Understanding the Black-White and Hispanic-White Test Score Gaps For Children Ages 5 to 13

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SECTION I: INTRODUCTION

The black-white and hispanic-white achievement gaps have been well documented (see Clotfelter et al., 2009). Researchers have cited the raw black-white math score gap as ranging from -0.66 (Levitt & Fryer, 2006) to -1.00 (Clotfelter et al., 2009)[1] among kindergarten-age children. Controlling for socioeconomic status and home-environment tends to lower (Phillips et al., 1998a and 1998b) or remove (Levitt & Fryer, 2004) this gap at age 5, although there is a growing consensus that this gap tends to widen as children age, even with these controls (see Clotfelter et al., 2009). The hispanic-white test score gap has also been documented among children (see e.g., Levitt & Fryer, 2004); however, unlike the black-white test score gap, it tends to narrow as children age (Reardon & Galindo, 2008). Authors such as Levitt & Fryer have suggested that the evolution of the hispanic-white test score gap as children age may be influenced by changes in language proficiency. The appropriate public policies for addressing these gaps rest on understanding why they exist.

Utilizing the National Longitudinal Survey of Youth (NLSY79), in this paper we document the black-white and hispanic-white math test score gaps for cross sections of children of ages 5, 7, 9, 11, and 13, and explore some of the potential causes of these gaps. Specifically, we test whether language proficiency is important for explaining the hispanic-white test score gap, using a series of language proxies within the NLSY. Additionally, we utilize the panel nature of the NLSY to characterize the effects of race and other controls on the rates of change of math test scores, using first difference models with race indicators re-inserted in the difference model.

The results we obtain from this dataset are informative. As in other studies, we document a raw math test score gap between blacks and whites and hispanics and whites among

[1] Note: gap estimates reported as standard deviations from a normalized mean of zero in full, unweighted samples.

kindergarten-age children. However, unlike Levitt & Fryer, controlling for observable characteristics (children's age, child's birth weight, socioeconomic status, participation in welfare, mother's age at first birth, and indicators for the number of children's books in the home), the black-white gap is not eliminated. We also find that both the raw and controlled black-white test score gaps rise for older children, both across groups of children (estimated by cross section analysis), as well as among children whose performance is followed over time (estimated by a first difference model). This rise in the gap is around 7 percentage points in the first difference model (whether controls are included or not) between ages 7 and 13, with significant rises in the gap occurring between 7 and 11 years of age.

For hispanics, the point estimate gap appears to shrink from cross sections of 5 year olds to cross sections of 13 year olds, but the 95% confidence bounds of the 5 year old gap estimates lie within the 95% confidence bounds of the 13 year old gap estimates. Additionally, hispanics do not experience a rate of change different than whites at the 95% confidence interval when a first difference model is estimated. Therefore, although we find a persistent hispanic-white test score gap from ages 5 to 13, even when including a series of controls, we cannot conclude with 95% confidence that this gap narrows, as was concluded by Levitt & Fryer. Furthermore, controlling for language proficiency of the test-taking child, the hispanic-white test score gap falls slightly for some age groups but is certainly not eliminated. However, making broad conclusions about the effects of language using the NLSY is problematic. First, because the NLSY interviews a core group of people who have been in the U.S. since at least 1979, it is very likely that few children with English deficiencies are present in the panel from 1986 to 2006. This suspicion is supported by the very small number of children in the sample who are allowed to take the survey in Spanish. Additionally, the NLSY variables available as proxies for

language proficiency of the child are limited. Thus our results on the effects of language on the hispanic-white test score gap remain inconclusive.

The structure of this paper is as follows. Section II provides a brief description of the existing literature. Section III details the estimation procedures used. Section IV summarizes and describes the data and presents the basic cross section results for children of ages 5, 7, 9, 11, and 13. Also, this section presents results for the first difference model characterizing the effects of race and other controls on the rates of change of math test scores. Section V presents the results when proxies for language proficiency are included as controls. Section VI concludes.

SECTION II: LITERATURE REVIEW

Our point of departure is *Understanding the Black-White Test Score Gap in the First Two Years of School* (Levitt & Fryer, 2004). Using a small number of variables within the Early Childhood Longitudinal Study kindergarten cohort (ECLS-K), Levitt & Fryer are able to virtually eliminate the black-white test score gap in kindergarten-age children. However, this gap returns for a cross-section of 1st graders, even after controlling for observable characteristics. Although other researchers have shown a black-white test score gap, only Levitt & Fryer have been able to eliminate the gap for 5 year olds through the use of controls.

Authors have explored a myriad of potential causes for these test score gaps, but the black-white test score gap has historically received extensive attention. For example, Vigdor and Ludwig (2007)[2] conclude that black students who go to majority black schools (that are also surrounded by majority black schools) do better than similarly situated students at majority white schools. Reardon (2008) suggests that although cognitive skill appears similar among blacks and whites in early childhood, the growth rate of cognitive ability of whites is much faster (see also

[2] See also Reardon, 2008

Levitt & Fryer, 2006). Barton and Coley's report (Barton & Coley, 2009) focuses on school factors such as class size, hunger and nutrition, and summer achievement gain/loss,[3] as well as indicators of teacher quality, and the authors conclude that teacher quality is very important in explaining the achievement of black students.

