Not only a matter of education

Laura Agosta / Formar Foundation - September 2011

Executive summary

In the past few decades, the education system in the US has undergone various reforms with the goal of achieving better quality for American students. Experts have tried measured the impact of these reforms and attempted to share some of their lessons. Nevertheless, there is not yet a complete compendium of evaluations of the impacts of these reforms on the educational achievements of Hispanic students and it is not clear which mechanisms are more effective than others in improving their level of education in particular.

For example, the results that overarching education reforms such as No Child Left Behind have had on Hispanic students show that improving their educational condition may not depend solely on improving schools or curricula but also on other factors such as the children's' socio-economic situation.

Which elements drive improvements in Hispanic students' educational achievement in US schools? What are the variables that ultimately explain their improvements? What is the link between educational achievement and other socio-economic factors? These are some of the questions that this paper – as part of a series of papers on the assessments on education reforms for Hispanics in the US –aims to answer.

In this first paper, we provide the reader with an overview of the main reform trends in improving Hispanic education. We also attempt an analysis of which factors influence Hispanic achievement based on a preliminary statistical analysis of some explanatory variables at the state level in the United States.

Our goal is to make a concrete contribution to the debate over which types of policies are required in order to improve the quality of Hispanic education. With that in mind, we seek to shed light on some of the relevant issues facing policymakers and the range of factors at play in forming the educational situation of Hispanics in the US.

Formar Foundation

Formar Foundation is a non-profit organization with ties to both Latin America and the United States that is dedicated to addressing issues of education and training at the early childhood, primary, and secondary schooling levels (pre-K through 12). We bring together a team of public policy practitioners, education professionals, volunteers and technical officials with experience in the analysis of educational needs and in the implementation of projects at the local, provincial, national, and regional levels. Our vision is to strive toward the elimination of regional disparities in children's access to quality education through policy reforms and the transformation of teacher evaluation systems in the Americas.

Formar Foundation relies on the participation of Esteban Bullrich, Gabriel Sánchez Zinny, Cristina Autorino, Mario Magaña Duarte and Laura Agosta. This is the second paper that Formar Foundation has produced on this topic.

Hispanic students at school

Hispanics are the largest, youngest and fastest growing minority in the United States. The group now includes 50.5 million people, accounting for 16 percent of the total population (MARTINEZ, ARIOSTO: 2001). Over the last ten years, the Hispanic population accounted for 56 percent of the nation's growth rate—an increase of 15.2 million out of a total of 27 million (PEW HISPANIC CENTER: 2011). Moreover, "between 1980 and 2000, the increase of 20.7 million in the Hispanic population accounted for 38 percent of the nation's total population growth. The white population increased by 14.3 million and accounted for 26 percent of the growth" (PEW HISPANIC CENTER: 2005, 4). More than 11,000,000 Hispanic children are currently between the ages of 5 and 17.

In terms of education policies that impact Hispanics, several major trends stand out:

- **Low enrollment of Hispanic children in early childhood programs and kindergarten**. Hispanic students tend to be less likely to be enrolled in these kinds of programs than white students. This jeopardizes the future of their educational achievement. According to several studies, the educational outcome gap is closely related to the access and quality of education in the early years of childhood development. This is especially important in the context of providing more educational opportunities to children that come from economically disadvantaged families, and those with parents with low educational attainment levels.
- **Hispanic dropout rates are among the highest and Hispanic education achievement levels are among the lowest of any minority.** This problem is exacerbated by a modern US society in which higher levels of educational achievement are increasingly considered prerequisites for employment, contributing to a higher than average unemployment rate among Hispanics.
- **Hispanic students disproportionately attend public schools that are larger, more minority-heavy, and lower quality**. It is vitally important to study not only those problems related to the characteristics of the cultural, social and economic condition of Hispanics as a group, but also those that relate to the way in which they are integrated into the system as a whole. Understanding the broader context of the schools that Hispanics are more likely to attend is key when evaluating public policy options.
- **Countering the underrepresentation of Hispanic teachers**. As shown above, there is an underrepresentation of Hispanic teachers at schools in the U.S. This is a problem in the sense that students often need special guidance during their time at school. Preparing more teachers within the Hispanic community is another necessary step in improving this group's educational achievement.
- **Hispanics encounter several barriers to college access.** According to the Pew Center, only 53 percent of Hispanic high school graduates are at least "minimally qualified" for admission to a four-year college (PEW CENTER: 2004, 2). This disparity is also reinforced by the fact that Hispanics are more likely to attend community colleges and less prestigious undergraduate institutions compared to the enrollment tendencies of white high school graduates. Moreover, even

if Hispanics are able to enter an undergraduate program, the likelihood of them dropping out is extremely high. In the U.S., the college graduation rate for Hispanics is 23 percent compared to 47 percent for whites (PEW CENTER: 2005, 16).

