly significant, and *BACHELOR* sinks to insignificance.

In Table 1, the coefficients are significantly positive for *BLACK* when we treat the data as a pooled cross section. This indicates that an increase in the proportion of a jurisdiction's population who are African American is associated with a more *unequal* 90/10 Ratio. This is not a surprising result for the pooled-cross-section-time-series specification. Many of the jurisdictions that were among the most unequal throughout the period under study are jurisdictions with large African-American populations. However, these coefficients change sign and lose statistical significance when we control for jurisdiction fixed effects. During the years covered by our study, most jurisdictions had little variation in the African-American proportion of their population.[23] This lack of variation contributes to the result that when we include

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[22] The results of the regressions that exclude *POST BACHELOR* are available on request.

[23] The racial composition of many jurisdictions changed dramatically in the middle decades of the 20th century, as millions of African Americans migrated northward and westward. However, this migration had largely come to a halt by 1970.

jurisdiction fixed effects, we are unable to detect a significant effect of the African-American proportion of the population.

In the pooled cross-section regressions for the 90/10 Ratio, the coefficients on *UNION* are positive, although they do not come close to statistical significance. The coefficients for *UNION* change sign when we control for jurisdiction fixed effects, but they remain insignificant. Thus, after we control for other factors, union membership does not play a significant role in determining the 90/10 Ratio. Below, however, we shall see that *UNION* has effects that are significant in some cases, for other dependent variables.

Our intuition is that transfer payments would exert an equalizing influence, all else equal. Thus we could expect a negative coefficient for *TRANSFERS*. In the pooled-cross-section results shown in Table 1, the coefficient is indeed negative, but it falls short of significance. However, when we control for jurisdiction fixed effects, the coefficient is negative and significant. In other words, when we control for jurisdiction fixed effects, an increase in the fraction of income in a jurisdiction that comes from transfer payments is associated with a lower 90/10 Ratio. This is consistent with the findings of Wolff and Zacharias (2007) and others, regarding the distributional effects of public transfer expenditures.

B. Regression Results for Other Measures of Inequality

So far, we have discussed the regression results for the 90/10 Ratio, shown in Table 1. Here, we briefly discuss the results from the same set of regressions for the 90/50 Ratio, the 50/10 Ratio, and the Gini Ratio, shown in Table 2.

<Table 2 about here>

In many cases, the relationships that emerge for the other inequality measures are similar to those that we have seen for the 90/10 Ratio. The coefficients for *HIGH SCHOOL* are significantly negative for every one of our inequality measures, both in the pooled cross-section and in the fixed-effects specification. The coefficients for *POST BACHELOR* are positive in every case, and they are significant at the one-percent level except in the pooled-cross-section regressions for the 50/10 Ratio, where they are marginally significant. The coefficients for *BACHELOR* far well short of statistical significance in nearly every specification.

The estimated coefficients for *UNEMPLOYMENT* and *SINGLE PARENT* are positive (*i.e.*, associated with increased inequality) in every case, although they are insignificant in the 50/10 regressions. The coefficients for *MANUFACTURING* are significantly negative (associated with reduced inequality) in most cases. The coefficients for *TRANSFERS* are usually negative (associated with reduced inequality) but not always significant. They are strongest in the fixed-effects specifications for the 50/10 Ratio and the Gini Ratio.

We have seen that *UNION* did not have significant effects on the 90/10 Ratio. However, when we consider the 90/50 Ratio, the coefficients for *UNION* are *negative* (associated with reduced inequality), significantly in the pooled cross-section, and of marginal significance in the fixed-effects case. On the other hand, when we consider the 50/10 Ratio, the coefficients for *UNION* are *positive* (associated with greater inequality). They are significant in the pooled-cross-section regressions, but not in the fixed-effects regressions. These results suggest that, holding other influences constant, an increase in a jurisdiction's union membership is associated with less inequality between the top and the middle of the income distribution, but greater inequality between the middle and the bottom.

V. The Relationship between the Initial Level of Inequality and the Growth Rate of Inequality

We have seen that many of the jurisdictions in which inequality was relatively high at the beginning of the period experienced relatively slow rates of inequality growth. Here, we test whether this apparent negative relationship was statistically significant. We have already run log regressions to determine the growth rates of our measures of inequality for each of the 51 jurisdictions. For each of the four inequality measures, we then run a single regression with data for all 51 jurisdictions, in which the growth rate of the inequality measure is the dependent variable, and the initial level of the inequality measure is the independent variable.[24]

The results are shown in Table 3. The estimated coefficients are indeed negative for all four inequality measures, although the effect is not statistically significant for the Gini Ratio. For the 90/10 Ratio, the estimated coefficient indicates that a jurisdiction with a beginning 90/10 that is 1.0 *higher* would have an annual 90/10 growth rate that is *lower* by about 0.15 percent per year, and the *p*-value for this result is 0.026.

<Table 3 about here>

In Figure 6, we show the data points on which the regression result for the 90/10 Ratio in Table 3 is based, as well as the regression line. The negative relationship is striking.

<Figure 6 about here>

In some of the jurisdictions that started out with a relatively low degree of inequality, the subsequent growth rate of inequality was very rapid. As a result, some of these jurisdictions leapfrogged to a higher level of inequality than the jurisdictions with an initially high degree of inequality. For example, Connecticut had the 36th-highest 90/10 Ratio in 1976-78, but the ninth-highest in 2006-08. Massachusetts went from 25th to second, New Jersey from 40th to seventh,

[24] As before, we use the average of each inequality measure from 1976 to 1978 for our initial level.

and Rhode Island from 35th to tenth. On the other hand, several jurisdictions leapfrogged in the opposite direction: South Carolina went from having the 12th-highest 90/10 Ratio in 1976-78 to having the 39th-highest in 2006-08, South Dakota went from 17th to 41st, and Iowa went from 23rd to 49th. The coefficient of variation of the 90/10 Ratios in the 51 jurisdictions was actually *higher* at the end of the period than at the beginning. There was some gap narrowing, but there was also a considerable amount of gap widening and re-ranking. Thus we would not characterize this as a process of convergence or mean reversion.

The results of our regression analysis, reported above, suggest some possible explanations for these changes. One of our strongest results is that the regression coefficients for *HIGH SCHOOL* are consistently negative—an increase in the proportion of a jurisdiction's population that has completed high school is associated with reduced inequality. At the beginning of the period of our study, in the 1970s, many of the most unequal states were in the South. In 1976-78, Alabama, Arkansas, Georgia, Louisiana, Mississippi, and Tennessee were among the nine jurisdictions with the highest 90/10 Ratios, and all of these were also among the bottom ten jurisdictions in terms of high-school attainment. In view of our regression results, the low levels of high-school attainment in the South in the 1970s are very much consistent with the high levels of income inequality in the South at that time.

However, during the 33 years covered by our study, the southern states increased their degree of high-school attainment more rapidly than the rest of the country. Using log regressions, we estimated the annual growth rate of high-school completion in each of the 51 jurisdictions. The eight jurisdictions with the most rapid rates of increase of high-school attainment, and 10 of the top 12, are in the South Census Division. These include all of the states listed a few paragraphs earlier. The annual rate of growth of high-school attainment in Alabama,

Arkansas, Mississippi, and Tennessee was more than twice as rapid as in a dozen states outside the South.

In view of our regression results for the effect of high-school attainment, the relatively rapid increase in high-school attainment in the South is consistent with the relatively slow increases in inequality in the South during the period of our study.