Many authors have attempted to estimate and explain the hispanic-white test score gap as well. For example, Levitt & Fryer (2004) find a hispanic-white raw math score gap of -0.722 standard deviations away from a normalized mean of zero at age 5, and this gap decreases by first grade. Garcia (Arizona State University) finds that whites do better than hispanics in every category of the reading proficiency levels for K-5, even while not including the 30% of hispanic children in the sample whose oral English abilities prevented them from completing the test. Tracking this information in a panel framework could be informative. Fry (2007) uses data from the 2005 NAEP to measure the gap between ELL students and white students. According to the assessment, 46% of ELL students did not achieve above a basic level in math compared to 11% of white students. Furthermore, ELL students don't just trail white students but also trail black students as well. The gap between ELL and black students scoring at or above the basic achievement level in math is 6 points in 4th grade and 12 points in 8th grade.

SECTION III: ESTIMATION STRATEGY

This paper utilizes data from the National Longitudinal Survey of Youth 1979 (NLSY79), as well as the Child Supplement of the same survey. The NLSY79 is a nationally representative sample of 12,686 young men and women who were 14-22 years old when they were first surveyed in 1979. These men and women have been interviewed annually from 1979 to 1994, and biennially from 1996. Beginning in 1986, children of the original NLSY79 cohort

[3] However, many of these variables can be viewed as proxies for other variables such as socioeconomic status, home environment, and neighborhood quality.

were interviewed as well. This dataset provides a rich array of information concerning, for example, the household composition and personal backgrounds, educational attainment, and socioeconomic status of both parents and children.

We utilize this dataset to measure the effect of race and other controls on the math scores of children in two ways.

A. Cross-Sections, Weighted Ordinary Least Squares Model

First, we run both weighted[4] and unweighted ordinary least squares regressions on cross sections of children aged 5, 7, 9, 11, or 13, who took the math portion of the Peabody Individual Achievement Test (PIAT) in any even numbered year between 1986 and 2006, inclusive.

The first of these weighted OLS regressions was estimated by the following model:

$$MPCT_i = \beta_0 + \beta_1 BLK_i + \beta_2 HISP_i + \beta_j \boldsymbol{SOCIO}_i + \beta_k \boldsymbol{NBKS}_i + \beta_{10} MALE_i + \beta_{11} AGE_i + \beta_{12} BWGT_i + \beta_l \boldsymbol{FIRSTBRTH}_i + \beta_m \boldsymbol{YR}_i + \varepsilon_i$$

(j=3, 4, 5, 6; k=7, 8, 9; l=13, 14; m=15, 16, 17, 18, 19, 20, 21, 22, 23, 24) (1)

The regressand, $MPCT_i$, represents the math portion PIAT percentile score for each child. The regressors include 1) race indicators for being black (BLK_i) and being hispanic ($HISP_i$), 2) a vector of socioeconomic variables ($\boldsymbol{SOCIO}_i$) including whether the highest educational achievement of the mother from 1979 to 2006 is high school (1=high school graduate only, 0=other) or college (1=some college, 0=other), a measure of the net income of the household in the calendar year prior to the child taking the test, a 0, 1 indicator of whether the mother received welfare in the year prior to the child taking the test,[5] 3) a vector of 0, 1 indicators of the number of books ($\boldsymbol{NBKS}_i$) the child owns,[6] 3) a 0, 1 indicator for whether the child was male ($MALE_i$), 4) a measure of the child's age in months (AGE_i), 5) a 0, 1 indicator of whether the child had a

[4] Weights are child weights available on NLSY79 child supplement.
[5] Net income is top-coded at $250,000
[6] Categories include: one to two books, three to nine books, and ten or more books

birthweight of 5.5 pounds or less ($BWGT_i$), 6) a vector of 0, 1 indicators for whether the mother of the child who took the test was a teenage mother at her first birth, or whether she was a mother 30 years of age or older at her first birth ($\boldsymbol{FIRSTBRTH}_i$), 7) a vector of 0, 1 indicators for the year the child took the test ($\boldsymbol{YR}_i$), and 8) an error term (ε_i).

The effect of language on math PIAT test percentile is estimated by the following model:

$$MPCT_i = \beta_0 + \beta_k \boldsymbol{BASELINE}_i + \beta_{24} MSPAN_i + \beta_{25} GDPENG_i + \beta_{26} GMAOUS_i + \beta_{27} GPAOUS_i + \varepsilon_i$$

(k=1-23) (2)

In this model, the regressand $MPCT_i$ is the same. The regressors include: 1) $\boldsymbol{BASELINE}_i$, which represents the vector of regressors present in model (1), 2) a 0, 1 indicator for whether the mother of the child who took the test was interviewed in Spanish by NLSY during the same year the child took the test ($MSPAN_i$), 3) a 0, 1 indicator of whether the household of the mother (e.g. the household of the grandparents of the test-taking child; restricted to hispanics only) did NOT speak Spanish within their household in 1979 ($GDPENG_i$), 4) a 0, 1 indicator of whether the mother of the mother was born outside of the U.S. ($GMAOUS_i$), 5) a 0, 1 indicator of whether the father of the mother was born outside of the U.S. ($GPAOUS_i$).

