THE UNINTENDED DISTRIBUTIONAL COSTS OF DEVOLUTION IN THE U.S. WELFARE REFORM OF 1996

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Abstract

The passage of the Personal Responsibility and Work Opportunity Reconciliation Act in 1996 devolved responsibility for the design and implementation of welfare programs from the federal to state governments in the U.S. Some of the strategies implemented to achieve the main goals of the reform –promoting higher levels of labor participation and decreasing levels of welfare dependency– might have had the unintended effects of reducing the protection received by the most vulnerable households and increasing inequality in benefit levels across states. In this paper we estimate these effects using TANF data covering the two decades after the PRWORA's enactment. First, we measure the contribution of each state to inequality in adequacy rates making use of the Gini index and interpreting this inequality measure in terms of deprivation. Second, we provide an interpretation of the decomposition of the change in welfare inequalities in terms of progressivity and re-ranking components. Third, we analyze the notions of inequality and convergence in TANF adequacy rates. We find that inequality in adequacy rates increased and a race-to-the-bottom process took place during the period under study.

Keywords: TANF, devolution, inequality, race-to-the-bottom

JEL: D31, H73, I38

1. INTRODUCTION[1]

The passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) devolved responsibility for the design and implementation of welfare programs from the federal to state governments in the U.S. The motivation was to prompt states to create effective and innovative programs in order to promote higher levels of labor participation and decreasing levels of welfare dependency. As states were given more capacity to design their programs the reform produced some kind of 'laboratories of democracy', using the phrase popularized by U.S. Supreme Court Justice Louis Brandeis.[2]

Two decades later, considerable evidence has accumulated showing that in the process of welfare reform state and local governments have followed differing strategies and ended enacting very different programs. We have also learned that some states and localities have been more responsive to the new framework than others as they have taken more advantage of the opportunity to change the programs parameters. This unequal responsiveness became more evident with the Great Recession, renewing discussion about the social welfare cost in terms of the resulting inequality in benefit levels. While it is clear that the success of the programs should be measured mainly according to their initial objectives –promoting higher levels of labor participation and decreasing levels of welfare dependency– some of the strategies implemented might have had the unintended effects of reducing the protection received by the most vulnerable households. Inequality arising from the increasing differences of benefit levels across states might also be a distributional concern. Lower adequacy rates and higher inequality in benefit levels would mean the devolution process yielded social welfare costs that should be taken into account in any comprehensive assessment of the reform.

There are several avenues through which PRWORA can potentially increase differences of welfare benefits among states. States have broad discretion to determine policies

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[2] "Laboratories of democracy" is a phrase popularized by U.S. Supreme Court Justice Louis Brandeis in New State Ice Co. v. Liebmann to describe how a "state may, if its citizens choose, serve as a laboratory; and try novel social and economic experiments without risk to the rest of the country."

while complying with three federal requirements: fostering labor transitions through work requirements, imposing sanctions to those who fail to comply with the work requirements, and setting time limits on the receipt of benefits. States can also modify eligibility requirements, including asset and earnings disregards. Additionally, states have the ability to choose both the extent of welfare eligibility and the intensity of benefits provided through the program, including reducing benefits for noncompliance.

A key issue is whether this increase in discretion to state governments has led to more generous welfare programs providing better coverage to the most vulnerable households or, in contrast, to punitive welfare programs that offer lower level of benefits, stringer eligibility criteria and more restrictive work requirements for those most vulnerable households. A second, less investigated issue, is whether decentralization has given rise to a substantial divergence in the level of benefits across states and which are the distributional consequences of this process. Higher levels of labor participation and decreasing levels of welfare dependency might have been obtained at the cost of hurting the most vulnerable households trough lower and unequal benefits.

One strand of the related literature of welfare decentralization has traditionally stressed the possible improvements in terms of efficiency and coverage of the programs. States governments better understand both social preferences and needs of the poor households and are able to implement these programs more effectively. On the other hand, the design of the policy reform would seem to have ignored the potential consequences of interjurisdictional competition. Decentralization might give rise to a 'race to the bottom' with lower benefit levels and higher differences across states (Peterson and Rom, 1989; Shroder, 1995; Rom *et al.*, 1998; Figlio *et al.*, 1999; Brueckner, 2000; Saavedra, 2000; Berry *et al.*, 2003; Bailey and Rom, 2004; Baicker, 2005a,b) and as a consequence lead to considerable welfare underprovision (Gramlich *et al.*, 1982; Brown and Oates, 1987; Wheaton, 2000; McKinnish, 2005; Toolsema and Allers, 2014). While the evidence is somewhat mixed regarding the size and causes of the 'race to the bottom' effect, most studies confirm it. The empirical importance of such interjurisdictional welfare competition has also been addressed in studies of some European countries with decentralized welfare related policies like personal social services in the UK (Revelli, 2006), local welfare benefits in Norway (Fiva and Rattsø, 2006) and the refugee placement program in Sweden (Dahlberg and Edmark, 2008).

As the evidence on lower benefits in real terms with respect to the levels before the reform in many states is increasingly robust, there has arisen renewed academic discussion over how does this higher decentralized system of welfare provision produce higher levels of inequality. As stressed by Chernick (2000), if more fiscal responsibility for redistribution is left to subnational levels of government, then states with weak fiscal capacity or limited preferences for redistribution might choose benefits and levels of access that fall below some supposed minimum national standards of adequacy.

In the assessment of the 1996 welfare reform, a key issue is whether the federal government should have set up explicit distributional constraints on the process of maximizing labor participation and reducing caseloads. Despite the government did not impose any explicit limit to the process of decreasing benefits we can assume that there were at least two implicit constraints: i) a maximum level of unequal benefit levels across states; ii) a maximum absolute loss of social welfare. By making these goals explicit it would have been possible to have more accurate evaluations of the states' outcomes. Given two states with the same results in terms of job creation, the one who would have got it without lowering benefits and contributing less to inequality would receive a more positive assessment.

The decision-maker disregarded the potential negative distributional externalities arising from interjurisdictional competition. The expectation was that under the abovementioned perspective of fifty laboratories there would be some who would clearly be winners and there would be a process of imitation –benchmark competition– of the states that did better. An optimal or equilibrium solution would be achieved with substantial improvements with respect to the system in force before the reform. The existence, however, of interjurisdictional competition places into question that the observed balance is the result of policy improvements in the experiment, being instead a sub-optimal product of the competition process. The measurement of the inequality arising from such competition would contribute to have a global picture of the results of this sub-optimal process.

A question commonly asked in the literature has been therefore whether the changes in benefit levels as a result of the devolution process has taken many states to what may be considered suboptimal provision levels, and whether the different intensity across states

in the trend of decreasing benefits has produced important inequalities in the protection provided by the program.

Our paper enters at this point. We use some of the tools of the income distribution literature to construct a more complete picture of inequality in benefit levels across states in the U.S. arising from the Temporary Assistance for Needy Families (TANF) program. While we are not the first to study both the decreasing trend in benefit levels in welfare programs in the US and the extent of differences across states, our work differs from the previous literature in that we analyze these differences using a distributional approach. While transitions to employment and reductions in welfare caseloads have garnered a great deal of research attention heretofore the evidence on these distributional concerns has been scarce. Far less research has examined how some states contribute to inequality in benefit levels and which is the marginal impact on social welfare of lower and more unequal benefits.

