

REGRESSIVE STATE TAX SYSTEMS: FACTS, SEVERAL POSSIBLE EXPLANATIONS, AND EMPIRICAL EVIDENCE*

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INTRODUCTION

GOVERNMENT TAXES ITS PEOPLE TO FINANCE its revenue needs. If there is a “benevolent social planner” that maximizes a social welfare function, it’s usually desirable for the tax system to be progressive in the sense that the average tax rate increases with income because the marginal utility of the rich people is lower than that of the poor people (Mirrlees, 1971; Fair, 1971).

However, the primary finding of a recent study by the Institute on Taxation and Economic Policy (2003) is that most states tax their middle- and low-income families far more heavily than the wealthy. In other words, most state tax systems are regressive. In addition, the disparities in effective tax rates between middle- and low-income families and the wealthy are substantial. Nationwide, the average state tax rates for the poorest 20 percent of families, the middle 20 percent of families, and the best-off 1 percent of families are about 11 percent, 10 percent, and 5.2 percent, respectively.

There is also striking cross-state difference in terms of tax systems. The most regressive 10 states are Alabama, Florida, Illinois, Michigan, Nevada, Pennsylvania, South Dakota, Tennessee, Texas, and Washington. In these most regressive 10 states, the average state tax rate for the poorest 20 percent of families is about five and a half times as great as that for the best-off 1 percent of families, and the average state tax rate for the middle 20 percent of families is about three and a half times as great as that for the best-off 1 percent of families. The least regressive four states are California, Delaware, Montana, and Vermont, among which Vermont’s tax system is relatively fair and Delaware’s tax system is even progressive overall.

Clearly, the “benevolent social planner” approach to tax systems fails to account for the prevalent adoption of regressive state tax systems. In retrospect, the apparent failure may not be surprising at all because there is simply no social planner in this world. This implies that we should use different approaches to understand

the prevalent adoption of regressive state tax systems.

In this paper, we first document the facts about the state tax systems in detail, focusing on the distribution of state tax burdens by different income groups. The relevant data is constructed and borrowed from the report by the Institute on Taxation and Economic Policy (2003).

We explore three possible explanations for the prevalent adoption of regressive state tax systems: (1) a model of majority voting over tax schedules (An, 2008); (2) population mobility; and (3) race heterogeneity. The model of majority voting over tax schedules links the distribution of individuals’ innate productivity levels and majority voting to the structure of tax systems. This model shows that it is very likely for majority voting to lead to the adoption of a regressive tax system, depending on the per capita state government revenue needs and the mean productivity of individuals. Given the adoption of a regressive tax system, the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. Population mobility and race heterogeneity are two factors that are absent from the model of majority voting over tax schedules, but might lead to the prevalent adoption of regressive state tax systems. Population mobility implies that the more mobile the population is, the more regressive the state tax system would be. Race heterogeneity implies that the more heterogeneous the race is, the more regressive the state tax system would be.

We take advantage of the cross-state difference in tax systems to test the three possible explanations. The results of our cross-state analysis support the model of majority voting over tax schedules and population mobility as two possible explanations for the prevalent adoption of regressive state tax systems, but do not support race heterogeneity.

The remainder of this paper is organized as follows. The second section documents the facts about the state tax systems. The third section explores the three possible explanations for the prevalent adoption of regressive state tax systems. The fourth

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section takes advantage of cross-state difference in tax systems and puts the three possible explanations into empirical test. The results of our cross-state analysis support the model of majority voting and population mobility as two possible explanations for the prevalent adoption of regressive state tax systems, but do not support race heterogeneity. The fifth section concludes.

FACTS ABOUT STATE TAX SYSTEMS

According to a new study by the Institute on Taxation and Economic Policy (2003), most state tax systems are regressive in the sense that the average state tax rate decreases with income. Table 1 summarizes the U.S. average state taxes by income group in 2002. From the last column of Table 1, we can see that only five states (California, Delaware, Montana, Oregon, and Vermont) require their best-off 1 percent of families to pay as much of their incomes in taxes as the middle 60 percent of families have to pay. From the eighth column of Table 1, we can see that only two states (Delaware and Montana) tax their best-off 1 percent of families at effective tax rates as high as the poorest 20 percent of families are required to pay. Please note that the numbers in the tables are calculated without taking into account the benefits the wealthy enjoy from federal itemized deductions. If the federal itemized deductions are taken into account, the state tax systems should be even more regressive because federal itemizers, who are a mostly better-off group, can effectively export part of their state tax burden to the federal government. Table 2 summarizes the U.S. average state taxes by income group in 2002 after accounting for the federal deduction offset. The last two columns of Table 2 show that only Delaware taxes their top 1 percent of families at effective tax rates as high as that of the poorest 20 percent of families are required to pay. In addition, no state requires their top 1 percent of families to pay as much of their incomes in taxes as the middle 60 percent of families have to pay.