At the other end of the educational spectrum, some of the northeastern states that experienced very rapid increases in inequality also had relatively rapid increases in the proportion of the population with education beyond college. We calculated the rate of growth of *POST BACHELOR*, in the same way that we calculated the growth rate of *HIGH SCHOOL*. New Jersey and Massachusetts ranked sixth and seventh in this regard.

We have already calculated the growth rates of our inequality variables. Using similar procedures, we calculated the growth rate of high-school attainment and post-bachelor's attainment. We then regressed the growth rates of inequality against the growth rates of our educational-attainment variables. The regression results support the idea that a higher rate of growth of high-school attainment is associated with a slower rate of inequality growth, while faster growth of post-bachelor's attainment is associated with more rapid inequality growth.

VI. Conclusion

In this paper, we study the changes in the distribution of income from 1976 to 2008, using annual data from the Current Population Survey for the 50 states and the District of Columbia. During this period, the United States as a whole experienced a large increase in income inequality. Most jurisdictions also experienced rising inequality, although there are considerable differences in the precise patterns of disequalization. A handful of states in the South, the Plains, and the

Mountains experienced insignificantly small increases (or even small decreases) in inequality. The most rapid increases in inequality were in the Northeast.

In most jurisdictions, the increases in overall inequality were dominated by changes in the upper half of the income distribution. If we focus only on the lower half of the income distribution, as measured by the ratio of income at the 50th percentile to income at the 10th percentile, there is no general evidence of disequalization: While the top income recipients moved away from those in the middle throughout the United States, the 50/10 Ratio actually decreased in more than half of the jurisdictions.

Our regression analysis reveals that, for most of our measures of income inequality, an increase in a jurisdiction's rate of high-school completion is associated with a *decrease* in income inequality, while an increase in the rate of post-college educational attainment is associated with an *increase* in inequality. We also find that an increase in the unemployment rate is associated with increased inequality, as is an increase in the fraction of families that are headed by a single parent. An increase in the fraction of the income in a jurisdiction that comes in the form of transfer payments is associated with reduced income inequality, as is an increase in the portion of the jurisdiction's economy that originates in manufacturing.

The fraction of a jurisdiction's work force that is a union member does not have a statistically significant effect on the 90/10 Ratio. However, an increase in the rate of union membership is associated with a *reduction* in the 90/50 Ratio, and an *increase* in the 50/10 Ratio. When we control for jurisdiction fixed effects, the fraction of a jurisdiction's population that is African American does not have a significant effect on our measures of inequality.

Jurisdictions that started with a higher level of inequality in the 1970s tended to have lower rates of inequality growth. This can be explained partly in terms of interjurisdictional

differences in educational attainment. Our regressions indicate that an increase in a jurisdiction's high-school attainment is associated with reduced inequality. Many of the states that were most unequal at the beginning of the period under study, in the 1970s, are southern states that also had the lowest rates of high-school attainment. However, during the next third of a century, the rates of high-school attainment increased relatively rapidly in these states, and this appears to have reduced the rate of increase in income inequality in these jurisdictions. Meanwhile, some states that had relatively low levels of inequality in the 1970s had rapid growth in post-college attainment, and this appears to have contributed to their relatively rapid rise in income inequality.

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Table 1
Regression Results for the Ninety-Ten Ratio,
For the 50 States and the District of Columbia, 1976-2008[a]

Independent Variable	**Pooled Cross Section**	**Jurisdiction Fixed Effects**
HIGH SCHOOL	-0.15016*** (-8.23)	-0.06945*** (-3.75)
BACHELOR	0.02913 (0.74)	0.00127 (0.05)
POST BACHELOR	0.19497*** (2.95)	0.28281*** (5.78)
UNEMPLOYMENT	0.10486** (2.23)	0.08708*** (4.39)
UNION	0.01279 (0.78)	-0.01088 (-0.60)
BLACK	0.02492** (2.15)	-0.09690 (-1.41)
SINGLE PARENT	0.03764* (1.92)	0.02520** (2.19)
TRANSFERS	-0.02519 (-0.34)	-0.17586** (-2.37)
MANUFACTURING	-0.02834** (-2.32)	-0.05070*** (-3.00)
CONSTANT	16.17493*** (10.81)	14.53356*** (8.21)
No. of Observations	1683	1683
Prob. > F	0.0000	0.0000
R-Squared	0.6260	0.4285

[a]Robust *t*-statistics are in parentheses.
Significance levels are indicated as: * = 10%; ** = 5%; *** = 1%.

Table 2
Regression Results for the Ninety-Fifty Ratio, Fifty-Ten Ratio, and Gini Ratio
For the 50 States and the District of Columbia, 1976-2008[a]

Independent Variable	**90/50 Ratio, Pooled**	**90/50 Ratio, Fixed Effects**		**50/10 Ratio, Pooled**	**50/10 Ratio, Fixed Effects**		**Gini Ratio, Pooled**	**Gini Ratio, Fixed Effects**
HIGH SCHOOL	-0.01511***	-0.00715***		-0.03724***	-0.01635***		-0.00228***	-0.00135***
	(-5.72)	(-3.16)		(-7.54)	(-3.26)		(-6.68)	(-4.76)
BACHELOR	0.00030	-0.00233		0.01555	0.00362		0.00031	-0.00026
	(0.07)	(-0.68)		(1.42)	(0.46)		(0.59)	(-0.61)
POST BACHELOR	0.02212***	0.02667***		0.02620*	0.06081***		0.00231***	0.00426***
	(3.74)	(5.83)		(1.70)	(4.69)		(3.19)	(7.10)
UNEMPLOYMENT	0.02205***	0.01539***		0.00749	0.00923		0.00212***	0.00183***
	(3.94)	(3.74)		(0.55)	(1.15)		(2.80)	(4.61)
UNION	-0.00404*	-0.00453		0.01160***	0.00393		-0.00028	-0.00048
	(-1.98)	(-1.53)		(2.94)	(0.73)		(-0.94)	(-1.32)
BLACK	0.00247*	-0.00082		0.00543	-0.01996		0.00022	0.00001
	(1.79)	(-0.20)		(1.61)	(-1.08)		(1.42)	(0.02)
SINGLE PARENT	0.00837***	0.00595***		0.00120	0.00133		0.00070**	0.00049***
	(4.00)	(3.99)		(0.21)	(0.38)		(2.34)	(3.02)
TRANSFERS	0.00973	-0.01071		-0.02579	-0.05373*		0.00058	-0.00166
	(0.93)	(-0.70)		(-1.30)	(-1.87)		(0.42)	(-1.24)
MANUFACTURING	-0.00552***	-0.00456*		-0.00196	-0.01302**		-0.00060***	-0.00095***
	(-3.99)	(-1.90)		(-0.56)	(-2.57)		(-3.03)	(-3.30)
CONSTANT	2.94861***	2.69842***		5.81871***	5.32961***		0.51183***	0.48660***
	(13.04)	(12.58)		(14.27)	(10.44)		(19.39)	(19.88)
No. of Observations	1683	1683		1683	1683		1683	1683
Prob. > F	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000
R-Squared	0.6837	0.5893		0.3811	0.1503		0.7554	0.7707

[a]Robust *t*-statistics are in parentheses.
Significance levels are indicated as: * = 10%; ** = 5%; *** = 1%.

