“Incentivizing laboratory federalism: can everyone participate?”

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Incentivizing laboratory federalism: can everyone participate?

Abstract

The implementation of policies to encourage laboratory federalism could be a powerful tool for federal governments to advocate change at the sub-national level. One example of such a policy is Race to the Top, a federal program that incentivized states to reform their education systems. A total of $4.35 billion was allocated to be awarded to states with winning proposals. This paper seeks to answer whether or not certain state characteristics can predict whether states entered the competition, and, if so, how well states do in the competition. Evidence from the initial round of the competition suggests that success was more likely for certain underlying characteristics, not because of states' policy decisions or active reform agendas. However, results from the second round of the competition seem to indicate that institutional change, specifically the presence of charter schools, was significant in predicting the grant recipients. The results suggest that the hurdle to achieving country-wide education reform through incentivizing change at the state level comes from designing a policy that whose aims are accessible and appropriate for all states.

Keywords: laboratory federalism, education reform, Race to the Top.
JEL Classification: I28, H77.

Introduction

"To stay experimentation in things social and economic is a grave responsibility. Denial of the right to experiment may be fraught with serious consequences to the nation. It is one of the happy incidents of the federal system that a single courageous 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" (Justice Louis Brandeis, 1932).

The idea of laboratory federalism is simple: states make independent decisions and develop and implement innovative policies. Other states can see what the other does and there can become a set of best-practices. It is more efficient than imposing one federal policy on all 50 states to see if that works; there could be 50 laboratories, the positives and negatives of each could be observed, and as a result there could be a determination of the optimal policy. This paper seeks to explore a recent federal policy that incentivized laboratory federalism. Can a federal policy be designed to encourage change through laboratory federalism rather than mandate that change? Will all states have an incentive to participate? Will participants be on equal footing or are some inherently more likely to win the grant money? At the end of the day, is this market based approach to reform achieving the broad based charge to incentivize reform across the country, or is it rewarding states that would likely have been leaders without the financial incentive?

President Obama's Race to the Top Fund, a multiphase competitive grant program which encourages education reform, proposes to motivate legislative reform at the state level with minimal commitment of federal funds. The Race to the Top Fund, initially funded by the American Recovery and Reinvestment Act of 2009, was a competition between states for $4.35 billion in federal stimulus money. States who applied competed for the money by proposing and enacting legislative reform. Money was awarded to states based on the guidelines set forth by Secretary of Education Arne Duncan. The name of the program emphasizes the idea behind the initiative. The term 'race to the bottom' describes the potential phenomenon that states in a federal system set lower standards in order to compete with each other, indicating the potential hazard of laboratory federalism. The Race to the Top, however, reflects the states' incentive to raise standards and compete to provide the best education for their students.

At a relatively low cost, the federal government wanted to inspire state governments to change their way of providing education. Jim Messina, Deputy Chief of Staff for Operations for President Obama, said about the program: "Before a dime was spent, 32 states had changed their laws" (Messina, 2010). President Obama had additional positive remarks about the Race to the Top program during his 2011 State of the Union Address. He said, "Race to the Top is the most meaningful reform of our public schools in a generation. For less than 1 percent of what we spend on education each year, it has led over 40 states to raise their standards for teaching and learning. And these standards were developed, by the way, not by Washington, but by Republican and Democratic governors throughout the country" (Obama, 2011). From the federal government's perspective, the new policy has already showed unequivocal success.

While the federal government trumpets this innovative program, there has been disagreement among state legislatures and education officials about the universality of benefits the program anticipates. Some say the programs and policies supported by Race to the Top have no strong basis in research. Others argue that the competition, which in part encourages the development of charter schools, gives an advantage to states with large urban popu-

lations, where charter schools are more common. Teachers' unions traditionally oppose some of the policies that Race to the Top encourages, such as connecting teacher pay and tenure to student achievement. Thus, states with strong union presence may also be at a disadvantage. Also, states which already have high educational standards are less inclined to sign on to common federal standards, thus decreasing their chances of success in the competition[1]. Based on the design of the program, some states are thus inclined to feel the burden rather than the benefit of the program even before submitting an application.

This paper views Race to the Top from the states' perspective to explore whether or not this competition for federal money is a fair fight. The first question is whether the program was designed in a way that motivated all types of states to apply for the competitive grants. The second question is whether the program design made certain states predisposed to do better in the scoring process. We use demographic, political, and educational factors to examine which states entered and succeeded in the Race to the Top with the intent to identify whether or not the program is an equal competition among all states.

Anecdotal and empirical evidence points to particular reasons for certain states not entering the competition. Results from the empirical analysis indicate that while the initial round of the program, with awards announced in March 2010, seems to have privileged certain types of states, the second round of the program, with awards announced in August 2010, did not show as strong of a pattern. The evidence seems to indicate that the competition may not be attractive to all states and the competition may be designed in a way that gives automatic preference to certain types of states. Thus, while the program has seen change, it may not be seeing change in all of the states, and may be rewarding states that would have made reforms absent the incentive.

1. Race to the Top

1.1. Structure of Race to the Top. The Race to the Top program had three phases that were broken down into two tiers each. Each phase required states to submit an application in Tier 1. The finalists from Tier 1 presented their plans in person to the Department of Education in Tier 2. The winners were then selected by the Department of Education. In Phase 1, there were 41 applicants and 16 finalists. In March 2010, Delaware and Tennessee were announced as the eventual winners, receiving $100 million and $500 million, respectively. In Phase 2, thirty-seven states (including the District of Columbia) submitted applications for Tier 1, and 19 finalists were announced in July 2010. In August 2010, the Phase 2 winners were announced, and ten states were awarded money totaling $3.325 billion. Figure 1 shows the outcome of Phase 1 of the competition and Figure 2 shows for the results of Phase 2. In Phase 3, only states that were finalists in Phase 2 and did not receive money were eligible to compete. Seven states received a total of $200 million in Phase 3.

In each phase, states are scored based on how their applications met the established guidelines. The guidelines encouraged states "to remove laws limiting the expansion of public charter schools, sign on to common standards, develop a strategy to turn around their worst-performing schools…work toward building better data systems…[and] drop any legal barriers linking student test results and teacher performance" (Cruz, 2009, p. 26). Some grading criteria were straightforward, but other points were assigned less objectively. States were graded by five different peer reviewers selected by the Department of Education for their experience in education policy and their impartiality to the competition. These scores were then averaged for each state's final score.

1.2. Policy emphases. The primary goal of Race to the Top is to provide a better education for all elementary and secondary students across the country. One of the root assumptions of the program is that states will be more likely to institute reforms when given a financial incentive. States may also learn from each other by seeing other states enact creative solutions to address educational concerns. By adding the competitive element and ultimately encouraging laboratory federalism to function at its best, the program hopes to entice all states to accept the challenge of a "Race." Since the policy emphases are directly related to the scoring, we must think about whether the policy emphases are accessible and can be implemented by all fifty states.