Nationwide, effective state tax rates, not surprisingly, follow a strikingly regressive pattern (see Figure 1). Before we take federal deduction offset into account, the average tax rates for the poorest 20 percent of families, the middle 20 percent of families, and the top 1 percent of families are 11.4 percent, 9.9 percent, and 7.3 percent, respectively. After we take federal deduction offset into account, the average tax rates for the poorest 1 percent of

families, the middle 20 percent of families, and the top 1 percent of families are 11.4 percent, 9.6 percent, and 5.2 percent, respectively.

Tax systems are also strikingly different across states. The most regressive ten states are Alabama, Florida, Illinois, Michigan, Nevada, Pennsylvania, South Dakota, Tennessee, Texas, and Washington. In order to highlight the most regressive 10 states, Table 3 extracts the data about the “terrible 10” before federal deduction offset from Table 1. Correspondingly, Table 4 extracts the data about the “terrible 10” after federal deduction offset from Table 2. In these most regressive 10 states, the average state tax rate for the poorest 20 percent of families is about five and a half times as great as that for the best-off 1 percent of families, and the average state tax rate for the middle 60 percent of families is about three and a half times as great as that for the best-off 1 percent of families. The least regressive four states are California, Delaware, Montana, and Vermont among which Vermont’s tax system is relatively fair and Delaware’s tax system is even progressive overall.

In summary, the study finds the prevalent adoption of regressive state tax systems. In addition, tax systems across states are strikingly different. Some states’ tax systems are very regressive, while several states’ tax systems are relatively fair or progressive overall.

THREE POSSIBLE EXPLANATIONS

Clearly, the prevalent adoption of regressive state tax systems cannot be explained by the “benevolent social planner” approach to tax systems. If there is a “benevolent social planner” that maximizes a social welfare function, it is usually desirable for the tax system to be progressive to improve distributional equity because the marginal utility of poor people is higher than that of the rich people (Mirrlees, 1971; Fair, 1971). The apparent failure of the “benevolent social planner” approach to state tax systems implies that we should use different approaches to understand real state tax systems.

In this section, we explore three possible explanations for the prevalent adoption of regressive state tax systems: 1) a model of majority voting over tax schedules (An, 2008); 2) population mobility; and 3) race heterogeneity.

First, An (2008) links the distribution of individuals’ innate productivity levels and majority