B. Panel Data, First Difference Model

Next, we utilized the panel nature of the NLSY and estimated the following first difference model to estimate the effect of being black or being hispanic on the rate of change of math percentile scores. We calculated the first difference for the following two period age ranges: 5 to 13, 7 to 13, 5 to 7, 7 to 9, 9 to 11, and 11 to 13.

The model before differencing is:

$$MPCT_{it} = \beta_0 + \beta_1 BLK_i + \beta_2 HISP_i + \beta_3 Welfare_{it} + \beta_4 MALE_i + \beta_5 AGE_{it} + \beta_6 BWGT_i + \beta_l \boldsymbol{FIRSTBRTH}_i + \alpha_i + \varepsilon_{it}$$

(l=13) (3)

Before differencing, the model is nearly identical to the cross-sectional model. We use nearly all of the same variables excluding the year dummies. Furthermore, prior to differencing, the model includes an error term that does not change over time, which is represented by "α_i".

The model after differencing is:

$$\boldsymbol{\Delta} MPCT_i = \Omega_o + \beta_1 BLK_i + \beta_2 HISP_i + \beta_3 \Delta Welfare_i + \beta_4 \boldsymbol{\Delta} AGE_i + \varepsilon_i \quad (4)$$

The dependent variable $\boldsymbol{\Delta} MPCT_i$ represents the rate of change in math percentile scores for each child from one time period to another. $\Delta Welfare_i$ is the effect of moving in and out of welfare on the rate of change in math percentile scores. It takes in values 0 (where 0 means that the respondent has stayed in welfare in the two time periods being differenced or the respondent has stayed out of welfare in the two time periods being differenced), -1 (where -1 means the respondent moved out of welfare from one time period to the next), and 1 (where 1 indicates that the respondent has moved into welfare from one time period to the next.)

The variable $\boldsymbol{\Delta} AGE_i$ is the change in a child's age (measured in months) from one time period to the next. $HISP_i$ is a 0, 1 indicator of whether the child is hispanic. BLK_i is a 0, 1 indicator of whether the child is black. These indicators are not differenced. Instead, they are placed back into the model as a level indicator. The model also includes an error term that changes over time, represented by ε_i.

When estimating the effect language has on the rate of change in math test percentile scores over time, the model takes following form:

$$\Delta MPCT_i = \Omega_o + \beta_1 BLK_i + \beta_2 HISP_i + \beta_3 \Delta Welfare_i + \beta_4 \Delta AGE_i + \beta_5 MSPAN_i + \beta_6 GDPENG_i + \varepsilon_i \quad (5)$$

In this model the independent variable $\Delta MPCT_i$ is the same as in model (4). In addition, the terms BLK_i, $HISP_i$, ΔAGE_i, $\Delta Welfare_i$, and ε_i are the same variables as in model (4). The variables $MSPAN_i$ and $GDPENG_i$ are the same language indicator variables from model (2). Like the race indicators, these indicators are not differenced. Instead, they are placed back into the model as level indicators.

SECTION IV: RESULTS

A. Cross Section Results

a. Raw Test Score Gaps by Race

As documented by Table 2, both black and hispanic 5 year olds have lower raw math percentile scores than whites by -17.16 and -15.07 percentile points, respectively. This result is similar to the black-white and hispanic-white raw math score gaps among kindergarten aged children found by Levitt & Fryer (2004).[7] Also, as found by Levitt & Fryer, raw black-white test score gaps appear to increase over time, rising from -17.16 at age 5 to -19.26 at age 13. Although point estimates of raw hispanic-white test score gaps fall slightly, from -15.07 at age 5 to -14.13 at age 13, this fall is noisy,[8] and the point estimate of -15.07 at age 5 does not fall outside of the 95% confidence interval of the point estimate at age 13. Therefore, with 95% confidence, we cannot reject the null hypothesis that the hispanic-white test score gap at age 5 is not statistically different from the same gap at age 13.

[7] Levitt and Fryer report black-white and hispanic-white test score gaps of -0.638 and -0.722, respectively, in standard deviations from a normalized mean of zero in the full, unweighted sample. If reported the same way, the raw gaps found in this paper for children of age 5 are -0.57 and -0.50 for blacks and hispanics, respectively.

[8] -12.84, -12.89, and -15.07 at the intermediate ages of 7, 9, and 11, respectively.

b. Baseline Controls

Table 3 explores the impact of adding control variables similar to those used by Levitt & Fryer (2004).[9] Importantly, these controls reduce the black-white test score gap relative to the raw gap at age 5 (from -17.16 to -11.22) but do not eliminate it. This finding tends to contradict Levitt & Fryer's finding that the black-white test score gap is effectively eliminated by these controls (Levitt & Fryer 2004).