One of Race to the Top's emphases is on rigorous standards and student assessments, both of which have been shown to improve student outcomes. Student outcomes in the United States are consistently below the global average on the Program for International Student Assessment (PISA), a survey of 15-year-old students conducted every three years by the Organization for Economic Co-operation and Development (OECD). This negative trend began in the 1970s and 80s, and the most recent PISA results still have United States students lagging behind. Tulip and Wurzburg (2007) attribute the United States' shortfalls to lower standards, a slower learning pace, and the lack of Curriculum-Based Exit Exam-type testing. A more unified national system of academic standards with improved testing and

[1] Such was the case with Virginia, which opted out of second round of RTTT competition (Virginia, 2010).

assessments could improve the performance of students in the United States compared to students in the rest of the world. There are standards systems currently in place in the United States, including associations such as the Common Core State Standards Initiative. The Common Core State Standards had been adopted by 36 states, the District of Columbia, and the US Virgin Islands as of September 2010; most states adopted during the summer of 2010, perhaps in preparation for Phase 2 of the competition. As of January 2013, all states except Texas and Alaska were part of the initiative. The aim of the Standards is to clearly define K-12 attainment of knowledge and skills that will prepare students for college courses or the workforce. However, some states would likely be hesitant to sign on to Common Core or another national or regional academic standards system. This consolidation of standard-setting and student evaluation takes education policy autonomy away from state authorities and puts it in the hands of a more centralized power. Though there may be benefits to consolidating education testing and standard-setting, the authority structure of the American public education system often resists centralization of power or policymaking. There may also be concerns that a common set of standards would adversely affect those states which already have high levels of college and workforce preparedness.

Another emphasis of Race to the Top is the importance of attracting and retaining quality teachers and other school leaders. Many states and individual school districts across the United States have implemented policies to reward effective teachers and attract good teachers to their schools. Research by Goldhaber and Brewer (1997) finds a relationship between quality of teachers and school outcomes. Lavy (2001) shows that incentive programs for teachers can produce more effective results. Race to the Top encourages states to implement policies which tie teacher pay and/or tenure to measures of student achievement. The greatest challenge and risk of policies that evaluate teachers based on the performance of their students is deciding on the mechanism used to link the two. In 1992, Tennessee authorities began using a mechanism based on agricultural research that studies what affects productivity levels of crops in various fields. Since then, 13 states have adopted a similar statistical measure of student growth to evaluate teacher performance[1]. There are difficulties in implementing a policy like this beyond establishing linkages between raw data and real student growth. One of these issues is how best to handle teachers who are not in the core areas of reading and verbal skills or mathematics. Data gathered from year to year in courses like music, art, and physical education, are harder to evaluate than data from those core subjects. States, like Tennessee, that already have programs to evaluate teacher performance in place will likely benefit from this portion of the competition, as it gives them an inherent advantage.

A third mission of Race to the Top is to have states develop longitudinal data systems. The benefits of developing statewide longitudinal data systems promise to be wide-spread and lasting. The start-up of these data systems may be difficult and costly, but more comprehensive data gathering practices and easier accessibility for teachers and administrators could be invaluable to improving education and education research across the United States. Once these fixed costs are paid, policy-makers will have better access to comprehensive data, and they will be better able to make curriculum and staffing decisions quickly and effectively. Smaller states may have a significant advantage developing these systems, as their student populations are not as large.

Race to the Top also emphasizes turning around the lowest-performing schools in a state. Fleishman and Heppen (2009) highlight certain methods that may be effective at turning around these schools. In a given situation, the best approach may be to replace the administration and/or faculty to jumpstart change, fund incentives for good teachers to take positions at the low-performing school, or close the school and reopen it as a charter school. States with larger percentages of low-performing schools may be at an advantage for this portion of the competition. If a state has few low-performing schools, there is not much that they can propose to change in order to garner points.

Finally, Race to the Top encourages states to allow and support public charter schools. Charter schools can provide an alternate setting in which to educate students within the public school system, especially low-performing or other specific subsets of students. While the research has been mixed, there is evidence that charter schools may improve educational outcomes[2]. Charter schools may allow for smaller class sizes, better pay to attract the best teachers, and a less traditional learning environment. Some states have had great success with charter schools. For example, Pickett Middle School, in Philadelphia, Pennsylvania, was closed in 2007 and reopened as an independently run charter school. The students' math proficiency has increased by 21% since the reopening, and read-

[1] "Under the approach, statisticians calculate an expected rate of achievement growth for each student, based on the student's prior achievement and demographic factors. Then they compare each student's actual achievement to the expected rate to determine the value added that teachers and schools contribute" (Rothman, 2010).

[2] See Hoxby (2003), Carruthers (2010), and Hanushek et al. (2007) for evidence on the effectiveness of charter schools. Other research has found that charter schools are less effective; see Bifulco and Ladd (2006) and Davis and Raymond (2011).

ing levels are up by 45%. Violence has also been reduced by 85% (Voices, 2010). However, not all charter school success is as clear-cut as in the Pickett Middle School example. A study was conducted to evaluate the performance of students after they moved to charter schools. Among one group of low-performing students that moved to charter schools, test scores actually declined from year to year when compared to the public school's average scores, which remained fairly constant (Bettinger, 2005). Teachers' unions are also typically opposed to charter schools, where the unions have no representation. This is a difficult hurdle to cross in the long process of passing legislative reforms, especially if the research does not conclusively show a benefit from instituting charter schools.

Most would agree that the United States education system and standards are in need of innovation and reform. Race to the Top aims to encourage and incentivize these needed reforms. The program makes assumptions about what education reform should look like and how it is tied to increased spending. This paper does not aim to question the merits of the various policy emphases; the goal here is to consider whether or not the policy emphases are accessible and feasible in all fifty states. The preliminary anecdotal evidence suggests that the emphases may be correlated with or even directly dependent on pre-existing conditions in the state, making them less likely to be viable options in every state.

2. Framework

Our empirical analysis attempts to determine if any type of state has an unintended, involuntary advantage in Race to the Top. We ask two specific questions: (1) What factors predict states applying to the Race to the Top competition; and (2) What factors predict states' performance in Race to the Top? Performance is defined as the state's score in either Phase 1 or Phase 2 of Race to the Top as determined by the team of peer reviewers from the Department of Education, on a scale from 0 to 500. Phase 3 is not included in the analysis because the only states eligible to compete in this phase were finalists from Phase 2 who did not receive an award.