Overview of the main trends and challenges in US education reform: the past decades

Policies to address the challenges of Hispanic educational achievement consist of two types. On the one hand, there are reforms targeted at improving the particular educational problems of the Hispanic community. These policies include programs to improve English language skills, scholarships for students, mentoring activities, and policies to encourage enrollment in early childhood education programs, among others.

On the other hand, there are the policies that do not focus on Hispanics per se, but that form part of a greater movement toward performance-based results assessment. This is the case of reforms related to parental choice, performance accountability, and teacher training. These policies are implemented with the objective of raising achievement for all students across the educational system.

The implementation and the impact of each of these types of reforms, of course, depend on many variables, including educational context, the importance of the Hispanic community in various regions, and political will. Programs targeted solely at Hispanic children, especially those that aim at improving their level of English comprehension, have proven successful. Nevertheless, these programs have been criticized as producing a form of segregation and promoting underachievement among students. In addition, as many studies conclude, "achieving proficiency in English is a necessary but not sufficient condition for Latino students to succeed in American schools" (KERPER MORA, 2002: 32). Thus, broader reforms such as increasing parental choice have been promoted as achieving more sustainable and equitable results.

During the 1990s, a new school reform movement became extremely influential in the United States. This movement sought to shift the focus of reform from the educational system and process to the student's educational achievement. Two important features characterized the education reforms of this movement. First, as in other fields of public service provision, a focus on outcomes and results became crucial. This type of performance evaluation required the definition of both particular standards and broader objectives in the pursuit of educational goals. Second, these standards and assessment-based reforms also included the involvement and feedback of various stakeholders in both the public and the private sector.

Some of these reforms focused primarily on the provision of better services for students, such as smaller class sizes or after school programs. Others related to the way in which education is financed, such as vouchers and school choice initiatives. The lens of the principal-agent problem provides us with a strong justification for such policies. In this sense, the reforms can be seen as a way of overcoming the problems produced by the fact that "the interest of the parents and voters are viewed

as imperfectly aligned with those of teachers and school administrators" (DEE, JACOB, 2010, 2). The following chart provides an overview of the reform landscape.

Table 1: School reforms: Overlook to some types of reforms

Type of reform	Type of policies
Reforms related to educational inputs	• Increase in the amount of hours of education • Decrease in class size • Increase funding for infrastructure and school supplies • Increasing teacher quality • Increase the use of technology in class
Reforms related to ameliorating factors that affect education performance	• Targeting school drop-out rate • Targeting absenteeism • Change in curricula
Reforms related to school choice and family financing	• Vouchers • Charter schools • School rankings

Source: Self-elaboration

By the beginning of the 21st century, the most important milestone of the reforms of this period was the 2001 No Child Left Behind Act. In meeting the challenge of making sure no student falls behind in achievement, the definition of a good education is based on the results on standardized tests in reading and mathematics, for which children are tested in grades 3 through 8. "If a child fails the test, she is judged not to have received a good education from the school. If the school does not make Adequate Yearly Progress (AYP) on student test scores, the school is considered not providing a good education to its students and is labeled 'in need of improvement.' The school then faces serious sanctions—from allowing its students to move to other schools to being restructured. Schools that produce good scores are considered good education providers" (ZHAO, 2009). In short, No Child Left Behind increased the freedom of local families to make educational decisions for their children, while holding individual schools accountable for achievement results

The ultimate goal of the law is to help all children achieve excellence in terms of their academic performance in the areas of math, English and science. A complex system of federal and local accountability has been created to administer its implementation, and the proficiency level required of students is determined by each state.

Besides serving as a way of improving the level of education of all American citizens, for No Child Left Behind and other reforms of this period, reducing the inequality between various sectors of American society were also primary objectives. Nevertheless, the evidence shows that minorities, including Hispanics, have not benefitted from these reforms as intended. Indeed, these policies are commonly criticized for measuring achievement through standardized testing while ignoring other criterion of the learning process. But even considering test scores to the exclusion of other evaluation

mechanisms, it is still the case that while scores have risen across sectors, Hispanics are not catching up with white students.