Using data covering the two decades after the PRWORA's enactment we contribute to the development of a more comprehensive picture of inequality across the states by first measuring the contribution of each state to inequality in adequacy rates making use of the Gini index and interpreting this inequality measure in terms of deprivation. Second, following Silber (1995) and Jenkins and Van Kerm (2006), we provide an interpretation of the decomposition of the change in adequacy inequalities in terms of progressivity and re-ranking components. Third, we analyze the notions of inequality and convergence under the unified framework proposed by Donghde and Silber (2015).

By using a distributional approach we find that inequality increased and a race-to-the-bottom process took place during the time period under study. Besides adding new robust measures of both processes we provide new results which were unknown so far identifying which states are the ones that contribute most to inequality. We also find that despite the reduction of benefits was lower in the states with initial lower levels inequality increased.

The remainder of the paper is organized as follows. Section two provides a brief summary of the main trends in benefit levels since the enactment of the reform. Section three summarizes how to interpret inequality in benefit levels in terms of deprivation; this allows us to identify the contribution of each state to total inequality. Section four

decomposes inequality in adequacy rates in terms of progressivity and re-rankings. In section five we analyze the issues of pro-poor growth and convergence through different measures. The paper ends with a brief list of conclusions.

2. TRENDS IN WELFARE BENEFITS

In 1996, the federal government passed legislation that transformed welfare provision in the US. The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) replaced the AFDC (Aid to Families with Dependent Children) program, which was a federal entitlement program providing federal funds to match states' expenditures on welfare programs, with the TANF (Temporary Assistance for Needy Families), a block grant that caps the dollar amount of federal funds to the states, regardless of increases in case size. This change made state expenditures on cash benefits through TANF no longer subsidized at the margin (Marton and Wildasin, 2007).

This new system of block grants gave states more capacity to select among policy parameters imposing on them simultaneously forceful mandates to promote work and reduce welfare usage. To qualify for TANF funds, states must comply with three federal requirements: i) state programs must emphasize work requirements to promote transitions from welfare to work; ii) state programs must include sanctions for reducing benefits to recipients who do not comply with the work requirements; iii) state programs must impose a five-year lifetime cap on receipt of benefits. As states responded to this new federal framework, their policy changes focused less on the amounts of reliefs offered than on the terms on which aid was given (Soss *et al.*, 2001; De Jong *et al.*, 2006).

Nevertheless, under the new framework, states have the ability to choose the intensity of benefits provided through their programs. Until the introduction of PRWORA, the states received the same federal match for their welfare spending regardless of whether this came from increased spending per recipient or the increased number of recipients. AFDC was jointly financed, with the federal matching rate depending on state income and with no cap on total expenditures. Quite the opposite, TANF is essentially a block grant, with a matching rate of 0. Different authors have estimated the elasticities of benefit levels and caseloads with respect to federal subsidies (Chernick, 1998; Ribar and

Wilhelm, 1999). The most robust results show that while states faced a marginal price (for both benefits and recipients) of around 40 cents on the dollar on average in 1995, TANF increased the price of either kind of spending to 1, representing an increase in both prices of 120% (Baicker, 2005a).

It was not surprising then to predict that states with higher caseload-to- population ratios under AFDC in 1996 were going to adopt more restrictive policies under the TANF system, including lower benefit levels. In general terms, PRWORA was a break from previous trends of welfare spending in the United States, which had grown both in absolute terms and as a percentage of GDP monotonically for 30 years prior to reaching an all-time high in 1994 (Moffitt, 1999). There is substantial evidence of a sharp decline in welfare caseloads since TANF was enacted in 1996. The first years after the PRWORA's enactment were marked by unprecedented drops in the number of families receiving cash assistance. The number of recipients dropped more than sixty per cent between 1994 and 2001 and continued to decrease in later years before slowing down and reversing slightly when the Great Recession began (Weaver, 2014). The national TANF average monthly caseload has fallen by more than two-thirds over the last two decades –from 4.4 million families in 1996 to 1.2 million families in 2016. In a number of states, TANF provides cash assistance to a much smaller share of poor families than the national data suggests. In 12 states, 10 or fewer families receive cash assistance for every 100 families in poverty while in 13 other states, 30 or more families receive cash assistance from every 100 families in poverty (Center on Budget and Policy Priorities, 2016). Most of the states that experienced a greater degree of caseload decline were those that engaged in second-order devolution –which allows local governments to exercise more discretion in the implementation of TANF (Kim and Fording, 2010).

According to these numbers, TANF has provided basic cash assistance to fewer needy families even when economic needs greatly increased, especially with the start of the Great Recession. The vast majority of states had declines in cash assistance during a very weak economic period, in sharp contrast to the huge increase in food stamp usage (Ziliak, 2016). There is also evidence showing that caseloads seem to have been less responsive to unemployment changes than they were twenty years ago. Using data on state caseloads from 1980-2009 and interacting unemployment rates and measures of welfare reform, Bitler and Hoynes (2010) found that the substantial changes implemented in welfare programs in the US during the nineties caused a decrease in the

cyclicality of cash welfare. The available evidence also suggests that the lack of increase in caseloads is explained almost entirely by declines in take-up rather than declines in eligibility (Purtell and Gershoff, 2012). Recently, Bitler and Hoynes (2016) confirmed the lack of responsiveness of TANF to the Great Recession extending the data through 2012, and as a consequence extreme poverty became more cyclical than in past recessions.

[TABLE 1]

Relatively less is known about the changes in benefit levels. Table 1 presents benefit levels for a family of three for 1996, 2000, 2005, 2010, and 2016 adjusted for inflation using the Consumer Price Index (Bureau of Labor Statistics). The purchasing value of most benefits has fallen. While differences among states are substantial, the amount of cash assistance has declined in inflation-adjusted terms since 1996 in almost every state –the exceptions are Wyoming and Texas. Many states did not adjust benefits, allowing inflation to erode the benefits' value. The mean states' benefit level measured in constant terms dropped 2.6% in twenty years from $307 in 1996 to $299 in 2016. If the analysis is extended in time moving to AFDC data before the implementation of TNF in 1996, the real benefit declined from 24 to upwards of 70 percent between 1970 and 2012, and for the median state it fell by 51 percent (Ziliak, 2016). These changes in the level of benefits imply that many families are more vulnerable financially today than decades ago.

Benefit levels vary substantially among states.. For each year, the benefits in the five states with the highest benefits more than triple the benefits in the five lowest benefit states. In 2016, in the former group were Alaska, New York, California, Connecticut, and New Hampshire; these states were also among the ten states with the highest benefits in 1996 before the TANF reform. At the bottom of the ranking are Mississippi, Tennessee, Arkansas, Alabama, and Louisiana, which were also the states with the lowest benefits twenty years ago. Nevertheless, with the exception of the upper and lower tails of the states' distribution, the corresponding rankings of benefit levels are not constant. While some states have a similar position each year, there have been some remarkable re-rankings. When comparing the current ranking and that of 1996, twenty states made jumps of five or more places. In general terms, the reduction of benefit

levels in real terms was remarkably higher in the five states with the highest benefits than in the five states with the lowest ones.