Table 3
Regression Results for the Relationship Between the Initial Level of Inequality and the Rate of Growth of Inequality, for the 50 States and the District of Columbia, 1976-2008

	Coefficient	***p*-value**	***t*-statistic**
Ninety/Ten Ratio	-0.0015	0.026	-2.30
Ninety/Fifty Ratio	-0.0030	0.086	-1.75
Fifty/Ten Ratio	-0.0060	0.000	-4.12
Gini Ratio	-0.0152	0.329	-0.99

Figure 1

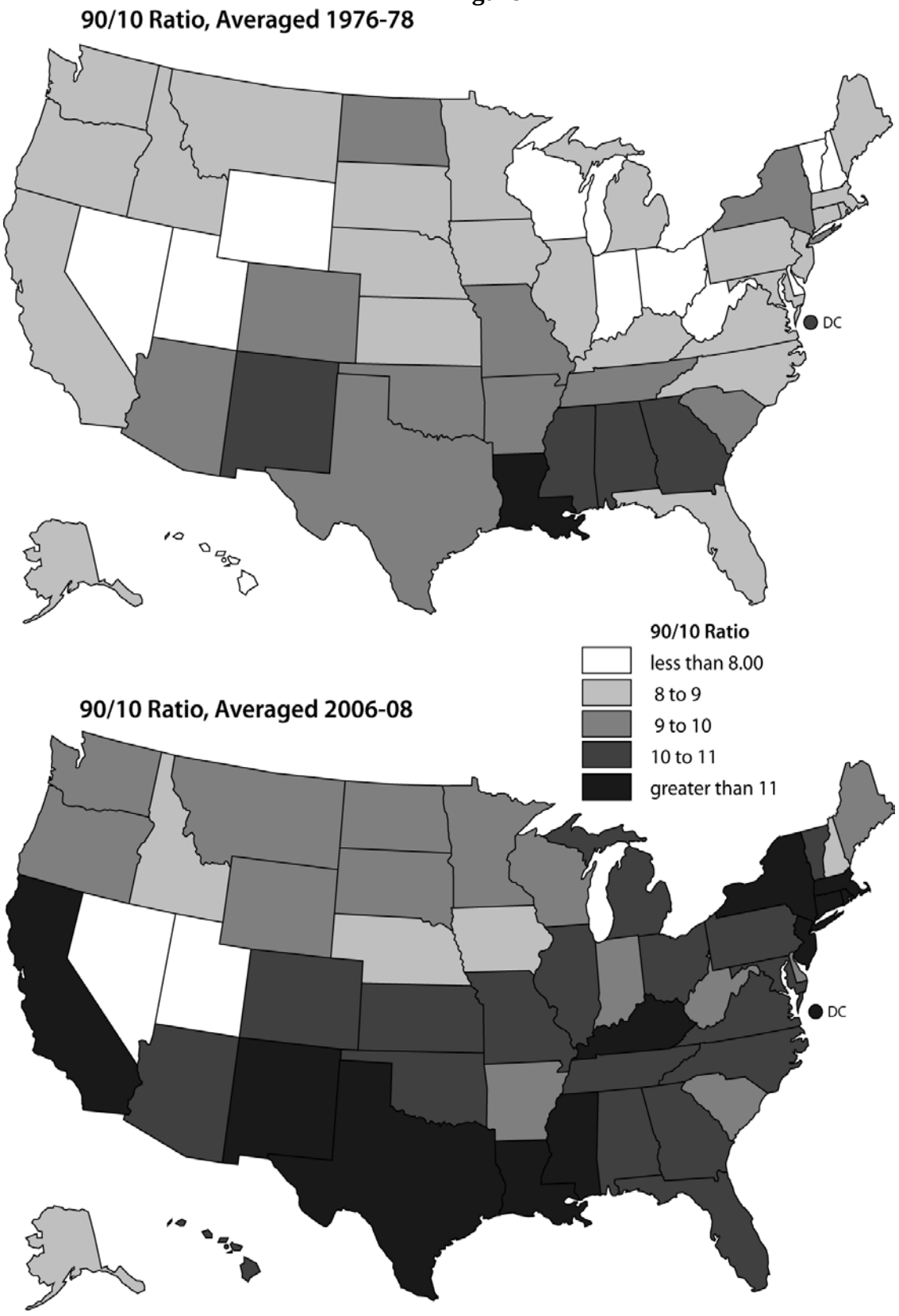

90/10 Ratio, Averaged 1976-78
DC
90/10 Ratio
less than 8.00
8 to 9
9 to 10
10 to 11
greater than 11
90/10 Ratio, Averaged 2006-08
DC

Figure 2
Comparison of the 90/10 Ratio in 1976-1978 with the 90/10 Ratio in 2006-2008, for the 50 States