Table 1
Cross-State Comparison of Tax Systems in 2002

<i>State</i>	<i>Poorest 20%</i>	<i>Second 20%</i>	<i>Middle 20%</i>	<i>Fourth 20%</i>	<i>Middle 60%</i>	<i>Top 1%</i>	<i>Poor/ Top 1%</i>	<i>Middle/ Top 1%</i>
Alabama	10.6	10.5	9.8	8.4	9.567	4.9	2.163	1.952
Alaska	3.8	4.2	3	3.2	3.467	2.8	1.357	1.238
Arizona	12.5	10.8	9.7	8.9	9.800	6.6	1.894	1.485
Arkansas	10.7	10.9	10.5	9.6	10.333	7.8	1.372	1.325
California	11.3	10.2	9.4	9.3	9.633	10.6	1.066	0.909
Colorado	9.9	9.7	9.1	8.5	9.100	6.1	1.623	1.492
Connecticut	10.3	10.3	10.4	10.7	10.467	6.4	1.609	1.635
Delaware	4.7	4.7	5.4	5.6	5.233	6.9	0.681	0.758
Florida	14.4	11.3	9.9	8.2	9.800	3	4.800	3.267
Georgia	11.9	11.3	10.6	10.1	10.667	7.5	1.587	1.422
Hawaii	12.6	12.3	11.2	10	11.167	8	1.575	1.396
Idaho	9.7	9.7	9.3	9	9.333	8.7	1.115	1.073
Illinois	13.1	11.3	10.4	9.9	10.533	5.8	2.259	1.816
Indiana	11.7	10.8	9.9	9.3	10.000	6.3	1.857	1.587
Iowa	10.6	10.5	10.6	10.3	10.467	7.9	1.342	1.325
Kansas	11.5	10.8	10.4	10.2	10.467	8	1.438	1.308
Kentucky	9.8	10	10.2	10.1	10.100	7.8	1.256	1.295
Louisiana	11.5	10.6	9.5	8.7	9.600	6	1.917	1.600
Maine	10	10.3	10.2	10.5	10.333	9.7	1.031	1.065
Maryland	9.4	9	9.5	9.6	9.367	7.6	1.237	1.232
Massachusetts	9.3	9.2	9.2	9.3	9.233	6.8	1.368	1.358
Michigan	13.3	12.2	11.1	10.4	11.233	6.7	1.985	1.677
Minnesota	10.5	10	10.4	10.4	10.267	9.3	1.129	1.104
Mississippi	10	11.6	9.8	8.8	10.067	6.9	1.449	1.459
Missouri	10	9.5	9.5	9.6	9.533	7.4	1.351	1.288
Montana	6.1	6.8	7	7.2	7.000	7.2	0.847	0.972
Nebraska	10.2	9.5	10	9.6	9.700	9.3	1.097	1.043
Nevada	8.3	7.5	6.3	5.8	6.533	2	4.150	3.267
New Hampshire	8.1	5.7	5.8	5.4	5.633	2.4	3.375	2.347
New Jersey	12.5	10.2	9.9	9.8	9.967	8.4	1.488	1.187
New Mexico	12.1	11.1	10.4	9.7	10.400	8.7	1.391	1.195
New York	12.7	11.4	11.9	11.9	11.733	9.1	1.396	1.289
North Carolina	10.7	10.1	10.2	9.9	10.067	8.9	1.202	1.131
North Dakota	10.2	9.5	9.1	8	8.867	6.5	1.569	1.364
Ohio	11	10.7	10.7	10.4	10.600	9.7	1.134	1.093
Oklahoma	12	11.1	11.2	10.6	10.967	7.9	1.519	1.388
Oregon	9.4	9.1	8.5	8.8	8.800	8.9	1.056	0.989
Pennsylvania	11.4	9.3	9.1	8.7	9.033	4.8	2.375	1.882
Rhode Island	13	10.8	10.7	10.4	10.633	8.6	1.512	1.236
South Carolina	7.9	8.3	9	8.7	8.667	7.7	1.026	1.126
South Dakota	10	9.2	9	7	8.400	2.3	4.348	3.652
Tennessee	11.7	10.5	8.8	7.4	8.900	3.4	3.441	2.618
Texas	11.4	9.6	8.3	7.4	8.433	3.5	3.257	2.410
Utah	11.5	12.1	11	10.5	11.200	7.6	1.513	1.474
Vermont	10	8.7	9.8	10.2	9.567	9.7	1.031	0.986
Virginia	9.1	8.4	8.4	8.5	8.433	7	1.300	1.205
Washington	17.6	12.9	11.3	9.5	11.233	3.3	5.333	3.404
West Virginia	9.3	10.3	9.7	9.2	9.733	8.7	1.069	1.119
Wisconsin	10.2	11.7	11.9	11.5	11.700	8.1	1.259	1.444
Wyoming	7.6	6.3	5.4	4.4	5.367	1.7	4.471	3.157

Source: The Institute on Taxation and Economics Policy (2003).

Note: These figures are Before the benefits the wealthy enjoy from federal itemized deductions.

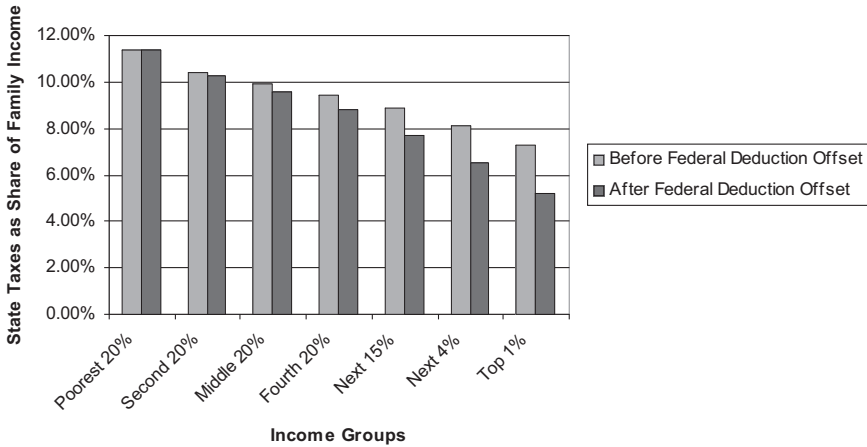
Table 2
Cross-State Comparison of Tax Systems in 2002

