



Escuela de Economía y Finanzas

Documentos de trabajo

Economía y Finanzas

Centro de Investigación
Económicas y Financieras

No. 16-20 **Low Test Scores in Latin America: Poor**
2016 **Schools, Poor Families, or Something Else?**

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Low Test Scores in Latin America: Poor Schools, Poor Families, or Something Else?

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June 19, 2016

Abstract

Latin American students consistently score low on international tests of cognitive skills. In the PISA 2012 results, students in seven Latin American countries had an average score of 395, or about 100 points lower than the average score of 497 in four Scandinavian countries. We examine why Latin American scores are lower and conclude that 50 points are explained by Latin American families' lower average educational and socioeconomic characteristics, 25 points are explained by Latin America's weak cultural orientation toward reading books, and the remaining 25 points are explained by the lower effectiveness of educational systems in teaching cognitive skills.

Key Words: Latin America; test scores; PISA; books; school quality

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I. Introduction

In a recent analysis of economic growth in Latin America, Hanushek and Woessmann [2012] argue that growth rates have been low despite increases in average levels of schooling because students' cognitive skills are "truly dismal." They show that student scores on mathematics and science tests are considerably lower in Latin America than in other countries with similar levels of schooling, and they conclude that, "the average student seems to get much less learning, as depicted by the test scores, for each year of schooling than the average student in the rest of the world."

It is natural to presume that if students in Latin America are not learning as much as students elsewhere, the teachers or the educational system must be at fault. But student learning is a function of activity both within and outside the school system. So the activity in the educational system may not be the whole cause, or even the most important cause of the low scores.

Breton [2015] presents evidence that high average test scores in other parts of the world, especially in East Asia, are due in part to the extensive private tutoring that students receive to raise these scores. In addition, it has been known since Coleman [1966] that a student's test scores are substantially determined by the socioeconomic characteristics of the student's family. Since Latin American countries are characterized by an unusually high level of income inequality, with a large share of poor families, the low scores could be due to the low average socioeconomic characteristics of these families.

Alternatively, the low scores could be a result of Latin American culture, which assigns less importance to student achievement on standardized tests than countries with Confucian-based cultures. The average level of schooling and the average scores on standardized tests are so uniform across Latin America that there may be an underlying cultural basis for these low scores.

In this study we attempt to quantify the causes of the low average test scores in Latin America, using cross-country data from the PISA 2012 evaluation of student test scores. In this analysis we estimate the effects of a series of family and school characteristics on test scores in Latin America and compare them to their estimated effects in Scandinavia.

There are many existing cross-country analyses of the effect of family and school characteristics on international test scores, which find that both types of characteristics affect student scores. But these analyses invariably assume that family and school characteristics have the same effect in every country (For example, [Woessmann, 2003]).

Given the huge differences in culture, average schooling, and average income in different countries, there is no reason to expect that family characteristics would have the same effects on student test scores in different regions. For this reason, in this study we assume that family and school characteristics have the same effect on scores *within* cultural regions, but not between these regions.

In our analysis we estimate the average effect of numerous family characteristics in seven countries in Latin America and compare this effect to the average effect of the same family characteristics in four countries in Scandinavia. We use Scandinavia as our point of comparison, rather than Asia or Europe, because Scandinavia has high average scores but does not depend on private tutoring to achieve these scores and because cultural characteristics within Scandinavia are more similar than in countries outside this region. Arguably in both Latin America and Scandinavia, families and schools are the principal determinants of student test scores. We compare these two groups of countries because countries within each region have similar scores and the results of our analysis are considerably more robust when groups of countries, rather than individual countries, are used for the comparison.

In our pooled regional analysis, the average PISA 2012 score in Scandinavia is about 100 points higher than the average score in Latin America. We find that family characteristics and the different effects of these family characteristics on students' scores are the primary cause of this difference in these two regions. We find that about 75 points of the 100-point regional difference are related to family differences, but about 25 points are related to a lower cultural orientation toward reading books at home in Latin America. The remaining 25 point difference in test scores are related to unidentified differences in the school systems in the two regions. The implication is that Latin American student's low average test scores relative to other world regions in recent international tests are due primarily to the way children are educated within the home.

The rest of this article is organized as follows: Section II examines the relationship between Latin American and other countries' test scores and their national socioeconomic characteristics in the PISA data. Section III presents the methodology used to investigate the causes of the low scores in Latin America. Section IV presents the results of the initial investigation. Section V presents some additional analysis of the relationship between the number of books at home and family characteristics across countries. Section VI concludes.

