Age of Entry and the High School Performance of Immigrant Youth

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Why Does Immigrant Education Matter?

- In 2005, immigrants exceeded 12% of the U.S. population, with the highest concentrations in large metropolitan areas.
- In 2000, 59.5 percent of population of Miami and 35.9% of population of NYC foreign-born.
- Matched by large populations of immigrants in schools.
- Success in school will shape:
  - The education of the labor force
  - Demands/supports for US social safety net
  - Competitiveness of the U.S. economy

Key Previous Research

- Schwartz and Stiefel (2006) and others evidence that foreign-born students outperform *otherwise similar* native-born in their elementary and middle school years,
- Chiswick and DebBurman (2004) and Ruiz-de-Velasco et al. (2002) and others suggest that high school entrants may be different.

Why might high school results differ?

- Prior human capital
  - Quality differences,Transferability
- Developmental stage
  - Social, Language acquisition skills
- Institutional/School differences
- Mobility
- Selective Migration
- K-8 successes may not be sustained

Key Questions

- How do immigrants fare in high school?
- Does their success depend upon the time of their entry in U.S. schools?
- How does their success compare to teen migrants – native-born students who move to a new school district during high school? (Are immigrants different than migrants?)
- Is the "immigrant advantage" evident in high school?

Summary of Paper

- Use longitudinal data on high school students in NYC and Miami public schools to examine high school performance.
- Three key immigrant groups defined by age/grade of entry:
  - High school or **Teen** immigrants
  - Middle school or **Tween** immigrants
  - Elementary school or **Child** immigrants
- Compare to native born students entering at same level.
- Positive "Nativity gap" largest among the teen entrants.
- Switching school districts in high school is detrimental to academic success - separate from immigration *per se*.

Empirical Strategy

- Regression models of high school outcomes using NYC data
- Measure the differences between students by entry level and nativity;
- Measure “nativity gap”
- Construct difference-in-difference estimate of the impact of HS entry on immigrant performance.
- Robustness checks: alternative specifications, different cohorts

New York City

- Largest School District in the Country
  - 1.1 million plus students, 1400 plus schools
- Diverse student body
  - More than a third black; a third Hispanic;
  - Mostly poor (free or red. price lunch eligible.)
  - Large, diverse immigrant population
- Diverse schools:
  - From very small (100-200) to large (4000+)
  - From all poor to mostly non-poor
  - Failing to excellent

IESP Data Set

- Longitudinal data on millions of students who have attended NYC public schools
  - Student data: socio-demographic, educational
  - All grades
  - 1995-96 through 2007-2008
- Data on schools (spending,programs), teachers, housing, neighborhoods, property values.
- Grades 1-8 all years; high school a little later;
- Follow students to college.
- More coming!

2002 Cohort

- 61,338 students: 20,707 (34%) foreign; 40,631 native;
- Outcome data includes 4 year high school graduation; Test taking and test score
- Socio-demographic data include race, home language, age relative to others in grade, sex, ELL status, high school and birth country.
- Similar data for a 2001 cohort and for 2002 Miami Cohort
- Foreign-born students are more likely to be Asian, LEP, overage for grade, to speak language other than English at home, less likely to be black.

Differences in Outcomes and Entry

- Foreign-born students do *well* in high school.
  - more likely to take key standardized tests
  - often do better than the native born
  - have higher graduation rates
- Foreign Born students more likely to enter late:
  - 40% enter in high school vs. 15% of the native born
- Less likely to enter in elementary school (43% vs.82%)

Graduation Rates Differ between Foreign Born and Native born and by Entry Cohort

	Foreign-born	Native-born		FB-NB
HS entry	0.447***	0.387***		.060***
MS entry	0.507***	0.469***		.038*
ES entry	0.579***	0.467***		.112***
				Diff-in-Diff
Difference HS - MS	-.060***	-.082***		.022
Difference MS - ES	-.072	.002		-.074***
Difference HS - ES	-.132***	-.080***		-.052***

Controlling for Student Characteristics Important

- Include race, home language, age relative to others in grade, sex, ELL status.
- Regression Adjusted differences show:
  - Among foreign-born, high school entrants have highest graduation rates
  - Among native-born, high school entrants have lowest graduation rates
  - Now, positive impact of high school entry for foreign-born compared to native-born

Including Student Controls

	Foreign-born	Native-born		Difference
HS entry	0.700***	0.595***		0.105***
MS entry	0.675***	0.647***		0.028
ES entry	0.693***	0.606***		.087***
				Diff-in-Diff
Difference HS - MS	0.025*	-0.052***		0.077***
Difference MS - ES	-.018	0.041***		-.059***
Difference HS - ES	0.007	-0.011		0.018

