The Transmission of Economic Status and Inequality:
U.S.-Mexico in Comparative Perspective

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Introduction: A Divided Mexico

The 2006 Mexican presidential election was a wake-up call for Mexico on many fronts. Andrés Manuel López Obrador, the candidate of the leftist *Partido de la Revolución Democrática* (PRD), finished less than 0.56 percentage points behind winner Felipe Calderón, who represented the conservative center-right *Partido Acción Nacional* (PAN). The level of support for both candidates was roughly the same: a little more than one-third of the voters. The candidate of the *Partido Revolucionario Institucional* (PRI), the party that had monopolized political power in Mexico for almost seventy years, finished a distant third, with only 22 percent of the votes.[1] The ardently contested presidential race showed an unprecedented progress of the left. In comparison with the previous presidential election, the PRD gained 8.4 million votes, while the PAN and PRI lost 1.1 and 4.3 million votes respectively.

The swing in the Mexican vote between 2000 and 2006 was coupled with a sharp regional polarization of the electorate.[2] Figure 1 shows the electoral map for the 2006 presidential race. The PRI candidate, Roberto Madrazo, did not win any state. Felipe Calderón took sixteen states, mostly in the north (along with Querétaro, Puebla, and Yucatán). López Obrador won the same number of states, but mostly in the south (as well as the Federal District and the states of Mexico, Zacatecas, and Baja California Sur).

FIGURE 1 HERE

In general, states won by the PAN's presidential candidate are better off. Calderón defeated López Obrador in states with an annual income per capita of US$6,511 in 2004.[3] In comparison, states where López Obrador prevailed had a per capita income of US$5,816. Leaving the Federal District aside, it is striking that the remaining fifteen states won by López Obrador had an average income of only US$4,038. The contrast is even more remarkable if we consider poverty levels. In 2005, states won by López Obrador had an extreme poverty rate 57 percent higher than states where he was defeated: 22 and 14 percent respectively. Further, two out of every three Mexicans suffering from food poverty were living in the states

[1] The PRI still holds strong regional and congressional political influence in Mexico.
[2] The hotly contested presidential race presented the opportunity not only to witness a clear partisan regional polarization in Mexico, but also to evaluate some of the weaknesses of the electoral process and political culture in Mexico. Old accusations reappeared regarding fraud, the persistence of corporatism, and the lack of credibility of electoral institutions. New anomalies emerged as well: the dominant and influential position of the television network duopoly, and strong and direct campaigning by President Vicente Fox and the business elite against one of the presidential candidates.
[3] Statistics calculated by the author using gross domestic product, population, and exchange rates statistics published by INEGI: www.inegi.gob.mx.

that favored the leftist candidate over the center-right one.[4] The differences would be even more striking if the Federal District had not been won by the PRD. This polarization has been correctly interpreted within the context of an ideological battle between the left and the center-right, or as a referendum between a candidate who supported continued economic liberalization versus a candidate who wanted to return to "old-style" practices of protectionism and populism (Moreno, 2007; Rubio and Davidow, 2006).[5]

This political outcome comes as no surprise when one observes the long-standing history of uneven development and deprivation in Mexico, which has been exacerbated by the economic reforms and severe recessions of recent years. Mexico's story has been one of progress and deprivation. Though Mexico's problems are far less severe than the economic, educational, health, and political problems facing most countries in Africa, Asia, and Latin America, the country is also far from enjoying the wealth and income levels of the United States or the living standards of European or East Asian societies. Rule of law is also a major challenge in Mexico's future.

Mexico remains a country of hope at best. It shares a 1,969-mile border with the world's wealthiest economy. It has experienced significant economic and social transitions during the last twenty-five years. The demise of import substitution industrialization in the early 1980s brought an abrupt end to a relatively steady period of economic expansion in Mexico. This reversal of economic progress was accompanied by a series of policy measures that included fiscal reforms, privatization of state firms, deregulation, and free trade agreements intended to incorporate Mexico into the global economy. The agriculture and manufacturing sectors are no longer driving the national economy, and commerce and services are now the main sources of employment for Mexicans. This well-documented transition has translated into high costs for the working class, in the form of stagnating real wages and reductions in social protections and benefits. Large numbers of women continue to enter the labor force to offset the weakening of the economic male-breadwinner model, but also due to positive changes in the status of women and increases in the labor demand for women. From a demographic perspective, fertility and mortality rates have decreased at an impressive rate. Mexican migration to the United States has become a national phenomenon, defining new social, economic, and cultural transnational links. The majority of the nation's population continues to concentrate in metropolitan areas, and internal migration is increasingly directed toward the North, where employment opportunities grow faster as a result of new industrialization aimed for export. From a social perspective, Mexico's literacy rates have increased as has access to secondary education. Mexicans alter their consumption patterns and adopt new lifestyles as they gain exposure to education, migration, and mass media. After seventy years of autocratic government, Mexico has a competitive but still incipient democracy, and its citizens have taken important steps toward increased political participation.

[4] Calculation by the author based on statistics of the *Consejo Nacional de Evaluación de la Política de Desarrollo Social*: http://www.coneval.gob.mx/coneval/medicion.html.

[5] In reality, this antagonism was more about inspiration than about proposals, since policy guidelines were not a major electoral issue.

Thus, in international comparisons, Mexico is classified as an upper middle income economy and ranks high in human development.[6] In 1994, Mexico became a member of the select group of member countries of the Organisation for Economic Co-operation and Development. The puzzling question is how Mexico has gone through numerous political, economic, and social transformations but with no significant effects on inequality and poverty. There are many statistics that still tell the story of Mexico's underdevelopment: uneven regional development; high urban and rural poverty rates; social and economic disparities in access to wealth, income, assets, health and education services; crime and insecurity; issues of rule of law; and millions of Mexicans living in the United States. The outcome of many decades of short-vision economic and social policies, poor leadership in public service, overprotected business elites, and a vast percentage of people not even finishing high school (today's elementary education) is significant poverty and inequality.

There is nothing new about inequality and poverty in Mexico. They have existed there for centuries, and Mexican society has developed a high tolerance for these social problems. So many Mexicans, millions, have stuck for so long at the bottom of the social stratification. Origin is destiny. At the heart of Mexico's social problems lies its incapacity to spread prosperity more equally and to change the destiny of millions of children born into poor families (Ruiz, 2007). Without greater equality, sustainable economic growth and development will be impossible as some scholars have argued (Alesina and Rodrik, 1994; Bourguignon, 2004)

Why does prosperity not spread more equally in Mexico? The historical record makes it clear that even during periods of rapid economic growth, Mexico has been inefficient in its efforts to significantly reduce poverty and inequality. Conditions in Mexico are more conducive to economic growth than they are to a more egalitarian society. I do not wish to argue that faster and sustained economic growth is not a much-needed outcome for Mexico. Rather, I wish to make the point that Mexico's major problem does not lie as much in its incapacity to produce as in its incapacity to create an institutional and policy framework that redistributes the benefits of economic growth. Redistributive policies can provide better results given the actual levels of economic output and government revenues. However, Mexico keeps delaying a more serious commitment to redistribution, hoping to first fix its economy (believing that it can grow as rapidly as China or India) and fiscal holes, and leaving Mexico's powerful elites to continue shifting resources in line with their own interests (Guerrero, López-Calva and Walton, 2006).

The relationship between social background, institutions, and economic status has long been of interest to social scientists and policymakers. The concern with the intergenerational transmission of poverty and inequality is based on the principles that this process violates norms of social justice and equal opportunity. As pointed out by Roemer (1998), the purpose of equal-opportunity policy is to "level the playing field" among individuals who compete for positions during the years of formation. This policy-oriented principle states that compensatory education should be provided for millions of Mexican

[6] Mexico ranks fifty-ninth and fifty-second in the world in terms of GDP per capita and human development, respectively.

children from disadvantaged socioeconomic backgrounds.[7] Mexico has made major investments in education expanding educational spending from 5.6 percent of its GDP in 1995 to 6.4 per cent in 2004, the highest percentage among OECD countries (OECD, 2006). However, there has been serious questioning about the efficiency of Mexico's investment in education giving its poor performance in international comparison, as we will see later in this paper.

Little systematic scholarly research has addressed the issues of social background, institutions, and economic status in Mexico, as well as about the improvements or setbacks of Mexican immigrants that move to a different social stratification system in the U.S. A key tenet of my research is that social disparities in Mexico can be better understood by establishing comparisons with the U.S. This approach is motivated by two reasons. The first is that millions of Mexicans are shaping their life opportunities and those of their descendants by moving between two societies with clear divisions based on class and ethnicity. Both countries can learn a great deal from this particular and intense binational experience. Second, the U.S. has a longer experience than Mexico implementing safety-net, anti-poverty, and compensatory education programs. This North America comparative approach has been set forth in a recent publication by Mary Jo Bane and René Zenteno (2008).

This is the first of a series of papers related to the issue of inequality of opportunities and distributive policies in Mexico, and the challenge of getting ahead when migrants move with their families to the U.S. In this article I want to shed light on the extent to which characteristics of the family of origin are associated with educational and labor market opportunities in Mexico, and how these effects have varied over time. The intergenerational transmission of economic status was analyzed in terms of occupational attainment of men, on the one hand, and quality of learning outcomes in science of 15-year-olds, on the other.

The rapidly growing Mexican population in the U.S. has led to an upsurge of interest in discerning its capabilities to assimilate to the Anglo-American society, which in turn is related to the chances of immigrant-origin children of having access to quality education. This is why the analysis of youth's educational achievement was extended to include this country. I asked the following relevant questions: Are the effects of parental social background on school performance stronger in Mexico than in the U.S.? How successfully are immigrant-origin youth living in Spanish-speaking homes navigating in the U.S. education system in comparison to those who stayed in Mexico?