Several questions remain to be answered. What type of policies will best improve the quality of education that Hispanic children receive? Should such reforms focus solely on education policy per se or should they also address broader socio-economic factors? What is the correlation between improvements in standardized test scores and a student's socio-economic context?

An overview of the achievement gap and other measurements of education achievement

The most common way of measuring education achievement in the US is through standardized test scores. The following is an overview of the situation of Hispanic students compared to other ethnicities in this regard.

Test results for the National Assessment of Educational Progress (NAEP)

The National Assessment of Educational Progress is the largest representative, ongoing, and multi-subject assessment of student performance. It is based on periodic assessments in mathematics, reading, science, writing, the arts, civics, economics, geography, and U.S. history (NAEP).

According to the NAEP, Hispanic students between the 4th and 8th grades improved their reading scores by, on average, 6.75 points from 2003 to 2011, whereas white students have improved their scores on average 2.24 points in the same period. In terms of scores in mathematics, Hispanic students have improved their situation by an average of 9.40 whereas white students improved by 5.99.

On both tests and at all grade levels, white students perform better than Hispanic students. The difference between these scores is known as the achievement gap, and this gap is commonly used as proxy for the relative educational achievement of Hispanics.

There are several criticisms of the use of standardize test scores to measure educational achievement, as well as of the idea that it is relevant to measure the educational level of one group against another. For example, a narrowing of the achievement gap could be positive if it meant an increase in Hispanic scores, but it could also be the result of a decline in white students' scores. Nevertheless, the achievement gap is an important, if incomplete, indicator of educational inequality, and for the purpose of this paper we will make use NAEP's indicators in this regard.

The following chart compares the achievement gaps of students between the 4th and 8th grade in the NAEP standardized test for English and math over several years. They were calculated taking into consideration the average school-reported Reading scale score sorted by race and ethnicity.

Overall, there has been a reduction of the achievement gap in all levels for all the tests.

Achievement gap- Reading tests

4th grade	1998-2011: reduction of 7.08 points 2003-2011: reduction of 3.38 points
8th grade	1998-2011: reduction of 5.07 points 2003-2011: reduction of 5.63 points

Achievement gap-Mathematics tests

4th grade	2003-2011: reduction of 1.52 points
8th grade	2003-2011: reduction of 5.29 points

Source: National Center for Education Statistics (NCES)

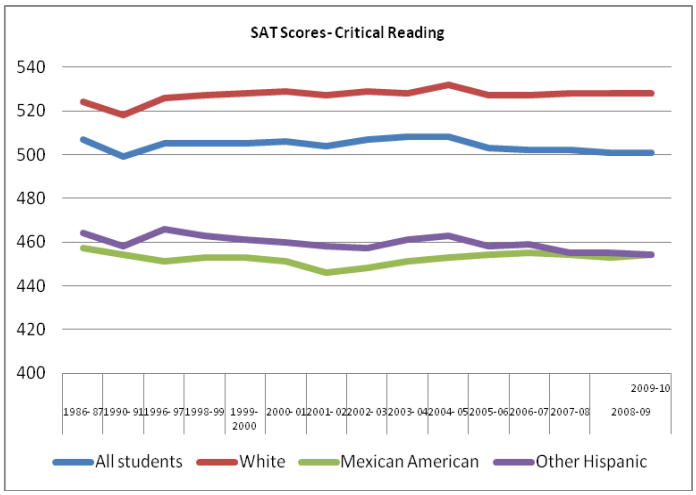
Graph 1: Change in achievement gap 2003-2011 by State- Reading test scores 8 grade
Source: National Center for Education Statistics (NCES)

Graph 2: Change in achievement gap 2003-2011- Math test scores 4th grade
Source: National Center for Education Statistics (NCES)