<i>State</i>	<i>Poorest 20%</i>	<i>Second 20%</i>	<i>Middle 20%</i>	<i>Fourth 20%</i>	<i>Middle 60%</i>	<i>Top 1%</i>	<i>Poor/ Top1%</i>	<i>Middle/ Top1%</i>
Alabama	10.6	10.5	9.6	8.2	9.433	3.8	2.789	2.482
Alaska	3.8	4.1	2.9	2.9	3.300	2.5	1.520	1.320
Arizona	12.5	10.7	9.5	8.5	9.567	4.9	2.551	1.952
Arkansas	10.7	10.8	10.5	9.3	10.200	5.8	1.845	1.759
California	11.3	10.1	9.2	8.7	9.333	7.2	1.569	1.296
Colorado	9.9	9.6	8.7	7.8	8.700	4.4	2.250	1.977
Connecticut	10.2	10.1	9.5	9.2	9.600	4.4	2.318	2.182
Delaware	4.7	4.7	5.2	5.1	5.000	4.8	0.979	1.042
Florida	14.4	11.3	9.8	8	9.700	2.7	5.333	3.593
Georgia	11.9	11.3	10.3	9.5	10.367	5.4	2.204	1.920
Hawaii	12.6	12.3	11.1	9.5	10.967	5.8	2.172	1.891
Idaho	9.7	9.6	9	8.4	9.000	6.1	1.590	1.475
Illinois	13.1	11.2	10	9.2	10.133	4.6	2.848	2.203
Indiana	11.7	10.7	9.7	8.7	9.700	4.7	2.489	2.064
Iowa	10.6	10.5	10.4	9.9	10.267	5.8	1.828	1.770
Kansas	11.5	10.8	10.3	9.8	10.300	5.7	2.018	1.807
Kentucky	9.8	10	10.1	9.6	9.900	5.6	1.750	1.768
Louisiana	11.5	10.6	9.5	8.6	9.567	4.9	2.347	1.952
Maine	10	10.2	9.9	10	10.033	6.8	1.471	1.475
Maryland	9.4	8.8	8.8	8.4	8.667	5.1	1.843	1.699
Massachusetts	9.3	9.1	8.6	8.2	8.633	4.6	2.022	1.877
Michigan	13.3	12.1	10.8	9.7	10.867	5	2.660	2.173
Minnesota	10.5	9.8	9.9	9.5	9.733	6.4	1.641	1.521
Mississippi	10	11.5	9.7	8.6	9.933	5.3	1.887	1.874
Missouri	9.9	9.4	9.3	9.1	9.267	5.3	1.868	1.748
Montana	6.1	6.7	6.8	6.7	6.733	5.2	1.173	1.295
Nebraska	10.2	9.4	9.8	9	9.400	6.4	1.594	1.469
Nevada	8.3	7.4	6.1	5.6	6.367	1.8	4.611	3.537
New Hampshire	8.1	5.6	5.4	4.8	5.267	1.9	4.263	2.772
New Jersey	12.4	10	9.3	8.5	9.267	5.9	2.102	1.571
New Mexico	12.1	11.1	10.4	9.5	10.333	6.3	1.921	1.640
New York	12.6	11.3	11.6	11.1	11.333	6.5	1.938	1.744
North Carolina	10.6	10	10	9.3	9.767	6.1	1.738	1.601
North Dakota	10.2	9.5	9	7.8	8.767	5.1	2.000	1.719
Ohio	10.9	10.6	10.3	9.7	10.200	6.7	1.627	1.522
Oklahoma	12	11.1	11.1	10.3	10.833	5.7	2.105	1.901
Oregon	9.4	8.9	8.1	7.9	8.300	6.1	1.541	1.361
Pennsylvania	11.4	9.2	8.8	8.1	8.700	3.5	3.257	2.486
Rhode Island	13	10.7	10.3	9.5	10.167	6	2.167	1.694
South Carolina	7.9	8.2	8.8	8.4	8.467	5.5	1.436	1.539
South Dakota	10	9.2	9	6.8	8.333	2.1	4.762	3.968
Tennessee	11.7	10.4	8.7	7.3	8.800	3	3.900	2.933
Texas	11.4	9.6	8.2	7.2	8.333	3.2	3.563	2.604
Utah	11.4	12	10.7	9.9	10.867	5.5	2.073	1.976
Vermont	10	8.6	9.5	9.5	9.200	7.1	1.408	1.296
Virginia	9	8.3	8.1	7.8	8.067	4.8	1.875	1.681
Washington	17.6	12.8	11.1	9.2	11.033	3.1	5.677	3.559
West Virginia	9.3	10.3	9.7	9	9.667	6.5	1.431	1.487
Wisconsin	10.2	11.6	11.3	10.6	11.167	5.9	1.729	1.893
Wyoming	7.6	6.2	5.4	4.3	5.300	1.6	4.750	3.313

Source: The Institute on Taxation and Economics Policy (2003).