I examine trends in Mexican social mobility and educational performance, especially as they relate to the degree to which a person's occupation and education outcomes depend on his or her parents' background. The intergenerational transmission of inequalities is analyzed in terms of occupational mobility of three cohorts of men. Education is the most important instrument for equipping Mexicans with specific tools and resources for success in the social and economic structure. Cross-country comparable data from the Programme for International Student Assessment (PISA) allowed me to evaluate the impact of socio-economic

[7] The other policy-oriented principle stated by Roemer (1998) is related to no-discrimination, that is, in the competition for positions in society, individuals should be judged only with respect to the relevant attributes for those positions.

background, migration and ethnic conditions on youth performance in science in Mexico and the U.S.

The paper looks specifically at the following aspects. First, I survey recent research on the transmission of economic status in Mexico. In section two, I examine research on the educational challenge of immigrant-origin children and youth in the U.S. and the role played by family socioeconomic background, ethnic differences and Spanish language retention. The paper then introduces the data and variables used in the empirical investigation of occupations and student performance, before turning to the analysis of both outcomes in terms of mobility and socio-economic background. The last section of the paper extends the examination of the transmission of economic status to children of immigrants living in Spanish-speaking homes in the United States.

1. Literature Review: Intergenerational Social Mobility in Contemporary Mexico

A central issue in studies of social stratification and life course, particularly in societies with high inequality such as Mexico, is social mobility. While economists tend to observe income and education changes in order to measure mobility, sociologists pay attention to occupations.

Contemporary studies on occupational mobility tend to focus on two aspects of this phenomenon. The first aspect relates to the degree of social mobility that is generated in a society as a result of global changes in the opportunity structures. This type of mobility, usually denominated "structural" or "absolute" mobility, has manifested itself in Mexico due to the major transformations in the occupational structure and the expansion of basic educational opportunities that took place in a context of rapid urbanization and industrialization up until the early 1980s. The second aspect relates to the process of social stratification, meaning the transmission of social advantages and disadvantages from one generation to the next, or the degree to which present opportunities depend on the resources accumulated by families. Whether it is or is not possible to achieve an increase in absolute mobility, a fundamental premise of democratic societies is to guarantee equal access to opportunities via universal education or social policies. It is possible to evaluate the extent to which these measures of mobility are "circulated" or "relative" by contrasting opportunities of increasing individual social mobility from distinct social strata.

Recent work on intergenerational schooling and occupational mobility have shown that Mexican cohorts were increasingly benefited by educational and labor market occupational opportunities, even though they had strong rural origins (Zenteno, 2003; Blinder and Woodruff, 2002; Torche, 2007). In the case of labor market opportunities, the economic transformations during the second half of the 20th century allowed a rapid incorporation of men into non-manual occupations, leading to an ascending occupational mobility in Mexico. However, statistical analyses revealed the existence of significant social inequality with respect to access to labor opportunities in urban areas, such as the Monterrey case (Solis, 2005).

Since labor markets provide the majority of individuals' monetary income in Mexico, living conditions and social status are basically determined by the type of employment

available. Recent studies on social mobility in Mexico concur that, prior to the external shocks of the 1980s, the country's main metropolitan areas offered abundant opportunities for social mobility. Industrialization via import substitution and migration opened the door to labor market opportunities for a vast population with very low education levels, which created a relatively open occupational structure with good chances for upward mobility (Escobar, 2001; Cortes and Escobar, 2003; Parrado, 2005; Solis, 2002). There was little uncertainty within families with respect to the future of their children, because it was believed that they would have more opportunities to positively transform their living conditions. This optimism persisted even among the population in the agricultural sector due to the internal migration processes (rural-urban) that signified an impulse in social mobility (Escobar, 2001). Thus, no one anticipated that during the 1980s Mexico's principal urban labor markets would experience severe economic crisis, profound economic reforms, and a strong process of economic tertiarization and informality. To what extent have these economic transformations affected social mobility in Mexico? The literature reviewed in this section has sought to answer this question through different approaches.

By observing the particularities of social inequality in Mexico, recent research has tended to observe educational and occupational achievements, unequal access to socio-economic status, and intergenerational or intra-generational social mobility. Formal education and employment categories have been used as reference frameworks for social stratification and social mobility research because the labor market constitutes the fundamental mechanism for assigning different dimensions in the stratification process (Solis, 2002).

Table 3 summarizes eight recent studies that analyzed social mobility in Mexico from either the education or labor market perspective. The purpose of this table is to concisely highlight the conclusions with respect to the dimensions of interest in this study: the upward mobility and importance of parental socioeconomic status or social origins. Relevant methodological information is also included. The evidence from these studies is mixed, but they yield important conclusions.

TABLE 3 HERE

Three of the studies based their empirical analysis on information collected from the "Gender, Age, Family and Work in Urban Mexico" module, which was included and administered in the National Urban Employment Survey (ENEU) by INEGI in 1994. The three studies are Behrman, Gaviria, and Szekely (2001), Binder and Woodruff (2002), and Cortes and Escobar (2003). The ENEU module was applied in a random sample of cities in Mexico.

In the first study, Behrman, Gaviria, and Szekely (2001) conducted a comparative study of intergenerational social mobility in Latin America, analyzing the educational and occupational dimensions of social stratification. Their contributions have more to do with educational differences, absolute and relative, between parents and their children, and less to do with occupational mobility. These authors found that in Mexico, as in the rest of Latin America, children always tend to surpass the level of education reached by their parents, a finding supported by Binder and Woodruff (2002) and Torche (2007). Despite this, Mexican educational mobility is classified as moderate with respect to other Latin American countries. This study also includes an analysis of cohorts (age groups), which seeks to explore the

connection between levels of education and changes in social mobility within these groups. Mexico is the only one of the five countries analyzed by these authors in which immobility increased slightly over time.

Occupational stratification is more rigid in Mexico. Behrman, Gaviria, and Szekely (2001) concluded that in Mexico, unlike Brazil and Colombia, the high mobility pattern of schooling attainment is not reproduced in terms of occupational status (a similar story appears in Torche, 2007). The authors assert that a person whose father holds a white-collar (non-manual) position is 3.5 times more likely to hold a similar position than is a person whose parent holds a blue-collar position (manual). According to these results, Mexico has the lowest rates of occupational mobility in the Americas. In contrast to educational attainment, the study of occupational achievements did not differentiate cohorts or age groups, which makes it difficult to draw any conclusion about trends.

Using the same data source, Binder and Woodruff (2002) reached similar conclusions regarding educational mobility in Mexico. They found high intergenerational educational mobility over time, but a reversal of this process for the youngest cohorts in the sample (individuals born between 1965 and 1971). Binder and Woodruff's significant contributions are related to the high degree of social stratification observed in Mexico. They documented large and significant differences regarding completion of high school between children born into a household whose head had 12 or more years of schooling and children of heads of household who never attended secondary school. In other words, gains in access to primary and lower-secondary educational levels in Mexico do not automatically translate into increased enrollments at upper and post-secondary levels.

Torche (2007), studying more recent survey data, also finds that the expansion of the educational system in Mexico has increased the opportunities for absolute mobility in schooling attainment: the majority of the adult population in Mexico (73 percent) have more education than their parents. However, like Binder and Woodruff, Torche points out that despite greater educational opportunities over time, a high degree of social stratification prevails in Mexico, since educational attainment is heavily dependent on parents' social background. This author goes even further by documenting that the major educational barrier in Mexico exists for individuals whose parents have no education at all.

Another study based on the "Gender, Age, Family and Work in Urban Mexico" ENEU module was published by Fernando Cortes and Agustin Escobar (2003). This study analyzed intergenerational mobility in three periods: before 1982, 1982-1988, and after 1988.[8] Distinct from other research that focuses on upward mobility through the whole occupational structure, Cortes and Escobar only calculate the odds of reaching the highest hierarchies: heads of large companies, professionals, and high public officials. In this study, the authors conclude that there is a marked deterioration of opportunities to ascend to or remain in higher hierarchical occupational categories after 1988.

[8] These periods are representative of distinct economic contexts that the country has experienced in the last forty years: import substitution industrialization (before 1982), transitional model or mixed economy (1982-1988), and economic restructuring (after 1988).

The only exception to the previous observation was found among individuals who were initially in the third occupational category (small managers and not professionals), where the decline was less marked. However, the decrease in high achievement opportunities has no relation to the transition of the economy, because although an economic downturn occurred in 1982, limitations on promotion were not seen until 1988.[9] So the ability for higher occupational achievement opportunities decreases in the three primary occupational categories, is constant in the fourth category, and is strengthened in the lower categories (Cortes and Escobar, 2003). One of the most interesting results of this study was uncovered through the entropy indexes used by the authors, which revealed progressively minor or decreasing difference between individuals in each occupational category. Hence there is less occupational fluidity, which induces more rigidity within the Mexican occupational stratification system.

Edith Pacheco's article "Children's occupational mobility based on their parents" analyzes how different initial socioeconomic statuses of individuals structure distinct incorporations into the labor market. This author uses the 1998 EDER data to inquire about gross and net inherited occupational concepts.[10] Pacheco (2005) analyzes three individual cohorts who were interviewed in this survey (1936-1938, 1951-1953, and 1966-1968) and follows their intergenerational mobility. Given the theoretical complexities and the analytics of studying social mobility of women, Pacheco only concentrated on the male population. Pacheco came to conclude that changes in occupational structures were only seen between the second and third cohorts in rural areas, while in urban areas they appeared between the first and second cohorts. Also, more upward occupational mobility was seen in urban areas. A stronger net inherited occupational impact was observed in rural environments. A higher capacity to abandon or resist a person's occupational level based on past generations was observed in urban areas, especially in occupations situated at the extremes of the labor structure. The relation between father's and son's occupation is measured by the type of geographic location and cohort's place of birth. Finally, the author's main argument is that education is the leading explanatory variable that indicates whether a person finds him or herself in a non-manual occupation, although in manual occupations cases, the father's occupation becomes the significant explanatory variable.

Emilio Parrado (2005) also utilizes the EDER data and is the only researcher, from all the reviewed studies, who analyzes the effects of economic restructuring during the 1980s with respect to intra-generational Mexican mobility in his "Reversal of opportunities: Neoliberal policies and intra-generational class mobility in Mexico" study. According to this author, in contrast to import substitution industrialization, the new economic context has negatively affected the permanent achievement of professional class occupation. This mitigates the neoliberal effect on inequality, which is defined as the incremental increase in demand for qualified workers in the new commercial and technological economic context. In this study, young cohort members are less likely, compared to intermediate cohorts, to incorporate themselves into the professional-class labor market due to the fact that

[9] However, it is worth noting that the decrease in opportunity for reaching the highest hierarchical strata does coincide with the national economic liberalization of 1988.