SAT scores

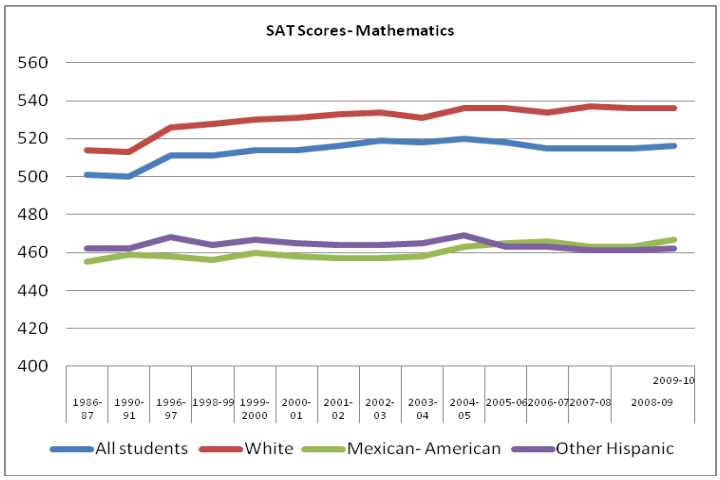
The SAT test attempts to measure the readiness of students for college. Analyzing the 2009 and 2010 scores, it becomes clear that Hispanic students score lower on the SAT in mathematics and critical reading than the average U.S. student.

Graph 3: SAT scores- Critical Reading



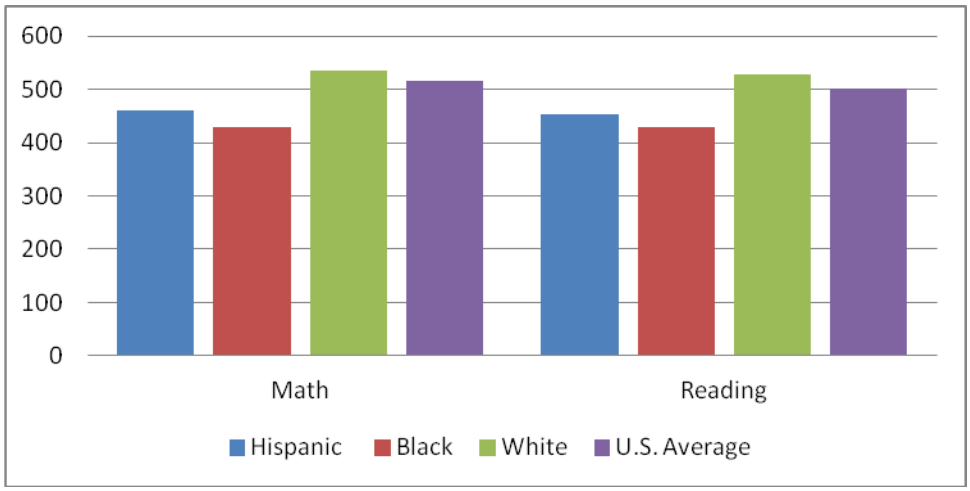
Source: National Center for Education Statistics, SAT Scores of college-bound senior

Graph 4: SAT scores- Mathematics



Source: National Center for Education Statistics, SAT Scores of college-bound seniors

Graph 5: SAT scores 2009/2010



Source: National Center for Education Statistics, SAT Scores of college-bound seniors 2009-10

It can be concluded that the trends in test scores show that

- The average US student has been improving his/her test scores results over the years, with exception of the SAT.
- White students consistently perform better on average than Hispanic students.
- However, there has been a reduction in the achievement gap as measured by NAEP test scores.

Hispanics in the education system: additional trends

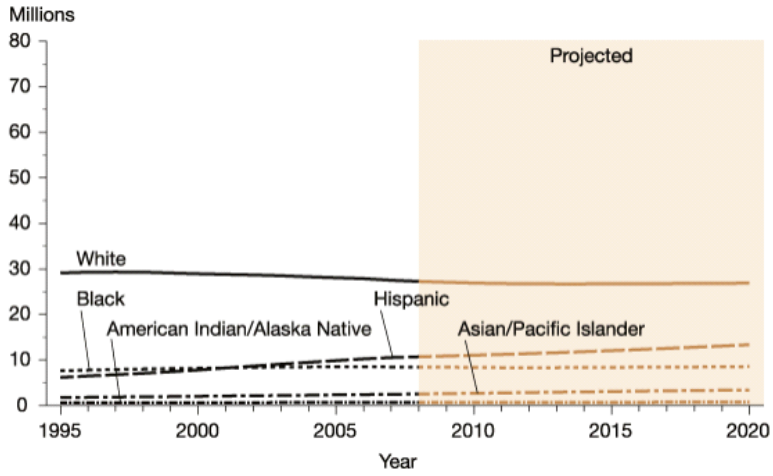
Traditionally, the explanation for the achievement gap between these different students has focused on the size and growth of the Hispanic population (NAEP: 2011). Some attention has been paid to structural issues as well, such as the type and structure of schools. In contrast, little attention has been paid to deeper underlying issues such as socio-economic status or the educational attainment of parents.