As mentioned above, the fall in benefit levels in most states has severely limited the capacity of the programs to alleviate poverty. A general approach to assess the economic sufficiency of the programs is to relate the level of benefits to a single measure representing average living standards. In order to do so, by comparing incomes and poverty lines we can assume that the states' aim for the program should be to provide cash transfers sufficient enough to bring everyone in each state up to an income level sufficient to not be considered poor. These adequacy rates are presented in Table 2. For each state, the level of benefit for a family of three is compared to the official poverty line calculated by the Census Bureau.[3]

[TABLE 2]

The picture of states and ratios considering benefits as a proportion of the federal poverty line is very similar to the previous analysis of inflation-updated benefits. The mean states' adequacy rate dropped from 37.2 in 1996 to 27.6 in 2015. In more than two-thirds of the states the adequacy rate decreased in over 20 per cent during this period. The only exceptions escaping this decreasing trend were Maryland and Wyoming where the level of benefits as a proportion of the poverty threshold increased more than 10 per cent.

Again, the differences are striking between the states with the highest ratios (over 42 per cent): New York, Alaska, California, Connecticut, and New Hampshire, and the states with the lowest ratios (below 15 percent): Louisiana, Alabama, Arkansas, Tennessee, and Mississippi. However, it seems that there is not a linear relationship between the reduction of the ratio and its initial level. In general terms, the reduction of benefits as a proportion of the poverty threshold was somewhat lower in the states that had the lowest ratios in the mid-nineties and the opposite occurred in case of the most generous states. However, there are important re-rankings –yet less relevant than in the case of absolute benefit rankings.

[3] For Alaska and Hawaii, where the cost of living is traditionally believed to be significantly higher than in other states, scaling factors of 1.25 and 1.15, respectively, are applied to the guideline for a family or household of three for the 48 contiguous states, and the results (if not already a multiple of $10) are rounded upward to the nearest whole multiple of $10.

In short, both measures of benefit levels across states show that the protection provided by TANF has eroded in most states, leaving more families without sufficient income resources to meet their basic needs. Currently, TANF plays much less of a role in reducing poverty than AFDC did before 1996 and also less than other social security programs currently do. Secondly, the large differences observed in the treatment given to poor households (in identical conditions) in different geographic areas of the country are a source of inequality. In this sense, the increasing decentralization of welfare benefits implied by TANF has given rise to a problem of horizontal inequity. This latter problem lies at the heart of any discussion on the welfare consequences of giving the states broader discretion and responsibilities to determine antipoverty policies.

3. STATES CONTRIBUTIONS TO INEQUALITY IN ADEQUACY RATES

Differences across states in adequacy rates contribute to inequality in terms of the different protection provided. These inequalities can be measured and so can be the contribution of each state to them. Considering the adequacy rate as a measure of the protection provided by each program it is possible to use traditional indicators of inequality to summarize how these differences have evolved. .

To this end we will make use of the Gini index and of its interpretation in terms of deprivation. The approach adopted here is similar to that of Sen's (1973), which is also closely related to Pyatt's (1976) interpretation of the Gini index in terms of the expected gain of a game in which each individual is able to compare herself with someone drawn from the total population. The measurement of social or overall deprivation involves a two-stage process. First, a deprivation profile is defined which consists of the list of individual deprivations felt by each individual in society. In a second step these individual indices are aggregated into an overall deprivation measure. To this point in time, all indices of deprivation proposed in the literature have been derived by means of this approach (Yitzhaki, 1979; Chakravarty and Chakraborty, 1984; Berrebi and Silber, 1985; Paul, 1991; Chakravarty and Mukherjee, 1999).

A simple framework to measure inequality in adequacy rates across states

Let us consider a state which expects to increase its adequacy rate and therefore compares itself with the level of all those states with higher levels of adequacy. Let us assume a fixed homogeneous population N {l, 2, . . . , n} of n (n≥2) jurisdictions that in

our framework are states that differ in the outcome of interest (adequacy rates). A feasible distribution Y is given by an outcome vector $(y_1, y_2, \ldots, y_n) \in \boldsymbol{R}^n$ where y_i is state i's adequacy, $i = 1, 2, \ldots, n$, $y_1 \leq y_2 \leq \ldots \leq y_n$ and μ is the mean adequacy. Following Runciman's (1966) statement that "the magnitude of a relative deprivation is the extent of the difference between the desired situation and that of the person desiring it", the deprivation, $I_D(y_i, y_j)$, felt by a state with adequacy y_i with respect to other state with adequacy y_j, where $y_j \geq y_i$, can be considered to be the adequacy differential. That is

$$I_D(y_i, y_j) = \begin{cases} y_j - y_i & if\ y_j \geq y_i \\ 0 & if\ y_j < y_i \end{cases} \qquad [1]$$

The average deprivation felt by a state with adequacy y_i over the whole set of jurisdictions, $I_D(y_i)$, is

$$I_D(x_i) = \frac{1}{n}\sum_{j=i+1}^{n}(y_j - y_i) = \mu\big(1 - L(i)\big) - \frac{(n-i)}{n}y_i = \mu_i^+ - \frac{(n-i)}{n}y_i \qquad [2]$$

where $L(i) = \frac{1}{\mu n}\sum_{j=1}^{i} y_j$ is the cumulative proportion of the total outcome (adequacy) enjoyed by the bottom *i*/*n* proportion ($0 \leq i \leq n$) of the jurisdictions and μ_i^+ is the mean adequacy of states where it is greater than y_i .

The average feeling of deprivation of the whole set of jurisdictions is I_D:

$$\begin{aligned} I_D &= \frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=i+1}^{n}(y_j - y_i) = \frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=i+1}^{n} y_j - \sum_{i=1}^{n}\frac{(n-i)}{n^2}y_i \\ &= \frac{1}{n^2}\sum_{i=1}^{n}(2i - n - 1)y_i = \mu G \end{aligned} \qquad [3]$$

As we want to analyse relative inequality and not the absolute index of inequality, we will compute deprivation in relative terms respect to the mean of the whole set of jurisdictions.

The contribution of each state to overall inequality is

$$C(x_i) = I_D(y_i)/nI_D \qquad [4]$$

[TABLE 3]

Table 3 shows the contribution of each state to overall inequality in adequacy rates in 1996, 2000, 2005, 2010 and 2015, and the corresponding Gini indexes. Inequality in adequacy rates has slightly increased, (4.74% increase) from 1996 to 2015, showing that relative mean differences in adequacy rates across states is greater in 2015 than in 1996.

We simultaneously observe changes in the contribution of the states to overall inequality in adequacy rates showing that the distance with respect to states with greater adequacy rates were not the same from one year to the next. Alaska was the state with the highest adequacy rate in 1996, 2000, and 2005, and therefore contributes 0 to inequality, while New York played the same role in 2010 and 2015. On the other extreme, we find Alabama and Mississippi in 1996 and 2000, and Mississippi and Tennessee in the remaining years.

However, contributions to inequality were not stable along this time span. Arizona, New Mexico and Oklahoma had the largest increases in contributions during 1996-2015. This means that the relative mean distance to the benchmark (greater adequacy rates) increased during this period of time. At the other extreme, Maryland, Texas and Wyoming showed the largest reductions in contributions. Furthermore, in the cases of Maryland and Texas the contribution continuously decreased along these years, with adequacy rates constantly getting closer to the highest ones every year.