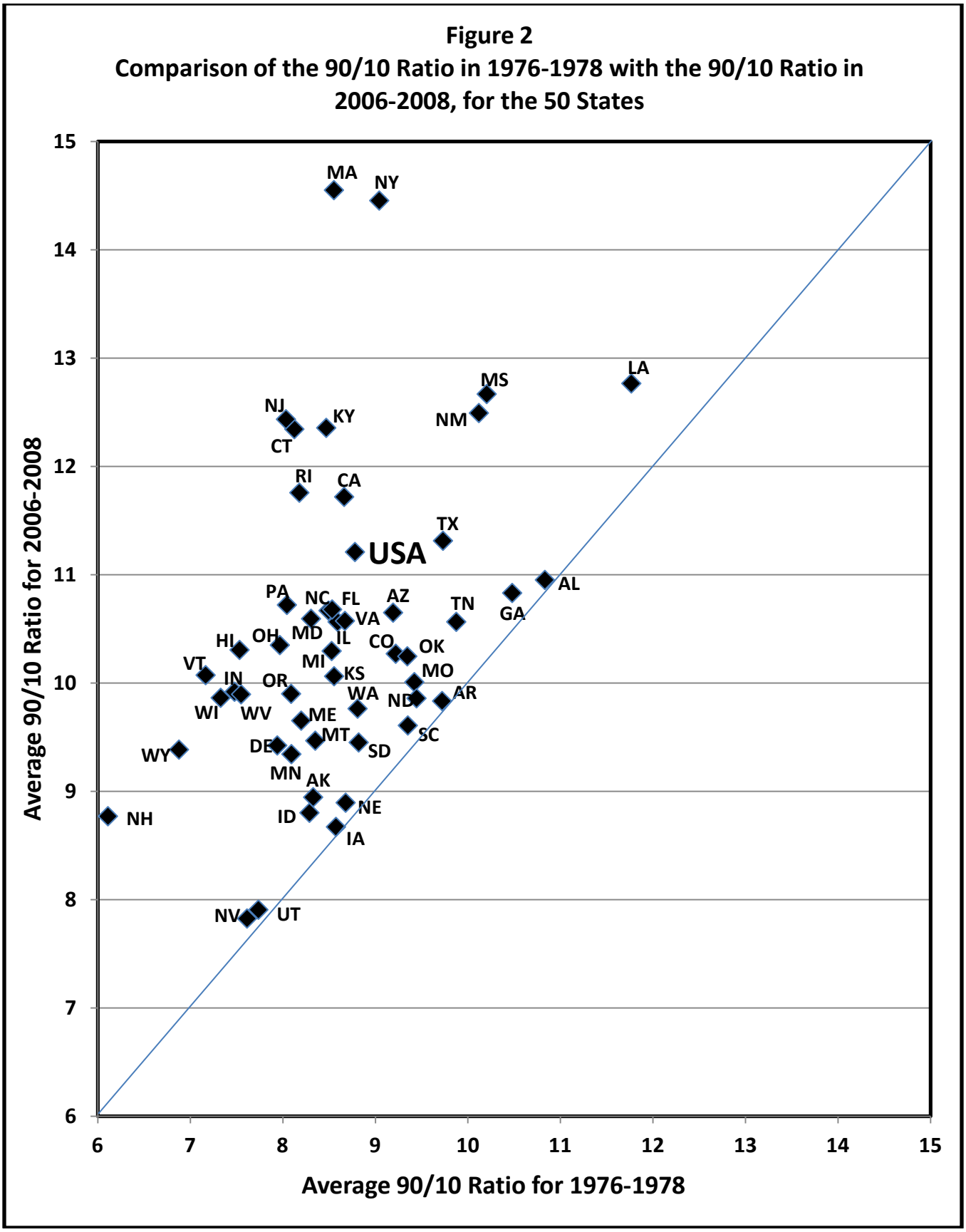


Figure 3
Estimated Annual Percentage Growth Rate of 90/10 Ratio, 1976-2008

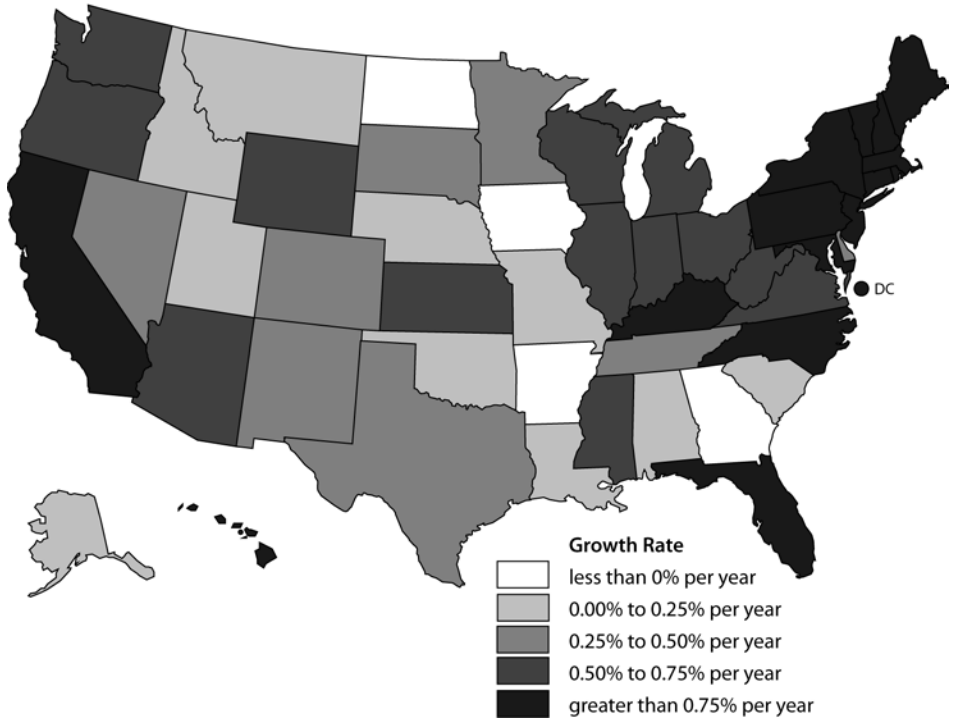


Figure 4
Estimated Annual Percentage Growth Rate of 90/50 Ratio, 1976-2008

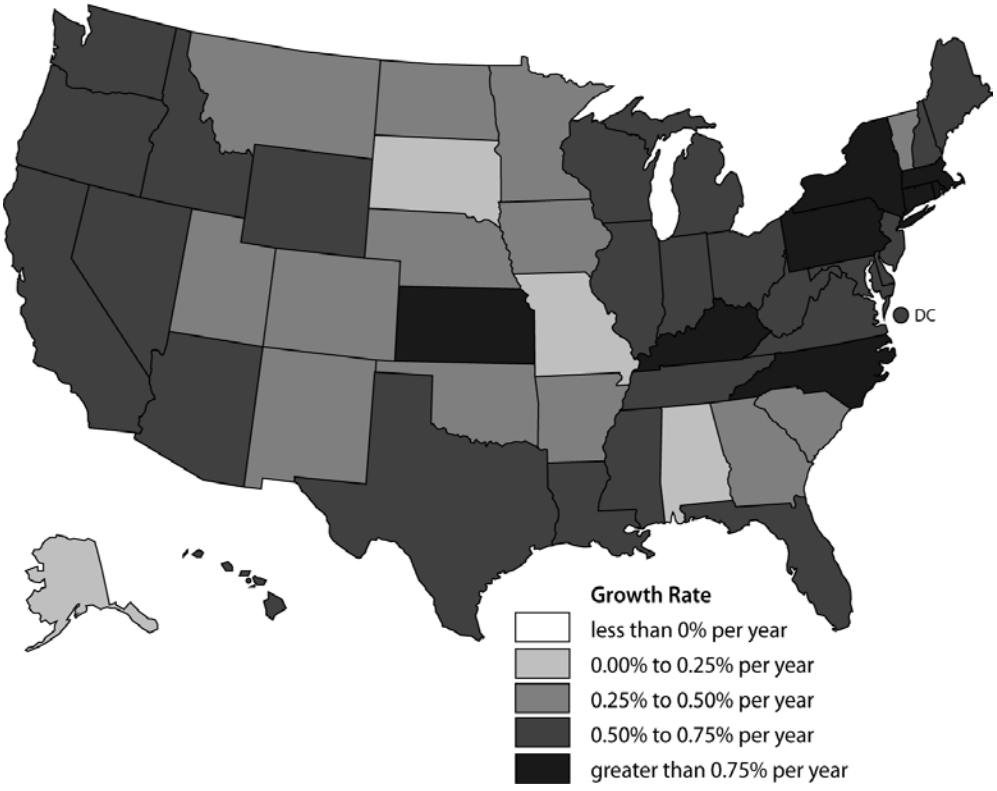


Figure 5

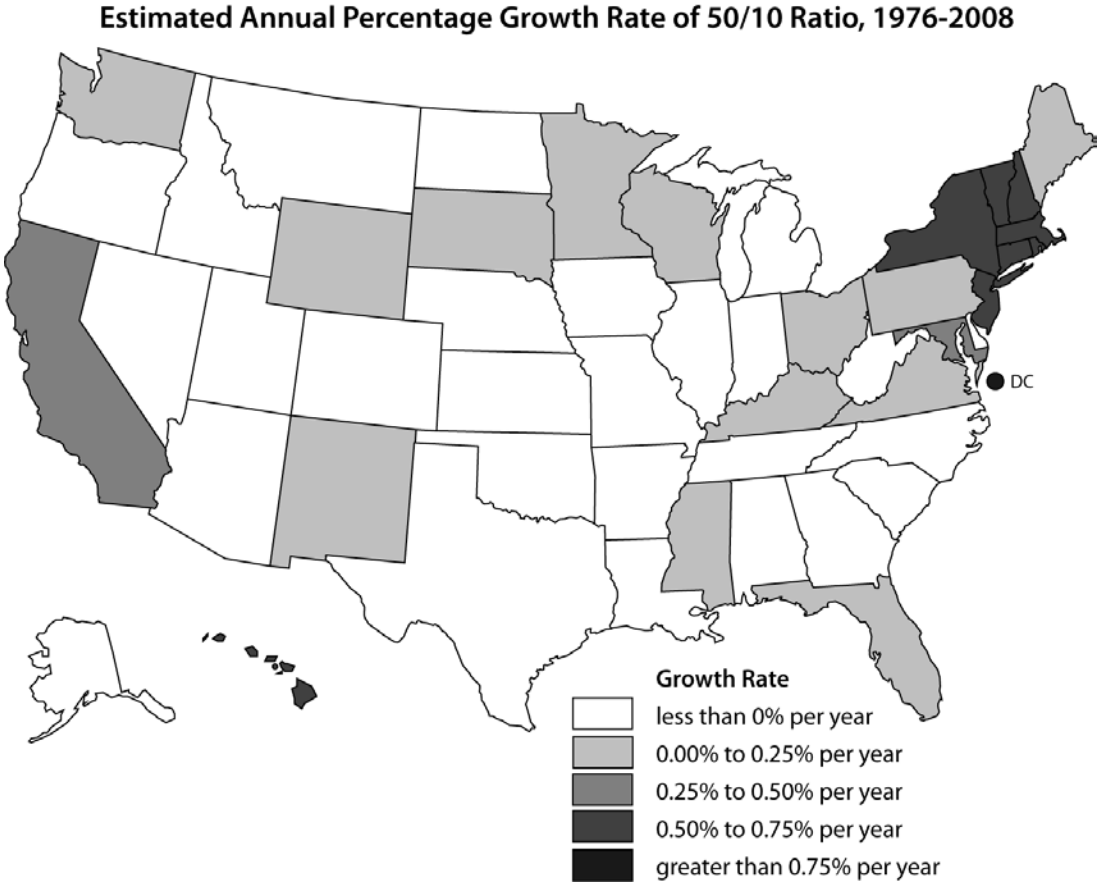
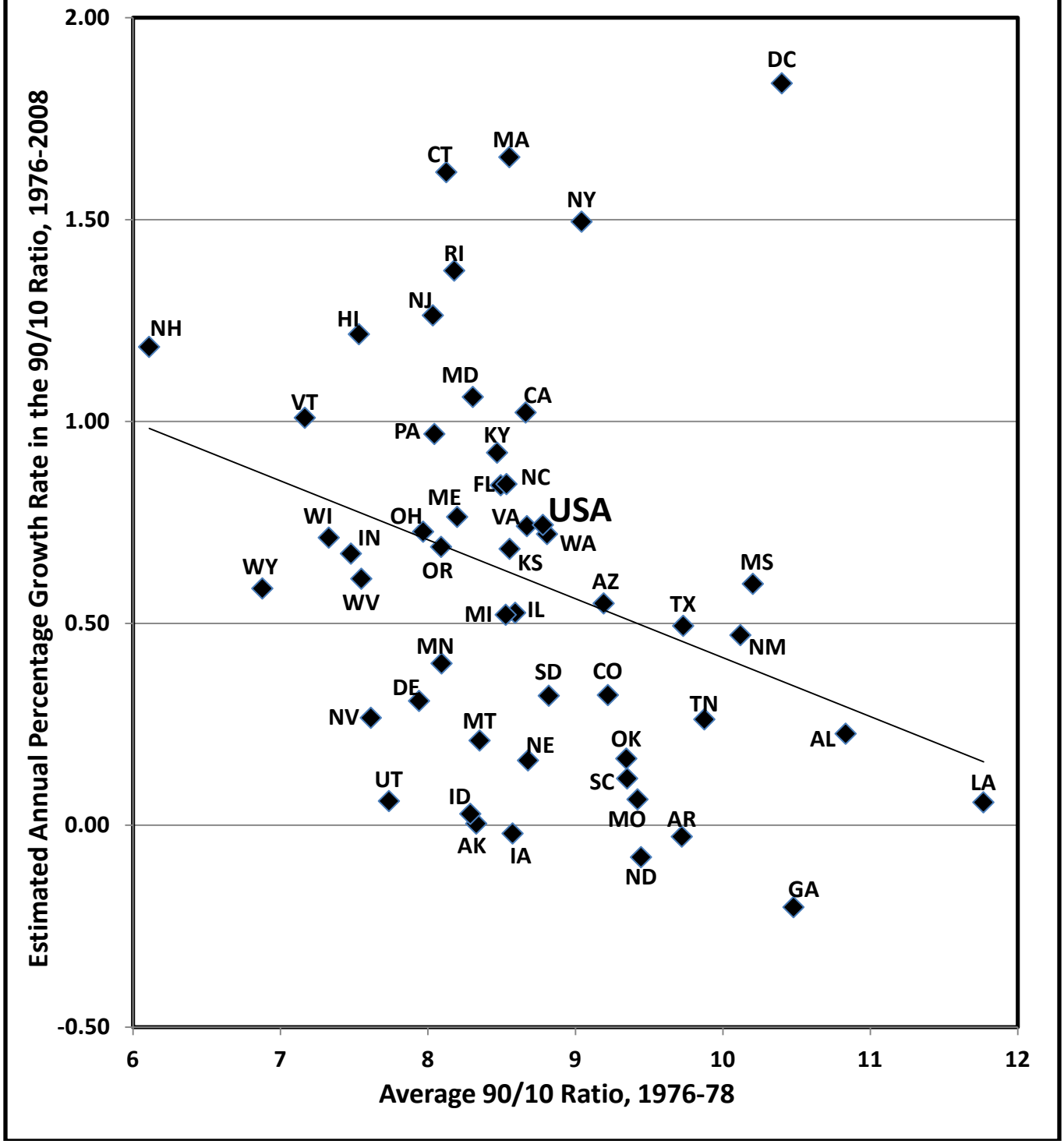

Estimated Annual Percentage Growth Rate of 50/10 Ratio, 1976-2008
DC
Growth Rate
less than 0% per year
0.00% to 0.25% per year
0.25% to 0.50% per year
0.50% to 0.75% per year
greater than 0.75% per year

Figure 6
Relationship of the Annual Percentage Growth Rate in the 90/10 Ratio for 1976-2008 to the Average 90/10 Ratio 1976-78, for the 50 States and the District of Columbia



APPENDIX
Descriptions of Explanatory Variables Used in Regressions

BACHELOR: Percentage of the population aged 25 or older in each jurisdiction with at least a Bachelor's degree, measured in percentage points. Source: Current Population Survey (CPS).

BLACK: Percentage of the population in each jurisdiction that is black, measured in percentage points. Source: U.S. Bureau of the Census, http://www.census.gov/popest/archives/index.html.

HIGH SCHOOL: Percentage of the population aged 25 or older in each jurisdiction that has at least completed high school, measured in percentage points. Source: CPS.

MANUFACTURING: Percentage of Gross Product in the manufacturing sector in each jurisdiction, measured in percentage points. Source: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/regional/gsp/.

POST BACHELOR: Percentage of the population aged 25 or older in each jurisdiction with educational attainment beyond a Bachelor's degree, measured in percentage points. For years beginning in 1992, this corresponds to a Master's, Professional, or Doctoral degree. For years before 1992, this corresponds to 18 or more years of education. Source: CPS.

SINGLE PARENT: In each jurisdiction, percentage of families with at least one child that have only one adult, measured in percentage points. Source: CPS.

TRANSFERS: Percentage of personal income in each jurisdiction that comes in the form of selected transfer payments. The categories include retirement and disability insurance benefits, Supplemental Security Income benefits, veterans' benefits, and other transfer receipts of individuals from governments. Source: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1&isuri=1&acrdn=4.

UNEMPLOYMENT: Annual unemployment rate in each jurisdiction, measured in percentage points. Source: U.S. Department of Labor, Bureau of Labor Statistics, http://data.bls.gov/cgi-bin/surveymost?la.