Controlling for Differences in Schools Matters, too

- Increased graduation advantage for high school entrants among foreign-born
- Now, native-born elementary entrants do slightly worse than native-born high school entrants
- In the end, nativity gap favors the foreign-born at ever level; largest advantage in high school

School Fixed Effects

	Foreign-born	Native-born		Difference FB-NB
HS entry	0.599***	0.513***		0.086***
MS entry	0.563***	0.512***		0.051***
ES entry	0.561***	0.501***		0.060***
				Diff-in-Diff
Difference HS - MS	0.036***	0.001		0.035*
Difference MS - ES	0.002	0.011		-0.009
Difference HS - ES	0.038***	0.012*		0.026**

Results Robust to Alternative Specifications

- Use Region Fixed Effects rather than foreign born as a single group;
- Country fixed effects
- Entry level by region effects
- Age of entry controls
- 2001 cohort results
- Miami results

Other Outcomes: Participation and Performance on Standardized Tests

- Foreign-born students are more likely to take tests
- Foreign students outperform native peers on math at every entry level
- Foreign students outperform native peers on English among high school entrants and elementary school entrants

Nativity Gaps by Level and DD, Other Outcomes

	Took Eng	Eng. Score	Took Math	Math Score	
High School					
FB – NB	.075***	.065***	.065	.357***	
Middle School					
FB – NB	.02	.009	.035***	.111***	
Elementary School					
FB – NB	.056***	.067***	.057***	.117***	
Difference in Nativity Gap Across Levels					
FB-NB,HS-MS	.055***	.056	.03*	.246***	
FB-NB,HS-ES	.019***	-.002	.008*	.24	
FB-NB,MS-ES	-.036	-.058	-.022	-.006***	

Graduation Results Contingent on Test-Taking & Prior Test Performance

- Again, among foreign-born, high school entrants outperform other entry levels
- Again, among native-born, high school entrants perform better than elementary entrants
- Again, foreign-born high school entrants do better than native-born students at any entry level

Why Do Our Results Differ from Other Studies?

- Specification: Definition of "otherwise similar"?
  - LEP, school fixed effects, native-born migrants
- Dependent Variable?
  - On-time graduation ≠ completed years of schooling
- Sample?
  - Years of observation (2002,2001)
  - Migrants to New York City, Miami
  - Students who entered the U.S. education system
  - Students who entered the public schools

Summary/ Conclusions

- Immigrants do quite well.
- Among immigrants, high school entrants do better than elementary or middle school entrants.
- Among native-born, high school entrants do less well.
- Diff-in-Diffs suggest high school entry has positive effect on foreign-born performance.
- Results robust to many alternative specifications.

Education Policy Implications

- Late-entering immigrants are disproportionately LEP and overage for grade. This is why they do poorly. Newcomer schools and other programs should continue to target this particular group.

- Late-entering native-born are at risk too. Schools play a big role in explaining their performance. Maybe newcomer schools for them too.

- In New York City at least, where graduation rates rank 43rd among the top 50 urban areas, immigrants demonstrate an ability to beat the odds relative to demographically-similar natives. Why this happens and whether it is sustained over the long-term, is unclear and worthy of future research

Directions for Future Research

- How do nativity gaps vary across schools?
- Which school programs or school features contribute to immigrant advantage?
- Understanding the variation in region effects
- Trajectories of immigrant performance

Student Characteristics

Variable	All Students	Foreign	Native
	Mean	Mean	Mean
Foreign-Born	0.338	1.000	0.000
LEP	0.079	0.209	0.013
English Spoken at Home	0.543	0.285	0.675
Female	0.512	0.500	0.518
Asian	0.140	0.275	0.071
Black	0.358	0.255	0.411
Hispanic	0.332	0.312	0.343
White	0.167	0.156	0.172
Overage for grade in 2002	0.292	0.416	0.229
N	61,338	20,707	40,631

Summary: Graduation Rates Differ by Nativity and Entry Level

- Among foreign-born, high school entrants less likely to graduate
- Among native-born, high school entrants less likely to graduate
- Higher graduation rates for foreign-born students than native-born peers entering at the same level – Nativity Gap favors the foreign-born
- Gap largest for early entrants

Entry Characteristics

Variable	All Students	Foreign	Native
	Mean	Mean	Mean
Entered in Elementary School	0.689	0.429	0.822
Entered in Middle School	0.073	0.171	0.023
Entered in High School (HS)	0.237	0.400	0.154
Entered HS in 99 (9^{th} Grade)	0.169	0.246	0.130
Entered HS in 00 (10^{th} Grade)	0.046	0.109	0.014
Entered HS in 01 (11^{th} Grade)	0.017	0.035	0.007
Entered HS in 02 (12^{th} Grade)	0.005	0.010	0.003
Age Entered NYC Schools	8.624	11.560	7.128

Table 2. Illustration of Difference and Diff-in-Diff.