II. Examination of the PISA Data

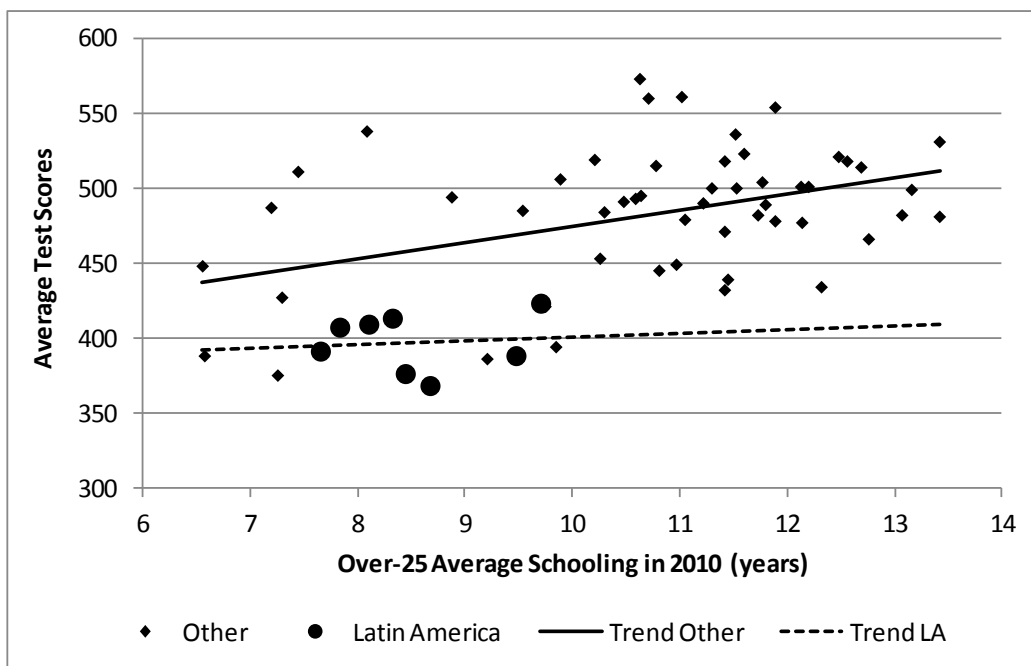
The international testing process began as a way to compare the results of the educational systems in the more educated OECD countries, but over time non-OECD countries with less educated populations have increased their participation in these tests. As countries in

Latin America have increased their participation, it has become possible to examine how the Latin American region is progressing relative to other world regions.

Figure 1 shows the average test scores on the PISA 2012 test vs. the average schooling attainment of the population over 25 years of age in 2010 [Barro and Lee, 2013] in 60 countries. The PISA results shown are for mathematics skills at age 15, for which the average score in the OECD is about 500 points. The schooling attainment measure indicates the level of schooling of adults whose average age is similar to that of the parents of the students taking the test. The scores shown in Figure 1 are divided between two groups of countries: the eight Latin American countries and the other 52 countries in the sample, with separate trend lines for the two groups of countries.

Figure 1

PISA 2012 Test Scores vs. the Schooling of the Adult Population in 2010



The *a priori* expectation is that student achievement on international tests would increase as their parents' average schooling increases. This trend could occur either because more educated parents contribute directly to their children's educational achievement or because more educated societies are wealthier, so they provide more resources to the schools, which facilitates student learning.

In the figure the average scores in the non-Latin American group of countries rise from about 450 at eight years of schooling to about 500 at 12 years of schooling, exhibiting the expected rising trend. The scores in the Latin American countries are substantially lower and do not improve noticeably with increases in adults' average level of schooling.

Overall the Latin American average scores are about 60 points lower than the average scores in other countries with similar levels of adult schooling. The Latin American average score is about 400 points, which corresponds to the achievement of basic skills [Hanushek and Woessmann, 2008]. The implication is that half of the Latin American students fail to achieve a basic level of skill in mathematics. Although the scores shown in Figure 1 are in mathematics, students tend to score similarly on the other PISA tests, so the mathematics score is also indicative of their relative level of skills in other academic subjects [Hanushek and Woessmann, 2008].

Figure 2 shows another comparison, the relationship between the PISA 2012 scores and GDP/adult in 2010 in the 60 countries. The GDP/adult data are calculated from the Penn World Table (PWT) 8.1 GDP data and [Feenstra, Inklaar, and Timmer, 2015 and the PWT 7.1 population data [Heston, Summers, and Aten, 2012]. Again the data are shown separately for the Latin American and other countries.

Both sets of countries show rising test scores with increases in GDP/adult, but again the Latin American scores are about 60 points lower than the average in other countries that have a similar level of income. There is clearly a regional/cultural difference between average test scores in the Latin American countries relative to the other countries.

Figure 3 shows the distribution of scores for several world regions. This figure reveals that most of the countries with the highest scores are in East Asia. These countries rely extensively on test scores to select students for entry into higher levels of education. In response, parents in these countries invest heavily in private tutoring to raise their children's scores [Dang and Rogers, 2008]. The figure also identifies four Scandinavian countries, which have scores similar to those in the more educated European countries. The regional groupings show that scores tend to cluster by cultural regions, even when current levels of adult schooling are not similar.