The effect of these baseline controls is similar for children ages 7 through 13, reducing the black-white gap by 7.03, 7.17, 8.07, and 6.48 percentile points for 7, 9, 11, and 13 year olds, respectively. The hispanic-white gap is also reduced by these controls but not eliminated, falling at ages 5, 7, 9, 11, and 13 by 4.06, 6.44, 6.11, 5.66, and 6.26 percentile points, respectively. Both as raw gaps and after implementing these controls, black gaps are larger than hispanic gaps at every age we measured.

c. Evolution of Test Score Gaps With Baseline Controls

After implementing baseline controls, black-white test score gaps persist and the point estimate gaps widen at higher ages, from -11.22 at age 5 to -12.78 at age 13. However, the black-white gap point estimate at age 5 is within the 95% confidence interval of the point estimate at age 13, preventing us from rejecting the null that the point estimates are the same and the gap is not changing.

Point estimates of the hispanic-white gap narrow with older students, changing from -11.02 to -7.87 from ages 5 to 13. However, the 95% confidence intervals for these estimates at ages 5

[9] Levitt & Fryer 2004 used: 1) black, hispanic, asian, and other race 0, 1 indicators, 2) a socioeconomic composite measure, 3) the level of the number of books in a child's home, 4) the number of books squared, x1000, 5) a 0, 1 indicator for whether the child was female, 6) age at kindergarten in months, 7) birth weight in ounces, 8) whether the mother was a teenage mother at time of first birth, or whether mother was at least 30 years of age at time of first birth, 9) whether mother was a WIC participant.

and 13 overlap, and therefore, we cannot conclude that the gap is widening with 95% confidence. Table 5 illustrates this pattern.

B. First Difference Model Results

First difference models were estimated for a base case (only race included), a baseline control case (welfare and age controls added), and a language control case (two language controls added to baseline case). As illustrated by Table 6, all of these models for the age interval from 7 to 13[10] recorded a rise in the black white gap over time of about 7 percentile points. In other words, during this age range, it appears that blacks lose ground to whites, even after eliminating time-invariant individual characteristics through first-differencing. Additionally, controls such as welfare changes and language indicators do not affect the coefficient on black for any age interval studied. As illustrated by Table 7, blacks lose ground to whites from ages 7 to 9 (-3.03) and 9 to 11 (-1.77). The coefficient on black was not significant at the 95% confidence interval for the difference model time periods of ages 5 to 7 and 11 to 13, suggesting that perhaps, most of the damage to black scores from ages 7 to 13 occurs between ages 7 to 11.

Interestingly, the hispanic coefficient is not significant at the 95% confidence level for any age range difference model estimated. This is surprising because many literature sources have found that hispanic students tend to close the gaps on white students as they age. This result does not contradict the cross section results, because in the cross section, over different ages, all 95% confidence intervals on the coefficients on hispanic overlapped. Therefore, we cannot conclude that hispanics are closing the test score gap with whites among older children or over time.

[10] The black-white rate of change gap was significant at the 95% confidence interval for the age range 7 to 13, both for the weighted and unweighted samples. Similar results were obtained for the age range 5 to 13, but only for the unweighted sample.

Finally, the language controls used are insignificant at 95% confidence for all first difference models estimated. However, point estimates of these coefficients move in the direction expected. For example, for the interval 7 to 13, the point estimate of the coefficient on *MSPAN* is 1.37 (see Table 6). In other words, if a child's mother is interviewed in Spanish, the child tends to have a higher improvement in math test scores over time than a comparable child whose mother is not interviewed in Spanish.

SECTION V: EFFECTS OF LANGUAGE PROFICIENCY

One primary motivation of this paper was to test the suggestion by Levitt & Fryer (2004) that language proficiency likely influences the evolution of the hispanic-white test score gap over time. Towards this end, we assembled a series of imperfect proxies of the test-taking child's language proficiency from the NLSY. No direct, acceptable[11] measure of the child's language proficiency was found in the NLSY. The language proxies used are described in Section III. These are imperfect proxies for the child's English proficiency for several reasons. First, the number of mothers interviewed in Spanish from 1986 to 2006 is small relative to all hispanics. Also, these mothers are unrepresentative of most hispanics, in that their lack of english proficiency has persisted for so long.[12] Second, the indicator for whether Spanish is spoken within the child's grandparent's household represents the other extreme: about 90% of hispanics fall into this group, while it is likely that a large portion of these hispanics have children who are English proficient. Not surprisingly, when inserted as controls, the coefficients on these variables are not statistically significant at the 95% confidence level, and the hispanic-white (as

[11] The NLSY contains a variable indicating whether the child was interviewed in Spanish. The number of children in the sample interviewed in Spanish was too small for use in reliable statistical estimation.

[12] Mothers were originally interviewed, in the U.S., in 1979. Therefore, mothers are no longer recent immigrants by 1986 to 2006, and weak English skills must have persisted for at least 7 to 27 years to continue to necessitate a Spanish interview in any of the years 1986-2006.

well as black-white) test score gap persists. Additionally, the coefficients on the mother's and grandparent's birthplaces are also not significant at the 95% confidence level (See, e.g. Tables 6 and 7).