$\alpha_0+\alpha_1 FB +\alpha_2 FBMS+\alpha_3 FBHS +\alpha_4 NBMS +\alpha_5 NBHS$

	FB (1)	NB (2)	FB-NB (3)
HS (1)	$\alpha_0 + \alpha_1 + \alpha_3$	$\alpha_0 + \alpha_5$	$\alpha_1 + \alpha_3 - \alpha_5$
MS (2)	$\alpha_0 + \alpha_1 + \alpha_2$	$\alpha_0 + \alpha_4$	$\alpha_1 + \alpha_2 - \alpha_4$
ES (3)	$\alpha_0 + \alpha_1$	α_0	α_1
			Diff-in-Diff
HS - MS (4)	$\alpha_3 - \alpha_2$	$\alpha_5 - \alpha_4$	$(\alpha_3 - \alpha_2) - (\alpha_5 - \alpha_4)$
MS - ES (5)	α_2	α_4	$\alpha_2 - \alpha_4$
HS - ES (6)	α_3	α_5	$\alpha_3 - \alpha_5$

What About Other HS Outcomes- Test Taking and Test Scores

Table 5. Regressions of Graduation from NYC High Schools for 2002 Cohort- Key Variables

	(1)	(2)	(3)	(4)
Native*MS Entry	0.002	0.041***	0.011	0.013
	(0.016)	(0.015)	(0.013)	(0.013)
Native*HS Entry	-0.080***	-0.011	0.012*	0.012*
	(0.013)	(0.010)	(0.006)	(0.006)
Foreign Born	0.112***	0.087***	0.060***	--
	(0.014)	(0.010)	(0.007)	--
Foreign*MS Entry	-0.072***	-0.018	0.002	-0.005
	(0.015)	(0.011)	(0.009)	(0.009)
Foreign*HS Entry	-0.132***	0.007	0.038***	0.029***
	(0.019)	(0.013)	(0.011)	(0.010)
Constant	0.467***	0.606***	0.501***	0.499***
	(0.029)	(0.039)	(0.009)	(0.009)
R-squared	0.01	0.13	0.36	0.36
Student Charact.	No	Yes	Yes	Yes
HS FE (n = 286)	No	No	Yes	Yes
Region FE (n = 13)	No	No	No	Yes

Table 5. Regressions of Graduation from NYC High Schools for 2002 Cohort- Student Characteristics

	(1)	(2)	(3)	(4)
Asian		0.010	0.016*	0.043***
		(0.023)	(0.009)	(0.011)
Black		-0.181***	-0.055***	-0.060***
		(0.030)	(0.011)	(0.011)
Hispanic		-0.229***	-0.091***	-0.089***
		(0.026)	(0.011)	(0.011)
Over Age for Grade		-0.275***	-0.140***	-0.140***
		(0.010)	(0.012)	(0.012)
Female		0.097***	0.074***	0.074***
		(0.008)	(0.005)	(0.005)
LEP		-0.160***	-0.137***	-0.128***
		(0.017)	(0.016)	(0.015)
Non-English Spoken at Home		0.048***	0.019***	0.020***
		(0.013)	(0.005)	(0.006)
Constant	0.467***	0.606***	0.501***	0.499***
	(0.029)	(0.039)	(0.009)	(0.009)
Observations	61338	61338	61338	61338
R-squared	0.01	0.13	0.36	0.36
HS FE (n = 286)	No	No	Yes	Yes
Region FE (n = 13)	No	No	No	Yes

Table 10. Graduation Models, Value Added - Student Characteristics

	(1)	(2)
Asian	-0.009	0.000
	(0.007)	(0.008)
Black	-0.003	-0.008
	(0.008)	(0.008)
Hispanic	-0.023***	-0.030***
	(0.007)	(0.007)
Over Age for Grade	0.005	0.006
	(0.006)	(0.006)
Female	0.039***	0.039***
	(0.004)	(0.004)
LEP	-0.085***	-0.081***
	(0.010)	(0.010)
Non-Eng. at Home	0.019***	0.022***
	(0.005)	(0.005)
English Test Z-Score	0.127***	0.127***
	(0.004)	(0.004)
Took English Test	0.435***	0.432***
	(0.021)	(0.021)
Math Test Z-Score	0.127***	0.129***
	(0.006)	(0.006)
Took Math Test	0.237***	0.238***
	(0.017)	(0.017)
Constant	-0.025	-0.020
	(0.026)	(0.026)
Observations	47491	47491
R-squared	0.47	0.47
HS FE (N=286)	Yes	Yes
Region FE (N=13)	No	Yes