Our explanatory variables are derived from state-level information on demographics, measures of heterogeneity, political climate, and educational data. We chose each of these categories because we believe they may have influenced whether a state entered the Race, and they may have had an effect on how states did in the competition. Demographic measures tell about the wealth and sociological make-up of a state. Measures of heterogeneity could tell us how likely the state is to agree upon an application to Race to the Top and legislative change. The political climate may predict how receptive the government of a state is to President Obama's agenda. Educational data tell us how well a state is already performing in education. Some of this information, like population size, is relatively exogenous and fixed in the short run. There is nothing that the state could directly do to change these variables; these variables are not specific policy choices that are made by the legislature or voted on by the electorate. However, others, like education spending per pupil, are policy choice variables that are directly determined or influenced by state policy. The regression results should show the types of states more likely to enter the competition and also whether the scores appear to have been determined more by fixed variables or whether states score better based on how they changed their behavior in the past through their previous policy choices.

3. Data

3.1. Demographic variables. Demographic data for 2008 and 2009 comes from the 2010 Statistical Abstract of the US Census, providing information on total population; population density; percent of the population that is white, black, Hispanic, and other races; and percent of the population in various age groups.

Total population may impact whether or not states entered Race to the Top because larger states were promised larger sums of money than smaller states. As for performance in the competition, larger states may have been advantaged or disadvantaged by their size. For example, start-up costs for certain programs, like test creation and data systems, may be the same across states of different sizes. Thus, a large state with a bigger budget would have a lower average fixed cost per pupil. However, these programs might also be harder to implement in larger states with more districts, schools, and students to manage.

Population density could affect states both entering and performing well in the competition. Large, urban cities are more likely to have charter schools, and charter schools are more likely to succeed in urban areas. Thus, states that have higher population densities are more likely to already have progressive charter school laws and/or create new schools for Race to the Top. In addition, other parts of the reform may also be geared toward urban areas. Secretary Duncan's background of working with Chicago schools would imply familiarity with education in urban areas rather than rural areas.

The different white, black, and Hispanic populations in a state could also affect entrance and performance in Race to the Top. Some of the programs of Race to the Top encourages may be geared toward minorities. Charter schools are often opened to help shrink achievement gaps between white and minority students. As a result, there are higher percentages of

minority students in charter schools compared to other public schools. Race to the Top also encourages states to turn around low-performing schools, which are often attended by minority students (SAT, 2009). The emphasis on turning around the worst performing schools affects minority students more than white students. States with fewer whites, more blacks, or more Hispanics are more likely to enact such programs that open charter schools or turn around low-performing schools, making them more likely to enter the Race. States with high percentages of minorities are also more likely to already have such programs in place, which may help their scores in the Race.

The age distribution in a state could affect entry and performance in Race to the Top as it might indicate strength of preferences for certain policies and propensity for political participation. We predict states with high percentages of people 65 and older would hurt states' chances in the competition and make them less likely to enter. As a public choice framework would predict, older individuals might be less concerned with the school system where they live, and more concerned with supporting other governmental priorities like infrastructure or lower taxes. While there are other age groups that might have a particular motive for supporting education, we did not include them in our regression. The age group 18 and under is not useful because this age group is too young to vote and affect change within their government. While parents could affect change, they range in age from about 20 to over 50, making it difficult to construct a defined age group to capture parental motivation. We also collected 2007 data on each state's median income and percent of residents below the poverty line, the most recent measure for the time period we are considering. We predict that lower median income and higher poverty levels would encourage states to enter the race, as poorer states would be in more need of the money. However, with respect to the score on their application, income could be either a positive or negative factor. Higher income levels might imply that states have larger budgets from higher tax revenue, and states with larger budgets are more likely to be able to afford the reform that the Obama administration encourages. At the same time, much like minority race status and dense population, the programs that Race to the Top hopes to support are geared towards impoverished students. Thus, poorer areas may be at an advantage in terms of finding support from the Department of Education.

3.2. Measures of heterogeneity. Alesina and Ferrara (2000) expect that more homogeneous populations are more likely to interact with each other and participate in activities in their community, such as religious groups, hobby clubs, youth groups, and sports groups. Thus, we believe that states with a more homogeneous population are more likely to draft an application and enter the Race to the Top. These states are also more likely to score well, since they might be more likely to work together effectively and able to pass stronger legislation. We utilized the census data to construct a measure of racial diversity. For religious diversity we collected 2000 data from the Association of Statisticians of American Religious Bodies. In both cases, we constructed the diversity measure using a Herfindahl-Hirschman Index (HHI); the closer the HHI is to 1 the more homogeneous the state is.

3.3. Political variables. We also looked at political factors that may have influenced participation and performance in Race to the Top. One political factor that may be important is whether or not the chief state education official is elected or appointed. We collected information on how states select their top education official from the Council of Chief State School Officers website. If state education officials are elected, they may be more motivated by what the people want, whether that is a focus on education or not. If top state education officials are appointed, then their agendas will likely fall in line with their respective governors' agenda. In this case, the top education official may work better with the governor in creating a strong application for Race to the Top. Either possibility could have a positive or negative correlation with both entrance and performance.

We also collected data on the political affiliations of governors and upper house state legislatures from StateScape. States which have Democratic governors and/or legislatures may be more likely to support President Obama's Democratic agenda, including Race to the Top. Thus, they will likely enter the Race and score better than other states. We used the percent of Democratic legislators in the upper house rather than the lower house because Druckman et al. (2005) shows that the upper house has a stronger impact on policymaking than the lower house.

3.4. Educational variables. Charter school legislation and success is part of the scoring rubric for Race to the Top. We collected 2009 data on charter schools in each state and the District of Columbia from The Center for Education Reform. Whether or not a state has passed any legislation providing for the approval and institution of charter schools can suggest how receptive the state is to education reform. This can also indicate how easily future reform legislation can be passed in a particular state. First, we constructed a variable that represents the number of charter schools in 2008-2009 as a percentage of all schools in the state. We also created a variable that measures the number of charter schools approved to open in each state for the 2009-2010 school year as a percentage of the number of existing charter schools for the 2008-2009 school year. Additionally, we make use of a dummy variable to capture whether or not a state had passed charter

school legislation that both allowed charter schools to be created and did not put a cap, or limit, on how many charter schools could operate in the state or a certain area of the state[1]. This variable may be an indicator of how willing a state is to reform its education system, and it can also show how seriously the state is taking the Race to the Top competition and its emphases.

It is likely that states with higher percentages of charter schools and newly approved charter schools will be more likely to enter the program and will also perform better in Race to the Top. In addition, states that had already passed legislation to allow for charter school creation with no caps may be more likely to apply to Race to the Top, as these states already showed willingness to institute reforms. For the same reason, those same states may score higher in Race to the Top. These states have instituted reforms that have made significant and recent changes, and this is likely to be seen as evidence of a favorable environment for successful implementation of any future reforms.