In short, not surprisingly, once the devolution process of 1996 got started, inequality in adequacy rates increased. Given also that benefit levels as percentage of federal poverty threshold fell in most states, we can then conclude that if the evaluation of the reform were made exclusively in distributional terms PRWORA yielded welfare losses. However, this increase in inequality could have been the cost of the improvements in participation rates and lower welfare dependency.

4. INEQUALITY, PROGRESSIVITY AND RE-RANKINGS IN TANF BENEFITS

Inequality changes in adequacy rates are associated with changes in the states' benefit levels and the changes in their ranks in the national distribution of these rates. These two types of changes may not be independent since, for instance, a large increase in the rates will often be associated with an increase in rank. This makes it necessary to go further in the analysis. The dispersion observed in the adequacy rates makes it important to disentangle whether changes in inequality are due to the re-rankings of the states or to a higher growth of adequacy levels of those states ranking lower in the adequacy distribution.

Following Silber (1995) and Jenkins and Van Kerm (2006), we model the change in the Gini index of adequacy rates between some base year (0) and final year (1) for a fixed number of states. Letting G_t denote the Gini index for year t, the change in this measure can be written as

$$\Delta G = G_1 - G_0 \qquad [5]$$

When the change in inequality is measured through the Gini index, an assumption of anonymity is made. It is not known whether the states had the same rank at time 0 and at time 1. We analyze the changes in the adequacy rates over time and decompose them into two components: one related to the changes in the states' relative adequacy and a second component related to the changes in their ranks in the corresponding distribution.

There are two steps through which inequality may be introduced in the different stages. Our starting point is the distribution of the adequacy rate in the initial year (year 0) assuming that the states keep the rank they had in year 0 but they are given their adequacy rate in year 1. Let $C_1^0(p)$ be the concentration curve for adequacy with respect to this "lexicographic adequacy parade" (Lambert and Aronson, 1993). The argument p denotes the states' rank in an adequacy parade where states are ordered by increasing initial rates of adequacy. It is easy to observe that for each p, $C_1^0(p)$ corresponds in fact to the ratio of the mean adequacy of the Np first states in the current stage of the adequacy parade and the mean adequacy for the whole population in year 1. The re-ranking component between year 0 and year 1 can be identified by rearranging the states

from the lowest to the highest in the distribution of year 1. This gives us the true adequacy parade.

In short, we may define *V* and *R* as:

$$V = G_0 - C_1^0 \quad [6]$$

$$R = G_1 - C_1^0 \quad [7]$$

where C_1^0 is the concentration index.

The coefficient V summarizes the progressivity or pro-poor growth across the base year adequacy distribution. When every state experiences an equi-proportionate growth in the adequacy rate, relative measures remain constant, and V=0. When $\mu_1>\mu_o$ and there is no equi-proportionate growth but it is more concentrated at the bottom of the distribution, V>0. This can be considered a pro-poor growth in adequacy rates (progressivity). By contrast, if gains are more than proportionally concentrated among states with higher adequacy rates, V<0. This would be the case of non-pro-poor growth in adequacy rates (regressivity). The opposite occurs when $\mu_1<\mu_o$. The coefficient *R* summarizes re-rankings from the initial to the final year. Clearly, when there is no re-ranking, R=0, and R>0 otherwise. R/G_1 is the asymmetric Gini mobility index', whose desirable properties are discussed at length by Wodon (2001) and Yitzhaki and Wodon (2004). And it, in turn, has the same form as the Atkinson (1980)-Plotnick (1981) measure of horizontal inequity in the income tax literature.

Therefore, the change in inequality can be decomposed in two terms, progressivity and re-ranking:

$$\Delta G = R - V \quad [8]$$

As stressed by Jenkins and Van Kerm (2006), *V* is a social-weighted average of the changes in relative adequacy between years 0 and 1 with weights determined by year 0 ranks and *R* is a relative- adequacy-weighted average of changes in social weights.

[FIGURE 1]

This decomposition can be represented graphically. The increase or decrease in inequality over this period is represented by an outward shift in the Lorenz curve.

Figure 1 shows the Lorenz and concentration curves for adequacy in years 1996 and 2015. The difference between the Lorenz curves can be broken down into two components. One is the difference between the Lorenz curve for adequacy rates in 1996 (L_{1996}) and the concentration curve for 2015 constructed using 1996 ranks (C_{2015}^{1996}). It summarizes the progressivity of the change: V is twice the area between these two curves. The second component is the difference between the concentration curve (C_{2015}^{1996}) and the Lorenz curve for 2015 (L_{2015}), which summarizes the extent of re-rankings. Note that, by construction, the latter lies nowhere below the former. R is twice the area between these two curves. Figure 1 shows very modest differences in the corresponding curves. To interpret the results we analyze the values of the indices of re-ranking, progressivity and change in inequality represented in Table 4.

[TABLE 4]

Mean adequacy rates fell during the period 1996-2015, but it is not clear whether this reduction was progressive or not. The concentration curve has sections above and below the Lorenz curve for 1996. The progressivity index has a positive sign showing that the average decrement of adequacy rates was greater for states with higher adequacy rates. The inequality decreasing effect of pro-poor growth in adequacy rates is more than offset by that of re-rankings. During 1996-2000 and 2005-2010 there was a progressive reduction in adequacy rates that was partially counterbalanced by re-rankings, all resulting in a reduction in inequality. In the period 2000-2005 inequality growth stemmed exclusively from re-rankings. Finally, the period 2010-2015 is the only one with a non-pro-poor growth in adequacy rates that was reinforced by re-rankings resulting in the greatest growth of inequality in adequacy rates. In general terms, we can conclude that for the whole period even though the states experienced a reduction in adequacy that was greater in the states with higher rates in 1996 , the effect of re-rankings made inequality to increase.

The decomposition analysis above therefore gives general support to the notion that the differences in adequacy rates increased mainly as the result of the changes in the positions of the states in the rates distribution.

It is also possible to identify the contribution of each state to overall progressivity and the re-rankings. Following the same reasoning than in the previous section, the

contribution of each state to overall progressivity and re-rankings are respectively $\frac{V(y_i)}{nV}$ and $\frac{R(y_i)}{nR}$, where:

$$V(y_i) = \frac{1}{n^2\mu_0}\sum_{j=i+1}^{n}(y_j - y_i) - \frac{1}{n^2\mu_1}\sum_{j=i+1}^{n}(x'_j - x'_i) \quad [9]$$

$$R(y_i) = \frac{1}{n^2\mu_1}\sum_{j=i+1}^{n}(x_j - x_i) - \frac{1}{n^2\mu_1}\sum_{j=i+1}^{n}(x'_j - x'_i) \quad [10]$$

and y_i is state i's adequacy rate in period 0, $y_1 \leq y_2 \leq \ldots \leq y_n$, x_i is state i's adequacy rate in period 1, $x_1 \leq x_2 \leq \ldots \leq x_n$ and x'_i is state i's adequacy rate in period 1 with states keeping the rank they had in year 0.