UNION: Percentage of each jurisdiction's nonagricultural wage and salary employees who are members of a union. For a detailed description of the data, refer to Barry T. Hirsch and David A. Macpherson, "Union Membership and Coverage Database from the Current Population Survey: Note," *Industrial and Labor Relations Review* 56 (2), January 2003: 349-54. The data are in http://www.unionstats.com/.

Appendix Table A.1(a)
The Ninety/Ten Ratio, Averaged from 1976-1978,
For the 50 States and the District of Columbia

Rank	Jurisdiction	90/10 Ratio 1976-78	Rank	Jurisdiction	90/10 Ratio 1976-78
1	Louisiana	11.77	26	North Carolina	8.53
2	Alabama	10.83	27	Michigan	8.53
3	Georgia	10.48	28	Florida	8.49
4	Dist. of Columbia	10.40	29	Kentucky	8.47
5	Mississippi	10.20	30	Montana	8.35
6	New Mexico	10.12	31	Alaska	8.33
7	Tennessee	9.87	32	Maryland	8.31
8	Texas	9.73	33	Idaho	8.29
9	Arkansas	9.72	34	Maine	8.20
10	North Dakota	9.45	35	Rhode Island	8.18
11	Missouri	9.42	36	Connecticut	8.13
12	South Carolina	9.35	37	Minnesota	8.09
13	Oklahoma	9.35	38	Oregon	8.09
14	Colorado	9.22	39	Pennsylvania	8.04
15	Arizona	9.19	40	New Jersey	8.03
16	New York	9.04	41	Ohio	7.97
17	South Dakota	8.82	42	Delaware	7.94
18	Washington	8.81	43	Utah	7.74
	U.S. Average	**8.78**	44	Nevada	7.61
19	Nebraska	8.68	45	West Virginia	7.55
20	Virginia	8.67	46	Hawaii	7.53
21	California	8.66	47	Indiana	7.48
22	Illinois	8.59	48	Wisconsin	7.33
23	Iowa	8.57	49	Vermont	7.17
24	Kansas	8.55	50	Wyoming	6.88
25	Massachusetts	8.55	51	New Hampshire	6.11

Appendix Table A.1(b)
The Ninety/Ten Ratio, Averaged from 2006-2008,
For the 50 States and the District of Columbia

Rank	Jurisdiction	90/10 Ratio 2006-08	Rank	Jurisdiction	90/10 Ratio 2006-08
1	Dist. of Columbia	19.22	26	Colorado	10.27
2	Massachusetts	14.55	27	Oklahoma	10.25
3	New York	14.46	28	Vermont	10.07
4	Louisiana	12.77	29	Kansas	10.06
5	Mississippi	12.67	30	Missouri	10.01
6	New Mexico	12.49	31	Indiana	9.92
7	New Jersey	12.44	32	Oregon	9.90
8	Kentucky	12.36	33	West Virginia	9.90
9	Connecticut	12.34	34	Wisconsin	9.86
10	Rhode Island	11.76	35	North Dakota	9.86
11	California	11.72	36	Arkansas	9.83
12	Texas	11.31	37	Washington	9.76
	U.S. Average	**11.21**	38	Maine	9.65
13	Alabama	10.95	39	South Carolina	9.61
14	Georgia	10.83	40	Montana	9.47
15	Pennsylvania	10.72	41	South Dakota	9.45
16	North Carolina	10.68	42	Delaware	9.42
17	Florida	10.67	43	Wyoming	9.39
18	Arizona	10.65	44	Minnesota	9.34
19	Maryland	10.59	45	Alaska	8.95
20	Virginia	10.57	46	Nebraska	8.90
21	Illinois	10.57	47	Idaho	8.80
22	Tennessee	10.57	48	New Hampshire	8.77
23	Ohio	10.35	49	Iowa	8.67
24	Hawaii	10.31	50	Utah	7.91
25	Michigan	10.30	51	Nevada	7.83

Appendix Table A.1(c)
Estimated Annual Percentage Rate of Growth of the Ninety-Ten Ratio from 1976 to 2008, For the 50 States and the District of Columbia

Rank	Jurisdiction	Annual Growth Rate	Significance[a]	Rank	Jurisdiction	Annual Growth Rate	Significance
1	Dist. of Columbia	1.838	***	26	Wyoming	0.587	***
2	Massachusetts	1.655	***	27	Arizona	0.550	***
3	Connecticut	1.618	***	28	Illinois	0.526	***
4	New York	1.495	***	29	Michigan	0.521	***
5	Rhode Island	1.374	***	30	Texas	0.494	***
6	New Jersey	1.263	***	31	New Mexico	0.471	***
7	Hawaii	1.216	***	32	Minnesota	0.401	***
8	New Hampshire	1.185	***	33	Colorado	0.323	
9	Maryland	1.061	***	34	South Dakota	0.321	
10	California	1.022	***	35	Delaware	0.308	*
11	Vermont	1.009	***	36	Nevada	0.266	*
12	Pennsylvania	0.969	***	37	Tennessee	0.262	*
13	Kentucky	0.923	***	38	Alabama	0.227	
14	North Carolina	0.845	***	39	Montana	0.210	
15	Florida	0.842	***	40	Oklahoma	0.165	
16	Maine	0.764	***	41	Nebraska	0.161	
	U.S. Average	**0.744**	***	42	South Carolina	0.116	
17	Virginia	0.741	***	43	Missouri	0.064	
18	Ohio	0.727	***	44	Utah	0.060	
19	Washington	0.721	***	45	Louisiana	0.057	
20	Wisconsin	0.712	***	46	Idaho	0.028	
21	Oregon	0.690	***	47	Alaska	0.004	
22	Kansas	0.685	***	48	Iowa	-0.020	
23	Indiana	0.673	***	49	Arkansas	-0.028	
24	West Virginia	0.611	***	50	North Dakota	-0.079	
25	Mississippi	0.598	***	51	Georgia	-0.203	

[a] Significance levels are indicated as: *=10%, **=5%, ***=1%.

Appendix Table A.2(a)
The Ninety/Fifty Ratio, Averaged from 1976-1978,
For the 50 States and the District of Columbia

Rank	Jurisdiction	90/50 Ratio 1976-78	Rank	Jurisdiction	90/50 Ratio 1976-78
1	Dist. of Columbia	2.857	26	Washington	2.209
2	Arkansas	2.549	27	Iowa	2.198
3	Mississippi	2.533	28	West Virginia	2.196
4	Louisiana	2.500	29	Rhode Island	2.190
5	Florida	2.420	30	New Jersey	2.186
6	Alabama	2.398	31	North Carolina	2.185
7	Missouri	2.395	32	Kansas	2.179
8	New Mexico	2.362	33	Kentucky	2.179
9	North Dakota	2.361	34	Oregon	2.176
10	California	2.345	35	Minnesota	2.157
11	Virginia	2.342	36	Illinois	2.156
12	New York	2.342	37	Utah	2.155
13	Texas	2.334	38	Connecticut	2.137
14	Oklahoma	2.329	39	Maryland	2.129
15	Georgia	2.316	40	Indiana	2.129
16	Tennessee	2.300	41	Ohio	2.114
17	South Dakota	2.299	42	Idaho	2.113
18	Vermont	2.295	43	Massachusetts	2.102
19	South Carolina	2.281	44	Pennsylvania	2.100
20	Arizona	2.279	45	Michigan	2.085
21	Maine	2.275	46	Hawaii	2.069
22	Nebraska	2.264	47	Delaware	2.035
23	Montana	2.250	48	New Hampshire	2.035
	U.S. Average	**2.248**	49	Nevada	2.026
24	Colorado	2.245	50	Wisconsin	1.987
25	Alaska	2.232	51	Wyoming	1.960