III. Methodology Used to Evaluate the PISA Results

The PISA international tests have been developed to examine the level of students' skills across countries and to attempt to understand what has enabled students to successfully acquire these skills. Since students acquire their skills through activities at home, at school,

Figure 2

PISA 2012 Test Scores vs. GDP/Adult in 2010

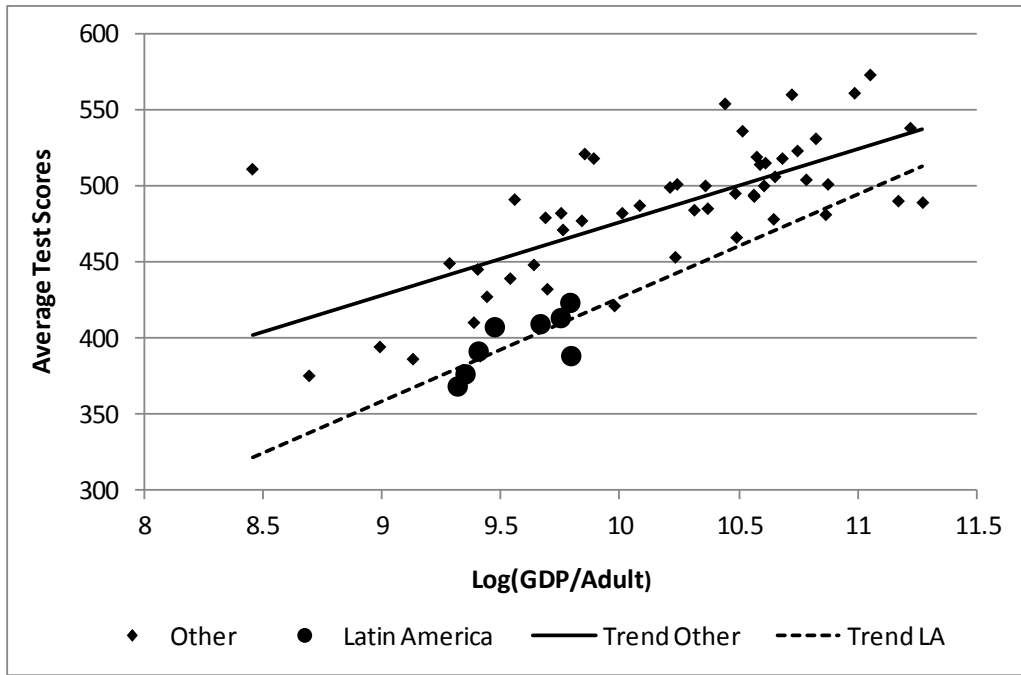
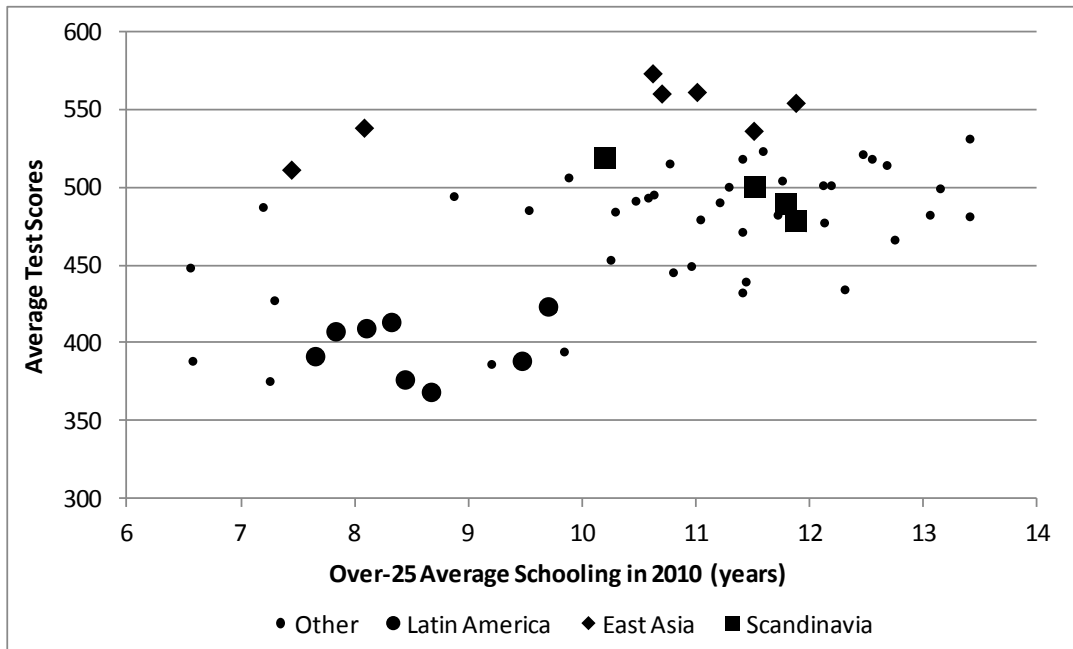


Figure 3

PISA 2012 Test Scores vs. Average Adult Schooling in 2010 by Region



outside school, and as a function of their native abilities, the characteristics of their families, and their culture, it is not easy to determine why students have higher scores in some countries than in others.