[10] Gross occupational inheritance refers to the resistance at the occupational level of past generations, recognizing that structural processes condition manual labor demand. Net inheritance signifies the dimension of permanence when individuals have the same occupation as their parents (Pacheco, 2005).

incorporation depends on the experience and level of education captured by the cohort (Parrado, 2005). However, the author confirms that education is no longer the determining factor in preventing downward social mobility, meaning that high levels of education do not assure entry or permanence in the highest occupational strata. Liberal economies have permitted the entry of large numbers of young people into the informal class. This social mobility deadlock has generally become constant in Mexican society.

The recent study by Torche (2007), mentioned above, also analyzes occupational mobility in Mexico. Torche finds lower mobility in Mexico than in industrialized countries. She attributes this to significant immobility at the extremes of social stratification; that is, people whose parents belong to the poorest and richest socioeconomic spectra have high probabilities of remaining in the same categories. More mobility is observed in the middle part of the socioeconomic distribution. Torche's findings suggest that a country with high inequality can provide opportunities for social mobility to its citizens, but the patterns of mobility manifest and reproduce in the type of inequality that exists in the country.

The last study, by Patricio Solis, addresses structural change and occupational mobility in Monterrey. This research is relevant not only because Solis compiled specific information to study this phenomenon, but also because he centers his argument on one of the country's most dynamic cities. Solis analyzes the National Urban Employment Survey and retrospective surveys: Social Mobility and Geography in Monterrey surveys completed by Browning, Balan, and Jelin in 1965; and the Social Mobility and Life Course Survey in Monterrey completed at the end of 2000. The last survey compared data on social mobility with data from 1965. Thanks to the retrospective characteristic of both surveys, Solis was able to analyze occupational mobility in Monterrey across the distinct periods of Mexico's economic development in the 20th century.[11] Contrasting the occupational trajectories of males in Monterrey with those observed in 1965, the study was able to analyze how economic transformations and social contexts have altered social mobility frameworks, as well as whether upward occupational mobility has declined or not (Solis, 2005). For example, the structural changes that occurred in Monterrey in the late 1970s translated into changes in the composition of the labor market, which facilitated structural upward mobility. This is, younger generations whose parents held blue-collar jobs could aspire to work in white-collar positions (Solis, 2005).

According to Solis, the permanence of upward structural mobility should be addressed with caution—first, because the bulk of non-manual occupations are concentrated in low-skilled activities, particularly trade and sales. Even in dynamic labor markets like Monterrey, professionals, managers, and specialized technicians do not make up the majority of non-manual occupations. On the other hand, the new economic context has also produced a marked decrease in non-manual labor incomes in Monterrey. This means that upward mobility toward the non-manual strata is less rewarded in terms of income than in the past. Younger generations who ascend in the labor structure now have a high probability of obtaining an income similar or inferior to that of their parents (Solis, 2002). Unequal access to labor opportunities due to class origins or occupational family background has increased.

[11] Solis completes an analysis of occupational mobility in Monterrey with data that include a broad range of cohorts (born between 1905 and 1969), where measures of mobility can be obtained during periods of stable development and economic liberalization.

Thus, even though Monterrey experienced significant industrial growth during the 20th century, it has not escaped the negative effects of economic transformation.

Although these studies adopted different perspectives and methodological discrepancies exist between them, they ultimately show that overall social mobility in Mexico is not as stagnant as might be expected in an era of economic crisis and restructuring. Nevertheless, almost all of these authors offer cautionary remarks with respect to two factors. One is that occupational mobility continues, but it tends to be more polarized and probably less likely to be linked with life conditions. Second, an individual's social origins tend to be a determining factor in occupational achievement, which denotes an increase in social inequality and unequal access to labor opportunities.

2. Literature Review: Ethnic and Immigrant Variation in Educational Achievement in the U.S.

According to a recent report released by the Pew Hispanic Center, the Latino population in the U.S. will triple in size during the next forty-two years and its share of the U.S. population will jump from 14 to 29 percent between 2005 and 2050 (Passel and Cohn, 2008). Immigrant-origin children and youth constitute the largest growing social group of the U.S. child population and they are projected to make up one-third of this segment of the U.S. population by the year 2040 (Suarez-Orozco and Suarez-Orozco, 2007). Mexicans represent the largest ethnic group among immigrants in the U.S. as approximately 400,000 Mexican citizens move their residence to the U.S. every year. By migrating north, Mexican families immediately improve their economic opportunities, but they also face barriers for intergenerational upward mobility.

The progress and integration of Mexican immigrant families and their children has been a major concern among social scientists and policy-makers in the U.S. Controversy about the wave of low-educated low-skill immigrants from Mexico and their prospects of adopting mainstream American identity came to a head with the publication of *Who Are We? The Challenges to America's Identity*. In his book, Samuel Huntington (2004) describes a process of "cultural bifurcation" in the U.S. society whose driving force has been the wave of immigration from Mexico and the rest of Latin America. This author argues that Latin American immigrants are less prompt to linguistic and cultural assimilation than previous generations of European immigrants due to the fact that they speak a common language and tend to cluster in Spanish-speaking regions and enclaves. In general, that Mexican immigrants do not move into mainstream American society as rapidly as other immigrant groups has been hypothesized by several authors (Borjas, 1999; Lazear, 2007).

Sociologists have challenged this straight-line notion of assimilation into American society and argue that this perspective does not seem to fit very well the current process of assimilation of immigrants. According to Portes, Fernandez-Kelly and Haller (2005) and Portes (2007), the experience of second generations of immigrants in the U.S. can be better understood as an undergoing process of segmented assimilation with significant differences across immigrant nationalities. Rapid integration into the core of American identity represents just one possibility for immigrant adaptation.

The traditional conception in the U.S. is that education is the key to social integration and mobility. Since the school system is the revolving door to the U.S. stratification system, and educational processes and outcomes have significant effects on intergenerational socioeconomic mobility, the success of immigrants and their descendents is highly dependent on their educational opportunities. Ethnic and immigrant variation in school outcomes are well-documented facts. In this section, I provide a short overview of empirical findings on school performance of immigrant children and youth from Mexico and Latin America, in particular the role that ethnic background, immigrant generational status, parental socioeconomic circumstances, and language retention play on school performance. The literature review will also help to justify some of the variables used on the empirical analysis of learning outcomes in science of 15-year-olds.

Although differences in educational achievement and attainment by racial and ethnic groups have narrowed over time (Kao and Thompson, 2003), the persistence of educational disadvantages faced by Hispanic, Latino or Mexican-origin minorities relative to other ethnic groups and across generations have been abundantly documented (Miller, 1995; Mare, 1995; Kao and Tienda, 1995; Kao, et. al, 1996; Warren, 1996; Vernez, et. al, 1996; Portes and Rumbaut, 1996 and 2001; Portes and Hao, 2004; Telles and Ortiz, 2008). As pointed out by Portes and Hao (2004), Mexican-origin students display significant disadvantages in achievement and retention that are generally aggravated by the schools that they attend.

There are many possible reasons why ethnic educational disadvantages prevail over time in U.S. society. In understanding ethnic stratification in school achievement, we must take care to distinguish between the cultural orientations of ethnic groups toward education (regardless their minority status) and the socioeconomic status of ethnic minorities that facilitate the reproduction of educational and occupational advantages or disadvantages (see Kao and Thompson, 2003 for an excellent review of these explanations).

Socioeconomic parental background is one of the best predictors of academic outcomes among children and youth in the U.S. (Bradley and Corwyn, 2002). The seminal work of James Coleman (1966) devoted a lot of attention to the influence and positive effects of social origin and class status on school performance of children. Parental socioeconomic status operates both directly and indirectly on educational attainment and achievement. On the one hand, parents with clear economic advantaged positions can afford to live in safer neighborhoods and send their children to better-quality public or private schools. On the other hand, more educated parents can offer a more stimulated and secure educational environment, providing their children with more resources (books, computers, internet access, private place to study, etc.) and with higher expectations on the value of education.

Since most immigrants from Mexico and the rest of Latin America arrive to the U.S. with low levels of schooling and job skills, ethnic and immigrant variations often disappear after taking parental socioeconomic circumstances into account. However, variations in school attainment are more likely to be accounted for by parental socioeconomic background across immigrant groups than across ethnic lines. For example, Kao, et al. (1996), found that parental background characteristics did not account for differences in standardized reading and math tests between Hispanic and Whites. In their study of 5,266 second-generation high school students in Florida and California, Portes and MacLeod (1996) and Portes and

Rambaut (1996) also found that parent's socioeconomic status did not eliminate the effects of ethnicity on school performance. Glick and White (2003) employ statistical analysis of nationally representative academic achievement trajectories of high school students to assess variations in students' performance. Their results indicate that the performance of students' trajectories were more influenced by family socioeconomic circumstances and ethnicity than by immigration and second generation status.

Since ethnic differences persist after taking parental socioeconomic background into account, sociologists have suggested two main explanations. First, ethnic and minority groups differ in key traits linked to cultural orientations toward education or they transmit differently educational aspirations into achievement and attainment (Kao and Thompson, 2003). Asian-American parents are said to possess more positive cultural beliefs about the benefits of education than other minority groups (Caplan et al., 1991). Low aspirations and expectations of Latino or Mexican-origin parents can help to explain why their children keep lagging behind other ethnic minorities groups in educational attainment and achievement (Kao and Tienda, 1995; Goldenberg, et. al, 2001). Scholars like Ogbu and Matute-Bianchi (1986) and Suarez-Orozco and Suarez-Orozco (1995) attribute this to the discriminatory practices experienced by Latinos in the U.S., which in turn have a significant effect on reducing educational expectations and aspirations for their children. However, establishing the nature of the relationship between cultural orientations toward education and school outcomes has proved challenging. Most of the time, studies either fail to separate the effects of ethnic and socioeconomic background from those of cultural orientations, or lack complete and meaningful measures of educational aspirations, motivations and behaviors. Second, segmented assimilation theorists dispute that school outcomes of immigrant and ethnic groups depends upon the specific context of settlement (Portes and Rumbaut 2001). Mexican-origin students not only come from low socioeconomic positions, but also tend to concentrate in segregated and impoverished neighborhoods and schools in American cities.