Appendix Table A.2(b)
The Ninety/Fifty Ratio, Averaged from 2006-2008,
For the 50 States and the District of Columbia

Rank	Jurisdiction	90/50 Ratio 2006-08	Rank	Jurisdiction	90/50 Ratio 2006-08
1	Dist. of Columbia	3.381	26	West Virginia	2.611
2	Louisiana	3.141	27	Delaware	2.608
3	Mississippi	3.114	28	South Carolina	2.598
4	New York	2.962	29	Maine	2.587
5	New Mexico	2.953	30	Colorado	2.586
6	Texas	2.899	31	Ohio	2.577
7	Massachusetts	2.866	32	Oregon	2.576
8	North Carolina	2.864	33	Indiana	2.569
9	Kentucky	2.846	34	Vermont	2.545
10	Florida	2.845	35	Nebraska	2.532
11	Tennessee	2.819	36	Maryland	2.531
12	California	2.816	37	Idaho	2.527
13	Alabama	2.813	38	Michigan	2.523
14	Connecticut	2.762	39	North Dakota	2.522
15	Missouri	2.741	40	Wisconsin	2.483
16	Arizona	2.739	41	South Dakota	2.477
	U.S. Average	**2.739**	42	Hawaii	2.474
17	Oklahoma	2.718	43	Washington	2.473
18	Virginia	2.714	44	Minnesota	2.463
19	Illinois	2.706	45	Montana	2.463
20	Rhode Island	2.706	46	Iowa	2.428
21	Georgia	2.688	47	Wyoming	2.370
22	New Jersey	2.676	48	Utah	2.359
23	Kansas	2.667	49	Nevada	2.354
24	Pennsylvania	2.651	50	New Hampshire	2.317
25	Arkansas	2.616	51	Alaska	2.297

Appendix Table A.2(c)
Estimated Annual Percentage Rate of Growth of the Ninety-Fifty Ratio from 1976 to 2008, For the 50 States and the District of Columbia

Rank	Jurisdiction	Annual Growth Rate	Significance[a]	Rank	Jurisdiction	Annual Growth Rate	Significance
1	Massachusetts	0.988	***	26	Virginia	0.588	***
2	Connecticut	0.958	***	27	Idaho	0.585	***
3	North Carolina	0.865	***	28	Mississippi	0.584	***
4	Kentucky	0.861	***	29	Nevada	0.578	***
5	Rhode Island	0.816	***	30	Wyoming	0.568	***
6	Pennsylvania	0.791	***	31	Tennessee	0.567	***
7	Kansas	0.785	***	32	Maine	0.560	***
8	New York	0.776	***	33	Wisconsin	0.557	***
9	Dist. of Columbia	0.738	***	34	Louisiana	0.553	***
10	New Jersey	0.729	***	35	Vermont	0.486	***
11	Ohio	0.727	***	36	Colorado	0.476	***
12	Texas	0.712	***	37	South Carolina	0.466	***
13	Oregon	0.706	***	38	New Mexico	0.458	***
14	Michigan	0.684	***	39	Oklahoma	0.428	***
15	Arizona	0.682	***	40	Alabama	0.425	***
16	Illinois	0.678	***	41	Montana	0.413	***
17	Hawaii	0.678	***	42	Nebraska	0.374	***
18	Indiana	0.676	***	43	Iowa	0.371	***
19	Maryland	0.675	***	44	Minnesota	0.366	***
20	Washington	0.673	***	45	North Dakota	0.290	***
21	West Virginia	0.673	***	46	Arkansas	0.271	***
22	California	0.659	***	47	Georgia	0.263	**
	U.S. Average	**0.658**	***	48	Utah	0.250	***
23	New Hampshire	0.622	***	49	Missouri	0.222	**
24	Florida	0.609	***	50	South Dakota	0.195	*
25	Delaware	0.592	***	51	Alaska	0.081	

[a] Significance levels are indicated as: *=10%, **=5%, ***=1%.

Appendix Table A.3(a)
The Fifty/Ten Ratio, Averaged from 1976-1978,
For the 50 States and the District of Columbia

Rank	Jurisdiction	50/10 Ratio 1976-78	Rank	Jurisdiction	50/10 Ratio 1976-78
1	Louisiana	4.705	26	Pennsylvania	3.831
2	Georgia	4.526	27	Nebraska	3.829
3	Alabama	4.509	28	South Dakota	3.828
4	Tennessee	4.296	29	Arkansas	3.819
5	New Mexico	4.275	30	Connecticut	3.802
6	Texas	4.169	31	Ohio	3.769
7	Colorado	4.111	32	Nevada	3.759
8	South Carolina	4.089	33	Minnesota	3.752
9	Michigan	4.087	34	Rhode Island	3.736
10	Massachusetts	4.066	35	Montana	3.736
11	Arizona	4.036	36	Alaska	3.731
12	Mississippi	4.030	37	Oregon	3.726
13	Oklahoma	4.010	38	Virginia	3.700
14	North Dakota	4.000	39	California	3.694
15	Washington	3.987	40	Wisconsin	3.689
16	Illinois	3.986	41	New Jersey	3.673
17	Missouri	3.929	42	Dist. of Columbia	3.640
18	Idaho	3.929	43	Hawaii	3.634
19	Kansas	3.915	44	Maine	3.616
20	North Carolina	3.907	45	Utah	3.587
	U.S. Average	**3.906**	46	Indiana	3.516
21	Iowa	3.906	47	Florida	3.509
22	Maryland	3.902	48	Wyoming	3.501
23	Delaware	3.902	49	West Virginia	3.442
24	Kentucky	3.884	50	Vermont	3.131
25	New York	3.862	51	New Hampshire	3.005

Appendix Table A.3(b)
The Fifty/Ten Ratio, Averaged from 2006-2008,
For the 50 States and the District of Columbia

Rank	Jurisdiction	50/10 Ratio 2006-08	Rank	Jurisdiction	50/10 Ratio 2006-08
1	Dist. of Columbia	5.678	26	Virginia	3.897
2	Massachusetts	5.065	27	Alaska	3.891
3	New York	4.879	28	Alabama	3.888
4	New Jersey	4.646	29	Arizona	3.888
5	Connecticut	4.470	30	Indiana	3.862
6	Rhode Island	4.349	31	Oregon	3.848
7	Kentucky	4.345	32	Montana	3.848
8	New Mexico	4.225	33	South Dakota	3.837
9	Maryland	4.184	34	West Virginia	3.794
10	Hawaii	4.167	35	Minnesota	3.794
11	California	4.161	36	New Hampshire	3.786
	U.S. Average	**4.094**	37	Kansas	3.778
12	Michigan	4.080	38	Oklahoma	3.767
13	Mississippi	4.069	39	Arkansas	3.759
14	Louisiana	4.066	40	Florida	3.750
15	Pennsylvania	4.042	41	Tennessee	3.750
16	Georgia	4.027	42	Maine	3.734
17	Ohio	4.019	43	North Carolina	3.728
18	Colorado	3.974	44	South Carolina	3.697
19	Wisconsin	3.973	45	Missouri	3.653
20	Washington	3.961	46	Delaware	3.609
21	Wyoming	3.956	47	Iowa	3.574
22	Vermont	3.955	48	Nebraska	3.512
23	North Dakota	3.912	49	Idaho	3.482
24	Illinois	3.905	50	Utah	3.349
25	Texas	3.901	51	Nevada	3.324

Appendix Table A.3(c)
Estimated Annual Percentage Rate of Growth of the Fifty-Ten Ratio from 1976 to 2008, For the 50 States and the District of Columbia