Since policy-makers cannot change native abilities or family and cultural characteristics, most analyses of test scores focus on the effect that school characteristics have on these scores. In these analyses students' personal and family characteristics are included as control variables, but they are not the focus of the analysis.

Our methodology is different because we want to identify the characteristics other than the school characteristics that cause the lower test scores in Latin America. These scores may be lower because family characteristics are different in Latin America than elsewhere (e.g., the parents' levels of education) but also because the *effects* of these characteristics are different in this region. For example, we want to know how many books Latin American families have relative to families in other countries, and whether the number of books they have has the same effect on students' test scores in Latin America as it does in other countries.

The key assumption in our approach is that there are family characteristics in Latin America that have a similar effect on test scores *within* the region but have a measurably different effect in other regions. This assumption of uniformity within the region is not necessarily valid, but because average scores are so similar across Latin American countries and because these countries have a similar colonial history, we think it is a reasonable assumption. We checked this assumption by estimating the effects of the various characteristics in each country, and we eliminated the one Latin American country (Mexico) from the study which exhibited very different estimated effects from the other countries in the region.

In order to implement our approach, we require a group of countries for comparison that have much higher test scores and also have scores and cultural characteristics that are similar to each other but very different from Latin America. For this comparison we have chosen Scandinavia, which, as shown in Figure 3, meets this criterion.

The countries in Scandinavia have similar average scores, and they are all much higher than the scores in the seven Latin American countries. As shown in Table 1, the average PISA 2012 test score in Scandinavia was 497, while the average score in Latin America was 102 points lower at 395 [OECD, 2014]. Sweden had the lowest score in Scandinavia (478) and this score was 55 points higher than the highest score in Latin America, which was in Chile. The countries in the table are those included in our analysis.

Latin America and Scandinavia are culturally quite different, but both have a Christian tradition and both rely almost entirely on families and schools to educate their children. Given

this similarity it seemed *a priori* that it might be possible to identify differences in the family and school characteristics in these two regions that explain the low test scores in Latin America.

Table 1			
PISA 2012 Average Test Scores			
Latin America		Scandinavia	
Argentina	388	Denmark	500
Brazil	391	Finland	519
Chile	423	Norway	489
Colombia	376	Sweden	478
Costa Rica	407		
Peru	368		
Uruguay	409		
Average	395	Average	497

The sample sizes for student scores in PISA are relatively small for individual countries, so estimates of family characteristics in each country could be affected by the particular schools included in the samples. By examining the average effect of family characteristics across countries within regions, we are able to identify robust differences in family characteristics and in the effect of these characteristics due to regional differences in culture or educational practices.

Our model of student test scores uses the data related to mathematics' scores in PISA 2012. We use the same model to explain these scores in both regions. A student's test score (TS) is a function of the student's family characteristics (X_i), a dummy variable for each school (S_j), and a dummy variable for each country (C_k):

$$(1) \quad TS_j = \alpha_0 + \sum \alpha_j X_i + S_j + C_k + \epsilon_i$$

The characteristics we include in the model are limited by the information collected in the PISA questionnaires. The family characteristics are:

- the presence of the mother and the father in the home,
- the educational level of the parents,
- the number of books at home, and
- the number of computers at home (0, 1, 2, or 3 or more).

The educational level of each parent is measured as primary schooling or less, secondary schooling, and post-secondary schooling.¹ The effect of post-secondary schooling is additive to the effect of secondary schooling. The number of books at home are included in six categories: (0-10, 11-25, 26-50, 51-150, 151-500, >500). All of these characteristics are included as dummy variables. We exclude not in the home, primary schooling or less, 0-10 books, and 0 computers, as the base levels in both regions.

One of our methodological concerns was that the base level of schooling be comparable between the two regions. The potential problem is that while parents with primary schooling or less are common in Latin America, in Scandinavia parents are almost certain to have more schooling unless they have mental deficiencies or are immigrants from less-educated, non-Scandinavian countries.

Table 2 shows the schooling characteristics of native and immigrant parents for Scandinavia in the PISA data. The data shown are unweighted, but they indicate the share of the parents who are immigrants by level of schooling. Although Scandinavia is often considered to be an ethnically homogenous region, the data indicate that over 20% of the students taking the PISA test are children of immigrants.

The data in Table 2 indicate that most of the parents whose schooling is limited to primary or less are immigrants. This is important because these parents are likely to be similar in mental capacity and skills to parents in Latin America with similar levels of schooling. As a consequence, the estimated effect of having parents with more education in Scandinavia relative to Latin America in the analysis is likely to be due primarily to the differing characteristics of the Scandinavian and Latin American school systems. In both regions parents in the base level of schooling (primary or less) are unlikely to have much capability to assist their children in academic learning, while those who have completed at least basic secondary schooling should have some capability to assist them.