Data regarding education funding for the 50 states and the District of Columbia is obtained from the 2007 Census of Governments Survey of Local Government Finances. Our education spending per pupil variable represents a state's average spending for each student K-12 in 2007. This variable serves as a measure of the importance placed on education in a state. All else equal, the more a state spends on education the higher its commitment to having a high-quality education system. Alternatively, education spending per pupil may serve as an indicator of the economic health of each state. A state that is struggling economically will not be able to fund education at a high level.

The higher the current spending per pupil, the more likely a state will apply to the Race to the Top program. If education is a high priority for a state, the Race to the Top program affords a great opportunity to increase the funding to which the state has access. On the other hand, a low level of education spending per pupil may also increase the likelihood of a state applying to Race to the Top. If a state is not spending enough and not getting the results it wants in student achievement, that state will have more motivation to enter a competition for funding. We anticipate higher spending per pupil will lead to a better score in Race to the Top. A state which already spends a comparatively large amount on education would be more able to fund and implement additional reforms. Public sentiment and the goals of policy makers would be better-suited to Race to the Top's recommended reforms in states which already prioritize education and have a large tax base.

Teacher salaries in each state could serve as another way to gauge the state's emphasis on education. The data for our average teacher salary comes from the 2008 Report Card on American Education issued by the American Legislative Exchange Council. Average teacher salary could be a measure of the emphasis placed on hiring and keeping high quality educators for the students in a state[2]. Variance in average teacher salary among states could also be explained by higher or lower cost-of-living in different geographical areas. Higher cost-of-living could indicate an economically more profitable area. Thus, average teacher salary may also be a gauge of the overall economic health of a state. As teacher salary is also a measure of wage, we took the log of the teacher salary for our regression.

A state with a higher average teacher salary might be more likely to apply to the Race to the Top program. For one, education already appears to be a priority for that state. Also, if a state has the resources to pay its teachers well, the state is economically healthy enough to give ample attention and further funding toward education and will likely support such efforts by submitting an application for Race to the Top. A higher average teacher salary will likely also result in a higher score in Race to the Top. Again, high priority on education and the ability to fund reform would likely lead to a higher score as they both will help a state achieve the stated goals of the program.

3.5. Summary statistics. Table 1 (see Appendix) shows summary statistics of both phases of the competition and the variables discussed above for the earlier time period. The population, population density, and the racial makeup variables indicate that there is a contrast across the states. At the same time, there are variables which do not vary as much across states, such as median income, percent in poverty, and the age variable. Comparing the means of our two measures of diversity, we see that states tend to be more religiously diverse than racially diverse, and there is a great deal more variance in racial diversity than religious diversity among states. Also, the least racially diverse states are much more homogeneous than the least religiously diverse.

Table 2 (see Appendix) displays summary statistics separately for those states that did not apply to Race to the Top and those states that did apply for Phase 1. There appear to be significant differences in the mean between states that did not apply and states that did apply, which leads us to believe this data can be powerful in helping to explain which types of states were more likely to participate in the program. For example, both population and population density are much higher on average in states that applied than

[1] A value of 1 was assigned to states which had passed legislation and removed caps; a value of 0 was assigned to states which had not passed legislation with no caps.

[2] Our use of teacher salary simplifies how teachers are really compensated. As shown in Loeb et al (2009), states compensate teachers not only through salary but also with health and retirement benefits. We would still argue that salary is a good proxy for total compensation.

in states that did not apply. The variable for governor party affiliation also seems to show that more states that applied had a Democratic governor than did the states that did not apply. Two other notable variables are the measurements of charter school involvement and support. States that applied to Race to the Top had, on average, more charter schools created in the 2009-2010 as a percent of existing charter schools than states that did not apply, and they were also more likely not to have caps on charter schools. Table 3 (see Appendix) shows summary statistics for Phase 2. Many of the variables show a similar pattern as seen in Table 2. One notable difference is that there is no longer a marked difference in charter school caps between the states that applied and those that did not.

4. Analysis

The analysis is done in three parts. First, we develop a model that uses state-level characteristics to predict applications to Race to the Top in Phase 1[1]. The results from empirically estimating this model will allow us to whether certain types of states were innately more likely to apply, perhaps providing evidence that the design of the program was more attractive to certain states. Second, we develop a model to predict scores on the applications in Tier 1 of Phase 1. The results from this analysis will allow us to see whether the scoring was related to policy choices and educational variables of states or whether scores could be predicted by intrinsic characteristics of states. Finally, we use the same model from the second part to predict scores in Tier 1 of Phase 2 to see whether the importance of characteristics in predicting scores has changed between Phase 1 and Phase 2.

4.1. Application. Our first regression looks at what factors contributed to a state's decision of whether or not to apply to the first phase of the Race to the Top program. The estimated equation is given by:

$$Enter_i = \beta_0 + \beta_1 pop_i + \beta_2 popdensity_i + \beta_3 percentwhite_i + \beta_4 percentblack_i + \beta_5 percenthisp_i + \beta_6 medincome_i +$$
$$+ \beta_7 percentpoverty_i + \beta_8 age65over_i + \beta_9 racediv_i + \beta_{10} religiousdiv_i + \beta_{11} eduofficialelected_i + \beta_{12} Demgov_i +$$
$$+ \beta_{13} percentdemupperhouse_i + \beta_{14} charterperctotal_i + \beta_{15} newcharterpercent_i + \beta_{16} nochartercap_i +$$
$$+ \beta_{17} eduspendingperpupil_i + \beta_{18} avgteachersalary_i + u_i.$$

The regression results are found in Table 4 (see Appendix). We have reported the standardized beta coefficients in addition to the standard coefficients for two reasons. First, beta coefficients will allow for easier interpretation of our results since our variables differ widely in measurement. Second, it allows us to quickly see which factors have the largest effects on states applying to the program. The regressions were run using a linear probability model[2]. While there are limitations to this type of analysis, heteroskedasticiy robust standard errors are reported. The linear probability model correctly predicts 90% of the states' applications[3].

The original hypothesis was that states with larger populations overall and more densely populated states would be more likely to enter the Race to the Top program. While larger population did not have a statistically significant effect, larger population densities did predict that a state was more likely to enter. Racial diversity was not statistically significantly. Religious diversity, our other measure of homogeneity within a state, does have a significant effect on states' participation in Race to the Top. Contrary to our expectations, it seems that a more religiously homogeneous state is actually significantly less likely to apply. It could be the case that some fairly religiously homogenous states have other reasons not to support the Race to the Top program. For example, a state with a large population of Catholic residents may also have a high relative number of private Catholic schools and see no need for the support of charter schools.