Rank	Jurisdiction	Annual Growth Rate	Significance[a]	Rank	Jurisdiction	Annual Growth Rate	Significance
1	Dist. of Columbia	1.099	***	26	Oregon	-0.016	
2	New York	0.719	***	27	North Carolina	-0.020	
3	Massachusetts	0.667	***	28	West Virginia	-0.062	
4	Connecticut	0.659	***	29	Alaska	-0.077	
5	New Hampshire	0.563	***	30	Kansas	-0.100	
6	Rhode Island	0.558	***	31	Arizona	-0.132	
7	Hawaii	0.538	***	32	Illinois	-0.152	
8	New Jersey	0.534	***	33	Colorado	-0.153	
9	Vermont	0.523	***	34	Missouri	-0.158	
10	Maryland	0.386	**	35	Michigan	-0.162	
11	California	0.364	***	36	Utah	-0.190	
12	Florida	0.233	***	37	Alabama	-0.198	
13	Maine	0.204		38	Montana	-0.203	
14	Pennsylvania	0.178	**	39	Nebraska	-0.213	*
15	Wisconsin	0.156		40	Texas	-0.218	**
16	Virginia	0.153		41	Oklahoma	-0.263	***
17	South Dakota	0.126		42	Delaware	-0.284	*
	U.S. Average	**0.087**		43	Arkansas	-0.299	**
18	Kentucky	0.062		44	Tennessee	-0.304	**
19	Washington	0.048		45	Nevada	-0.311	**
20	Minnesota	0.035		46	South Carolina	-0.350	*
21	Wyoming	0.019		47	North Dakota	-0.369	**
22	Mississippi	0.014		48	Iowa	-0.391	**
23	New Mexico	0.013		49	Georgia	-0.466	***
24	Ohio	0.000		50	Louisiana	-0.496	***
25	Indiana	-0.003		51	Idaho	-0.557	***

[a] Significance levels are indicated as: *=10%, **=5%, ***=1%.

Appendix Table A.4(a)
The Gini Ratio, Averaged from 1976-1978,
For the 50 States and the District of Columbia

Rank	Jurisdiction	Gini Ratio 1976-78	Rank	Jurisdiction	Gini Ratio 1976-78
1	Dist. of Columbia	0.438	26	North Carolina	0.387
2	Mississippi	0.431	27	Idaho	0.387
3	Louisiana	0.431	28	Illinois	0.386
4	Arkansas	0.427	29	Oregon	0.385
5	Alabama	0.420	30	Massachusetts	0.385
6	North Dakota	0.416	31	Rhode Island	0.384
7	South Dakota	0.415	32	Connecticut	0.383
8	Georgia	0.414	33	Kentucky	0.381
9	Tennessee	0.411	34	Minnesota	0.380
10	Oklahoma	0.409	35	New Jersey	0.380
11	Texas	0.407	36	Michigan	0.378
12	Florida	0.406	37	Pennsylvania	0.377
13	Missouri	0.405	38	Iowa	0.377
14	New Mexico	0.405	39	Alaska	0.376
15	New York	0.404	40	Ohio	0.372
16	Nebraska	0.401	41	Indiana	0.371
	U.S. Average	**0.401**	42	Maryland	0.370
17	Maine	0.399	43	Vermont	0.370
18	Montana	0.397	44	Nevada	0.370
19	California	0.396	45	Utah	0.368
20	Arizona	0.396	46	West Virginia	0.367
21	Virginia	0.394	47	Delaware	0.365
22	Colorado	0.394	48	Wyoming	0.364
23	Kansas	0.394	49	Wisconsin	0.361
24	Washington	0.393	50	Hawaii	0.358
25	South Carolina	0.388	51	New Hampshire	0.348

Appendix Table A.4(b)
The Gini Ratio, Averaged from 2006-2008,
For the 50 States and the District of Columbia

Rank	Jurisdiction	Gini Ratio 2006-08	Rank	Jurisdiction	Gini Ratio 2006-08
1	Dist. of Columbia	0.528	26	Missouri	0.447
2	New York	0.493	27	Indiana	0.445
3	Mississippi	0.490	28	Ohio	0.444
4	Louisiana	0.488	29	North Dakota	0.443
5	Massachusetts	0.488	30	Michigan	0.442
6	New Mexico	0.483	31	Maryland	0.442
7	Connecticut	0.478	32	Oregon	0.442
8	California	0.477	33	South Carolina	0.442
9	Kentucky	0.471	34	Wisconsin	0.439
10	Texas	0.471	35	South Dakota	0.438
11	Oklahoma	0.469	36	Arkansas	0.438
	U.S. Average	**0.466**	37	Vermont	0.436
12	Illinois	0.466	38	Minnesota	0.435
13	Alabama	0.464	39	Delaware	0.434
14	Florida	0.464	40	Maine	0.433
15	New Jersey	0.464	41	Washington	0.433
16	Rhode Island	0.463	42	Hawaii	0.430
17	North Carolina	0.461	43	Nebraska	0.427
18	Arizona	0.459	44	Montana	0.427
19	Tennessee	0.458	45	Wyoming	0.426
20	Virginia	0.456	46	Iowa	0.421
21	West Virginia	0.452	47	Nevada	0.421
22	Kansas	0.451	48	Idaho	0.419
23	Georgia	0.450	49	New Hampshire	0.414
24	Pennsylvania	0.450	50	Alaska	0.413
25	Colorado	0.449	51	Utah	0.409

Appendix Table A.4(c)
Estimated Annual Percentage Rate of Growth of the Gini Ratio from 1976 to 2008,
For the 50 States and the District of Columbia

Rank	Jurisdiction	Annual Growth Rate	Significance[a]	Rank	Jurisdiction	Annual Growth Rate	Significance
1	Dist. of Columbia	0.698	***	27	Washington	0.242	
2	Massachusetts	0.585	***		**U.S. Average**	**0.205**	***
3	New York	0.565	***	28	Colorado	0.193	
4	Connecticut	0.546	***	29	New Mexico	0.184	
5	New Jersey	0.514	***	30	Mississippi	0.170	
6	Rhode Island	0.481	***	31	Nevada	0.166	
7	Pennsylvania	0.454	***	32	Maine	0.156	
8	Maryland	0.452	***	33	Wisconsin	0.154	
9	Kentucky	0.405	***	34	Minnesota	0.139	
10	California	0.377	**	35	Oklahoma	0.112	
11	North Carolina	0.371	**	36	Delaware	0.099	
12	New Hampshire	0.356	**	37	Alabama	0.092	
13	Arizona	0.355	**	38	Louisiana	0.056	
14	Hawaii	0.352	**	39	Wyoming	0.028	
15	Texas	0.349	***	40	South Carolina	0.022	
16	Florida	0.316	**	41	Idaho	-0.010	
17	Illinois	0.309	*	42	Arkansas	-0.032	
18	West Virginia	0.297	*	43	Utah	-0.050	
19	Michigan	0.285	**	44	Missouri	-0.063	
20	Kansas	0.278		45	Montana	-0.086	
21	Tennessee	0.276	**	46	Iowa	-0.115	
22	Vermont	0.271		47	Nebraska	-0.131	
23	Ohio	0.267	*	48	South Dakota	-0.147	
24	Indiana	0.265		49	Georgia	-0.167	
25	Virginia	0.258		50	North Dakota	-0.190	
26	Oregon	0.253		51	Alaska	-0.279	

[a] Significance levels are indicated as: *=10%, **=5%, ***=1%.