- School and general education characteristics:

- High levels of enrollment in public schools:

According to the National Center for Education Statistics, between the years 2008 and 2020, white enrollment in public elementary and secondary schools is projected to decrease by one percent, while increasing 25 percent for Hispanic students.

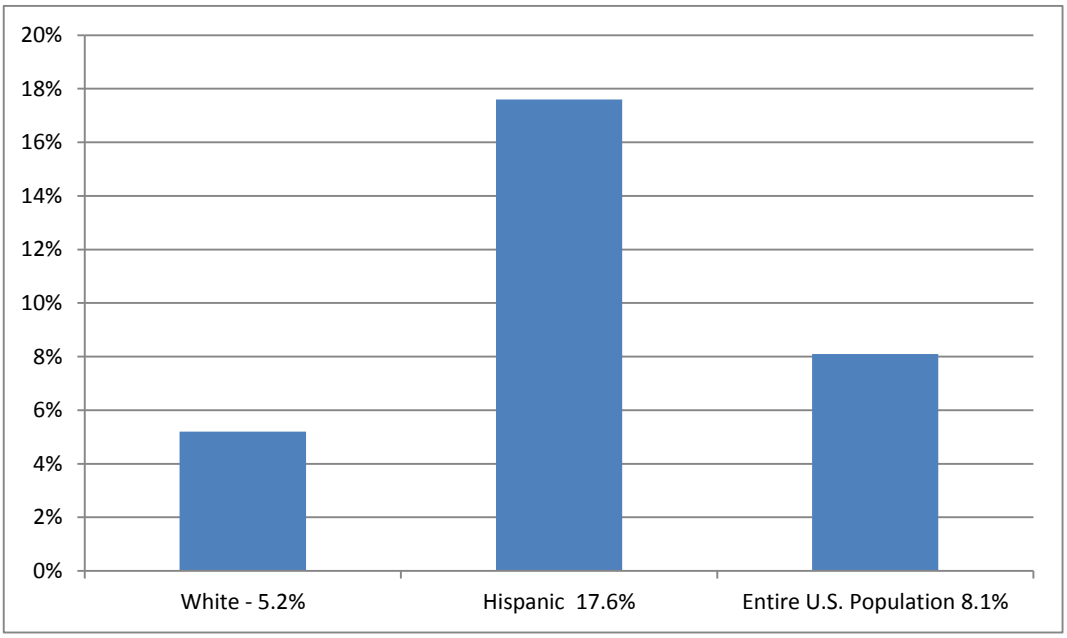
Graph 7: Enrollment in public elementary and secondary schools



Source: Graphic and information courtesy of National Center for Education Statistics

- The Hispanic high school dropout rate is the highest among all US ethnic groups, and almost twice as much as that of the population as a whole.

Graph 8: Drop out rates by ethnicity



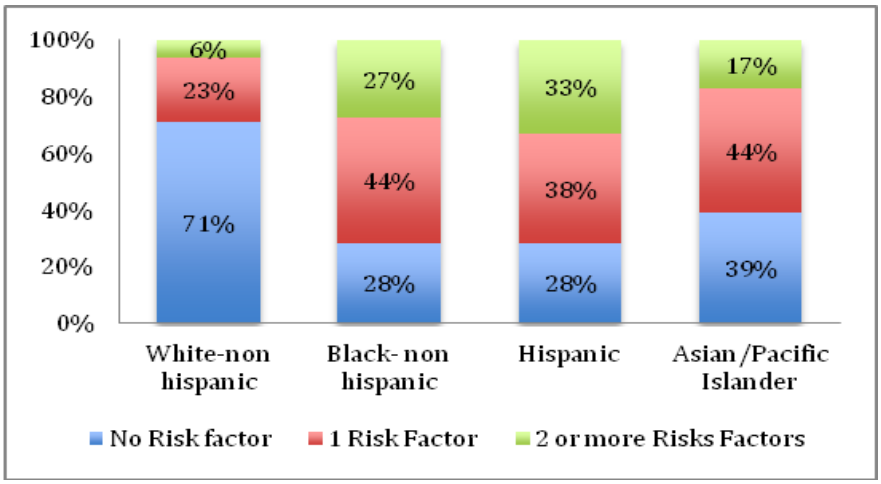
Source: National Center For Education Statistics, 2009

The evidence shows that Hispanic students attend more crowded schools, where the teacher/pupil ratio is higher, and they tend to drop out at a higher rate than the average US student.