In the empirical study of immigrant-origin and school achievement, scholars have distinguishes between first- and second-generation immigrants. Numerous cross-sectional studies of the early educational achievement of children in immigrant families show that they are doing well in comparison to native-born minorities and whites (Kao and Tienda 1995; Vernez and Abrahamse 1996; Fuligni 1997; Glick and White 2003). Suarez-Orozco and Suarez-Orozco (1995) found that Mexican-born students perform better than Mexican-American peers as a result of their higher achievement motivations. Padilla and Gonzalez (2001) reported findings from a sample of 2,167 high school students, showing that immigrant students perform better than third-generation students. In their study of academic achievement of high school students, Glick and White (2003) found that the achievement trajectories of first- and second-generation immigrants did not differ from their third-generation counterparts. Moreover, for some educational outcomes recent immigrants and second-generation immigrants outperformed third and higher generations. They conclude that immigrant and second-generation youth's trajectories are not determined by their generational status per se.

The major effort to date attempting to discern the educational adaptation process of immigrant second generation in early adulthood has been provided by the Children of Immigrants Longitudinal Study. Portes and Rumbaut have produced extensive work on the study of the immigrant second generation and its adaptation process in early adulthood (Portes

and MacLeod 1996; Portes and Hao 2004; Portes 1996; Portes and Rumbaut 2001). A key tenet of these studies is that educational adaptational outcomes are influenced not only by national origins, socioeconomic background and the specific contexts of reception, but also by structural conditions in the host society such as racial stratification, economic opportunities, and spatial segregation. These studies have found that the assimilation experience varies substantially for different immigrant groups depending on the specific contexts of integration they encounter in local communities.

Assimilation into American society is itself very dependent on English language acquisition. Linguistic adaptation is another challenge for Mexican-origin families in the U.S. given their higher probabilities of holding to parent's native language (Lopez, 1996). In their study of language retention in Southern California, Rumbaut, Massey and Bean (2006), found that Mexicans and other Latin American immigrants display stronger retention and greater ability to speak parent's native tongue than other immigrant groups. However, according to their data of Southern California, language retention decrease significantly across generations and no mother tongue can be expected to survive beyond the third generation. They conclude that the ability to speak Spanish proficiently can be expected to fade away between the second and third generation.

Weather retaining the parent's native tongue leads to favorable or unfavorable school outcomes are a matter of debate. According to Rumberger and Larson (1998), bilingual students had a higher rate of educational stability and had greater chances of completing high school credits than were students with English-only background. In his "Parent-Child Differences in Educational Expectations and the Academic Achievement of Immigrant and Native Students," Lingxin Hao and Melissa Bonstead-Bruns (1998) found that the higher rate of parental language retention of promotes academic achievement among immigrant Mexican children.

3. Data and Variables

I draw on two sources of data for the analysis of the transmission of economic status: the National Retrospective Demographic Survey (known by its Spanish acronym EDER) and the Programme for International Student Assessment (PISA).

I evaluate intergenerational occupational mobility of Mexican males using data from the EDER. The EDER, directed and designed by Marie Laure Coubes, Gabriel Estrella, Maria Eugenia Zavala, and Rene Zenteno, constitutes the first nationally representative survey of life histories in Mexico and was designed to capture changes in life course transitions across three generations of Mexicans. Fieldwork was conducted in 1998 by the Mexican Census Bureau (INEGI) on three cohorts of Mexican men and women born in the years 1936-1938, 1951-1953, and 1966-1968. These cohorts are representative of distinct periods in Mexico's economic development. This survey collected information about men's occupational histories, as well as data on other relevant variables, such as father's occupation, education, and migratory origin.

The EDER collected retrospective histories on major life course events, such as marriage, fertility, employment, and migration, from independent samples of men and women. The data include information for 2,340 respondents--1,105 men and 1,235 women distributed in approximately equal numbers across cohorts. The questionnaire, administered in person, followed a modified version of the Event History Calendar methodology (Freedman et al., 1988), and retrospective information was collected for every year in a respondent's life. The survey design and retrospective history data are ideal for capturing occupational differences in the timing of life course transitions accompanying Mexico's process of development and fertility decline.

The three cohorts were, on average, 61, 46, and 31 years of age, respectively, at the time of the survey, and they capture labor market behavior under markedly different social and economic conditions. The fifteen-year separation between the cohorts permitted interviews with individuals who transitioned to adulthood in different economic, social, and demographic periods. Labor trajectories of the members of the 1936-38 cohort occurred entirely during the peak of import substitution industrialization (1951-1967); those of persons born between 1951 and 1953 took place at the end of the import substitution period and culminated during the prelude to the 1980s economic crisis (1966-1982). Finally, the trajectories of the 1966-68 cohort corresponded to the first part of the crisis of the 1980s and culminated during the period of economic liberalization in the 1990s. In this way, the careers of each cohort reflect their exposition in successive periods of Mexico's socioeconomic development.

A key advantage of the EDER is that it includes information about the occupation of the father when the individual was 15 years old. To make the three cohorts perfectly comparable, we restrict our analysis to the occupation status of men at age 30.The occupational classification employed identifies a hierarchy of five occupational groups. At the top are (I) higher non-manual workers (professional), followed by (II) lower non-manual workers, (III) skilled manual laborers, (IV) low-skilled manual laborers, and (V) agricultural workers. Using this information, I was able to calculate intergenerational occupational mobility tables by birth cohort, as well as to estimate ordered logistic regression models (Powers and Xie, 2000). In order to explore the effects of social adscription (father's occupation) on occupational attainment levels, I adjusted a set of cohort-specific logit models on the probability of attaining a higher position in the occupational hierarchy that controls for changes in the marginal distribution of occupations. Ordered logit models take advantage of the ordinal scale of the dependent variable; a five-group occupational hierarchy with non-manual occupation at the top and low-manual at the bottom. Given that occupational attainment (y_i) assumes the values i = 1, 2, …5, which correspond to ordered responses, a logit model can be written in the following form:

$$\Pr(y_i \geq j \mid \mathbf{x}_i) = \frac{\exp(\alpha_j + \mathbf{x}_i'\beta)}{1 + \exp(\alpha_j + \mathbf{x}_i'\beta)}$$

Under this parameterization, the odds-ratios can be interpreted as referring to cumulative odds, i.e., as the odds that occupational attainment is greater or equal to a given level j versus lower than j. While father's occupation tries to capture the effect of social origin on occupational mobility, years of schooling is included in the model to control for the effect

of “effort” on the outcome variable. I include two controls for other circumstances or effort variables: community of socialization (rural-urban) and migration condition until age 30.

The study of social origin and education outcomes uses data from the Programme for International Student Assessment. PISA is a policy-oriented international study of the knowledge of 15-year-olds. In order to monitor a country’s improvements in educational outcomes in the context of other countries’ performances, PISA surveys have been conducted in 2000, 2003 and 2006, each round having a specific focus: reading, mathematics, and science, respectively. In 2006, more than 400,000 students from fifty-seven countries were evaluated, including all the economies of the Organisation for Economic Co-operation and Development (OECD) and twenty-seven other partner countries. Nationally representative samples were drawn, representing 20 million 15-year-olds enrolled in educational institutions. For example, of the 1.4 million 15-year-olds eligible population in Mexico, 30,971 students participated in PISA 2006. In the U.S., 5,611 students were tested out of an eligible student population of 4.2 million. PISA 2006 obtained a detailed profile of student performance in science. It also collected data on student, family, and institutional factors that could be related to differences in performance.

I restrict the analysis to students’ performance in the science scale for two reasons. First, the challenge of getting ahead in the highly competitive globalized economy of today is the challenge of expanding capabilities in science literary. Scientific achievements hold the key to unleashing economic growth based on knowledge and technological progress. Second, PISA 2006 reports in much greater detail science performance than mathematics and reading literacy. The continuous metric captures variation in scientific literacy regarding understanding of scientific concepts, and the ability to apply a scientific perspective to real-life problems and to think scientifically about evidence. In particular, the scientific scale measured the extent to which an individual: (1) Possesses scientific knowledge and uses that knowledge to identify questions, acquire new knowledge, explain scientific phenomena and draw evidence-based conclusions about science-related issues; (2) Understands the characteristic features of science as a form of human knowledge and enquiry; (3) Shows awareness of how science and technology shape our material, intellectual and cultural environments; and (4) Engages in science-related issues and with the ideas of science, as a reflective citizen (OECD, 2007a).

Achievement test scores in science are not only an excellent indicator of ability and exposure to quality of education, but they are also an absolute measure of current success with significant effects on future educational attainment and labor market outcomes.

In order to answer the relevant questions, I relied on standard multivariate models of student performance in the early childhood development and education production function literature (see Todd and Wolpin, 2003, and Ammermuller, et. al., 2004, for reviews on these models). The method used is a typical model of education in which academic performance, measured by students’ science scores is regressed on student, family, school-level and institutional-level characteristics. A constant coefficient model applying an ordinary least squares procedure was used to estimate the effects of social origin and other important independent variables on student performance differences. The following OLS regression was estimated separated by country:

$$ST_{is} = B_{is}\beta_1 + R_{is}\beta_2 + I_{is}\beta_3 + \varepsilon_{is}$$

where the dependent variable ST_{is} is the achievement science test score of student i in school s. The outcome is a function of a vector of student background characteristics B, school-specific variables R, and I is a vector of institutional characteristics. The error term has a complex structure of student-specific and school-specific error terms that reflects omitted factors at both levels.