[TABLE 5]

Table 5 shows the share of each state in the change in inequality in adequacy rates for the period 1996-2015. The different contributions to changes in inequality might be driven by changes in the initial level of adequacy rates or by changes in the ranking of the states. This information is contained in the columns labeled %V and %R in Table 5. Arizona and Oklahoma contributed the most to the growth of inequality while Texas and Wyoming contributed the most to reduce that growth. Regarding progressivity in the reduction of adequacy rates, Wyoming and Maryland made the greatest contribution to this pro-poor trend in rates, while Arizona and Oklahoma contributed in the opposite direction (non-pro-poor change). Concerning re-rankings, Wyoming and Maryland experienced the largest increases, whereas Mississippi and Tennessee the smallest.

This variety of experiences is again related to the broader discretion to determine states policies introduced by PRWORA in 1996. Although under a general trend of falling benefits, some states introduced less strict requirements to access benefits or softer constraints on the intensity of benefits. The advantage of our approach in this section is that this heterogeneity can be translated into distributional measures that show that in general terms the reduction in adequacy rates was especially marked in the states with initial higher benefit levels ('pro-poor decreasing trends').

6. INEQUALITY AND CONVERGENCE IN BENEFIT LEVELS

The previous analyses of inequality in benefit levels and the corresponding contributions of the different states to overall inequality help to confirm the increasing differences in adequacy rates across states as a result of the devolution process.

A second and important issue that can be addressed using a distributional approach is whether or not devolution also yielded a 'race to the bottom' process. Given that benefit levels became lower in most states and that differences across states have become larger today than two decades ago, it can be expected that this process has been one of the long-term results of the reform. The issue of the relationship between the change in adequacy rates and how these changes are distributed among states is central in considering whether these changes gave rise to increasing or decreasing levels of convergence.

In order to identify the welfare gains associated with inequality and convergence in adequacy rates, first we make use of a graphical tool, the well-known Growth Incidence Curves (GIC) introduced by Ravallion and Chen (2003). The GIC initially was formulated to measure pro-poorness of anonymous income growth, but it was soon extended in a variety of ways. Grimm (2007) applied this curves to the non-anonymous case and referred to it as the Individual Growth Incidence Curve (IGIC). Grosse et al. (2008) used these curves to examine whether growth in non-income dimensions was pro-poor by defining the Non-Income Growth Incidence Curve (NIGIC). We make use of the NIGIC to obtain a graphical analysis of the distribution of growth in adequacy rates. More precisely, we will use the graphical tools of the Anonymous and Non Anonymous Non-Income Growth Incidence Curves.

In the anonymous case, we estimate the growth rate in adequacy of a state ranked *i* in 2006 relative to that of a state with the same rank i in 2015. In the non-anonymous case, we compute the growth rate in adequacy in a state in 2006 relative to the adequacy corresponding to the same state in 2015.The non-anonymous-NIGIC can be estimated using the change in adequacy rates y_t for each state at two periods, t and $\mathrm{t}-1$, the states ranked by increasing order of adequacy rates at $\mathrm{t}-1$,

$$g_{it}=\left(\frac{y_{it}}{y_{it-1}}\right)-1 \qquad [11]$$

where y_{it} and y_{it-1} refer to the adequacy rate of state i at times t and $t-1$ in a population of n states. If g_{it} is a decreasing function for all i, then inequality falls over time for all inequality measures.

The anonymous-NIGIC can be estimated using the change in the adequacy rates y_t for each percentile p at two periods, t and $\mathrm{t}-1$,

$$g_t(p)=\left(\frac{y_t(p)}{y_{t-1}(p)}\right)-1 \qquad [12]$$

If $g_t(p)$ is a decreasing function for all p, then inequality falls over time for all inequality measures.

We are aware that the use of anonymous-NIGIC is based on a cross-sectional comparison of the marginal distributions at the beginning and end of the time period considered. Therefore, we omit the issue of income mobility from the evaluation of growth rates. This approach satisfies the symmetry axiom in the measurement of income inequality. If we want to consider income mobility in the evaluation of growth rates, we should use the non-anonymous-NIGIC.

[FIGURE 2]

Figure 2 shows the Non-anonymous and the Anonymous Growth Incidence Curves for the adequacy rates. The figure confirms our previous conclusion of a progressive non-anonymous reduction of adequacy rates. In general terms, the greatest reduction in these rates during the period 1996-2015 was in the states which had higher adequacy rates in 1996. Nonetheless, the analysis in an anonymous setting shows that the highest reduction in the adequacy rates during the same period took place in the lower centiles. This apparent contradiction is due to the re-rankings. The highest increases in the ranking were experienced by the states with lower initial adequacy rates, which in 2015 are significantly higher in the distribution.

Finally, we compute distributional change indices. First, we use Silber's (1995) measure of distributional change to assess inequality in growth rate. Second, following Donghde and Silber (2016), we estimate the index of distributional change that summarizes convergence in a non-anonymous case –this index measures the degree of β-convergence across states in the adequacy rate. This methodology allows the estimation

of measures of distributional change even when the number of observations is limited and only available in aggregate form. This methodology is particularly useful in the analysis at the state level because of the relatively small number of observations (51, from 50 states plus the District of Columbia). In such a case, traditional econometric approaches to convergence analysis cannot be used.

Let s_i and w_i refer to the share in total adequacy rate at times t and $t-1$. Let us assume that the shares s_i and w_i are ranked by increasing values of the shares s_i. The index C_N

$$C_N = \sum_{i=1}^{n} s_i \{ [\sum_{j>i} w_j - \sum_{j<i} w_j] - [\sum_{j>i} s_j - \sum_{j<i} s_j] \} \qquad [13]$$

Which measures the degree of β-convergence across states in adequacy rates.

We also compute the index of convergence in the various centiles in the anonymous case, C_A, which reveals the extent of σ-convergence in adequacy rates. The expression for C_A is the same as for C_N but in this latter case the shares s_i are ranked by increasing values of the share s_i while the shares w_i are ranked by increasing values of the share w_i.

[TABLE 6]

In general terms, we find that the estimated values of the various non-anonymous and anonymous indices differ in sign (Table 6). As we remarked above, this is so because the different approaches to identification of states lead us to different ranking conclusions. In addition, the indices of inequality across states in the growth of adequacy rates, in both the non-anonymous and anonymous cases, are small (no greater than 0.08). Also, along the entire period, inequality in growth rates did not show a clear tendency, displaying increases and reductions in the non-anonymous case, and an upward slope in the anonymous case-- except for the last part of the period analyzed.

The comparison of adequacy rates in 1996 and 2015 reveal a negative non-anonymous convergence of adequacy rates meaning that on average the adequacy levels in those states with greater initial values decreased at a higher rate than that of those with low adequacy levels so there is convergence over time. Such a case corresponds to what in the literature is characterized as β-convergence. In this context, states with higher

reductions than the average contribute more to the overall distributional change. This is the case of Oklahoma and Arizona.

In the anonymous case we can look at the rates of growth in the various centiles. A priori, this would seem not to make much sense in our framework as we work with states. However, it might be useful for assessing σ-convergence in adequacy rates. The finding that the convergence index is positive in the anonymous case implies that on average the reduction in the rates were greater in the lower than in the higher centiles so that inequality increased (σ-divergence).