Note: These figures are After the benefits the wealthy enjoy from federal itemized deductions.

Figure 1: State Taxes in 2002 (Averages for All States)



Source: The Institute on Taxation and Economics Policy (2003).

voting to the structure of tax systems. He shows that it is very likely for majority voting to lead to the adoption of a regressive tax system, depending on the per capita state government revenue needs and the mean productivity of the population. Given the adoption of a regressive tax system, the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. His result intuitively makes sense: Given the adoption of a regressive tax system, if government revenue requirement keeps increasing, it would be no longer feasible for the government to impose the extra tax burden on poor people. The only option for the government is to impose the extra burden on the rich people so that the tax system would become less regressive.

Second, An (2008) assumes that the population is given and people do not migrate across states. However, in reality people do migrate. In addition, it is reasonable to assume that it is easier for more productive people (rich people) to move from one state to another state because they have more resources to overcome kinds of “migration barriers.” Hence, it seems reasonable to argue that state tax systems are regressive so as to prevent its more productive people to move out and to attract other states’ more productive people to move in. Thus, population mobility implies that the more mobile the population is, the more regressive the state tax system would be.

Third, a substantial body of work, following Becker (1957) argues that people like people of their own race more than they like people of other races. Racial heterogeneity seems to be a significant factor in the political process. Alesina, Baqir, and Hoxby (2004) show that individuals prefer to form racially homogeneous political jurisdictions. DiPasquale and Glaeser (1998) document that racial heterogeneity is closely linked to the incidence of riots. Alesina, Baqir, and Easterly (1999) conclude that racial heterogeneity is an important determinant of local public finances.

American minorities are disproportionately represented among the poor. In 1999 the poverty rate among non-Hispanic whites in the United States was 7.7 percent, compared with 23.6 percent among Blacks. Non-Hispanic whites made up 70.7 percent of the U.S. population but only 46.1 percent of the poor. Since racial minorities are highly overrepresented among the poorest Americans, it seems reasonable to argue that racial heterogeneity is likely to result in a regressive tax system because progressive tax systems would favor the poor racial minorities. Thus, race heterogeneity implies that the more heterogeneous the race is, the more regressive the state tax system would be.

EMPIRICAL EVIDENCE

We have explored three possible explanations for the prevalent adoption of regressive state tax

Table 3
The 10 Most Regressive State Tax Systems in 2002

<i>State</i>	<i>Poorest 20%</i>	<i>Second 20%</i>	<i>Middle 20%</i>	<i>Fourth 20%</i>	<i>Middle 60%</i>	<i>Top 1%</i>	<i>Poor/ Top1%</i>	<i>Middle/ Top1%</i>
Alabama	10.6	10.5	9.8	8.4	9.567	4.9	2.163	1.952
Florida	14.4	11.3	9.9	8.2	9.800	3	4.800	3.267
Illinois	13.1	11.3	10.4	9.9	10.533	5.8	2.259	1.816
Michigan	13.3	12.2	11.1	10.4	11.233	6.7	1.985	1.677
Nevada	8.3	7.5	6.3	5.8	6.533	2	4.150	3.267
Pennsylvania	11.4	9.3	9.1	8.7	9.033	4.8	2.375	1.882
South Dakota	10	9.2	9	7	8.400	2.3	4.348	3.652
Tennessee	11.7	10.5	8.8	7.4	8.900	3.4	3.441	2.618
Texas	11.4	9.6	8.3	7.4	8.433	3.5	3.257	2.410
Washington	17.6	12.9	11.3	9.5	11.233	3.3	5.333	3.404

Source: The Institute on Taxation and Economics Policy (2003).

Note: These figures are Before the benefits the wealthy enjoy from federal itemized deductions.