That these language controls within the NLSY do not explain the hispanic-white test score gap can be interpreted in two ways. First, it is possible that the suggestion by Levitt & Fryer that child language proficiency is important in explaining the gap as well as its evolution over age groups is incorrect. However, it is also possible that the NLSY is a poor dataset from which to test the effects of language. A dataset that measures child language proficiency directly and samples a large number of recent immigrants would be ideal. These criteria are not present in the NLSY.

SECTION VI: CONCLUSION

The black-white and hispanic-white test score gaps are an empirical reality, but their causes remain elusive. We confirm the literature and find that the black-white test score gaps are persistent. However, unlike Levitt & Fryer, we find that this gap cannot be eliminated with controls similar to theirs. Also, we find that black-white test score gaps tend to rise both in cross sections of students from ages 5 to 13 as well as in first difference models over the same age range. We also find, consistent with the literature, a hispanic-white gap that persists and is not eliminated by our set of control variables. Although we find that the point estimates of the hispanic-white gaps shrink as age rises in cross sections of students from ages 5 to 13, we cannot conclude that these estimates are statistically different with 95% confidence. Finally, our attempt to characterize the effects of language on the hispanic-white gap remain inconclusive, primarily due to the nature of the NLSY dataset. We anticipate that datasets rich with low-

English proficiency children will provide fertile opportunities to test the effects of language on the hispanic-white test score gap.

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Table 1a: Summary Statistics by Race - Student Characteristics

	Full Sample	White	Black	Hispanic
Test Scores:				
Math Around 5 Years of Age	48.56	56.16	39.38	41.30
	(30.35)	(29.50)	(29.21)	(28.80)
Math Around 7 Years of Age	51.16	58.29	43.12	45.40
	(24.89)	(23.65)	(23.84)	(24.24)
Math Around 9 Years of Age	51.70	60.50	41.48	46.51
	(28.54)	(26.89)	(27.39)	(27.62)
Math Around 11 Years of Age	51.66	61.54	41.19	45.59
	(28.89)	(26.88)	(27.24)	(28.37)
Math Around 13 Years of Age	49.40	59.80	38.93	44.64
	(27.24)	(25.65)	(24.94)	(26.22)
Race:				
White	0.49	1.00	0.00	0.00
	(0.50)			
Black	0.31	0.00	1.00	0.00
	(0.46)			
Hispanic	0.19	0.00	0.00	1.00
	(.3972)			

Table 1b: Summary Statistics by Race - Student Characteristics

	Full Sample	White	Black	Hispanic
Other Controls:				
Male	0.51	0.51	0.50	0.52
	(.49)	(0.49)	(0.50)	(0.50)
Age (in months) From 1986 to 2006	133.72	124.23	147.37	138.72
	(0.48)	(52.24)	(39.97)	(45.24)
One or Two Books in Household	0.19	0.09	0.29	(0.26)
	(0.39)	(0.29)	(0.45)	(0.44)
Three or Nine Books in Household	0.18	0.15	0.20	0.22
	(0.39)	(0.36)	(0.40)	(0.41)
Ten or More Books in Household	0.60	0.75	0.47	0.48
	(0.49)	(0.43)	(0.50)	(0.50)
Mother's Age at First Birth	21.93	23.07	20.17	21.47
	(5.16)	(5.23)	(4.67)	(4.84)
Teenage Mother at First Birth	0.40	0.30	0.55	0.43
	(0.49)	(0.46)	(0.50)	(0.50)
Thirty Plus Mothers at First Birth	0.10	0.13	0.06	0.08
	(0.30)	(0.34)	(0.23)	(0.27)
Birth Weight of Child 5.5 LBS or Less	0.09	0.07	0.14	0.08
	(.289)	(0.25)	(0.35)	(0.27)
Welfare	0.10	0.04	0.20	0.12
	(0.30)	(0.20)	(0.40)	(0.32)
Mother Completed College	0.31	0.34	0.30	0.25
	(0.462)	(0.47)	(0.46)	(0.43)
Mother Completed High School	0.32	0.42	0.39	0.32
	(0.47)	(0.49)	(0.49)	(0.47)
Income	55139.21	66562.04	35912.22	51185.31
	(49847.91)	(54041.89)	(34414.93)	(47387.12)
Mother Born Outside of the U.S	0.08	0.03	0.03	0.28
	(0.27)	(0.17)	(0.16)	(0.45)
Grandmothers Born Outside of the U.S	0.11	0.05	0.03	0.40
	(0.31)	(0.21)	(0.16)	(0.49)
Grandfather Born Outside the U.S	0.11	0.04	0.03	0.39
	(0.31)	(0.21)	(0.17)	(0.49)
Grandparents Speak No Spanish in HH	------	------	------	0.02
				(0.15)
Mothers Interviewed in Spanish	0.03	0.01	0.01	0.15
	(0.18)	(0.07)	(0.09)	0.35