The dependent variable in this multivariate analysis was the science test score of 15-year-olds. The normality of distribution of scores did not require any transformation of this variable. Therefore, absolute differences of scores in the regression analysis indicate absolute differences in performance. The regressors were grouped at the student-family and school level. At the individual level, highest parental EDUCATION and highest parental OCCUPATION represent the main proxies for family socioeconomic background or social adscription of students. Both are numeric variables describing years of formal schooling and an occupational prestige scale (ranging from 16 to 90 according to the quality of the occupation).[12]

In understanding family background, we must take care to distinguish between family socioeconomic status and parental expectations and practices for behavior and academic performance. This is also important given the existence of ethnic variation in the cultural and behavioral orientations towards education. For the most part, cultural orientations of ethnic groups have been poorly measured in statistical analysis of school performance. Cultural traits have been often interpreted as part of the effect captured by categories of ethnic groups after controlling by family SES. In our analysis we took care to separate the effects of family socioeconomic and ethnic background from parental practices manifested on home educational resources and cultural possessions. Home EDUCATIONAL RESOURCES, an often omitted variable in educational achievement studies, is an index constructed by the OECD based on the availability of the following items at home: a desk to study, a quiet place to study, a computer they can use for school work, educational software, their own calculator, books to help with their school work, and a dictionary. CULTURAL POSSESIONS at home are also an index reflecting the possession of valuable cultural and educational resources at home such as classic literature, book of poetry and works of art. EDUCATIONAL RESOURCES and CULTURAL POSSESIONS parameters were estimated for each country (OECD, 2007a).

The model also includes predictors derived from the previous theoretical review on immigration and education. FIRST GENERATION captures the migration status of the student in case he or she was born outside the country of assessment. SECOND GENERATION indicates that the student was born in the country of assessment but whose parents are foreign-born. The PISA dataset does not report the country of origin of immigrant students or their parents, making impossible to identify Mexican or Latin American origin of 15-year-olds. However, the study reported language spoken at home for students who use a different language at home than the language of assessment. Thus, speaking SPANISH at home represents an excellent proxy for mainstream ethnic background in Mexico (versus

[12] The prestige scale is based on income potential and educational attainment associated with the occupation.

students speaking an indigenous language at home) and Hispanic ethnic background in the U.S. (versus English speakers). Simultaneously, speaking SPANISH at home will capture the effects of parental language retention on science literacy in the U.S. We can argue that in the presence of better controls for SES and cultural orientation toward educations, the persistence of ethnic differences would be reflecting more discriminatory patterns than cultural orientations toward education.

The control variables included many student and school characteristics that have been reported to influence student performance. Other regressors at the individual level include numeric variables for the student's AGE and highest school GRADE completed. FEMALE is a dummy variable equal to 1 if the student is female and 0 otherwise. Dummy variables for the number of hours spent on homework or self-study were also included. At the school level, it includes the school size and its squared value. The type of community the school is in is represented by dummy variables RURAL, SEMI-URBAN, URBAN, and METROPOLITAN. Type of school is measured by PRIVATE, which is a dummy variable equal to 1 if the school is a private school and 0 otherwise. In terms of school resources, it includes teacher-student and computers-student ratios, as well as several measures related to the school's autonomy, parental pressure, and accountability policies.

To produce nationally representative samples of students in each country, PISA used a two-stage clustered sample design in which schools were the primary sampling unit. Given the complex data structure produced by PISA survey design in each country, as well as the clustering of student-level data within schools, it was necessary to estimate weighted least square and clustering-robust linear regressions. By employing weighted least squares procedures using sampling probabilities as weights, we avoid bias in the estimated equations and obtain nationally representative coefficient estimates from stratified survey data. In conducting the analysis, we also used clustering-robust linear regressions to estimate standard errors that recognize the clustering of the student-level data within schools. In this way, we only required that the student observations be independent across schools given the fact that schools were the primary sampling unit in the PISA study and there is possible dependence of students within the same school.

Results of OLS regressions should be taken with some caution for the following reasons. First, given the non-experimental nature of the PISA study, caution must be exercised when drawing causal inference and policy conclusions based on the results of this analysis. Second, in the case of Mexico, students are not randomly assigned to the different levels of the school system, and OLS regressions have been estimated without any corrections for selectivity into the education system. Therefore, the effects of some explanatory variables, such as family socioeconomic status, should be interpreted with caution due to a possible overestimation. Third, the socioeconomic and cultural background and language spoken at home (i.e. Spanish) variables are likely to be endogenous to unobserved family characteristics. Family characteristics that are unobserved in the data may include parenting style and more detailed information about values regarding the importance of education, and parental expectations. We use the PISA data to estimate the correlation between family socioeconomic, educational and cultural background, and science literacy, making no attempt to control for the endogeneity of parental background.

4. Intergenerational Occupational Mobility in Mexico: More Inequality in Opportunities?

The movement of individuals up and down the economic ladder is a foundation of productive and competitive societies. But it does not seem to happen in countries where unequal access to opportunities and social adscription play significant roles in determining individual life chances. How important is one's social origin in explaining occupational success in Mexico?

To answer these questions, I constructed logistically ordered regression models. These models allowed me to compare the likelihood that an individual with social origin x^1 (as defined by father's occupation) achieves an occupation higher in the hierarchy than someone whose social origin falls in the reference category x^2, once structural mobility is controlled for and the effects of other variables included in the model are taken into account.

Table 4 shows the results of the models calculated for each of the cohorts. Model 1 introduces variables associated with social origins: "father's occupation," which is the indicator used to denote the individual's social class of origin, and "community of origin," which distinguishes persons raised in rural communities from those who spent the majority of their youth and adolescence in urban environments. In this model, the effects of social class of origin can be interpreted as if they were independent of migration conditions. The migration variable is also expected to have a positive effect on occupational mobility, not only because it captures the effect of relocating in search of better economic opportunities, but also because the period analyzed was strongly characterized by a response to expanding opportunities in Mexico's largest metropolitan areas. Model 2 includes an additional variable: the individual's education level. From the perspective of human capital, education level and work experience must be the principal measures of the individuals and the occupational opportunities structure that result in occupational mobility. The years of schooling variable was introduced to estimate the net effect of socioeconomic background on occupational success.

TABLE 4 HERE

Risk differences of the logistical ordered regression models are represented by the *odds ratios*. If the estimated value of the category or metric does not vary significantly from 1, then there are no differences between the success of those in the origin strata x^1 and x^2. If the effect is significantly greater than 1, then there is a greater probability of success for the x^1 stratum. On the contrary, if the effect is significantly less than 1, then there is a greater probability of success for the x^2 stratum.

Without controlling for "talent" or "effort" as captured by the education variable, the results for Model 1 demonstrate that social origin has significant effects on occupational achievement across the three cohorts. The relationship is straightforward: the higher the economic status of the father, the better an individual's chances for upward intergenerational mobility. In the advanced cohort, dummy variables for achieving a better occupation for high- and low-skilled manual laborers were calculated to be 37 (not statistically significant) and 84 percent less, respectively, in relation to non-manual laborers. In the intermediate cohort, the

difference fell between 79 and 77 percent, and in the young cohort it was between 54 and 83 percent. It is important to emphasize that the inequality of opportunities between low-skilled manual laborers and non-manual workers was significantly greater in the young cohort, whose labor trajectory occurred entirely during the years of economic crisis and economic liberalization, than it was in the intermediate cohort.

Community of socialization was a very significant factor in predicting an individual's chances for experiencing upward intergenerational occupational mobility during the last fifty years in Mexico, although its effects seem to be diminishing over time. Without controls for individuals' educational level, migration only played a significant role in occupational success for Mexican men born between 1936 and 1938.

Education has long been a significant predictor of intergenerational occupational mobility in Mexico. Model 2's results show that the estimated probabilities of individuals experiencing occupational mobility increase with education: increasing 36, 36, and 47 percent for each additional year of educational attainment in the 1936-38, 1951-53, and 1966-68 cohorts, respectively. Though better formal instruction contributes to greater occupational success in all cohorts, the effects of social origin do not disappear for the young cohort. Men who entered the work force during the years of restructuring and economic crisis continued to experience intergenerational upward mobility.[13] However, men born in 1966-68 to fathers in white-collar occupations had better chances than did men of blue-collar origin for experiencing upward social mobility in Mexico. In this cohort, the chances for obtaining a better occupation among men whose fathers were low-skilled manual and high-skilled manual workers were only 34 and 56 percent of the measures for those with non-manual fathers, respectively. In their analysis of intergenerational educational mobility, Binder and Woodruff (2002) found a similar reversal of mobility for a comparable cohort (1965-1971).

Once we control for differences in education, the odds for upward mobility become very significant for migrants across all generations. Urban socialization also played an important role in intergenerational mobility, but the effect was not statistically significant for the youngest cohort, probably due to the fact that this generation, unlike the others, is mostly urban.

The EDER data demonstrate that Mexico's economy and society were capable of promoting intergenerational occupational mobility during the second half of the 20th century, and that education and migration advanced individuals' opportunities. The results show that social origin, as measured by father's occupation, is increasingly important in determining the occupational success of Mexican men. These results demonstrate a less than encouraging panorama, and they may indicate that despite the increase in the country's absolute mobility rate, social inequality in access to labor opportunities is of equal or greater magnitude than what was observed during the era of import substitution industrialization. Given these considerations, future policies should not only seek to increase opportunities for better and more effective occupational mobility, but they should also promote structural and institutional

[13] It is important to clarify that this process had very little to do with the growth of high-skilled non-manual occupations (professional or management), and more to do with the resulting expansion of low-skilled non-manual jobs (including merchants and vendors) and high-skilled manual jobs (Zenteno and Solis, 2004).

conditions that favor a more equitable distribution of opportunities for young people from all social classes.

Why did we find large correlations between family socioeconomic status and occupational attainment in the youngest generation? One possible explanation for the observed inequalities in access to occupational opportunities could be the result of growing differences in access to quality education. This learning factor is poorly captured by the years of schooling. At the same level of educational attainment, children have different family resources to access better learning skills.

