

# **ARE INCOME DISTRIBUTION PROGRAMS DESIGNED TO REDISTRIBUTE INCOME? DO THEY? EVIDENCE FROM THE STATES**

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## **ABSTRACT**

*Income inequality has generally been viewed as a problem and concern for policy makers. Income redistribution programs are a means to address this problem. These programs typically consist of progressive taxation to lower the incomes of the highest earners and transfer programs designed to raise the incomes of the lowest earners.*

*The Gini Coefficient is the most popular tool to measure income inequality within nations or states. It measures the degree of inequality between the quintiles of a region's population. This paper calculates the Gini Coefficient for each of the 50 states and the District of Columbia before any redistribution programs are implemented. It then recalculates the Gini Coefficients after taking into account redistribution efforts at the federal and state level. A comparative analysis is then conducted to determine how much more equality results from these programs from an absolute and a relative perspective.*

*It might be expected that states with higher measures of income inequality would have more aggressive income redistribution programs. This paper examines the extent to which this expectation is accurate. Other policies that are promoted to remedy the problem of income inequality are higher minimum wages and greater spending on education. The effectiveness of these policies is also addressed.*

## **INTRODUCTION**

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The Gini Coefficient is the most popular tool to measure income inequality within nations or states. It measures the degree of inequality between the quintiles of a region's population. This paper calculates the Gini Coefficient for each of the 50 states and the District of Columbia before any redistribution programs are implemented. It then recalculates the Gini Coefficients after taking into account redistribution efforts at the federal and state level. A comparative analysis is then conducted to determine how much more equality results from these programs from an absolute and a relative perspective.

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### **Prior Research**

The Gini Coefficient is a statistic developed by an Italian statistician named Corrado Gini that measures the degree of income inequality in a region by quintiles. The value of the coefficient can range from 0, which would imply complete income equality, to 1, indicating that one person (or household) has all of the income. It is the most popular measure of the degree of income inequality in both nations and states.

While there have been various comparative studies of income distributions among nations, much less has been written about inequality at the state level in the U. S. One study (Econscious) used regression analysis in an attempt to identify the causes of inequality between the states. Explanatory variables tested included whether the state was a “right to work” state (no relationship), state income tax rates (higher state tax rates correlate with higher degrees of inequality), and population density (strongest correlation, with an R-square of 0.14). The information presented is a descriptive analysis and no policy implications are offered.

Another article (Leigh) addresses the question of whether redistributive state tax policies reduce inequalities. Using data from 1977 to 2002, the author concludes that redistributive taxation reduces income inequality and that these policies do not slow the growth of per capita income.

In a 2012 publication (Cooper, et. al.) the authors analyze the effects of federal and state taxes on the distribution of income within individual states. The resulting comparison of pre and post tax Gini Coefficients show substantial reductions in inequality in all states. They find that most of the gains result from federal tax policy, though there is substantial variation among the states.

These prior studies have addressed issues in what might explain differences in income distributions between the states, and how effective redistributive policies have been in reducing inequality. This study will try to determine if state policies are actually designed to reduce inequality and if they are effective in improving a state’s relative position in income inequality rankings.

### **Gini Coefficients**

The 2010 Census provides the most comprehensive source of data for the questions we want to address in this study. Therefore, unless otherwise noted, all data sources are from 2010. Table B19081 (Census) contains the mean income for all households in each quintile by state. Using these figures, I calculated a Gini Coefficient for each state. These are included in the column labeled Own Gini in Table I. The second column, Popular Gini, contains the most widely

circulated measures of Gini Coefficients for the states, found in periodicals and posted on Wikipedia (Wikipedia).

The coefficients in the Popular measure tend to be higher than those in the Own calculation, however the correlation coefficient between the two measures is .949 with a P-Value of .000, so the measures track almost perfectly together.

The third column of Table I are the Gini Coefficients after adjusting for state and federal taxes and federal transfers (After Tx & Tr Gini). I calculated these by using data from the Congressional Budget Office (for Federal taxes by quintile), the Tax Foundation (for state tax rates) and the Census Bureau (Table DP03, for cash transfers and SNAP benefits). While there are some cash assistance programs from the states and noncash transfer programs to assist households in the lower quintile, these are difficult to quantify and impute an accurate value.