Table 2: Cross-Section - Raw Gaps

	5		7		9		11		13	
Math test percentile	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Black	**-17.16**	1.33	**-14.78**	0.79	**-18.04**	0.87	**-19.38**	0.90	**-19.26**	0.89
	(0)		(0)		(0)		(0)		(0)	
Hispanic	**-15.07**	1.53	**-12.84**	0.92	**-12.89**	1.08	**-15.07**	1.10	**-14.13**	1.09
	(0)		(0)		(0)		(0)		(0)	

Table 3: Cross-Section with Baseline Controls

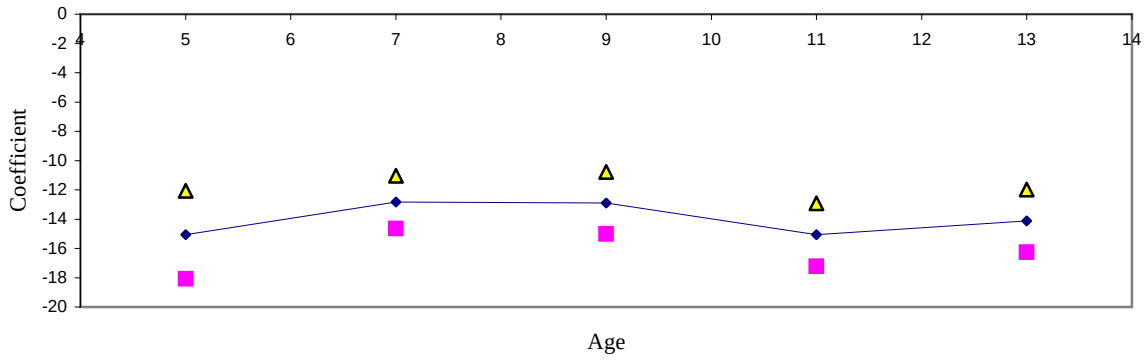
	5		7		9		11		13	
Math test percentile	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Black	**-11.22**	1.70	**-7.75**	0.99	**-10.87**	1.11	**-11.31**	1.18	**-12.78**	1.15
	(0)		(0)		(0)		(0)		(0)	
Hispanic	**-11.02**	1.85	**-6.40**	1.05	**-6.78**	1.20	**-9.41**	1.24	**-7.87**	1.24
	(0)		(0)		(0)		(0)		(0)	
Mother completed high school	2.87	2.08	**4.02**	1.15	**2.65**	1.27	**2.64**	1.33	**4.87**	1.31
	(0.168)		(0)		(0.037)		(0.048)		(0)	
Mother completed college	**10.61**	2.34	**10.49**	1.38	**9.18**	1.49	**10.18**	1.57	**10.21**	1.56
	(0)		(0)		(0)		(0)		(0)	
Net income	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00
	(0.004)		(0)		(0)		(0)		(0)	
Welfare	**-4.57**	1.97	**-5.14**	1.21	**-4.40**	1.29	**-7.76**	1.43	**-4.80**	1.41
	(0.020)		(0)		(0.001)		(0)		(0.001)	
One or two books at home	-4.73	5.00	**8.65**	3.78	2.51	4.90	-4.48	4.40	3.79	4.28
	(0.344)		(0.022)		(0.609)		(0.309)		(0.375)	
Three to nine books at home	**11.37**	4.32	**7.96**	3.28	**9.66**	4.53	-0.94	4.41	**7.83**	4.33
	(0.009)		(0.015)		(0.033)		(0.831)		(0.071)	
Ten or more books at home	**10.26**	4.06	**16.49**	3.19	**15.81**	4.43	4.78	4.38	**12.06**	4.31
	(0.012)		(0)		(0)		(0.275)		(0.005)	
Male	**-4.29**	1.41	-0.67	0.81	1.60	0.91	**3.18**	0.93	**3.77**	0.96
	(0.002)		(0.403)		(0.080)		(0.001)		(0)	
Age	0.07	0.22	0.08	0.08	**0.17**	0.08	-0.05	0.09	**-0.22**	0.09
	(0.756)		(0.306)		(0.044)		(0.595)		(0.012)	
Child birth weight	-3.95	2.51	**-5.90**	1.55	**-6.96**	1.73	**-3.99**	1.77	**-5.06**	1.76
	(0.116)		(0)		(0)		(0.024)		(0.004)	
Teenage mother at 1st birth	**-3.86**	1.93	**-2.70**	1.08	**-3.86**	1.20	-1.50	1.28	-1.21	1.28
	(0.045)		(0.012)		(0.001)		(0.243)		(0.347)	
Thirty or older at 1st birth	4.00	2.61	2.34	1.55	**4.61**	1.89	1.82	2.03	3.25	2.23
	(0.126)		(0.130)		(0.015)		(0.369)		(0.145)	