Table 4
The 10 Most Regressive State Tax Systems in 2002

<i>State</i>	<i>Poorest 20%</i>	<i>Second 20%</i>	<i>Middle 20%</i>	<i>Fourth 20%</i>	<i>Middle 60%</i>	<i>Top 1%</i>	<i>Poor/ Top1%</i>	<i>Middle/ Top1%</i>
Alabama	10.6	10.5	9.6	8.2	9.433	3.8	2.789	2.482
Florida	14.4	11.3	9.8	8	9.700	2.7	5.333	3.593
Illinois	13.1	11.2	10	9.2	10.133	4.6	2.848	2.203
Michigan	13.3	12.1	10.8	9.7	10.867	5	2.660	2.173
Nevada	8.3	7.4	6.1	5.6	6.367	1.8	4.611	3.537
Pennsylvania	11.4	9.2	8.8	8.1	8.700	3.5	3.257	2.486
South Dakota	10	9.2	9	6.8	8.333	2.1	4.762	3.968
Tennessee	11.7	10.4	8.7	7.3	8.800	3	3.900	2.933
Texas	11.4	9.6	8.2	7.2	8.333	3.2	3.563	2.604
Washington	17.6	12.8	11.1	9.2	11.033	3.1	5.677	3.559

Source: The Institute on Taxation and Economics Policy (2003).

Note: These figures are After the benefits the wealthy enjoy from federal itemized deductions.

systems: (1) the model of majority voting over tax schedules; (2) population mobility; and (3) race heterogeneity. The model of majority voting shows that it is very likely for majority voting to lead to the adoption of a regressive tax system. Given the adoption of a regressive tax system, the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. Population mobility implies that the more mobile the population is, the more regressive the state tax system would be. Race conflict suggests that the more heterogeneous the race is, the more regressive the state tax system would be.

The study by the Institute on Taxation and Economic Policy (2003) shows that almost all state

tax systems are regressive. In addition, tax systems across states are strikingly different. In this section, we take advantage of the cross-state difference in state tax systems to test the three possible explanations and see which one (or ones) holds.

Data

Regressivity: The last two columns of both Table 1 and Table 2 are used as our four measures of regressivity of state tax systems. For notational convenience, we denote them as *BT_Before*, *MT_Before*, *BT_After*, and *MT_After* respectively. *BT_Before* means the ratio of the average tax rate for the Bottom 20 percent of families over the average tax rate for the Top 1 percent of families Before accounting for the federal deduction offset.

MT_Before means the ratio of the average tax rate for the Middle 60 percent of families over the average tax rate for the Top 1 percent of families Before accounting for the federal deduction offset. *BT_After* and *MT_After* are defined in a similar way. The higher these four measures are, the more regressive the state tax systems are.

G/x_{mean} : Per capita state government revenue needs, G , can be constructed by dividing the total state government revenue needs by the population of the state. The data on the total state government revenue needs is available from the National Association of State Budget Officers (<http://www.nasbo.org>). The data on the population of each state is available from the U.S. Census Bureau (<http://www.census.gov>). We use per capita income of each state to proxy the average productivity of individuals for each state, x_{mean} . The data on per capita income of each state is also available from the U.S. Census Bureau.

Population mobility: Based on the Census 2000 data, the U.S. Census Bureau has constructed the in-migration rate and out-migration rate from 1995 to 2000 for each state. The in- and out-migration rates for each state are based on an approximated 1995 population, which is the sum of people who reported living in the state in both 1995 and 2000, and those who reported living in the area in 1995 but lived elsewhere in 2000. The in-migration/out-migration rate for each state is the number of people who move into/out of the state divided by the approximated 1995 population. We define population mobility for each state as the average of in-migration rate and out-migration rate for each state — i.e.,

$$PopulationMobility = (Immigrationrate + Outmigrationrate)/2.$$

The data on the in-migration rate and out-migration rate is available from the “State-to-State Migration Flows: 1995 to 2000”, a Census 2000 Special Report which is available at the U.S. Census Bureau Web site.

Race heterogeneity: Following Alesina et al. (1999), we define race heterogeneity for each state as follows:

$$(1) RaceHeterogeneity = 1 - \sum_i (Race_i)^2,$$

where $Race_i$ denotes the share of population self-identified as of race i and

$i = \{White, Black, Asian\ and\ Pacific\ Islander, American\ Indian, Other\}$.

We follow the racial classification used by the U.S. Census Bureau. These classifications are somewhat arbitrary, but they also reflect which race groupings are politically salient. And the data on $\{Race_i\}$ for each state is available at the U.S. Census Web site.

Please note that if the population of a state is 100 percent pure, then *RaceHeterogeneity* is equal to zero.