In summary, the distributional convergence analysis confirms that there was some kind of catching-up by states with lower benefit levels with the states with the most generous ones. Nevertheless, this process of rapprochement was mainly led by a general trend of reductions in benefits that were especially marked in the states with higher adequacy rates when PRWORA was enacted. This result is related with the change to a new system of block grants. As the Federal Government shifted from matching rates to a flat lump sum, the effective price of aid per dollar spent went up for those states that had higher benefits and mating rates in the previous regime. As different authors have stressed, it is not surprising to find a larger than proportional decrease in adequacy rates for those previously higher spending states (Baicker, 2005; Fetter, 2016).

Therefore, the analysis supports the notion of some sort of race-to-the-bottom effect, which may be associated with marginal distributional social welfare losses that could reduce the gains involved by the improvements in labor participation and caseload numbers.

7. CONCLUSION

The increased ability of states to set TANF benefit levels and eligibility conditions as a result of the welfare reform that was enacted in 1996 has attracted great attention from researchers and policymakers. While changes in labor participation rates and increases in self-sufficiency or less transfer dependency -the stated main objectives of the reform- have been subjects of increasing attention in the literature, there is a need for research that provides a more complete assessment of the impact of the reform in terms of distributional costs. The past two decades have witnessed an intense debate over the long-term effects of the reforms on the under-provision of welfare benefits and the

likely ‘race to the bottom’ process that would accompany the reform with lower benefit levels and higher differences across states. While previous work has provided evidence of the existence of a ‘race to the bottom’ effect and a general reduction in TANF levels, after many years of research we still have relatively little insight into which have been the potential distributional costs of PRWORA.

The potential effects of the devolution process on inequality across states raise numerous interesting questions. In this paper, we have focused more narrowly on the measurement of these inequalities across time using a distributional approach. By considering alternative distributive approaches to identify the different avenues through which inequality in states’ benefits could have increased we contribute to the development of a more comprehensive picture of the long-term results of the process.

According to our results, the purchasing value of most benefits has fallen drastically since PRWORA was enacted, with the amount of cash assistance declining both in inflation-adjusted terms and as a proportion of the federal poverty line in almost every state. As a result, the capacity of the programs to alleviate poverty has been severely limited and extreme poverty is more cyclical now in the U.S. than in past recessions. During the last two decades differences in benefit levels between the higher and lower generous states have been very large. Nevertheless, with the exception of the upper and lower tails of the states’ distribution the corresponding rankings of benefit levels have not been constant. Additionally, the reduction of benefit levels has been remarkably larger in the states with higher benefits than in the lower ones.

We find that welfare reform prompted inequality increases in adequacy rates across states at the same time that the amounts received by poor households were reduced. Regardless of the function considered and under the assumption of constant labor participation rates and caseloads, higher inequality levels and a lower mean of the distribution of adequacy rates unequivocally yield losses in terms of social welfare.

One contribution of the paper has been to identify the precise effect of each state’s reform on overall inequality in benefit levels across years and states. While contributions to inequality were not stable along the different time periods, it is clear that some states increased their contributions to inequality between 1996 and 2015 (Arizona, New Mexico and Oklahoma) while the opposite occurred in other states

because of the positive growth inf their adequacy rates (Maryland, Texas and Wyoming).

In general terms, almost all the states experienced a reduction in their adequacy rates that can be termed as being pro-poor, as in the states with lower adequacy rates in the mid-nineties reductions were lower than in the rest of the states. However, changes in the position of each state in the distribution of adequacy rates (re-rankings) made overall inequality to increase. Again, while some states contributed to progressivity with their reduction of adequacy rates –Wyoming and Maryland made the greatest contribution to this pro-poor trend– other states contributed significantly in the opposite direction.

Finally, another unequivocal finding from our distributional approach is to confirm that devolution also yielded a 'race to the bottom' effect among states in the longer term. The distributional convergence analysis shows that there was some kind of convergence in benefit levels: the states with lower benefits at the beginning of the devolution period had lower reductions in benefit levels while the states with largest benefits at the beginning had the largest reductions in benefits.

In short, the assessment in distributional terms of the system that gave states more capacity to select among policy parameters is negative. Yet knowing that the major objective of the reform was fostering transitions from welfare to work, the increasing capacity of states to achieve this goal also had significant negative distributive impacts: lower adequacy rates, higher inequality across states, and a downward divergence path. All these lead to conclude that the PRWORA reform of 1996 yielded some distributional costs, which one would have to compare to the gains in labor participation rates and reduced dependence in an overall assessment of the success of the reform.

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Table 1. Inflation-adjusted monthly TANF benefit levels (for a family of three)

	July 1996	July 2000	July 2005	July 2010	July 2015	July 2016	Real change. 1996-2016
Alabama	164.0	149.7	177.3	160.9	146.7	143.6	-12.4
Alaska	923.0	842.8	761.1	690.8	630.0	616.4	-33.2
Arizona	347.0	316.8	286.1	208.1	189.7	185.7	-46.5
Arkansas	204.0	186.3	168.2	152.7	139.2	136.2	-33.2
California	596.0	571.6	596.2	519.4	480.5	470.2	-21.1
Colorado	356.0	325.0	293.6	345.8	315.3	308.5	-13.3
Connecticut	636.0	580.7	524.4	504.4	476.4	466.1	-26.7
Delaware	338.0	308.6	278.7	311.3	230.7	225.7	-33.2
D.C.	415.0	346.0	312.5	320.3	296.2	294.5	-29.0
Florida	303.0	276.7	249.9	226.8	206.8	202.4	-33.2
Georgia	280.0	255.7	230.9	209.6	191.1	187.0	-33.2
Hawaii	712.0	520.4	470.0	456.5	416.3	407.4	-42.8
Idaho	317.0	267.5	254.8	231.3	210.9	206.4	-34.9
Illinois	377.0	344.2	326.5	323.3	294.9	288.5	-23.5
Indiana	288.0	263.0	237.5	215.5	196.6	192.3	-33.2
Iowa	426.0	389.0	351.3	318.8	290.8	284.5	-33.2
Kansas	429.0	391.7	353.7	321.1	292.8	286.5	-33.2
Kentucky	262.0	239.2	216.0	196.1	178.8	175.0	-33.2
Louisiana	190.0	173.5	197.9	179.6	163.8	160.3	-15.6
Maine	418.0	420.9	399.9	363.0	331.0	323.9	-22.5
Maryland	373.0	380.7	397.5	429.6	434.1	424.7	13.9
Massachusetts	565.0	515.9	509.6	462.5	421.8	412.7	-27.0
Michigan	459.0	419.1	378.5	368.2	335.8	328.6	-28.4
Minnesota	532.0	485.7	438.7	398.2	363.1	355.3	-33.2
Mississippi	120.0	155.2	140.2	127.2	116.0	113.5	-5.4
Missouri	292.0	266.6	240.8	218.5	199.3	195.0	-33.2
Montana	438.0	428.2	334.0	377.2	400.0	392.7	-10.3
Nebraska	364.0	332.4	300.2	272.4	248.4	291.2	-20.0
Nevada	348.0	317.7	287.0	286.6	261.4	255.8	-26.5
New Hampshire	550.0	525.0	515.4	505.2	460.7	450.8	-18.0
New Jersey	424.0	387.1	349.6	317.3	289.4	283.2	-33.2
New Mexico	389.0	400.8	320.8	334.5	259.4	273.1	-29.8
New York	577.0	526.8	569.8	563.5	538.5	526.9	-8.7
North Carolina	272.0	248.4	224.3	203.6	185.6	181.7	-33.2
North Dakota	431.0	417.3	393.3	357.0	331.7	324.6	-24.7
Ohio	341.0	340.6	307.6	324.8	322.8	315.9	-7.4
Oklahoma	307.0	266.6	240.8	218.5	199.3	195.0	-36.5
Oregon	460.0	420.0	379.3	363.0	345.4	337.9	-26.5
Pennsylvania	421.0	384.4	347.2	315.1	287.3	281.2	-33.2
Rhode Island	554.0	505.8	456.8	414.6	378.1	370.0	-33.2
South Carolina	200.0	186.3	169.0	202.1	189.1	188.3	-5.8
South Dakota	430.0	392.6	413.1	415.4	408.8	400.0	-7.0