The last column in Table I contains the Gini Coefficients calculated by Cooper, et. al. in their 2012 study (After Taxes Gini). It accounts for all taxes including sales and motor fuels taxes. This calculation generally results in the lowest values for all Gini Coefficients presented here. The average value for each of the columns is:

Popular Gini	.453
Own Gini	.420
After Tx & Tr Gini	.376
After Taxes Gini	.314

By comparing the averages of the first two Ginis listed with the latter two, it is clear that tax and transfer policies do substantially reduce the absolute level of income inequality in the U.S. This would confirm the results from prior research that found this to be true. But do these policies change state rankings in any significant way?

**Table I**

State	Own Gini	Popular Gini	After Tx & Tr Gini	After Taxes Gini
Alabama	0.440	0.4720	0.392	0.325
Alaska	0.392	0.4220	0.356	0.311
Arizona	0.432	0.4550	0.380	0.331
Arkansas	0.432	0.4580	0.388	0.309
California	0.448	0.4710	0.392	0.330
Colorado	0.428	0.4570	0.388	0.327
Connecticut	0.428	0.4860	0.380	0.320
DC	0.492	0.5320	0.444	0.314
Delaware	0.408	0.4400	0.356	0.306
Florida	0.440	0.4740	0.400	0.341
Georgia	0.428	0.4680	0.392	0.320
Hawaii	0.396	0.4330	0.341	0.315
Idaho	0.396	0.4330	0.356	0.305
Illinois	0.432	0.4650	0.392	0.322
Indiana	0.412	0.4400	0.364	0.308
Iowa	0.396	0.4270	0.340	0.290
Kansas	0.412	0.4450	0.360	0.314
Kentucky	0.432	0.4660	0.392	0.311
Louisiana	0.444	0.4750	0.392	0.329
Maine	0.404	0.4370	0.356	0.285
Maryland	0.412	0.4430	0.372	0.322
Massachusetts	0.440	0.4750	0.392	0.324
Michigan	0.416	0.4510	0.389	0.312
Minnesota	0.408	0.4400	0.356	0.308
Mississippi	0.440	0.4680	0.392	0.331
Missouri	0.416	0.4550	0.380	0.308
Montana	0.412	0.4350	0.356	0.293
Nebraska	0.396	0.4320	0.356	0.300
Nevada	0.412	0.4480	0.380	0.321
New Hampshire	0.396	0.4250	0.356	0.322
New Jersey	0.432	0.4640	0.364	0.335
New Mexico	0.432	0.4640	0.392	0.318
New York	0.455	0.4990	0.408	0.322
North Carolina	0.432	0.4640	0.392	0.321
North Dakota	0.396	0.4330	0.356	0.305
Ohio	0.416	0.4330	0.372	0.301
Oklahoma	0.416	0.4520	0.365	0.312
Oregon	0.412	0.4540	0.360	0.301
Pennsylvania	0.432	0.4490	0.392	0.312
Rhode Island	0.432	0.4610	0.388	0.309
South Carolina	0.428	0.4610	0.384	0.309
South Dakota	0.412	0.4420	0.372	0.313
Tennessee	0.432	0.4680	0.396	0.328
Texas	0.432	0.4690	0.396	0.347
Utah	0.392	0.4190	0.344	0.294
Vermont	0.408	0.4440	0.356	0.296
Virginia	0.428	0.4590	0.388	0.329
Washington	0.408	0.4410	0.372	0.325
West Virginia	0.412	0.4541	0.368	0.301
Wisconsin	0.396	0.4300	0.352	0.295
Wyoming	0.392	0.4230	0.344	0.303

For the purpose of this analysis it is important to consider the relative ranks of the states for each measure of the Gini Coefficients presented in Table I. These rankings are included in Table II. A ranking of 1 indicates the state with the most equal distribution of income and a ranking of 51 would be the state with the most unequal income distribution