Table 2			
Distribution of Parents' Schooling in Scandinavia in the PISA 2012 Data			
	Natives	Immigrants	Total
Basic Secondary +	77.9%	19.0%	96.8%
Primary or less	0.7%	2.5%	3.2%

¹ We ignore post-secondary technical training, and we combine basic and advanced secondary into one category and undergraduate, professional, and graduate degrees into one post-secondary category. We combined these schooling levels after determining that more disaggregated types of schooling are not statistically significant.

We test the effect of including the individual schools and individual countries in the model as a fixed effect to see if the effects of family characteristics are robust to their inclusion. Since families tend to cluster in schools as a function of their income or education levels, we expect that the inclusion of this variable will reduce the effect of the family characteristics on a student's test score.

The national samples are stratified to provide better coverage of schools with less common characteristics. We use the PISA weights to convert the sample results to national results.

Since the PISA evaluation is very extensive, each student takes only part of the complete test. The student's expected score on the complete test is estimated using different methodologies, which yields five plausible values for each student's score. We use Macdonald's [2008] software to calculate the variance in the estimated effect of the average score using the five plausible values.

IV. Results

Table 3 presents our model results. The results for Latin America are in columns 1-4 and for Scandinavia in columns 5-8. For each region we show the estimated effects of each family characteristic with no fixed effects, with school fixed effects, with country fixed effects, and with both fixed effects.

The estimates in the table indicate that the family characteristics have considerable capability to explain the average test scores in both regions. Mom at home, Mom and Dad with secondary school, and the number of books at home are highly statistical significant in both regions. Computers at home are highly significant in Latin America, but less so in Scandinavia. Still, the statistical significance of computers at home is high enough in Scandinavia to make the difference in their effects meaningful to explain the test score difference between the two regions.

A review of the estimated effects of the various characteristics in the table shows that they are very different in the two regions, but within both regions the effects of the family characteristics are robust to the inclusion of the school and/or the country fixed effects. The changes from adding fixed effects are larger in Latin America, especially related to country effects, undoubtedly because the seven Latin American countries are less similar than the four Scandinavian countries.

As expected, the inclusion of the fixed effects tends to reduce the effects of family characteristics on student test scores. Since the inclusion of the school fixed effects is required to avoid attributing school effects to family characteristics, we perform our detailed

comparison of the effects in Scandinavia vs. Latin America using the model results that include the school fixed effects. We do not include the country fixed effects in the comparison because

Table 3								
Effects of Characteristics on Test Scores in Scandinavia and Latin America								
	Scandinavia				Latin America			
Fixed Effects	No	School	Country	Both	No	School	Country	Both
Mom at home	19.0* (4.4)	18.6* (4.4)	19.4* (4.4)	18.9* (4.4)	28.0* (2.3)	25.3* (2.2)	24.0* (2.2)	21.4* (2.1)
Dad at home	4.7 (2.6)	5.0 (2.6)	5.7 (2.5)	6.2 (2.5)	-0.1 (1.6)	-0.8 (1.5)	0.1 (1.5)	-0.5 (1.5)
Mom_secondary	29.8* (5.8)	26.8* (5.9)	25.3* (5.8)	22.7* (5.9)	11.9* (1.6)	10.2* (1.5)	9.3* (1.5)	8.2* (1.5)
Mom_university	8.8* (1.9)	7.4* (1.9)	5.8* (1.9)	5.4* (1.9)	3.1 (1.5)	2.3 (1.4)	-0.9 (1.5)	-1.2 (1.4)
Dad_secondary	10.8* (1.5)	11.1* (1.5)	11.2* (1.5)	11.4* (1.4)	14.5* (5.4)	16.4* (5.4)	18.6* (5.2)	18.2* (5.3)
Dad_university	0.2 (1.5)	-1.3 (1.5)	-1.7 (1.5)	-3.1 (1.5)	4.8 (1.8)	3.6 (1.8)	2.1 (1.7)	1.5 (1.7)
10-25 books	15.9* (3.2)	14.2* (3.1)	14.7* (3.1)	13.6* (3.1)	6.4* (1.5)	6.7* (1.5)	7.1* (1.5)	6.7* (1.5)
26-100 books	39.8* (2.9)	38.0* (2.8)	38.2* (2.8)	36.9* (2.8)	25.4* (1.5)	23.4* (1.5)	22.5* (1.5)	20.3* (1.5)
101-200 books	62.8* (3.0)	60.3* (2.9)	61.5* (2.9)	59.4* (2.9)	37.4* (2.4)	34.1* (2.3)	32.6* (2.3)	29.2* (2.2)
201-500 books	84.8* (3.1)	82.8* (3.1)	84.2* (3.1)	82.2* (3.0)	62.6* (3.7)	57.0* (3.6)	51.1* (3.6)	47.3* (3.4)
>500 books	89.7* (4.0)	88.8* (3.9)	92.1* (3.9)	90.7* (3.9)	46.1* (5.3)	42.2* (4.9)	36.3* (5.0)	33.1* (4.7)
1 computer	41.9 (18.6)	40.6 (17.6)	31.0 (18.2)	32.4 (17.6)	24.7* (1.6)	21.1* (1.5)	17.1* (1.6)	14.3* (1.5)
2 computers	36.2 (18.2)	34.8 (17.2)	27.4 (17.9)	28.0 (17.2)	41.4* (2.0)	33.9* (1.9)	26.6* (2.0)	21.9* (1.9)
3+ computers	35.6 (18.2)	35.3 (17.2)	31.6 (17.9)	31.8 (17.1)	59.2* (2.2)	47.9* (2.1)	34.2* (2.2)	27.9* (2.1)