- Socio-economic characteristics:

According to the US Department of Education, there are four factors that affect student achievement: having a mother who has less than a high school education; being part of a family on welfare or receiving food stamps; living in a single-parent family situation; and having parents whose primary language is a language other than English. By 2000, "about 7 out of 10 (71 percent) entering kindergartners from Hispanic or Black families have one or more of these risk factors, compared to about 3 out of 10 (29 percent) of those from White families and 6 out of 10 (61 percent) from Asian/Pacific Islander families" (LLAGAS, SNYDER: 2003, 68). The following graph shows that Hispanic kindergarten students tend to have two or more risk factors at a higher rate than those of other races.

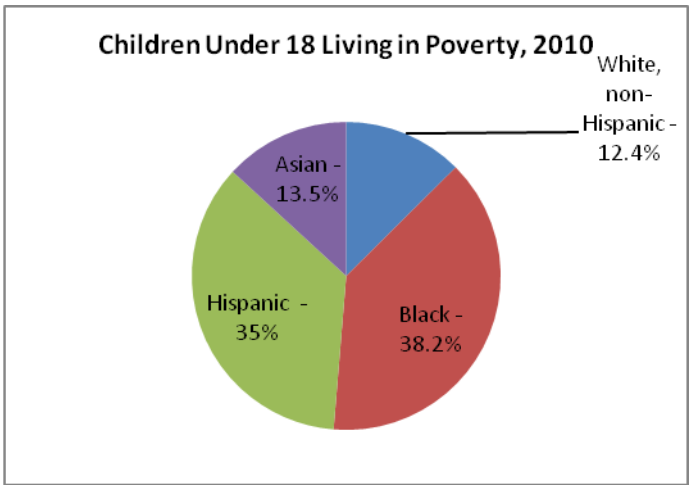
Graph 9: Distribution of kindergartners, by number of risk factors and race/ ethnicity: Fall 1998



Source: National Center for Education Statistics (NCES),

Moreover, in 2010, 35 percent of Hispanic children were living in poverty compared to only 12 percent of white children.

Graph 10: Children under 18 living in poverty, 2010



Therefore, we can assume that there are environmental and family factors that intervene in the educational performance of children, and this particularly differentiates Hispanic from white students. Overlooking these factors can decrease the effectiveness of the implementation of reforms.

In explaining the achievement gap, Barton identifies two types of factors that correlate with student achievement. On the one hand, there are factors that occur before and beyond school such as: (i) birth weight, (ii) Lead poisoning, (iii) Hunger and nutrition, (iv) Reading to young children, (v) Television watching, (vi) Parent availability, (vii) Student mobility and parent participation. On the

other, there are factors that occur at school such as (i) Rigor of curriculum, (ii) Teacher experience and attendance, (iii) Teacher preparation, (iv) Class size, (v) Technology-assisted instruction and (vi) School safety (BARTON: 2004).

A study conducted by Educational Testing Services highlights other key factors that affect children's educational achievements. Some of them relate to the parent-pupil ratio, others to the financial situation of the families, children's literacy development, childcare disparities, the home as an educational resource, and the parent-school relationship (BARTON, COLEY: 2007)

It is clear that more research and policy analysis is needed to integrate these diverse factors into specific lines of education reform that will success in improving education quality for Hispanics.

We will continue with an exploration of a framework to statistically analyze these factors at the state level.

Developing a framework for the factors that affect Hispanic student achievement

As we have seen, the current trend in the US is to address Hispanic students' educational problems with mostly – and many times, only – reforms to education policy itself.

Nevertheless, the literature shows that educational achievement is very much dependent on other risk factors rooted in the individual, household and state level contexts – such as parents' educational attainment, poverty rates, the language used at home, and many others.

In this study, we embark on a preliminary exploration of the potential factors responsible for the educational gap between white and Hispanic students at the State level.

According to the data collected, the following are the means, minimum and maximum points in the dataset for the achievement gaps for different grades and types of tests.