Tennessee	185.0	168.9	152.5	138.5	126.3	123.5	-33.2
Texas	188.0	183.5	183.9	194.6	191.8	190.3	1.2
Utah	416.0	411.8	390.9	372.7	339.9	332.6	-20.1
Vermont	597.0	567.9	527.7	479.0	436.8	427.4	-28.4
Virginia	354.0	323.2	320.8	291.1	265.5	273.1	-22.8
Washington	546.0	498.5	450.2	420.6	355.6	347.9	-36.3
West Virginia	253.0	299.5	280.4	254.5	232.1	227.1	-10.3
Wisconsin	517.0	614.5	554.9	503.7	445.7	436.1	-15.6
Wyoming	360.0	310.4	280.4	419.9	445.0	438.8	21.9

Source: Center on Budget and Policy Priorities and Bureau of Labor Statistics

Table 2. Benefit as percentage of Federal Poverty Level (for a family of three)

	July 1996	July 2000	July 2005	July 2010	July 2015	Change. 1996-2015
Alabama	15.6	14.2	16.4	14.7	13.5	-13.2
Alaska	70.1	63.9	56.3	50.4	46.4	-33.8
Arizona	32.9	30.0	26.5	19.0	17.5	-47.0
Arkansas	19.4	17.6	15.6	13.9	12.8	-33.8
California	56.6	54.1	55.1	47.4	44.2	-21.8
Colorado	33.8	30.8	27.1	31.6	29.0	-14.1
Connecticut	60.4	55.0	48.5	46.0	43.9	-27.3
Delaware	32.1	29.2	25.8	28.4	21.2	-33.8
D.C.	39.4	32.8	28.9	29.2	27.3	-30.8
Florida	28.8	26.2	23.1	20.7	19.0	-33.8
Georgia	26.6	24.2	21.4	19.1	17.6	-33.8
Hawaii	58.8	42.9	37.8	36.2	33.3	-43.3
Idaho	30.1	25.3	23.6	21.1	19.4	-35.5
Illinois	35.8	32.6	30.2	29.5	27.1	-24.1
Indiana	27.3	24.9	22.0	19.7	18.1	-33.8
Iowa	40.4	36.8	32.5	29.1	26.8	-33.8
Kansas	40.7	37.1	32.7	29.3	27.0	-33.8
Kentucky	24.9	22.7	20.0	17.9	16.5	-33.8
Louisiana	18.0	16.4	18.3	16.4	15.1	-16.4
Maine	39.7	39.9	37.0	33.1	30.5	-23.2
Maryland	35.4	36.1	36.8	39.2	40.0	12.9
Massachusetts	53.6	48.9	47.1	42.2	38.8	-27.6
Michigan	43.6	39.7	35.0	33.6	30.9	-29.0
Minnesota	50.5	46.0	40.6	36.3	33.4	-33.8
Mississippi	11.4	14.7	13.0	11.6	10.7	-6.2
Missouri	27.7	25.3	22.3	19.9	18.3	-33.8
Montana	41.6	40.6	30.9	34.4	36.8	-11.4
Nebraska	34.6	31.5	27.8	24.9	22.9	-33.8
Nevada	33.0	30.1	26.5	26.2	24.1	-27.1
New Hampshire	52.2	49.7	47.7	46.1	42.4	-18.8
New Jersey	40.2	36.7	32.3	29.0	26.6	-33.8
New Mexico	36.9	38.0	29.7	30.5	23.9	-35.3
New York	54.8	49.9	52.7	51.4	49.6	-9.5
North Carolina	25.8	23.5	20.7	18.6	17.1	-33.8
North Dakota	40.9	39.5	36.4	32.6	30.5	-25.4
Ohio	32.4	32.3	28.4	29.6	29.7	-8.2
Oklahoma	29.1	25.3	22.3	19.9	18.3	-37.0
Oregon	43.7	39.8	35.1	33.1	31.8	-27.2
Pennsylvania	40.0	36.4	32.1	28.8	26.5	-33.8
Rhode Island	52.6	47.9	42.2	37.8	34.8	-33.8
South Carolina	19.0	17.6	15.6	18.4	17.4	-8.3
South Dakota	40.8	37.2	38.2	37.9	37.6	-7.8
Tennessee	17.6	16.0	14.1	12.6	11.6	-33.8

Texas	17.8	17.4	17.0	17.8	17.7	-1.1
Utah	39.5	39.0	36.1	34.0	31.3	-20.8
Vermont	56.7	53.8	48.8	43.7	40.2	-29.0
Virginia	33.6	30.6	29.7	26.6	24.4	-27.3
Washington	51.8	47.2	41.6	38.4	32.7	-36.8
West Virginia	24.0	28.4	25.9	23.2	21.4	-11.0
Wisconsin	49.1	58.2	51.3	46.0	41.0	-16.4
Wyoming	34.2	29.4	25.9	38.3	41.0	19.9

Source: Center on Budget and Policy Priorities and Health and Human Services Department.

Table 3. States contribution to inequality in adequacy rates and Gini coefficient