5. Socio-economic Background and Student's Performance: Equalizing Poor Outcomes in Mexico.

The Mexican education system comprises four levels: preschool (K1–K3), compulsory basic education (elementary, grades 1–6 and lower secondary, grades 7-9), upper secondary education (grades 10–12), and higher education. Although education enrollment has been growing considerably over time, particularly in basic education, educational attainment is still low: 7.9 years of schooling in the population older than 15 years in 2003 (Santibañez, Vernes and Razquin, 2005).

In understanding education as an important opportunity-enhancing vehicle, we must also take care to distinguish between selection into the education system and the quality of learning opportunities. Equity in the distribution of learning opportunities is conditional on school attendance. As figure 5 shows, educational enrollment rates vary considerably by age (educational level) and poverty conditions in Mexico, indicating a high degree of inequality in educational attainment. Improvements in schooling attendance between 2000 and 2005 are shown by the data. Still, there is a high degree of stratification. Enrollment drops significantly after age 12 and children living in poor families have greater chances of dropping out of school. While elementary education is almost universal in Mexico, 2005 enrollment rates drop to 94 per cent by age 12, 72 percent by age 15 and 39 percent by age 18.[14] The corresponding statistics for children living in extreme poor households are 90, 59, and 26 percent, respectively. Figures for poor children would have been worse without the incentives provided by the *Oportunidades* program to poor families to keep children attending school in Mexico.

FIGURE 5 HERE

What about academic achievement levels in Mexico? Table 5 shows the performance of 15-year-old Mexican students in a comparative international perspective, thanks to the PISA study described earlier in this paper. Remember that by this time in the life cycle of a Mexican person, there is a 28 percent chance of being a school drop out. Therefore, at this age there is "self-selection" into the school system mainly as a result of differences in the socioeconomic status of families and in individual talent.

[14] Mexico has more college graduates than ever, although the proportion of the population of 18 year-olds and over with a bachelor degree, just under 1 in 10, is still low (Santibañez, Vernes and Razquin, 2005).

TABLE 5 HERE

Mexico obtained the lowest mean scores on the science, reading and mathematics scales among OECD countries in 2006. The OECD average score for these tests were 500, 492 and 498 points, respectively. The connection between income levels and student performance levels is not straightforward. Different from South Korea in that, along with Finland, has one of the best performances; the average achievement scores of students in the U.S. are below the average of OECD countries. The difference between South Korea and the U.S. is more remarkable on the mathematics than the science test. By comparing the U.S. to Canada, Australia, and New Zealand, differences in the share of immigrants do not seem to play a role on achievement scores.

The average scores for Mexican 15-year-olds in the science score was 410. One of every two students in Mexico was not proficient at baseline level, that is, the level at which students begin to demonstrate the science competencies that will enable them to participate actively in life situations related to science and technology (OECD, 2006). A special report for Mexico states that Mexican students performed relatively better on science questions when they were asked to identify scientific issues and figure out key features of a scientific investigation. However, they struggled with scientific evidence, this is, analyzing data and experiments (OECD, 2007b).

We begin our empirical analysis with a focus on the relationship between family socioeconomic status and science literacy. If education is an engine of upward mobility, the education system should compensate for expected unfavorable outcomes of children with poor socio-economic background. Still today, a substantial part of youth achievement can be attributed to students' socio-economic differences. In OECD countries, without controlling for other factors, the PISA's index of economic, social, and cultural status (ESCS) background of students accounts for 14.4 percent of the explained variance in student performance in science (see Table 6).[15] Figures vary significantly among OECD countries from a low 8.1 percent in South Korea to a high 21.4 percent in Hungary (data not presented here). Both Mexico and the U.S. present highly stratified education systems where 16.8 percent and 17.9 percent of 15-year-olds student's performance is explained by social adscription, respectively.

TABLE 6 HERE

The greater effect of socio-economic background in the U.S than in Mexico is demonstrated by the fact that an increase in one unit on the ESCS metric would represent an improvement of 49 score points in the science test in the former country. In Mexico, performance would only increase by 25 points, indicating that other institutional processes

[15] PISA's index of economic, social, and cultural status (ESCS) was derived by PISA from the following variables: the highest international socioeconomic index of occupational status of the father or mother; the index of highest educational level of parents converted into years of schooling; and the index of home possessions obtained by asking students whether they had at their home: a desk to study at, a room of their own, a quiet place to study, a computer they can use for school, educational software, a link to the Internet, their own calculator, classic literature, books of poetry, works of art (e.g., paintings), books to help with their schoolwork, a dictionary, a dishwasher, a DVD player or VCR, the number of cellular phones, televisions, computers, cars and books at home, and three other country-specific items (OECD, 2007a).

tend to equalize its poor outcomes. Equality in education outcomes is not regarding social origin and is not in conflict with the high quality of education, as countries like Japan, China, South Korea and Finland can testify (OECD, 2006).

Once selected into the school system in Mexico, the equalizing of learning outcomes of youth in science is reflected in the data. Mexico has the lowest standard deviation in the science score (see Table 7). This is also reflected in the fact that the Gini coefficient for this education outcome is only 0.101 in Mexico, in comparison with a figure of 0.123 in the U.S. A recent report by the OECD (2007a) found little variation between schools in Mexico in comparison with other OECD countries, suggesting that very few schools stand out in learning opportunities.

Higher influence of socio-economic background in Mexico would be expected if the 28 percent of 15-year-old drop-outs would be attending school. However, other factors also explain Mexico's poor performance in science. The second column of Table 6 shows that Mexico would improve its score in science to only 435 if students would have the average socio-economic background of the OECD countries. Mexico would only surpass Turkey. The large U.S.-Mexico literacy gap would also remain if students in both countries would have the same family socioeconomic background, indicating that science training is also related to educational institutional differences between the two NAFTA partners.

In order to determine the extent to which science test scores are associated with family socioeconomic background characteristics in the presence of other important student and school level characteristics, as well as to evaluate the effects of other important social stratification characteristics such as ethnicity and immigration status, we estimated ordinary least square regression models separately for Mexico and the U.S. The distribution (means and standard deviations) of the explanatory variables introduced in section 4 are reported on Table 7, while Table 8 presents results from the lineal regression models. Regressors are divided between variables measuring student effects and school effects.

TABLE 7 HERE

Socioeconomic parental background is one of the best predictors of academic outcomes among children and youth in Mexico and the U.S. Models that include only parental background characteristics show that both parental education and parental occupation have a significant positive effect on science academic achievement in Mexico and the U.S. These relevant independent variables explain 15 percent of the total variation on science test scores in both countries in this regression setting. However, the effects of social origin are much stronger in the U.S. than in the Mexican education system.

TABLE 8 HERE

Although the estimated effects of social origin on assessment outcomes decrease when additional variables are included in the regression, they are still very significant. The degree to which socio-economic background matters differs between the two countries. What is most notable from the addition of student and school characteristics is that once they are controlled, the effects of parental education and occupation decrease more in Mexico than in the U.S. This result suggests that the relation between social origin and inequality of educational

opportunities in Mexico might be more significant in terms of school attendance than in learning outcomes. Once in the school system, parental socioeconomic background has a positive effect on science literacy in Mexico, but the size of the effects are not as noticeable as in the U.S. After other variables were controlled, the positive and significant effects of parental education and parental occupation were less than half one score point (0.5) in the science scale in Mexico, while parental education and parental occupation increase school performance in science by 4.4 and 1.0 score points in the U.S., respectively. This is not to say that parental socioeconomic background does not matter in Mexico. Results suggest a small but positive influence. Rather, the results indicate that other factors –among them home educational resources, gender, immigration status, language spoken at home, school size and school student-teacher ratios influence more academic achievement in Mexico.

Family's orientation and practices toward schooling have positive effects in school outcomes. An increase of one unit in the index of home educational resources has positive effects of 7.3 and 1.6 points in the test scores in Mexico and the U.S., respectively. However, the regression coefficient was not statistically significant in the U.S. Cultural possessions is also a strong significant predictor, particularly in the U.S. An increase of one standard deviation in the index of cultural possessions led to an increase in science literacy of 14.8 points in the U.S. A similar statistic for Mexico would be of only 2.7 points.

On average, female students performed 12.6 and 14. 6 points lower than boys in Mexico and the U.S., respectively. Student's age and highest school grade completed are included in the model simply as controls since not everybody in the sample was exactly 15 years old and not all 15 years old were in the same grade. In both countries, the academic performance of 15-year-old students increases statistically significantly with the grade level in which they are enrolled and decreases with age which might be the effect of grade repetition. For cross-sectional models, the relationship between number of self-study hours and science test scores is positive and significant in both countries.

When other factors are controlled for, in particular socioeconomic status, natives outperform immigrant students in Mexico and the U.S.[16] After taking into account differences in socioeconomic background, educational resources, cultural possessions and other individual and school characteristics, immigrant students lag behind native-born peers in Mexico by almost 50 score points. Although the percentage of immigrant students in Mexico is lower than the U.S., the disadvantage of these students (mainly from Central America) is outstanding. Different from the U.S. where speaking Spanish at home represents an ethnic minority, in Mexico speaking Spanish at home is associated with positive learning outcomes. Controlling by other traits, speaking a language different to Spanish at home has significant negative effects on student's achievement scores. Those speaking an indigenous language at home have scores 22.0 points lower than Spanish-speaker students.

In the case of Mexico, school-level traits also contribute to understand school performance and other aspects of Mexican social stratification system. In Mexico results show a positive relationship between school size and student's education outcomes, indicating that larger schools might attract more resources for learning capabilities than smaller schools. However, controlling for differences in school size, school location has on average no clear

[16] Regression results for the U.S. are analyzed in detail in the next section.

association with science literacy of youth in Mexico. The only exception is schools in urban areas that outperform the rest of schools. Science literacy ratings are negatively associated with larger student-teacher ratios. Surprisingly, attending a private school has a positive but statistically insignificant effect on science test scores, suggesting that private education might be more relevant to accumulate social capital rather than human capital in Mexico.