Charter school factors are significant predictors of states' decisions regarding application to Race to the Top. States with a higher percentage of charter schools and a higher number of charter schools approved to open in the next year, as a percentage of existing charter schools in the state, were more likely to apply for Race to the Top funds. States that have legislation allowing charter schools and also have not placed a cap on the number of charter schools that may be created were more likely to enter the Race to the Top program. These findings

[1] We do not present results here on the predicting applications to Race to the Top in Phase 2. Like the results from Phase 1, there are not many significant conclusions that can be drawn from regression results as many of the reasons for states not applying are particular to each state.

[2] Probit analysis could not be estimated on the variables because the covariate pattern between a Democratic governor and having a cap on charter schools predicted outcomes perfectly. After dropping these offending variables, the results are consistent to the OLS analysis, however things are less precisely estimated than with the OLS model. Variables such as the charter schools as a % of all schools, the new charter schools as a % of existing charters, and teacher's salary all remain positive and significant. The only other significant variables in the probit model are percent Hispanic and percent of democrats in the upper house, both of which have a negative effect on applying to the program. The correlation between the predicted values from the OLS model and the modified probit model is .77. There are six states for which the predictions differ; the probit model better predicts those states that didn't enter the competition, the OLS model better predicts those states that did enter the competition.

[3] The LPM model incorrectly predicts Maryland, Montana, North Dakota, Texas and Alabama. Several of these states have unique political climates which are discussed later in this section.

were as we had expected, based on the Race to the Top program's emphasis on supporting charter schools and charter school creation. States which had already passed legislation supporting charter schools would be more inclined to invest funds and effort to apply for the program, given that the program recognizes and rewards charter school initiatives.

The expectation was that both higher education spending per pupil and a higher average teacher salary in a state would increase a state's likelihood to apply for Race to the Top funds. Our findings were consistent with that hypothesis for teacher salaries. Whether it is an indicator of the state's prioritization of education or simply an indicator of general economic health, a higher average teacher salary in a state significantly increased the probability that the state submitted an application for Race to the Top. However, we discovered that a higher level of education spending per pupil significantly lowered the state's likelihood of applying. Perhaps states with the financial means to fund education well for all their pupils were less inclined to seek additional funding from the Race to the Top program. If this were the case, it would seem to contradict our findings regarding average teacher salaries. The perceived inconsistency may be explained if we consider the teacher salary variable as a testament only to economic health and cost-of-living factors and not as an indicator of how much funding the state is able to give their education system.

The factors we included explain 15 percent of the variance among states. The model was not particularly effective in explaining why states did or did not enter because only ten states did not enter the first round. With a small sample of fifty to begin with and only a small number of those driving the variation in the dependent variable, it is difficult to measure differences across the two groups of states. There is also evidence to show that states that did not enter opted out for reasons that were not included in our analysis. Texas governor Rick Perry cited multiple reasons for not entering, including estimations that the cost to adopt common standards would exceed the reward for winning Race to the Top (Ayala, 2010). Alaska's Education Commissioner Larry LeDoux stated that Alaska decided not to enter Race to the Top because it infringed on state sovereignty (Hsieh, 2010). Some states, like Indiana, had trouble with teachers' unions (Wall, 2010). Since teachers' unions generally oppose some of the reform agenda in Race to the Top, notably the push to link student performance with teacher evaluation, states with strong union presence may not have been competitive for the program[1]. One other concern that state legislatures had with the program is that may just be the latest educational fad. State legislators from North Dakota and Texas profess that each new Presidential administration has a new approach to education, and that the priorities of Race to the Top will no longer apply when the next administration takes over (Kelsch, 2010).

4.2. Scores. Our second set of regressions examines which factors affected states' performance in Phase 1 of the Race to the Top program. The model is given by:

$$Score_i = \beta_0 + \beta_1 pop_i + \beta_2 popdensity_i + \beta_3 percentwhite_i + \beta_4 percentblack_i + \beta_5 percenthisp_i + \beta_6 medincome_i +$$
$$+ \beta_7 percentpoverty_i + \beta_8 age65over_i + \beta_9 racediv_i + \beta_{10} religiousdiv_i + \beta_{11} eduofficialelected_i + \beta_{12} Demgov_i +$$
$$+ \beta_{13} percentdemupperhouse_i + \beta_{14} charterperctotal_i + \beta_{15} newcharterpercent_i + \beta_{16} nochartercap_i +$$
$$+ \beta_{17} eduspendingperpupil_i + \beta_{18} avgteachersalary_i + u_i.$$

The score variable represents the numerical score assigned to the state's application by judges from the Department of Education in Tier 1 of the competition. We used the same explanatory variables from our first regression to run ordinary least squares. Again, both the standard coefficients and beta coefficients are reported to explain our findings.

4.2.1. Phase 1. The regression results that predict score in Phase 1 are reported in Table 5, column 1 (see Appendix). According to the adjusted R^2 value, the factors we include explain 69 percent of the variance among states in Round 1. As predicted, population density had a significant positive effect on states' scores in Phase 1 of the program. Certain programs that Race to the Top encourages, such as charter schools, are traditionally implemented in urban areas more than rural areas, so urban areas likely had the advantage of either already having programs in place or being better equipped to implement new programs. Total population also had a positive effect on states' scores. The hypothesis was that start-up costs may be constant, so states with larger budgets would have an advantage. Based on the evidence, this seems to have outweighed the alternate hypothesis that the programs may be harder to implement in larger states.

As predicted, higher percentages of white residents in a state predict lower scores, and higher percentages of Hispanic and black residents had

[1] We attempted to include teacher union presence as a variable in our equation, but lack of consistent state-by-state data from the two major teachers' unions, the American Federation of Teachers and the National Education Association, prevented us from doing so.

the opposite effect. As seen by the comparison of beta coefficients, percent of white residents was one of the strongest predictors of score. The programs encouraged by Race to the Top seem to be focused on states with large populations of minority students. Median income showed a significant negative correlation with score, while percent of population below the poverty line was not statistically significant. The percent of residents 65 and over had a negative effect on score as predicted. Since the elderly population is not likely to have school-aged children and thus gets no direct family benefit from improving education, states with a large percentage of their population over 65 are not likely to make education a priority relative to other public programs.

Racial homogeneity helped states scores, reinforcing the idea that homogeneous states are more likely to agree on passing legislative reform. However, religious homogeneity showed a significant negative effect on score. Thus, religious heterogeneity was an apparent advantage to states. One possible explanation for this unexpected result, as discussed in the results section for the application regression, includes the presence of a few very religiously homogenous states with different policy strategies than the Department of Education. It is also apparent by the beta coefficients that the racial homogeneity is much more influential in the positive direction (3.43) than the religious homogeneity is in the negative direction (-.21).