Table 4: Cross-Section with Language Controls

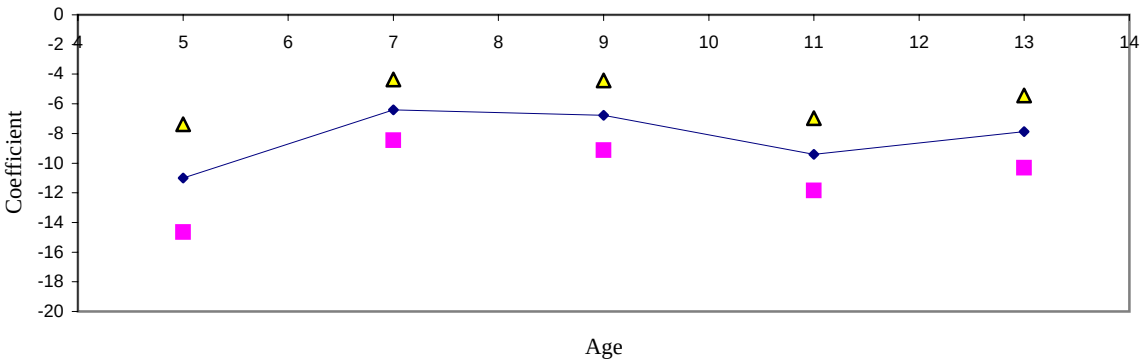
	5		7		9		11		13	
Math test percentile	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.
Black	**-10.48**	1.67	**-8.65**	0.97	**-10.53**	1.09	**-12.13**	1.24	**-13.14**	1.20
	(0)		(0)		(0)		(0)		(0)	
Hispanic	**-9.29**	1.90	**-6.58**	1.16	**-7.00**	1.31	**-9.39**	1.54	**-5.79**	1.55
	(0)		(0)		(0)		(0)		(0)	
Mother completed high school	1.85	1.76	**4.57**	1.02	**2.96**	1.12	4.90	1.40	**4.76**	1.41
	(0.295)		(0.005)		(0.030)		(0.104)		(0.001)	
Mother completed college	**9.25**	2.03	**10.90**	1.22	**10.00**	1.35	**11.31**	1.65	**10.02**	1.66
	(0)		(0)		(0)		(0)		(0)	
Net income	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00
	(0.001)		(0)		(0)		(0)		(0)	
Welfare	**-5.76**	1.66	**-3.86**	1.02	**-4.29**	1.12	**-5.60**	1.51	**-4.26**	1.49
	(0.001)		(0)		(0.002)		(0)		(0.004)	
One or two books at home	-1.15	4.72	8.50	3.19	5.85	3.77	0.21	4.46	2.91	4.58
	(0.808)		(0.144)		(0.175)		(0.231)		(0.525)	
Three to nine books at home	**9.43**	4.39	8.13	2.77	**12.91**	3.25	1.13	4.48	7.07	4.65
	(0.032)		(0.106)		(0.001)		(0.537)		(0.129)	
ten or more books at home	**10.17**	4.29	**15.59**	2.71	**18.89**	3.18	8.39	4.44	**11.13**	4.63
	(0.018)		(0)		(0.000)		(0.346)		(0.016)	
Male	**-3.74**	1.23	-0.63	0.72	0.88	0.82	**2.36**	0.98	**3.65**	1.01
	(0.002)		(0.405)		(0.357)		(0.007)		(0)	
Age	0.21	0.20	0.05	0.07	**0.19**	0.07	0.00	0.09	**-0.21**	0.09
	(0.289)		(0.395)		(0.029)		(0.647)		(0.028)	
Child birth weight	-4.24	2.21	**-4.59**	1.37	**-6.90**	1.49	**-4.94**	1.88	**-5.40**	1.87
	(0.055)		(0)		(0)		(0.022)		(0.004)	
Teenage mother at 1st birth	-3.14	1.64	**-0.91**	0.94	**-3.74**	1.06	0.22	1.36	-1.29	1.35
	(0.057)		(0.010)		(0.004)		(0.206)		(0.340)	
Thirty or older at 1st birth	**5.07**	2.51	1.37	1.50	**3.90**	1.77	1.69	2.19	2.50	2.41
	(0.044)		(0.337)		(0.050)		(0.454)		(0.301)	
Mother interviewed in Spanish	0.06	4.26	-2.88	2.76	-3.01	2.51	-5.63	3.42	-5.42	3.54
	(0.990)		(0.068)		(0.297)		(0.136)		(0.125)	
Spanish not spoken at home	0.44	4.35	1.27	2.40	4.12	2.60	3.16	2.99	2.43	3.22
	(0.919)		(0.464)		(0.153)		(0.146)		(0.451)	
Mother not born in US	-2.70	3.49	-0.03	2.22	-1.91	2.42	1.42	3.32	-4.10	3.44
	(0.440)		(0.388)		(0.517)		(0.615)		(0.234)	
Grandmother not born in US	2.09	3.21	0.67	2.00	0.26	2.09	0.05	2.65	-0.96	2.81
	(0.515)		(0.188)		(0.923)		(0.431)		(0.733)	
Grandfather not born in US	-4.02	3.03	-0.89	1.87	1.43	1.93	0.34	2.30	-0.95	2.49
	(0.185)		(0.387)		(0.512)		(0.776)		(0.703)	