**Table II**

State	Popular Gini Rank	Own Gini Rank	After T & T Rank	After Taxes Rank
Alabama	45	45.5	41.0	40.5
Alaska	2	2.0	10.5	21.5
Arizona	27	38.0	27.5	47.5
Arkansas	30	38.0	32.5	19.0
California	44	49.0	41.0	46.0
Colorado	29	30.0	32.5	42.0
Connecticut	49	30.0	27.5	31.5
DC	51	51.0	51.0	27.5
Delaware	13	13.5	10.5	14.0
Florida	46	45.5	49.0	50.0
Georgia	40	30.0	41.0	31.5
Hawaii	8	7.0	2.0	29.0
Idaho	8	7.0	10.5	12.5
Illinois	37	38.0	41.0	36.5
Indiana	13	19.5	18.5	16.0
Iowa	5	7.0	1.0	2.0
Kansas	20	19.5	16.5	27.5
Kentucky	38	38.0	41.0	21.5
Louisiana	47	48.0	41.0	44.5
Maine	12	11.0	10.5	1.0
Maryland	18	19.5	23.5	36.5
Massachusetts	47	45.5	41.0	39.0
Michigan	23	25.5	35.0	24.0
Minnesota	13	13.5	10.5	16.0
Mississippi	40	45.5	41.0	47.5
Missouri	27	25.5	27.5	16.0
Montana	11	19.5	10.5	3.0
Nebraska	7	7.0	10.5	7.0
Nevada	21	19.5	27.5	33.5
New Hampshire	4	7.0	10.5	36.5
New Jersey	34	38.0	18.5	49.0
New Mexico	34	38.0	41.0	30.0
New York	50	50.0	50.0	36.5
North Carolina	34	38.0	41.0	33.5
North Dakota	8	7.0	10.5	12.5
Ohio	8	25.5	23.5	9.0
Oklahoma	25	25.5	20.0	24.0
Oregon	26	19.5	16.5	9.0
Pennsylvania	22	38.0	41.0	24.0
Rhode Island	32	38.0	32.5	19.0
South Carolina	32	30.0	30.0	19.0
South Dakota	17	19.5	23.5	26.0
Tennessee	40	38.0	47.5	43.0
Texas	43	38.0	47.5	51.0
Utah	1	2.0	3.5	4.0
Vermont	19	13.5	10.5	6.0
Virginia	31	30.0	32.5	44.5
Washington	16	13.5	23.5	40.5
West Virginia	23	19.5	21.0	9.0
Wisconsin	6	7.0	5.0	5.0
Wyoming	3	2.0	3.5	11.0

## Income Inequality And State Policy

There are primarily two types of redistribution activities that states might engage in to address problems of income inequality. These are taxes and transfer programs. We can measure the extent to which states are using taxes to redistribute income by examining the top marginal income tax rates in each state. The Tax Foundation has this information for 2010.

It would be expected that if states in general are using their income taxes to address the problem of income inequality then states with higher marginal tax rates would correlate with states that have higher pre-tax Gini Coefficients. This is not evident from an analysis of simple correlation coefficients.

If we correlate top state marginal tax rates with the state Gini Coefficients we get values of .127 for Own Gini (P-Value = .375) and .162 for Popular Gini (P-Value = .257) indicating no significant relationship between these measures of income inequality and top marginal tax rates in the states.

Similarly, if we correlate the state rankings based on top marginal tax rates and state rankings for the Gini Coefficients we get even weaker results of .011 for the Own Gini Rank (P-Value = .938) and .043 for the Popular Gini Rank (P-Value = .764).

Even though states do not appear to be using marginal tax rates to address the problem of income inequality, do the policies have some effect on the distribution of income? Correlating the top marginal rates with the after tax measures of income inequality we get an After Tx & Tr Gini coefficient of -.101 (P-Value = .480) and an After Taxes coefficient of -.345 (P-Value = .013). For these relationships the negative signs indicate that the higher marginal tax rates are associated with lower Gini calculations, and there is some significance in the After Taxes correlation coefficient, as indicated by the lower P-Value.

Comparing the marginal tax rate rank with the After Tx & Tr Rank we get a coefficient of .011 (P-Value = .938) and for the After Taxes Rank the coefficient is -.347 (P-Value = .013). This would again reinforce the implication that higher marginal tax rates are associated with lower measures of income inequality with respect to the After Taxes Gini measure. This would imply that federal and state tax policies, when broadly viewed, do achieve lower degrees of income inequality.

Measuring the total value of transfers to lower income households is a fairly difficult figure to quantify. A study of the total level of welfare benefits by the states was conducted by Tanner and Hughes and this provides the best measure for the question being address here: Are transfer programs designed to address disparities in income at the state level?

The total value of both federal and state benefits are included in their analysis and that can be correlated with the Gini Coefficients to determine if these transfer programs are targeted at reducing income inequality in the states and how well they are doing in achieving this goal (intended or unintended).

The total value of transfers for each state has no significant correlation with the Popular Gini (-.111, P-Value = .438) and actually has a negative sign as does the correlation with the Own Gini (-.156, P-Value = .274). This would indicate that higher Gini Coefficients correspond to lower total benefits, which would be opposite of what might be expected.