State	1996	2000	2005	2010	2015
Alabama	5.79	5.88	4.72	5.01	4.89
Alaska	0.00	0.00	0.00	0.01	0.02
Arizona	2.00	2.12	2.23	3.74	3.65
Arkansas	4.84	4.95	4.95	5.26	5.12
California	0.10	0.08	0.01	0.05	0.05
Colorado	1.86	1.98	2.11	1.13	1.23
Connecticut	0.05	0.07	0.13	0.07	0.06
D.C.	1.11	1.66	1.79	1.49	1.49
Delaware	2.14	2.27	2.37	1.64	2.74
Florida	2.76	2.88	2.97	3.31	3.26
Georgia	3.21	3.32	3.37	3.71	3.62
Hawaii	0.07	0.58	0.71	0.61	0.70
Idaho	2.51	3.07	2.85	3.22	3.16
Illinois	1.57	1.69	1.59	1.44	1.53
Indiana	3.06	3.16	3.22	3.56	3.49
Iowa	1.00	1.11	1.26	1.51	1.58
Kansas	0.97	1.07	1.24	1.47	1.54
Kentucky	3.58	3.68	3.74	4.05	3.95
Louisiana	5.18	5.27	4.19	4.49	4.38
Maine	1.08	0.79	0.77	0.93	1.01
Maryland	1.63	1.20	0.79	0.39	0.19
Massachusetts	0.19	0.24	0.19	0.23	0.27
Michigan	0.76	0.80	0.97	0.87	0.96
Minnesota	0.33	0.39	0.52	0.60	0.69
Mississippi	6.89	5.74	5.73	6.00	5.82
Missouri	2.98	3.07	3.15	3.50	3.44
Montana	0.90	0.74	1.48	0.79	0.41
Nebraska	1.74	1.87	1.99	2.37	2.36
Nevada	1.99	2.10	2.23	2.09	2.10
New Hampshire	0.24	0.21	0.16	0.07	0.10
New Jersey	1.02	1.12	1.29	1.53	1.61
New Mexico	1.43	0.97	1.66	1.29	2.15
New York	0.15	0.20	0.04	0.00	0.00
North Carolina	3.38	3.49	3.55	3.85	3.77
North Dakota	0.96	0.82	0.83	1.00	1.01
Ohio	2.09	1.74	1.88	1.43	1.13
Oklahoma	2.70	3.07	3.15	3.50	3.44
Oregon	0.75	0.80	0.96	0.93	0.86
Pennsylvania	1.04	1.16	1.32	1.56	1.63
Rhode Island	0.22	0.28	0.43	0.48	0.57
South Carolina	4.93	4.95	4.95	3.90	3.68
South Dakota	0.97	1.06	0.68	0.47	0.35
Tennessee	5.28	5.38	5.40	5.68	5.51
Texas	5.23	5.00	4.55	4.08	3.60
Utah	1.10	0.87	0.86	0.83	0.91

Vermont	0.10	0.09	0.12	0.16	0.18
Virginia	1.89	2.02	1.66	2.00	2.04
Washington	0.26	0.32	0.46	0.43	0.76
West Virginia	3.78	2.43	2.35	2.74	2.69
Wisconsin	0.41	0.03	0.06	0.07	0.14
Wyoming	1.80	2.23	2.35	0.44	0.14
Gini index	0.197	0.197	0.201	0.199	0.207

Table 4. Growth in mean adequacy rates, change in inequality, progressivity and re-rankings

Years	Growth in mean	ΔG	V	R
1996-2015	-0.256	0.009	0.012	0.021
1996-2000	-0.070	-0.001	0.006	0.005
2000-2005	-0.091	0.004	0.000	0.004
2005-2010	-0.054	-0.001	0.010	0.008
2010-2015	-0.070	0.007	-0.005	0.002

Table 5. States contributions to changes in inequality, progressivity and re-rankings. 1996-2015

State	%ΔG	%V	%R	State	%ΔG	%V	%R
Alabama	-14.07	11.63	0.17	Montana	-10.07	11.94	2.13
Alaska	0.48	0.00	0.21	Nebraska	15.48	-8.42	2.23
Arizona	38.40	-27.81	1.70	Nevada	4.56	-2.83	0.46
Arkansas	10.95	-7.31	0.83	New Hampshire	-2.93	5.05	1.49
California	-1.04	3.30	1.37	New Jersey	14.09	-6.18	2.86
Colorado	-12.01	12.60	1.63	New Mexico	17.30	-8.18	3.18
Connecticut	0.19	0.56	0.40	New York	-3.16	7.33	2.65
D.C.	9.54	-3.75	2.17	North Carolina	12.02	-9.05	0.34
Delaware	15.31	-11.85	0.26	North Dakota	2.20	1.57	1.85
Florida	13.87	-10.60	0.30	Ohio	-19.20	21.82	3.53
Georgia	12.42	-9.52	0.27	Oklahoma	18.95	-14.69	0.30
Hawaii	14.03	-1.69	5.32	Oregon	3.14	0.85	1.87
Idaho	16.93	-13.16	0.26	Pennsylvania	14.06	-6.06	2.91
Illinois	0.58	3.84	2.39	Rhode Island	7.80	-2.51	2.09
Indiana	12.53	-9.61	0.26	South Carolina	-22.78	19.05	0.40
Iowa	13.70	-6.06	2.75	South Dakota	-12.71	15.30	2.81
Kansas	13.53	-6.11	2.65	Tennessee	10.52	-8.23	0.13
Kentucky	11.86	-8.70	0.46	Texas	-30.78	25.95	0.66
Louisiana	-12.31	10.49	0.32	Utah	-3.01	7.05	2.57
Maine	-0.32	4.55	2.38	Vermont	1.91	1.35	1.60
Maryland	-30.02	44.89	11.50	Virginia	5.28	-3.37	0.48
Massachusetts	1.92	0.22	0.97	Washington	11.31	-5.07	2.23
Michigan	5.33	-0.44	2.13	West Virginia	-20.19	19.95	2.06
Minnesota	8.32	-3.08	2.00	Wisconsin	-5.43	8.29	2.17
Mississippi	-16.86	13.56	0.00	Wyoming	-34.72	53.21	14.01
Missouri	13.10	-10.07	0.26				

Table 6. Inequality and convergence in adequacy rates.

		Inequality of adequacy rates growth	Convergence of adequacy rates
1996-2015	Non-anonymous	0.088	-0.013
	Anonymous	0.034	0.005
1996-2000	Non-anonymous	0.036	-0.007
	Anonymous	0.015	-0.002
2000-2005	Non-anonymous	0.033	0.001
	Anonymous	0.021	0.005
2005-2010	Non-anonymous	0.047	0.029
	Anonymous	0.029	-0.005
2010-2015	Non-anonymous	0.026	0.006
	Anonymous	0.018	0.007

Figure 1. Lorenz and concentration curves for adequacy rates. 1996 and 2015

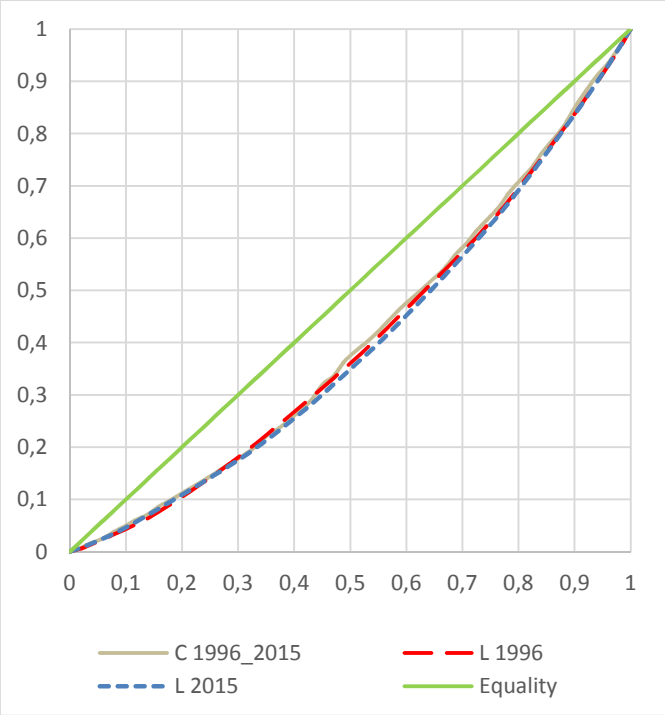

Figure 2. Non-anonymous and Anonymous Growth Incidence Curves of States Adequacy Rates