Table 5: Cross Section, Hispanic-White Gaps (Weighted)*

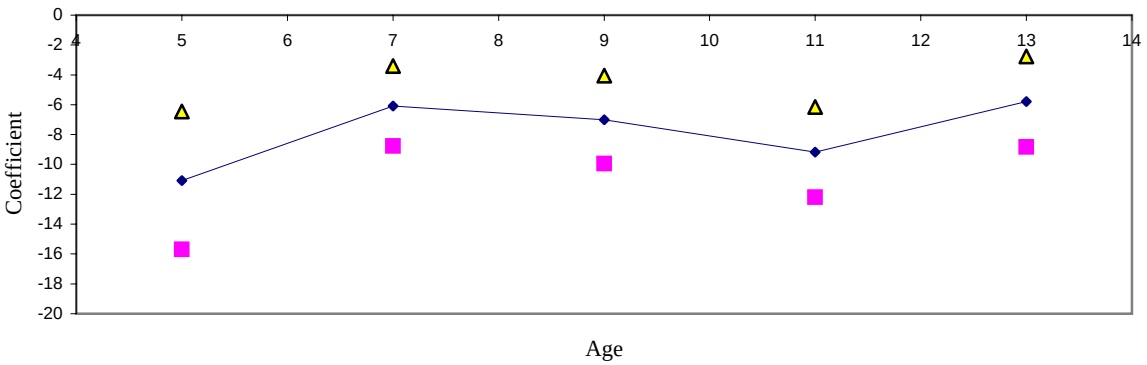
Hispanic-White Gap, Raw (Weighted)



Hispanic-White Gap, Baseline Controls (Weighted)



Hispanic-White Gap, Language Controls (Weighted)



*Colored points represent 95% confidence intervals

Table 6: First Difference Model, Interval 7 to 13

No Controls:		Coeff.	T-Stat	P-Value	95% Conf.Interval		Rsqr	obs
	Blacks	**-7.29**	-6.00	0.00	-9.68	-4.91	0.01	2232.00
		(1.21)						
	Hispanics	-1.93	-1.31	0.19	-4.84	0.96		
		(1.48)						
	Cons	3.24	4.47	0.00	1.81	4.66		
		(0.72)						

Baseline Controls:		Coeff.	T-Stat	P-Value	95% Conf.Interval		Rsqr	obs
	Blacks	**-7.43**	-5.98	0.00	-9.86	-4.99	0.02	2179.00
		(1.24)						
	Hispanics	-2.35	-1.43	0.15	-5.58	0.88		
		(1.65)						
	Diff_Age	**-0.68**	-2.64	0.01	-1.18	-0.17		
		(0.26)						
	Diff_Welfare	0.29	0.19	0.85	-2.65	3.23		
		(1.50)						
	Cons	52.05	2.80	0.01	15.64	88.47		
		(18.57)						

Language Controls:		Coeff.	T-Stat	P-Value	95% Conf.Interval		Rsqr	obs
	Blacks	**-7.28**	-5.64	0.00	-9.81	-4.75	0.01	2005.00
		(1.29)						
	Hispanics	-1.93	-1.12	0.26	-5.29	1.44		
		(1.72)						
	Diff_Age	**-0.59**	-2.23	0.03	-1.11	-0.07		
		(0.27)						
	Diff_Welfare	0.11	0.07	0.94	-2.92	3.15		
		(1.55)						
	MSPAN	1.37	0.30	0.77	-7.70	10.45		
		(4.63)						
	GDPENG	-0.67	-0.14	0.89	-10.02	8.69		
		(4.63)						
	Cons	45.42	2.37	0.02	7.76	83.08		
		(19.20)						

Table 7: First Difference Model, Age Ranges With Significant Black-White Gap Change

Interval 7 to 9:

	Coeff.	T-Stat	P-Value	95% Conf.	Interval	Rsqr	obs
Blacks	**-3.03**	-3.40	0.00	-4.78	-1.28	0.01	3824.00
	(0.80)						
Hispanics	-0.13	-0.11	0.91	-2.50	1.39		
	(1.21)						
Diff_Age	**-1.24**	-5.73	0.00	-1.66	-0.81		
	(0.22)						
Diff_Welfare	0.58	0.39	0.70	-2.33	3.49		
	(1.48)						
MSPAN	0.04	0.01	0.99	-7.11	7.19		
	(3.65)						
GDPENG	-1.16	-0.38	0.70	-7.10	4.78		
	(3.03)						
Cons	3.49	6.95	0.00	2.51	4.48		
	(0.50)						

Interval 9 to 11:

	Coeff.	T-Stat	P-Value	95% Conf.	Interval	Rsqr	obs
Blacks	**-1.77**	-1.99	0.05	-3.51	-0.03	0.01	3794.00
	(0.89)						
Hispanics	-2.02	-1.65	0.10	-4.43	0.38		
	1.23						
Diff_Age	**-0.72**	-3.11	0.00	-1.18	-0.27		
	(0.23)						
Diff_Welfare	-0.45	-0.33	0.74	-3.13	2.23		
	(1.37)						
MSPAN	2.96	0.92	0.36	-3.36	9.28		
	(3.22)						
GDPENG	-0.68	-0.28	0.78	-5.34	3.98		
	(2.38)						
Cons	18.80	3.35	0.00	7.80	29.80		
	(5.61)						