Method of selection of states' top education official was not a statistically significant predictor of scores. However, states with Democratic governors performed significantly better than those with Republican governors, as predicted, since they might be more likely to support President Obama's agenda. All else held constant, states with democratic governors scored 57.58 points higher than other states. However, the percentage of Democrats in a state's upper house was an insignificant factor.

The current number of charter schools as a percent of total schools was insignificant. This may make sense, as the Race to the Top program is more concentrated on new reform efforts, rather than charter schools which are already in place. Continued progress in charter school reform, which the next two variables capture, should have a greater effect on score. Having more charter schools opening in the coming year and no cap on charter schools were positive factors for states. States were scored in part based on charter laws, and states that already had charter laws had less to change in order to conform to the Race to the Top agenda. It may also have been easier to pass more innovative reform in those states, since the residents, teachers, and education officials were already accustomed to progressive education reform.

Educational expenditures per pupil has a negative impact on score, meaning that states that spend less on their students did better in Race to the Top. These findings are not in line with the a priori hypothesis, and they do not complement the findings on average teacher salary, which positively impact score. It may be that teacher salary, which takes other factors such as cost of living into account, predicted higher scores for other reasons, similar to the first regression on application to the program. For example, urban areas typically have higher cost of living, so they are more likely to have higher teacher salaries.

The results from looking at Phase 1 seem to indicate that states with a higher population density, a lower percent white, a lower median income, and more racial homogeneity were likely to score significantly better than other states. The factors that emerge as having the largest effect are factors that a legislature cannot attempt to change. If Race to the Top was a program that seemed to result in rewarding states based on non-legislative factors, then there might not be any hope for certain states whose demographic and economic variables are not consistent with the apparent pattern of scoring. This would be a concern; is there anything these states could do in the future to be more competitive in these federal grant programs?

4.2.2. Phase 2. As mentioned before, Phase 2 occurred in the first half of 2010 with the winners being announced in August of that year. We can compare the predictors of score in Phase 1 with what predicted score well in Phase 2 to see if the federal government weighted things differently in scoring the second time around. In effect, was the competition more accessible to states who didn't have a high population density, low percent of whites, a low median income, and low racial diversity? The composition of the states that applied did not change much in the second round. Other than the winning states, Delaware and Tennessee, nine states that entered in Phase 1 did not enter in Phase 2. Six states entered in Phase 2 for the first time.

The results from a regression that predicts score in Phase 2 is in Table 5, column 2. The same explanatory variables are used as before, and once again the standard coefficients as well as the beta coefficients are reported. The first thing to note is that this regression was not as successful in predicting scores. The adjusted R^2 value for this regression is only 29 percent. Out of the small amount of variation that can be explained, the only statistically significant variable from this regression was charter schools as a percent of total schools. A higher percentage of charter schools had a positive impact on scores, as predicted. Specifically, holding all else constant, a one percent increase in the number of charter schools increased score by about 6.5 points. It is

interesting that this variable was not significant at all in the regression predicting scores in Phase 1. It appears that out of all the factors, the most important predictor in Phase 2 was a variable that directly reflected active legislative activity by the state government. The results from Phase 2 seem to indicate a shift in scoring practices that makes it more likely that states are being awarded based on their proposal of innovative policies and promises of change rather than their innate characteristics that the reviewers may subconsciously take into account.

Conclusion

The empirical analysis identifies characteristics that are significant predictors in both the application and performance regressions. The results suggest that some states may be predisposed both to apply to Race to the Top and to do well in the competition. This also means that other states may be at a disadvantage in Race to the Top because factors that appear important for success are beyond their control. These findings may suggest that some states should not even apply because they are predisposed to perform poorly in the competition based on the design of the program. Does that line up with the intent of the competition? Should access to funding through federal education reform be available to all states?

In President Obama's 2011 State of the Union Address, he summarized Race to the Top: "To all 50 states, we said, 'If you show us the most innovative plans to improve teacher quality and student achievement, we'll show you the money'". Based on the results from Phase 2, this statement seems like it could be more accurate than the Phase 1 results would have led us to conclude. However, there are still states that opt-out from even applying to the program. Based on our findings, maybe Charles Barone, director of federal policy for Democrats for Education Reform, was more correct in saying, "Race to the Top wasn't for everybody; it wasn't ever a fifty-state strategy" (Herbst, 2010).

Even though the monetary awards given out by the Race to the Top Fund may not realistically be up for grabs by all states, the program may still be an effective tool for reform. Since many more states have passed legislation than have or likely will receive funding, the true effect of the Race to the Top Fund will be in the education reform it produces. While only twelve states received funding, 46 states and the District of Columbia adopted plans to comprehensively reform their education system. Clearly, the monetary incentive of Race to the Top was enough to encourage states to participate. In creating a competition, Secretary Duncan succeeded in securing almost full participation without a single mandate.

With respect to the states that didn't actively participate in the Race, even they could be affected in the future by the influence of laboratory federalism. States that did not change anything for the competition may later see that other states' programs are successful in improving educational outcomes. They may copy these successful programs and thus improve their education system, with no federal funding. Secretary Duncan encouraged this behavior in a speech to the Teachers College of Columbia University. States can also see where innovative programs failed along the way. Representative Mark Maddox, from the Phase 1 winning state of Tennessee explained, "You can benefit from our mistakes so you don't have to make them as well" (Maddox, 2010). This will help states implement strong programs, and also avoid programs that may not be successful. This paper does not formally test the impact of states' actions on each other. However evidence like the approval of the Common Core Standards suggests that this is a strong asset of the program.

Without funding every program or mandating any, the federal government motivated change in the educational system across the country. While the Race has certainly been effective as a tool to inspire widespread reform through competition and monetary incentives, it is yet to be seen what long-lasting effects this reform will have on America's education system. Future research may be able to shed more light on the costs and benefits of the program, both by states that participated and those that did not, or may be able to investigate whether states learned best practices from other states. As our federalist system currently seems to be testing the relationship between federal, state and local governments, design of policies to encourage laboratory federalism could be a powerful tool for our federal government to advocate change. The experience with Race to the Top shows that the federal incentive may have been effective in generating reform, however it remains unclear whether the positive effects of legislative change are large enough to justify a program that may not be accessible or appropriate for all states.