Results of Regression Analysis

As a first check, we use *BT_Before* as the measure of regressivity of state tax systems and run four regressions: (1) Regress *BT_Before* on G/x_{mean} ; (2) Regress *BT_Before* on *PopulationMobility*; (3) Regress *BT_Before* on *RaceHeterogeneity*; and (4) Regress *BT_Before* on G/x_{mean} , *PopulationMobility*, and *RaceHeterogeneity*. The results are reported in Table 5.

From column (1) of Table 5, we can see that the coefficient of G/x_{mean} is -20.51962 and statistically significant because its p -value is only 0.0020. The negative coefficient of G/x_{mean} means that the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. Thus, the empirical evidence significantly supports the model of majority voting over tax schedules as one possible explanation for the prevalent adoption of regressive state tax systems.

From column (2) of Table 5, we can see that population mobility might not be a very significant contribution factor for the prevalent adoption of regressive state tax systems because its p -value is a little high (0.0898). In retrospect, this result may not be surprising at all because most cited reasons for migration have nothing to do with state tax systems. For example, between 1995 and 2000, 308,000 people moved from New York to Florida, creating the largest state-to-state flow in the United States. This flow reflects substantial retiree migration, not different state tax systems between New York and Florida. In addition, between 1995 and 2000, most state-to-state flows could be characterized as fairly balanced. Highly imbalanced flows were quite uncommon.

Having said that, we can also see that the coefficient of *PopulationMobility* is 7.79509. The

Table 5
Report for Linear Regression Results

<i>Dependent Variable: BT _ Before(Regressivity)</i>				
<i>Independent Variables</i>	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
Intercept	3.51514 (SE: 0.52734) (P: <.0001)	1.03279 (SE: 0.49747) (P: 0.0433)	1.87978 (SE: 0.38501) (P: <.0001)	2.65890 (SE: 0.75640) (P: 0.0010)
<i>G/X_{mean}</i>	-20.51962 (SE: 6.26589) (P: 0.0020)			-20.13778 (SE: 6.43069) (P: 0.0030)
<i>PopulationMobility</i>		7.79509 (SE: 4.50238) (P: 0.0898)		6.08965 (SE: 4.21073) (P: 0.1549)
<i>RaceHeterogeneity</i>			-0.08560 (SE: 1.09791) (P: 0.9382)	0.57823 (SE: 1.01067) (P: 0.5700)

Note: *BT _ Before* means the ratio of the taxes as share of income for the Bottom 20 percent people over the taxes as share of income for the Top 1 percent people, Before accounting for the federal deduction offset. It is a measure of regressivity of state tax systems.

Table 6
Report for Linear Regression Results

<i>Dependent Variable: MT _ Before(Regressivity)</i>				
<i>Independent Variables</i>	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
Intercept	2.65386 (SE: 0.33383) (P: <.0001)	1.06959 (SE: 0.31639) (P: 0.0014)	1.62139 (SE: 0.24453) (P: <.0001)	2.13634 (SE: 0.47993) (P: <.0001)
<i>G/X_{mean}</i>	-13.24132 (SE: 3.96659) (P: 0.0016)			-12.92812 (SE: 4.08023) (P: 0.0027)
<i>PopulationMobility</i>		4.86282 (SE: 2.86356) (P: 0.0959)		3.76878 (SE: 2.67168) (P: 0.1651)
<i>RaceHeterogeneity</i>			-0.12660 (SE: 0.69731) (P: 0.8567)	0.29966 (SE: 0.64126) (P: 0.6425)

Note: *MT _ Before* means the ratio of the taxes as share of income for the Middle 60 percent people over the taxes as share of income for the Top 1 percent people, Before accounting for the federal deduction offset. It is a measure of regressivity of state tax systems.

positive coefficient of *PopulationMobility* means that the more mobile the population is, the more regressive the tax system would be.

Overall, we take this as evidence that population mobility contributes to the prevalent adoption of

regressive state tax systems, although it may not be very significant.

From column (3) of Table 5, we can see that race heterogeneity is not a significant factor at all contributing to the regressive state tax systems because

Table 7
Report for Linear Regression Results

<i>Dependent Variable: BT_After(Regressivity)</i>				
<i>Independent Variables</i>	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
Intercept	4.10248 (SE: 0.52389) (P: <.0001)	1.65797 (SE: 0.50269) (P: 0.0018)	2.38547 (SE: 0.38604) (P: <.0001)	3.36755 (SE: 0.75633) (P: <.0001)
G/X_{mean}	-21.39684 (SE: 6.22448) (P: 0.0012)			-21.32556 (SE: 6.43017) (P: 0.0018)
<i>PopulationMobility</i>		6.75907 (SE: 4.54966) (P: 0.1439)		4.95260 (SE: 4.21039) (P: 0.2455)
<i>RaceHeterogeneity</i>			-0.05257 (SE: 1.10085) (P: 0.9621)	0.65137 (SE: 1.01058) (P: 0.5224)

Note: *BT_After* means the ratio of the taxes as share of income for the Bottom 20 percent people over the taxes as share of income for the Top 1 percent people, After accounting for the federal deduction offset. It is a measure of regressivity of state tax systems.