Table 9. Regressions of High School Test-Taking & Test Scores – Key Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Took HS English Test		English Test Score		Took HS Math Test		Math Test Score	
Native*MS Entry	.005	.007	-.017	-.016	-.006	-.005	.063**	.062**
	(.011)	(.011)	(.033)	(.033)	(.012)	(.012)	(.032)	(.032)
Native*HS Entry	-.033***	-.032***	.068***	.069***	-.098***	-.097***	-.025	-.028
	(.008)	(.008)	(.018)	(.018)	(.009)	(.009)	(.017)	(.017)
Foreign Born	.056***	--	.067***	--	.057***	--	.117***	--
	(.006)	--	(.011)	--	(.007)	--	(.012)	--
Foreign*MS Entry	-.031***	-.039***	-.075***	-.082***	-.028***	-.033***	.057**	.058***
	(0.008)	(0.008)	(0.021)	(0.021)	(0.009)	(0.008)	(0.022)	(0.022)
Foreign*HS Entry	-.014	-.022**	.066***	.059**	-.090***	-.095***	.215***	.218***
Constant	.728***	.728***	.201***	.186***	.736***	.737***	.133***	.135***
	(.007)	(.007)	(.021)	(.021)	(.008)	(.009)	(.020)	(.020)
Observations	61338	61338	43188	43188	61338	61338	41380	41380
R-squared	0.40	0.41	0.35	0.36	0.32	0.33	0.35	0.36
Student Charact.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HS FE (n = 286)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE (n = 13)	No	Yes	No	Yes	No	Yes	No	Yes

Table 9. Regressions of High School Test-Taking & Test Scores- Student Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Took HS English Test		**English Test Score**		**Took HS Math Test**		**Math Test Score**	
	(.010)	(.009)	(.024)	(.023)	(.011)	(.011)	(.027)	(.026)
Asian	.008	.025***	-.052**	.009	.019**	.032***	.184***	.151***
	(.008)	(.008)	(.026)	(.027)	(.008)	(.009)	(.027)	(.026)
Black	.003	-.004	-.290***	-.277***	-.030***	-.037***	-.275***	-.269***
	(.008)	(.008)	(.028)	(.028)	(.010)	(.010)	(.029)	(.028)
Hispanic	-.038***	-.038***	-.243***	-.215***	-.068***	-.070***	-.281***	-.253***
	(.007)	(.007)	(.023)	(.025)	(.010)	(.011)	(.023)	(.024)
Over Age for Grade	-.180***	-.181***	-.361***	-.361***	-.168***	-.169***	-.312***	-.315***
	(.010)	(.010)	(.015)	(.015)	(.007)	(.007)	(.015)	(.015)
Female	.042***	.042***	.182***	.182***	.029***	.028***	.038***	.037***
	(.004)	(.004)	(.011)	(.011)	(.005)	(.005)	(.010)	(.010)
LEP	.090***	.104***	-.771***	-.759***	.035**	.041**	-.367***	-.400***
	(.013)	(.013)	(.033)	(.032)	(.017)	(.017)	(.030)	(.028)
Non-English at Home	-.003	.005	-.028*	-.042***	.012**	.017***	.035**	.010
	(.004)	(.005)	(.014)	(.015)	(.005)	(.005)	(.015)	(.016)
Constant	.728***	.728***	.201***	.186***	.736***	.737***	.133***	.135***
	(.007)	(.007)	(.021)	(.021)	(.008)	(.009)	(.020)	(.020)
Observations	61338	61338	43188	43188	61338	61338	41380	41380
R-squared	0.40	0.41	0.35	0.36	0.32	0.33	0.35	0.36
HS FE (N=286)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE (N=13)	No	Yes	No	Yes	No	Yes	No	Yes