Table 1. Exploring the gaps in the reading scores

Variable	Mean	Min-Max
Key outcomes of interest		
Test scores Reading 4th grade white students 2002	226 (5.99)	218-248
Test scores Reading 4th grade Hispanic students 2002	203 (8.17)	188-224
Gap Reading 4th grade 2002	24 (8.64)	8-55
Test scores Reading 4th grade white students 2011	229 (6.6)	216-255
Test scores Reading 4th grade	208 (7.11)	196-226

Hispanic students 2011		
Gap Reading 4th grade 2011	22 (7.96)	4-53

Methodology

We constructed a model to evaluate the factors that could have played the largest role in explaining the achievement gap in 2011. **We are interested in the education gap between white and Hispanic 4th grade reading scores for the year 2011.**

We then selected a series of potential variables that could have influenced this outcome, and we analyzed them using statistical tools (for complete list of variables, please refer to the annex). This state level analysis uses as data sources state data from the Census of 2000 and 2010, the American Community Survey and NAEP statistics.

On average, the reading gap has been reduced a 0.68 points from 2002 to 2011 for students in the 4th grade. Moreover, the difference between the test scores in the reading test between white and Hispanic students in 2011 has proven to be statistically significant at the 0.01 level of confidence.

We also selected some variables that defined different trends that the states followed in terms of (i) demographics (ii) socio economic situation and (iii) education statistics. An exploratory analysis of these trends suggests a number of relevant factors.

Exploring the demographic trends:

- The overall population grew 9.76 percent between 2000 and 2010, whereas the Hispanic population grew 43 percent.
- On average among states, there was a decrease of 0.17 points in the percentage of women in the total population
- On average, there has been a decrease of 20 percentage points in the incidence of teenage birth rate between 1991 and 2009

There is a positive correlation between the gap in 4th grade reading test scores in 2011 and the percentage of women in the population. The analysis shows that states with wider gaps also have more women as a percentage of the total population (0.27).

In terms of the Hispanic population growth, states with a wider gap also had a smaller Hispanic population growth (correlation -0.18).

In terms of socio economic trends:

- Between 2000 and 2010, there has been an overall increase in the poverty rate of 2.08 percent and an increase of 3.11 percent among poor Hispanics
- In 2009, 11.9 percent of white children were poor, whereas 31.8 percent of Hispanic children were poor.

- In 2010, 21.5 percent of Hispanic households were using food stamps.

The most evident correlation in this area was that between the reading test gap and child poverty. The greater the difference between Hispanic and white children living in poverty, the wider the achievement gap (0.39)

In terms of education trends

- The percentage of the population holding a bachelors degree increased on average by 3.85 percent
- The number of Hispanic students has increased 93 percent over the total growth of the student population
- Between 2001 and 2009, there has been a decrease in the drop-out rate among Hispanics of 2.78 percent.
- The teacher-to-pupil ratio in 2009/10 was 1 to 15
- The average spending per child in education grew 6.86 percent from 2000 to 2010

There is a positive correlation between the reading gap and the dropout rate of Hispanic students for the period 2008 and 2009 (0.26) – the higher the rate is, the wider the reading gap. Moreover, states that have increased the percentage of their populations holding a bachelor degree increased also their reading gap, and this is a strong correlation (0.43).

Explaining the achievement gap: a statistical approximation

Correlation does not mean causation. Therefore, the variables analyzed above should be subjected to a regression analysis to determine their total impact in explaining the achievement gap.

As previously stated, our outcome of interest is the achievement gap in the reading scores of 4th grade between white and Hispanic students in 2011. Following our theory and the analysis, we developed a model that regressed that variable with some key demographic, socio-economic and educational indicators. This table explains the different variables selected for the model and the sources:

Variable	Explanation	Source
Dependent variable		
4th grade Reading achievement gap 2011	The difference between white student's test scores and Hispanic students	NAEP
Explanatory variables		
Population growth from 2000 to 2010	Total population growth for the period	Census
Difference between percentage of Hispanic and white poor children 2009	Difference between the percentage of total Hispanic children that are poor and total	American Community Survey

	white children that are poor	
Difference between drop out rates of Hispanic from 2000 to 2009	Drop out rates of Hispanic children in public schools for both periods	U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD)
Teacher to student ratio 2009/2010	Amount of students per teacher	U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD)

We then run the following regression to assess which factors can explain the achievement gap in 2001 for the different states with this model:

4^{th} grade Reading achievement gap 2011-hat= β_1(Population growth from 2000 to 2010*) + β_2(Percentage of women in the population in 2000*) + β_3(Difference between percentage of Hispanic and white poor children 2009 *) + β_4(Difference between drop out rates of Hispanic from 2000 to 2009 *)+ β_5(Teacher to student ratio 2009/2010*)+ ε_{it}^*

The following are the results for the model:

Variable	Coefficient
Demographic variables	
Population growth 2000 to 2010	-0.37 (0.199)*
Percentage of women in the population in 2000	-3.77 (0.26)
Socio Economic variables	
Difference between percentage of Hispanic and white poor children 2009	0.87 (0.25)**
Education variables	
Difference between drop out rates of Hispanic from 2000 to 2009	1.22 (0.47)**
Teacher to student ratio 2009/2010	1.12 (0.64)*
Constant	184.91 (169)
Adjusted R square	0.28
Observations	29

Notes:
* significant at the 0.10 level; ** significant at the 0.05 level

The total model explains 28% of the variation in the achievement gap for the reading scores between white and Hispanic students at the state level in 2011.
From this analysis, we can see that the variables related to socio-economic and educational aspects are the most significant when explaining the achievement gap in the reading scores of 2011 between white and Hispanics. In fact, an increase of one unit in the percentage of Hispanic children that are poor in comparison with white children in poverty is associated with an increase of 0.87 points in the

achievement gap. Moreover, one point of increase in the dropout rate among Hispanic students from one year to the other is associated with an increase of 1.22 points in the achievement gap. The teacher to student ratio is also significant for this analysis. We see that an increase of one point in the teacher to student ratio is associated with an increase of 1.12 in the achievement gap.

In terms of the demographic variables, an increase of one percentage point in the population growth between 2000 and 2010 is associated with a decrease of 0.37 points in the achievement gap.

Implications of the analysis and limitations

The data analysis presented here can only be applied for an explanation of the achievement gap between white and Hispanic students in 2011. To have more generalizable implications, data points for different periods should be considered. Nevertheless, we can think about possible conclusions to reflect on.

From the data we have analyzed, it seems reasonable to hypothesize that the differential in poverty levels between Hispanic and white children is affecting the achievement gap. In fact, the higher is the percentage of children that are poor compare to the percentage of white students in that situation we have some evidence to believe that the wider is the achievement gap.

In terms of education variables, we can also assume that reducing the drop-out rate among Hispanics as well as decreasing the teacher to student ratio could have a significant impact on the reduction of the achievement gap.

Among the limitations of this study we highlight that could be possible a non-explanatory correlation between poverty rates and drop-out rates in school. Moreover, other relevant variables related to performance including the differences in schools, teachers or educational background of the families are missing in this analysis. More sophisticated statistical methods, as well as an analysis at the individual level, are recommended to draw more robust conclusions.

Summary, relevant conclusions and policy recommendations

We began this research interested in understanding the reasons behind subpar education results among Hispanic students. Even in those states that improved their standardized test results, Hispanic students continue to lag behind white students. We wanted to understand if education reform on its own would be enough to reduce the achievement gap in the Hispanic community.

This goes far beyond a simple academic point of interest. It is an issue of utmost importance for the economic development of the United States. Such a large percentage of underperforming and under-educated students presents a massive challenge for the competitiveness of the US economy in the 21st century.

In this paper we attempted to shed some light on the relationship between education reforms, Hispanic student achievement, and socio-economic factors. Our hypothesis was that poverty levels, lack of language skills and other social issues have impacted the quality of education among

Hispanics, and that education reform polices alone would ultimately not be enough to solve the education deficit.

We used the achievement gap between whites and Hispanics as a proxy for the dependent variable in a model that aims to explain the influence of socio-economic as well as structural educational characteristics on educational disparities. This study found that, at the state level, there are some variables that are significantly correlated with the achievement gap, as measured in the 2011 reading scores of white and Hispanic students. The higher the percentage of poor Hispanic children compared to white, the greater the achievement gap. Moreover, the higher the dropout rates among Hispanics, the wider is the achievement gap as well. Finally, a higher achievement gap is also observed in correlation with higher teacher/student ratios.

Education reformers too often overlook this intricate system of variables that influence the achievement gap. This is the first paper of a series that will investigate in more depth the factors that affect the quality of Hispanic education in the US, and which will – hopefully – improve the discussion over which policies are better suited to tackle the challenges ahead.

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