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Appendix

Table 1. Summary statistics for all states

	Mean	Standard deviation	Minimum	Maximum	*N*
Score in Phase 1	359.47	67.22	135.80	454.60	41
Score in Phase 2	389.54	68.45	212.00	471.00	36
Demographic factors:					
Population	5,961,955	6,724,633	532,668	36,800,000	51
Population density	377	1,347	1	9,639	51
Percent of white	0.81	0.13	0.30	0.96	51
Percent of black	0.11	0.11	0.01	0.54	51
Percent of Hispanic	0.10	0.10	0.01	0.45	51
Median income	$50,248	$8,080	$36,338	$68,080	51
Percent in poverty	0.13	0.03	0.07	0.21	51
Percent aged 65 and over	0.13	0.02	0.07	0.17	51
Measures of heterogeneity:					
Racial diversity	0.71	0.14	0.28	0.92	51
Religious diversity	0.37	0.06	0.22	0.51	51
Political factors:					
Education official selection	0.27	0.45	0.00	1.00	51
Governor party affiliation	0.54	0.50	0.00	1.00	50
Percent of Democrat, upper house	0.53	0.16	0.20	0.88	50
Educational factors:					
Charter schools, percentage of all schools	0.04	0.06	0.00	0.36	51
New charter schools approved, percentage of existing	0.02	0.05	0.00	0.25	51
No charter school cap	0.39	0.49	0.00	1.00	51
Education spending per pupil	$10,384	$2,452	$5,765	$17,173	51
Average teacher salary	$46,593	$6,966	$34,709	$61,195	51

Note: Data on the governor party affiliation and the political distribution of the upper house is not available for Washington, DC.

Table 2. Summary statistics by decision to apply to Race to the Top in Phase 1

	States that did not apply			States that applied		
	Mean	Standard deviation	*N*	Mean	Standard deviation	*N*
Demographic factors:						
Population	4,628,152	7,238,534	10	6,287,273	6,647,062	41
Population density	98.10	171.68	10	444.50	1495.83	41
Percent of white	0.82	0.13	10	0.81	0.13	41
Percent of black	0.10	0.13	10	0.12	0.11	41
Percent of Hispanic	0.09	0.12	10	0.10	0.09	41
Median income	$51,003	$9,830	10	$50,064	$7.726	41
Percent in poverty	0.12	0.04	10	0.13	0.03	41
Percent aged 65 and over	0.12	0.02	10	0.13	0.02	41
Measures of heterogeneity:						
Racial diversity	0.71	0.16	10	0.71	0.14	41
Religious diversity	0.40	0.07	10	0.37	0.06	41
Political factors:						
Education official selection	0.30	0.48	10	0.27	0.45	41
Governor party affiliation	0.40	0.52	10	0.58	0.50	40
Percent of Democrat, upper house	0.54	0.13	10	0.52	0.17	40
Educational factors:						
Charter schools, percentage of all schools	0.02	0.02	10	0.05	0.07	41
New charter schools approved, percentage of existing	0.01	0.01	10	0.03	0.05	41
No charter school cap	0.20	0.42	10	0.44	0.50	41
Education spending per pupil	$10,641	$2,545	10	$10,321	$2,457	41
Average teacher salary	$44,342	$5,975	10	$47,142	$7,145	41

Note: Data on the governor party affiliation and the political distribution of the upper house is not available for Washington, DC.

Table 3. Summary statistics by decision to apply to Race to the Top in Phase 2

	States that did not apply			States that applied		
	Mean	Standard deviation	*N*	Mean	Standard deviation	*N*
Demographic factors:						
Population	4,437,533	6,581,705	13	6,726,035	6,973,601	36
Population density	61.68	64.03	13	500.08	1613.97	36
Percent of white	0.87	0.08	13	0.79	0.14	36
Percent of black	0.05	0.06	13	0.13	0.12	36
Percent of Hispanic	0.08	0.09	13	0.11	0.10	36
Median income	$51,379	$7,631	13	$52,435	$9,002	36
Percent in poverty	0.12	0.02	13	0.13	0.03	36
Percent aged 65 and over	0.13	0.02	13	0.13	0.02	36
Measures of heterogeneity:						
Racial diversity	0.78	0.12	13	0.68	0.14	36
Religious diversity	0.37	0.08	13	0.37	0.06	36
Political factors:						
Education official selection	0.38	0.51	13	0.25	0.44	36
Governor party affiliation	0.31	0.48	13	0.43	0.50	35
Percent of Democrat, upper house	0.40	0.22	13	0.48	0.18	35
Educational factors:						
Charter schools, percentage of all schools	0.02	0.02	13	0.05	0.07	36
New charter schools approved, percentage of existing	0.06	0.08	13	0.07	0.06	36
No charter school cap	0.46	0.52	13	0.42	0.50	36
Education spending per pupil	$10,855	$2,654	13	$10,753	$2,688	36
Average teacher salary	$43,705	$5,341	13	$47,040	$6,866	35

Note: Data on the governor party affiliation and the political distribution of the upper house is not available for Washington, DC.

Table 4. Predicting application to Race to the Top

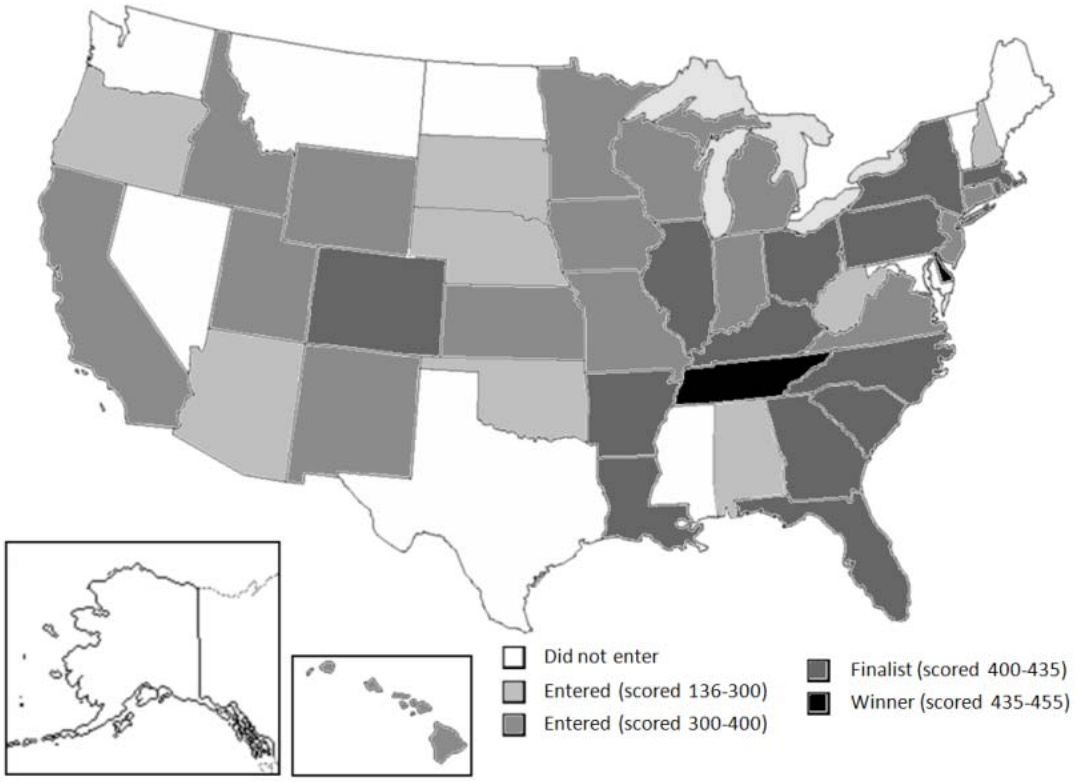
	Apply for Phase 1		
	Unstandardized coefficients		Standardized coefficients
	B	SE	Beta
Population	0.000	0.000	0.006
Population density	0.001	0.000	0.535**
Percent of white	-2.529	2.222	-0.746
Percent of black	-2.228	1.488	-0.522
Percent of Hispanic	-0.718	0.832	-0.175
Log of median income	-2.042	2.116	-0.806
Percent in poverty	-1.603	8.334	-0.123
Percent aged 65 and over	-2.816	6.774	-0.123
Racial diversity	1.614	2.160	0.551
Religious diversity	-2.240	0.921	-0.335**
Education official elected	-0.055	0.144	-0.062
Democratic governor	0.071	0.134	0.088
Percent of Democrat, upper house	-0.015	0.384	-0.006
Charter schools as a % of all schools	2.320	1.235	0.241*
New charters schools approved as % of existing	2.575	1.200	0.304**
No charter school cap	0.270	0.110	0.330**
Education spending per pupil	-0.000	0.000	-0.413**
Log of average teacher salary	1.565	0.752	0.547**
Constant	8.978	25.149	22.219
Observations	50		
Adjusted *R*-squared	0.15		