*Statistically significant at the 1% level.

we want to compare the average effect of the family characteristics between the two regions, rather than attribute these effects to unknown characteristics of the individual Latin American countries.

Table 4 presents the estimated coefficients on each family characteristic, the mean value of the characteristic, the average effect of the characteristic in both regions, and the difference between the average effect in the two regions, all based on the estimates that include school fixed effects. A review of these results indicates that, as we suspected, the values and the effects of family characteristics are very different in Latin America and Scandinavia.

Table 4							
Mean Differences in Effects of Characteristics on Test Scores							
	Scandinavia			Latin America			Difference
Variable	Effect	Mean	Total	Effect	Mean	Total	Total
Mom at home	18.6	0.94	17.4	25.3	0.85	21.5	-4.1
Dad at home	5.0	0.83	4.1	-0.8	0.66	-0.5	4.6
Parents at home			21.5			21.0	0.5
Mom Secondary	26.8	0.91	24.5	10.2	0.65	6.7	17.8
Mom University	7.4	0.60	4.4	2.3	0.42	0.9	3.5
Dad Secondary	16.4	0.88	14.5	11.1	0.62	6.9	7.6
Dad University	3.6	0.48	1.7	-1.3	0.46	-0.6	2.3
Parents' Schooling			45.1			13.6	31.2
10-25 books	14.2	0.13	1.9	6.7	0.28	1.9	0.0
26-100 books	38.0	0.31	11.8	23.4	0.22	5.3	6.6
101-200 books	60.3	0.19	11.6	34.1	0.07	2.3	9.3
201-500 books	82.8	0.16	13.1	57.0	0.03	1.6	11.5
>500 books	88.8	0.08	6.8	42.2	0.01	0.6	6.1
Books at Home			45.2			11.7	33.5
1 computer	40.6	0.05	2.2	21.1	0.39	8.2	-6.0
2 computers	34.8	0.19	6.6	33.9	0.20	6.9	-0.3
3+ computers	35.3	0.73	25.9	47.9	0.13	6.2	19.7
Computers			34.7			21.3	13.4
Total			146.4			67.7	78.7

The first characteristic is the presence of the parents in the house. In both regions the presence of the mother has a large positive effect on a student's test score. The presence of the father has a positive effect on a student's score in Scandinavia, but not in Latin America. These results indicate that parenting responsibilities are shared to a greater degree in Scandinavia. The presence of both parents in the household in Scandinavia occurs more

frequently than in Latin America, but overall the total effect on test scores of having both parents in the house is similar in both regions.

The estimates of the contribution that higher parental education has on students' test scores reveal big differences between the regions, both from the level of education and from the effect of this education on students' scores. The effects on test scores of parents having more education are much larger in Scandinavia than in Latin America. Scandinavian students with a mother educated to the secondary level score 16.6 points higher than Latin American students with a mother at the same level of education. Scandinavian students whose mother is educated to the university level score 5.1 points higher than Latin American students with a mother educated to this level. Overall the higher effect of a mother's education and the higher average educational level of mothers in Scandinavia explain 21.3 points of the difference between Scandinavian and Latin American students' scores.

Differences in the father's education explain another 9.9 points of the difference in scores between the regions. Overall the difference in the two parents' education levels and the effect of this education explains 31.2 points of the 102 point difference in the students' average scores.

The next two categories of characteristics are books in the home and computers in the home. Both of these characteristics are included in PISA to identify the socioeconomic level of the students within countries, without specifying which characteristic may be more important in explaining these differences. Individual student test scores are positively correlated with both the number of books and with the number of computers in the home in both regions.

What is striking in the results is that the effect on test scores of having books in the home is much higher in Scandinavia than in Latin America. This effect in Scandinavia is about double the effect in Latin America. In addition, the number of books in the home is much higher in Scandinavia. As a consequence, having more books at home is a major factor in explaining students' scores in Scandinavia, but not in Latin America.

Differences in books at home explains 45.2 points among student scores within Scandinavia, but only 11.7 points among these scores within Latin America. The biggest effects of books on student test scores in Scandinavia are concentrated in homes with 101-500 books. In contrast, few Latin American households have this many books, and even when they do have this number, their presence does not have nearly as large an effect on students' scores.