Table 12. Robustness Tests, Graduation Models – Student Characteristics

	(1)	(2)	(3)	(4)	(5)
Asian	0.016*	0.016*	0.043***	0.047***	0.044***
	(0.009)	(0.009)	(0.011)	(0.011)	(0.011)
Black	-0.055***	-0.055***	-0.060***	-0.060***	-0.060***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Hispanic	-0.091***	-0.089***	-0.089***	-0.087***	-0.088***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Over Age for Grade	-0.140***	-0.156***	-0.140***	-0.139***	-0.140***
	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)
Female	0.074***	0.074***	0.074***	0.074***	0.074***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
LEP	-0.137***	-0.139***	-0.128***	-0.126***	-0.126***
	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)
Non-English at Home	0.019***	0.017***	0.020***	0.018***	0.019***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Age Admit		-0.015**			
		(0.007)			
Age Admit^2		0.001***			
		(0.000)			
Foreign* Age Admit		0.011***			
		(0.003)			
Foreign* Age Admit^2		-0.001*			
		(0.000)			
Constant	0.501***	0.541***	0.499***	0.499***	0.500***
	(0.009)	(0.025)	(0.009)	(0.009)	(0.009)
Observations	61338	61338	61338	61338	61338
R-squared	0.36	0.36	0.36	0.36	0.36
HS FE (n=286)	Yes	Yes	Yes	Yes	Yes
Region FE (n=13)	No	No	Yes	No	Yes
Country FE (n=177)	No	No	No	Yes	No

Table 12. Robustness Tests (Entry Age, Country, Region by Entry Level), Graduation Models - Key Variables

	(1)	(2)	(3)	(4)	(5)
Native* MS Entry	0.011	-0.047**	0.013	0.012	0.013
	(0.013)	(0.019)	(0.013)	(0.013)	(0.013)
Native* HS Entry	0.012*	-0.100***	0.012*	0.012*	0.012*
	(0.006)	(0.024)	(0.006)	(0.006)	(0.006)
Foreign Born	0.060***	0.040	--	--	--
	(0.007)	(0.037)	--	--	--
Foreign* MS Entry	0.002	-0.051***	-0.005	-0.007	--
	(0.009)	(0.014)	(0.009)	(0.008)	--
Foreign* HS Entry	0.038***	-0.076***	0.029***	0.028***	--
	(0.011)	(0.023)	(0.010)	(0.010)	--
Constant	0.501***	0.541***	0.499***	0.499***	0.500***
	(0.009)	(0.025)	(0.009)	(0.009)	(0.009)
Observations	61338	61338	61338	61338	61338
R-squared	0.36	0.36	0.36	0.36	0.36
HS FE (n = 286)	Yes	Yes	Yes	Yes	Yes
Region FE (n = 13)	No	No	Yes	No	Yes
Country FE (n=177)	No	No	No	Yes	No

Table 10. Graduation Models, Value Added – Key Variables

	(1)	(2)
Native*Middle School Entry	0.011	0.012
	(0.013)	(0.013)
Native*High School Entry	0.036***	0.037***
	(0.007)	(0.007)
Foreign-Born	0.013***	--
	(0.005)	--
Foreign*Middle School Entry	0.036***	0.032***
	(0.008)	(0.008)
Foreign*High School Entry	0.065***	0.059***
	(0.009)	(0.010)
Observations	47491	47491
R-squared	0.47	0.47
Student Characteristics	Yes	Yes
HS FE (n= 276)	Yes	Yes
Region FE (n = 13)	No	Yes

Student Outcomes

Variable	All Students	Foreign	Native
	Mean	Mean	Mean
Took Regent or RCT, English	0.711	0.748	0.692
Regents English Score[a]	69.127	67.867	69.826
Took Regent or RCT, Math	0.745	0.777	0.729
Regents Sequential I Math Score[b]	66.132	68.541	64.842
Took SAT	0.261	0.314	0.233
SAT Score[c]	919.695	908.047	927.689
Graduated from HS in 4 Years	0.474	0.513	0.454
Still Enrolled after 4 Years	0.289	0.286	0.290

Entry Gaps by Nativity and DD, Other Outcomes

	Took Eng	Eng. Score	Took Math	Math Score	
Foreign-born					
High – Middle	.017*	.141***	-.062***	.158***	
Middle – Elem	-.031***	-.075***	-.028***	.057***	
High – Elem	-.014	.066	-.090***	.215***	
Native-born					
High – Middle	-.038***	.085***	-.092***	-.088***	
Middle – Elem	.005	-.017	-.006	.063***	
High – Elem	-.033***	.068***	-.098***	-.025	
Diff in Diff					
FB-NB,HS-MS	**.055*** **	**.056**	**.03***	**.246*** **	
FB-NB,HS-ES	.019***	-.002	.008*	.24	
FB-NB,MS-ES	-.036	-.058	-.022	-.006***	