Similarly, the rankings of states welfare benefits have no significant correlation with the rankings of the states by Popular Gini (-.082, P-Value = .569) and Own Gini (-.036, P-Value = .804). In this case however, the negative signs would be expected because the higher ranked states in benefits (most benefits = 1) should negatively correlate with the more unequal distribution of income (most unequal = 51).

Given these relationships we can conclude that state and federal transfer payments are not systematically intended to address the unequal distribution of incomes between states.

The next question is, do the transfer payments alter income distributions between the states after taxes and transfers have been reflected in the Gini calculations. Correlating the total benefits with the After Taxes Gini shows no relationship (.008, P-Value = .957) and the correlation with the After Tx & Tr Gini actually yields a negative sign (-.231, P-Value = .103) implying that higher benefits are associated with a more equal income distribution.

The state rankings by transfer payments also do not correlate with the rankings by After Taxes Gini (-.023, P-Value = .872) or After Tx & Tr Gini (.060, P-Value = .676).

All of the above would indicate that relative state benefits are not intended to reduce relative income inequality and they do not succeed in reducing relative income inequality.

### **Recent Policy Proposals To Reduce Income Inequality**

A policy proposal to increase the federal minimum wage has been offered as a mechanism for reducing income inequality. If this was an effective approach then we would expect states with higher minimum wage laws to have lower Gini coefficients than states that only follow federal minimum wage policies. However, this does not appear to be the case.

20 states have mandated higher minimum wages than the federal rate. These states have an average Popular Gini score of .462. States without higher minimum wages have an average of .448. Similarly, the Own Gini average for the higher minimum states is .428 and the average for the other states is .415.

State Gini rankings also do not support the notion that higher minimum wages reduce income inequality. States with higher mandated minimum wages have an average ranking of 30.35 with Popular Gini and 31.05 with Own Gini (recall that a ranking of 51 implies the most unequal distribution of income). States without the higher minimum wage mandates have an average rank 21.68 with Popular Gini and 22.74 with Own Gini.

States with higher minimum wage laws rank higher in income inequality measures (where a higher rank indicates a more unequal distribution of income) than states without such laws.

Greater spending on education has been proposed as a means to lower income inequality. If this is an effective measure we would expect states that spend more per pupil would have lower levels of income inequality than states that spend less.

Correlating the amount spent by states per pupil with Popular Gini we get a weak but significant relationship (.227, P-Value = .049) indicating that states that spend more on education have a higher level of income inequality. The correlation with Own Gini (.211, P-Value = .137) yields the same sign but no significance.

If we consider state rankings there appears to be no significant correlation with education spending ranked by state with Popular Gini rankings (-.089, P-Value = .536) or Own Gini rankings (-.121, P-Value = .396).

States that spend more on education do not achieve a more equal distribution of income.

Some have argued that economic growth is the most important factor in reducing income inequality. If we examine the growth in GDP of the states from 2000 to 2010 and their relationship to the Gini Coefficients in 2010 we get correlated values of -.269 (P-value = .056) for Popular Gini and -.292 (P-value = .038) for Own Gini. These show that income inequality is negatively correlated with economic growth and they are significant at the 10 percent level for Popular Gini and at the 5 percent level for Own Gini.

The same relationships exist if we compare the state rankings for GDP growth through 2010 with the Popular Gini (-.269, P-value = .067) and Own Gini (-.284, P-value = .043) state rankings. These values suggest there is some association between stronger economic growth and less income inequality.

If we compare state GDP growth from 2010 through 2012 we find that the correlation with Popular Gini (-.087, P-value = .542) and Own Gini (-.121, P-value = .397) are still negative, but insignificant for this time frame. The same holds true if we compare state rankings of GDP growth and Popular Gini (-.116, P-value = .419) and Own Gini (-.138, P-value = .333) state rankings. While economic growth rates from 2010 onward remain negatively associated with income inequality there is not a significant relationship during this limited time frame.

## SUMMARY

State income tax policies do not appear to be designed to address the problem of income inequality and they do not succeed in reducing this inequality. When a broader range of taxes are considered there is a significant correlation with relative inequality reduction at the state level.

Transfer programs implemented at the federal and state level also do not appear to be designed to reduce relative income inequality between the states and they do not result in less relative inequality.

Higher minimum wage laws are associated with greater, not less, income inequality and would not appear to be effective measures for achieving a more equal distribution of income. Similarly, higher levels of spending on education do not achieve a more equal distribution of income.

Higher rates of economic growth are significantly associated with more equal distributions of income, which might imply that, for an individual state, policies to promote economic growth are the key for achieving less income inequality relative to other states.



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