In summary, inequality of opportunities in education represents a major problem in Mexico both in attainment and achievement. In Mexico positive changes in parental socio-economic status improves youth achievement in science. However, the intergenerational transmission of economic status in terms of learning outcomes in science of 15-year-olds is not particular of Mexico. Indeed, achievement inequalities related with parental socioeconomic background seem to be lower in Mexico than in the U.S. Results show that a higher degree of equality in achievement scores in Mexico has been achieved compromising the overall level of achievement scores in science, suggesting that student performance is considerably related to institutional differences in Mexico. Findings reveal a high degree of stratification in the Mexican education system related to selection into the school system and learning inequalities associated to gender, family socio-economic background, immigration status, and speaking an indigenous language at home.

6. Immigration and Integration: Science Education Outcomes of Spanish-Speaking Youth in the U.S.

Results from the previous section make clear that Mexican and Mexican-origin children have the opportunity to access an educational system in the U.S. than produce, on average, better school outcomes in sciences than Mexican educational institutions. However, we also showed that characteristics of the family of origin play a more significant role differentiating science literacy in the U.S. than in Mexico. While Mexicans face inadequate educational opportunities related to access to upper-secondary and tertiary education in their own country, they face deficient educational opportunities related to learning outcomes in the U.S.

Are children of immigrants “catching up” to native-born students? How successfully are immigrant-origin youth living in Spanish-speaking homes navigating in the U.S. education system in comparison to those 15-year-olds “left behind” in Mexico? The PISA study represents an excellent opportunity to compare the learning outcomes of first and second generation immigrant children not only to native-born peers, but also to 15-year-olds “left behind” in Mexico. PISA also allows us to measure immigration status along with the ethnic influence of living in a Spanish-speaking home.

Additional PISA data, not presented here, show that among 15-year-old students in the U.S., the proportion of students who are foreign born (first generation) or who have foreign born parents (second generation) are 6.0 and 9.0 percent, respectively. Also, seven percent of students reported that the main language spoken at home was Spanish. Although the presence of Spanish-speakers at home is significant across immigrant-origin groups, Spanish ethnic effects and immigration effects do not completely overlap. Forty-four percent of foreign born students reported that Spanish is the main language spoken at home, and this figure decline to

only 38 percent among second-generation students in the PISA dataset. Even among native students (native parents or one foreign born parent), 13 percent reported speaking Spanish at home. Finally, almost nine in ten students who reported Spanish ethnic minority background were immigrant students or had foreign born parents.[17]

Figure 6 reports the performance in science of 15-year-old Mexican and U.S. students, as well as group differences in the U.S. according to immigrant and Spanish-language background status. The average achievement scores of first- and second-generation students in the U.S. are below the average of the country by 46 and 31 score points, respectively. The interaction between immigration status and Spanish ethnicity provide an even worse scenario. Spanish-speaking immigrant 15-year-olds (first and second generation) perform at levels more comparable to the Mexican than to the U.S. youth. Their science scores' distribution closely resembles the Mexican distribution. The average score for 15-year-olds immigrant students who speak Spanish at home was 411. The academic performance among Spanish speakers improves to 429 among second-generation bilingual students, but it is still a poor performance in international comparisons.

FIGURE 6 HERE

Are these asymmetries in education outcomes due to differences in socio-economic status and other relevant individual and school characteristics? Table 9 shows the coefficients of student performance OLS models in the United States. Since segmented assimilation theorists have suggested that the effects of the immigration experienced varies by ethnic minority groups, this time we run models adding interaction terms for Spanish-language ethnicity and immigrant generational status.

Our model with no statistical controls confirms that immigrant and Spanish ethnic backgrounds are strongly predictive of science test scores (see Table 9). Holding constant the effect of language spoken at home, foreign-born and second-generation students perform 28 and 20 score points lower on the PISA science scale than native-born peers, respectively. Adolescents of Spanish language background are still at an educational disadvantage relative to their student counterparts by almost 80 points. The Spanish language retention-first generation status interaction was not statisfically significant. However, the Spanish ethnic effect varies according to the value of second-generation status. If a student is U.S. native, then the effect on science test scores of speaking Spanish at home decline by almost 80 points. If the student has foreign born parents, science test scores are estimated to decline by 47 points (-79.86 + 32.44). This indicates that Spanish language retention is not as negative in school outcomes for second-generation students as it is for other students.

TABLE 9 HERE

As expected, higher parental socioeconomic status is associated with better science ratings. The effect of parental education on science reading achievement was 4.5 points, while each unit of change in the parental occupation scale raises science scores by 1 point. Cultural

[17] It is important to mention that in the PISA data, timing of exposure to U.S. society did not have significant statistical effects on school performance.

traits related to parents' educational expectations and aspirations have been often unmeasured and interpreted as part of the effects of ethnic groups or parental socioeconomic status. By including measures of home educational resources and cultural possessions, I took care to separate these effects. Both proxies of family's orientation and practices toward schooling have positive effects in school outcomes. However, only the effect of cultural possessions was statistically significant after other variables were controlled. The amount of classic literature, book of poetry and works of art that a family owns exercises a consistent and strong influence on science literacy. An increase of one unit in the index of cultural possesions has positive effects of 14.6 points in the test scores in the U.S. This result might be reflecting different cultural values and practices about the importance of education across families, as well as a different aspect of socioeconomic status.

More-detailed parental socioeconomic status, parental cultural possessions and home educational resources measures did not completely accounted for group differences between Spanish-speakers and immigrant-origin students and their native-born peers. Nevertheless, the estimated effects of these variables considerably diminish or disappear in the presence of other student and school control. In the U.S., accounting for parental socioeconomic background, home educational resources, family's cultural possessions and other individual and school characteristics reduces the performance disadvantage of immigrant students from 28 to 16 score points and second-generation students from 20 to 6 score points. However, even when these variables are taken into account; foreign-born adolescents are still at an educational disadvantage relative to their native-born counterparts. The full model confirms that the effect of Spanish-language minority background does not vary according to the values of first-generation status. On the contrary, and consistent with previous studies, the difference between second-generation students and their native-born peers disappear in the presence of relevant controls. The fact that the interaction effect of Spanish language retention and second-generation status is positive and statistically significant, suggests that holding to Hispanic roots is not as negative for second-generation bilingual students as for other students.

Taking into account social adscription and other variables make the effect of second generation status vanish but not the influence of ethnicity in school achievement. The widely documented disadvantage of Spanish-language ethnic minorities on cognitive skills persists among 15-years-olds in the U.S. On average, students who speak Spanish at home performed 34 points lower than English or other language speakers.

The barriers confronted by youth attending schools in metropolitan areas and schools where foreign-born students cluster are also shown in Table 9. In the presence of controls for differences in school size, student-teacher ratios and other school level measures related to admittance and selection abilities, managing and funding, parental pressure and choice, accountability policies, school autonomy and school resources, adolescents enroll in metropolitan schools have scores 28 points lower than students attending rural schools in the PISA science scale. This result is congruent with the known inequality of educational opportunities generated in major metropolitan areas due to the high segregation of school districts. An increase of one percent in the number of native-born students per school is, on average, associated with an increase in science test scores by almost one point on the test.

Conclusions

As the Mexican and U.S. economies and societies become more integrated over time, the challenge of millions of Mexicans children and youth of getting ahead in both countries is the challenge of providing them equal chance of success regardless of the economic status into which they were born. Today, Mexicans face inadequate educational and labor market opportunities in their own country and in the United States. However, little systematic and comparative scholarly research has addressed the issues of social background, institutions, and economic status in Mexico and the U.S., as well as about the improvements or setbacks of Mexican immigrants that move between two societies with clear divisions based on class and ethnicity.

As Mexico looks to the future and taking into account its recent history, the country should feel more confident about its potential to improve economic performance, increase average income, and broaden access to educational and health services than about its prospects for reducing extreme poverty and social and economic disparities. There is no question that Mexico is a wealthier country today than it was fifty years ago. However, Mexico's economic success was not uniform over the postwar period and had to endure severe economic shocks. Mexico has also made significant advances in social indicators, as shown by the human development index (HDI), thanks to impressive reductions in infant and child mortality rates and improvements in access to secondary education. Despite significant gains in health and education, poverty and inequality are still major social problems in Mexico. Inequality and poverty have been falling in recent years, but they remain high. With a Gini coefficient of 0.471 in 2004, income distribution is still highly unequal. By 2006, 45 million people were living in poverty; 14 million of them were surviving under conditions of extreme deprivation in Mexico.

Consistent with previous studies, the EDER data demonstrated that Mexico's economy and society were capable of promoting intergenerational occupational mobility during the second half of the 20th century. Better formal instruction and migration contributed to greater occupational success in all cohorts, and their effects on experiencing upward mobility seems to be increasing over time. When controlling by the "talent" of individuals, the impact of social origin, as measured by father's occupation, practically disappeared in the cohorts that entered the labor force during the import substitution industrialization period. However, the labor trajectories of the 1966-68 cohort, corresponding to the period of the economic reforms and economic crisis in the 1980s and 1990s, reveal an emerging pattern of social inequality in which family socio-economic status is associated with upward mobility opportunities in the labor market. Given these considerations, future policies should not only seek to increase opportunities for better and more effective occupational mobility, but they should also promote structural and institutional conditions that favor a more equitable distribution of opportunities for young people from all social classes.

At the heart of Mexico's high disparities in prosperity lies its incapacity to compensate children from economically and educationally disadvantaged families. Education is the most important opportunity-enhancing vehicle available to any society. Results indicate that in Mexico, family socio-economic background is associated more with selection into the education system, in particular at the upper-secondary and tertiary education levels, and less

with learning inequalities, at least until age fifteen. Social and cultural adscription has a significant impact on student performance in Mexico, but in a lesser degree than the U.S. Ironically, the highly centralized Mexican education system seeks to provide students with similar opportunities for poor learning. Inequality of learning outcomes in Mexico is also related to other important aspects of social stratification, such as gender, immigration status and speaking an indigenous language at home.

There is no question that Mexico should match investments in education (highest among OECD countries) and increasing access to schools with improvements in academic performance. Among the many institutions which combine to yield major negative and equalizing effects on student performance are centralized curriculum scope, lack of autonomy of public schools in personnel and process decisions, and a powerful teacher union with little incentives for achievement and competition. However, improvements in learning as a result of decentralization and accountability might have negative effects in education inequality.