Notes: Robust standard errors are reported. * significant at 10%; ** significant at 5%; *** significant at 1%. The District of Columbia is not included in the regression analysis.

Table 5. Predicting scores in Race to the Top

	Score in Phase 1			Score in Phase 2		
	Unstandardized coefficients		Standardized coefficients	Unstandardized coefficients		Standardized coefficients
	B	SE	Beta	B	SE	Beta
Population	0.000	0.000	0.301*	0.000	0.000	0.173
Population density	0.260	0.048	1.039***	0.093	0.089	0.393
Percent of white	-1,945.329	451.226	-3.409***	1.868	6.177	0.347
Percent of black	410.655	217.254	0.522*	-2.550	2.618	-0.373
Percent of Hispanic	192.072	127.746	0.267	-1.726	2.521	-0.261
Log of median income	-515.449	221.048	-1.167**	-224.886	502.732	-0.558
Percent in poverty	-952.627	825.820	-0.417	-4.842	18.005	-0.218
Percent aged 65 and over	-1,681.360	945.090	-0.379*	-8.869	12.852	-0.200
Racial diversity	1,745.573	474.778	3.437***	-360.208	581.807	-0.724
Religious diversity	-249.860	130.077	-0.206*	-53.082	231.168	-0.043
Education official elected	-15.901	17.864	-0.106	-16.532	28.483	-0.107
Democratic governor	57.580	22.107	0.426**	13.233	32.185	0.097
Percent of Democrat, upper house	0.194	63.998	0.000	86.046	104.975	0.227
Charter schools as a % of all schools	-182.579	253.610	-0.119	649.740	366.260	0.432
New charters schools approved as % of existing	450.843	129.852	0.348***	223.265	268.830	0.207
No charter school cap	45.283	14.775	0.337***	40.297	36.447	0.295
Education spending per pupil	-0.017	0.006	-0.590**	-0.001	0.009	-0.028
Log of average teacher salary	356.151	96.013	0.755***	93.597	233.620	0.193
Constant	2,867.166	2,576.686	42.340	2,043.566	4,831.102	29.770
Observations	40			35		
Adjusted *R*-squared	0.69			0.29		

Notes: Robust standard errors are reported. * significant at 10%; ** significant at 5%; *** significant at 1%. The District of Columbia is not included in the regression analysis.



Source: Data from the US Department of Education.

Fig. 1. Score ranges in Phase 1

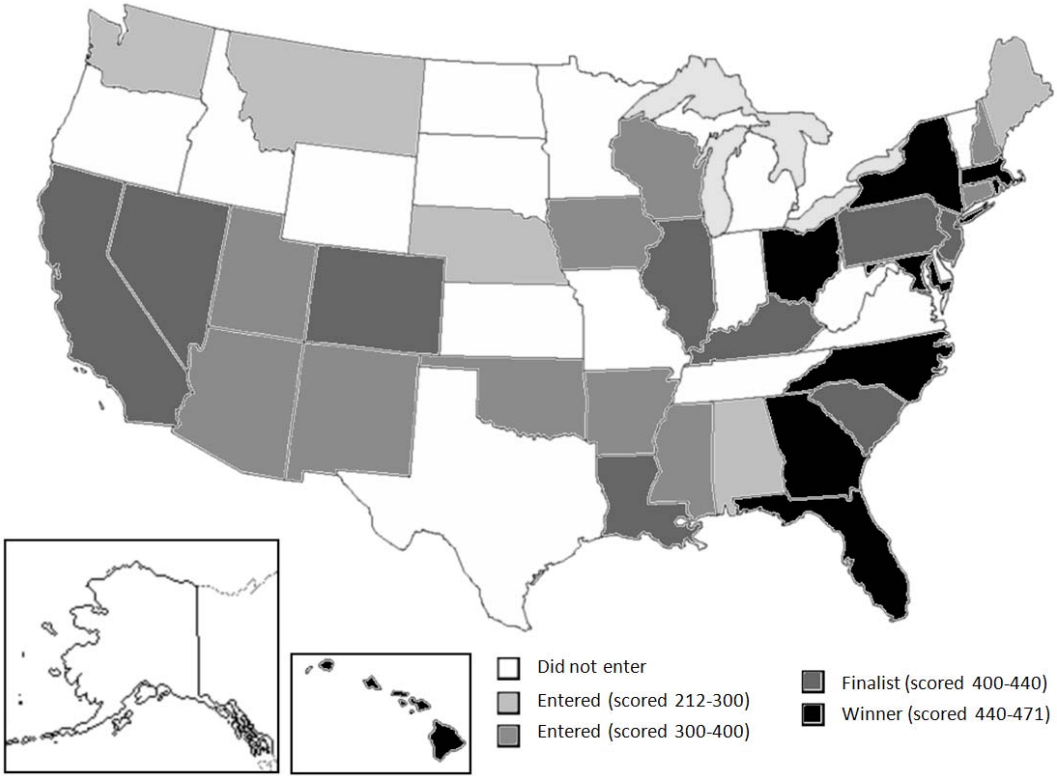


Fig. 2. Score ranges in Phase 2