Differences in the number and the effect of books in the home explain 33.5 points of the 102-point difference between Scandinavia and Latin America test scores. While this difference is showing up as a family characteristic, the enormous regional difference in the effect and the small effect of books within Latin America indicates that this regional difference has a cultural,

rather than primarily a socioeconomic basis. As a consequence, we will look into it in greater detail in the next section.

The final category of family effects is related to computers in the home. As expected, the average number of computers at home is higher in Scandinavia than in Latin America, and this difference explains some of the difference in student test scores. But in contrast to the books, the effect of having more computers at home is similar in both regions, so there does not seem to be a cultural difference in how computers at home affect test scores. Differences in the number of computers at home explains 13.4 points of the 102-point Scandinavian advantage.

Overall the differences in family characteristics explain 79 points of the 102-point Scandinavian advantage, leaving only 23 points unexplained. We think it is reasonable to attribute this difference to the direct effect of the superior quality of the Scandinavian educational system on students' test scores.

V. Analysis of the Effect of Books

The regression results indicate that the biggest difference in students' test scores between Scandinavia and Latin America is associated with the number and the effect of having books in the home. Not surprisingly, the average number of books in homes in Latin America is much lower than in Scandinavia. More surprisingly, the effect of having additional books in the home is much larger in Scandinavia. The first question raised by these results is whether the number of books in homes in Latin America and Scandinavia is normal for countries at their level of schooling or income, or whether one or both of these regions is an outlier in this regard.

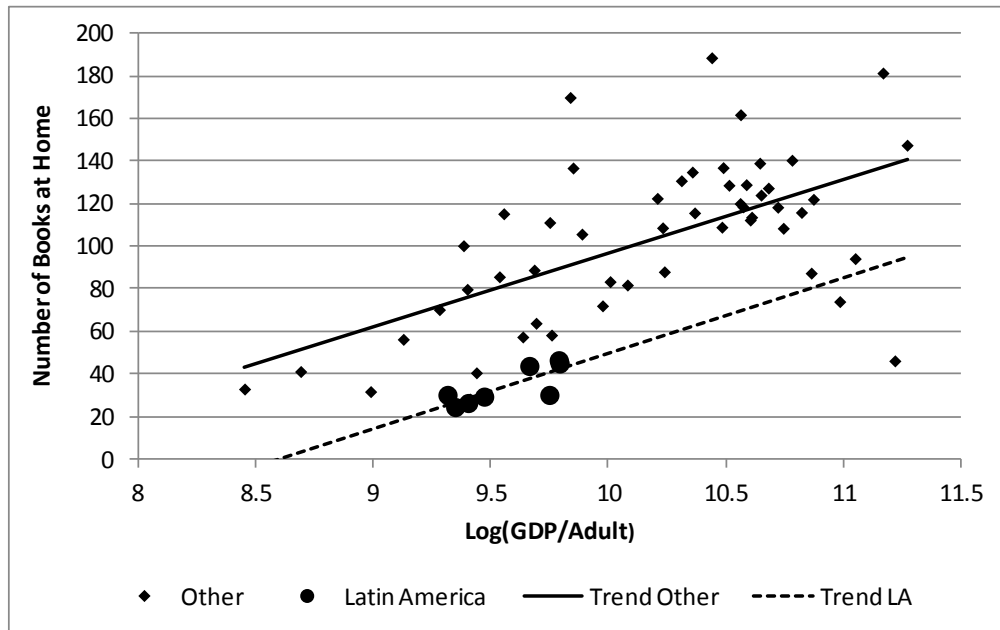
Figure 4 shows the average number of books in countries as a function of GDP/adult, with the trend shown separately for Latin America and other countries. What we observe is that Latin America is an outlier in the very low number of books typically found in the home. The average number of books at home in Latin America is about 35, while in other countries at the same level of income the average number is about 80. So homes in Latin America have less than half as many books as other countries at the same level of development. This is an enormous difference. Scandinavia appears to be somewhat above average with 130 books at home, but only by about 10 books.

Examining the distribution of books in the PISA data, we find that the average number of books is low in Latin America because 44% of the students have only 0-10 books at home. These statistics indicate that Latin American society is much less book-oriented than most other societies. The consistency of the low level of books throughout the Latin American countries indicates that it is a cultural characteristic of the region, likely associated with the similar historic colonial relationships these countries had to Spain and Portugal prior to independence.

Baten and van Zanden [2008] argue that book consumption is a good measure of a country's human capital because it is a proxy for adults' capability to comprehend the written word. If this is correct, then the low number of books in Latin American homes indicates that Latin American adults have an unusually low level of human capital, given their level of schooling and their societies' average level of income.