Table 8
Report for Linear Regression Results

<i>Dependent Variable: MT_After(Regressivity)</i>				
<i>Independent Variables</i>	<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>
Intercept	3.03094 (SE: 0.31399) (P: <.0001)	1.60972 (SE: 0.30349) (P: <.0001)	2.02298 (SE: 0.23185) (P: <.0001)	2.67065 (SE: 0.45605) (P: <.0001)
G/X_{mean}	-12.97532 (SE: 3.73079) (P: 0.0011)			-12.92287 (SE: 3.87718) (P: 0.0017)
<i>PopulationMobility</i>		3.59418 (SE: 2.74673) (P: 0.1969)		2.50039 (SE: 2.53873) (P: 0.3298)
<i>RaceHeterogeneity</i>			-0.11049 (SE: 0.66115) (P: 0.8680)	0.31640 (SE: 0.60935) (P: 0.6061)

Note: *MT_After* means the ratio of the taxes as share of income for the Middle 60 percent people over the taxes as share of income for the Top 1 percent people, After accounting for the federal deduction offset. It is a measure of regressivity of state tax systems.

its *p*-value is even higher than 0.9, at 0.9382. In addition, the coefficient of *RaceHeterogeneity* is negative (-0.08560), which is in contradiction with the theoretical prediction. Therefore, the empirical analysis does not support race heterogeneity.

This result is in sharp contrast with many papers regarding the effect of race heterogeneity on the political process.

From column (4) of Table 5, we can see that the coefficient of G/x_{mean} is -20.13778 and statistically

significant because its p -value is only 0.0030. The negative coefficient of G/x_{mean} means that the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. Therefore, this regression significantly supports the model of majority voting over tax schedules as one possible explanation for the regressive state tax systems. Similarly, the coefficient of *Population Mobility* is positive (6.08965), which supports our prediction, although its p -value is a little high (0.1549). We still take this as evidence that population mobility contributes to the prevalent adoption of regressive state tax systems. However, this regression does not support race heterogeneity because the p -value of the coefficient of *Race Heterogeneity* is as high as 0.5700.

As a robustness check, we also use *MT_Before*, *BT_After*, and *MT_After* as measures of regressivity of the state tax systems and do the exactly same regression analysis. The results are reported in Table 6, Table 7, and Table 8 respectively. Comparing these three tables with Table 5, we can see that the results are very consistent: Our empirical analysis supports the model of majority voting over tax schedules and population mobility as two possible explanations for the prevalent adoption of regressive state tax systems, but does not support race heterogeneity.

CONCLUSION

A recent study finds that almost all states adopt a regressive tax system, which cannot be explained by the “benevolent social planner” approach to tax systems. This paper explores three possible explanations for the prevalent adoption of regressive state tax systems: (1) a model of majority voting over tax schedules; (2) population mobility; and (3) race heterogeneity. The model of majority voting shows that it is highly possible for majority voting to lead to the adoption of a regressive tax system, depending on the per capita state government revenue needs and the mean productivity of the population. Given the adoption of a regressive tax system, the tax system would be less regressive as the ratio of the per capita government revenue requirement over the mean productivity of the population increases. Population mobility implies

that the more mobile the population is, the more regressive the state tax system would be. Race heterogeneity implies that the more heterogeneous the race is, the more regressive the state tax system would be.

We take advantage of the cross-state difference in tax systems to test the above three possible explanations. The results of our cross-state analysis support the model of majority voting over tax schedules and population mobility as two possible explanations for the regressive state tax systems, but do not support race heterogeneity.

We fully recognize that there might be other possible factors contributing to the prevalent adoption of regressive state tax systems. It's impossible for us to explore all of them. In addition, as any kind of a time-series data on regressivity of state tax systems is not available, further time-series analysis is infeasible. However, the bottom line is that we believe the model of majority voting over tax schedules and population mobility convincingly, at least partially, explains the prevalent adoption of regressive state tax systems and survives our empirical test.

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