Figure 4

Number of Books vs. Average Adult Schooling in 2010



The data in Figure 4 likely indicate that there is no tradition of book-reading in most Latin American households, which may indicate that parents provide little encouragement to their children to read. If the parents' level of human capital is unusually low given their level of schooling, they may not be able to provide much assistance to the children in their academic studies. This could explain why the effect of the parent's level of education on student test scores is so much lower in Latin America than in Scandinavia and why Latin American students have an unusually low level of cognitive skills in academic subjects, as measured by their average scores on international tests.

The researchers in the OECD countries who created the international tests consider a small number of books at home to be an indicator of low socioeconomic status. But the distribution of books and their effects on scores in Latin America shown in Table 2 indicates

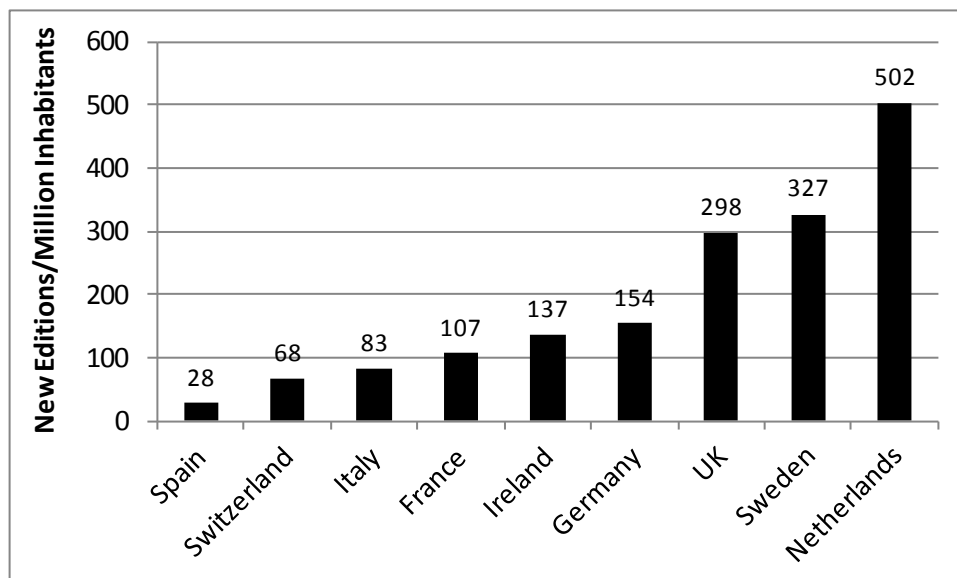
that books at home play a different role in children’s education in this region than in other regions. Latin American families with a higher socioeconomic status do not have many more books at home than families with a lower status, and when they do, having more books at home is not associated with much higher test scores.

The average household in Latin America has about 45 books less than the expected amount at the region’s level of development. Within Scandinavia an additional 45 books at home is associated with about a 15-point increase in average test scores. In addition, the 35 books they do have in Latin America have an effect on test scores that is about 10 points less than in Scandinavia. Overall it appears that the low affinity toward books in Latin America reduces students’ scores on the PISA test by about 25 points on average.

The very low level of books in Latin America appears to be a legacy of the region’s Iberian Catholic heritage, which historically was noteworthy within Europe for its opposition to books. Figure 5 shows the level of book production in eight European countries in 1800, the period just before Latin American Independence. The data shown is for the number of new editions per million inhabitants [Baten and van Zanden, 2008].² Spain’s level of book production was only a small fraction of the rate in Protestant European countries at the time and much lower than in Italy or France.

Figure 5

Book Production in Europe in 1800



² Data provided by Joerg Baten.

Beginning in the 16th century, Protestants encouraged their members to learn to read so they could study the Bible and other religious texts, while the Catholics forbade their members from reading the Bible and maintained a list of prohibited books [Mosher, 2016]. As a result, the presence of a large number of books at home was a positive social indicator in Northern Europe, while in Spain and Latin America it suggested heresy. This situation continued for many centuries, and it appears to have left a negative influence on the societal interest in purchasing books in Latin America that continues to this day.

VI. Conclusions

Scandinavia has average PISA 2012 test scores that are about 100 points higher than Latin America, of which about 75 points are explained by differences in family characteristics. But of these 75 points, about 25 appear to be due to the unusually low level of books in the home and to a negative orientation toward books in Latin America, rather than to the low socioeconomic level of the families. We conclude that 50 points of the difference between PISA scores in Scandinavia and Latin America are due to the lower average socioeconomic characteristics of families in Latin America, 25 points are due to the low Latin American cultural affinity toward books, and 25 points are due to the lower effectiveness of the schools in teaching cognitive skills.

These findings indicate that a considerable portion of the lower student scores on international tests in Latin America is due to the low educational level of the parents, which cannot be easily addressed by improving the quality of the schools. The implication is that students' tests scores are likely to rise as the average educational level of the adult population rises over time. On the other hand, it may be possible to improve students' scores by changing the cultural affinity toward purchasing books and reading at home if governments in the region urge parents to buy books and read to their children to assist them in their acquisition of cognitive skills.

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