While Mexicans face inadequate educational opportunities related to access to upper-secondary and tertiary education in their own country, they face deficient educational opportunities related to learning outcomes in the U.S. In the U.S., students are falling behind other countries in science. However, immigrant-origin youth, in particular those who speak Spanish at home, struggle more with scientific evidence, data and experiments than native-born peers. Indeed, analysis of science scores among immigrant-origin youth who speak Spanish at home reveal little differences in academic achievement than adolescents in Mexico. Large correlations exist between immigration status of children, language spoken at home and clustering of immigrant students in schools and student's performance. Results clearly reveal a high degree of stratification in the U.S. education system in regard to these important characteristics.

The Spanish-Language ethnic and first-generation effects on the science score test diminished but do not disappear when parental socioeconomic status, family cultural possessions, home educational resources and other variables are taken into account. How to describe the remaining Spanish-language ethnic variation in science test scores? The conditions of the second-generation indirectly indicate that language-retention is not a negative trait on school performance in the presence of English proficiency. The remaining disadvantage could be explain by the low educational expectations that Latin American families take with them from their countries of origin to the U.S. Low expectations and aspirations might be also reinforced with the discriminatory practices experienced by Latinos in the U.S. However, since our analysis included some proxies of parent's expectations and aspirations, the last and most important explanations would be exclusion. In general, there is nothing intrinsic to the deficiencies in education of Latino-origin youth that cannot be explained by their inferior socioeconomic position, modes of incorporation and segregation in U.S., as it has been proved in previous studies. The performance disadvantages of students with an immigrant and Spanish ethnic background that are described here lay out major challenges for the U.S. education system. The relevant policy question is why the U.S. education system fails to provide better compensatory education to children with poor socioeconomic background, making more likely the reproduction of social inequalities across ethnic and immigrant lines.

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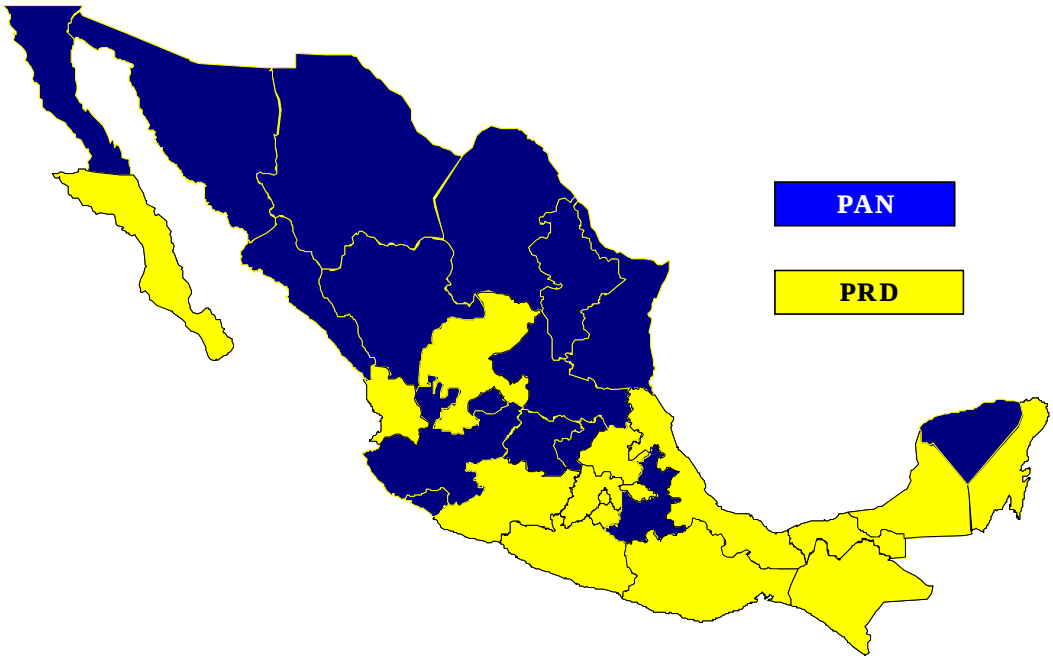
Figure 1: Mexican Presidential Electoral Map 2006



Source: Salazar, Gabriela, Mentor Tijerina and Roberto Garza. 2006. **Elecciones 2006: Análisis de Resultados.** Publicum Estrategias. http://www.publicum.com.mx/

Table 3. Research on Social Mobility in the Contemporary Mexico

Authors	Sample Representation	Upward Mobility Trend	Social Adscription	Notes
Binder and Woodruff (2002)	Urban (cities)	Continuity in access to education, slowing down among youngest cohort.	High in education, but effects declining over time.	
Behrman, Gaviria, and Székely (2001)	Urban (cities)	Continuity in education, but moderate increases in immobility. Occupational stratification is more rigid.	Low regarding education. Significant in the case of occupations.	No distinctions by cohort or age with regard to occupations, making it impossible to draw any conclusion about trends.
Cortés and Escobar (2003)	Urban (cities)	Decreasing with regard to access to high-skilled occupations.	More robust as a predictor of occupational attainment.	Control for structural mobility. It focuses on the first job and the propensity to move up to highest socioeconomic status occupations. There is no control for education.
Solís (2003)	Monterrey	Continuity in occupational mobility.	Increasing over time.	Control for structural mobility and education. Occupation observed at age 33.
Parrado (2005)	Rural-Urban (national)	Decreasing occupational mobility.	Not analyzed.	It refers to intra-generational mobility.
Pacheco (2004)	Rural-Urban (national)	Continuity in occupational mobility in rural areas, but stiff occupational mobility in urban contexts.	Strong with regard to manual occupations.	
Torche (2007)	National	Continuity in access to education, but rigid occupational stratification.	In the case of education, strong predictor for children with parents with no schooling, increasing over time.	No distinctions by cohort or age with regard to occupations, making it impossible to draw any conclusion about trends.
Zenteno (2002)	Rural-Urban (national)	Continuity in inter-generational mobility, but clear polarization in intra-generational mobility.	Not analyzed.	There are no controls for structural mobility in the case of inter-generational mobility nor for schooling. Occupations are observed at first job and at age 29.

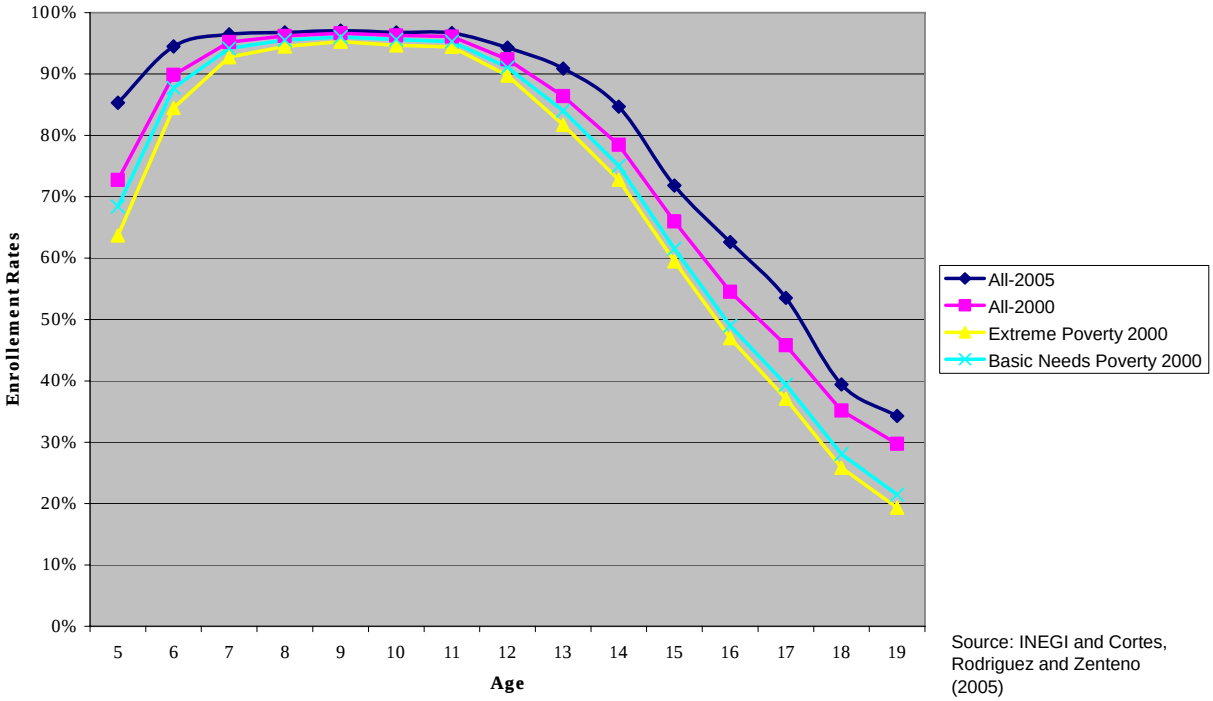
Table 4. Effects of Social Origin and Education on Occupational Achievement of Mexican Man. Odds Ratios From Ordered Logit Cohort Models. Mexico, 1998

	Model 1			Model 2		
	1936-38	1951-53	1966-68	1936-38	1951-53	1966-68
Fathers' Occupation						
Non manual (reference)						
Higher Manual	0.63	0.21 ***	0.46 **	0.91	0.75	0.56 *
Lower Manual	0.16 ***	0.23 ***	0.17 ***	0.45 **	1.01	0.34 ***
Community Childhood						
Rural (reference)						
Urban	4.69 ***	2.70 ***	1.72 **	3.77 ***	1.86 **	0.79
Migration Condition						
Non-migrant (reference)						
Internal Migrant	1.81 **	1.35	1.33	1.75 **	1.45 *	2.40 ***
Schooling				1.36 ***	1.36 ***	1.47 ***
Pseudo R2	0.17	0.09	0.08	0.27	0.20	0.22
n	336	343	330	336	343	330

Source: Author's estimations based on the *Encuesta Demográfica Retrospectiva Nacional* (1998).

* Significant at p < .10
** Significant at p < .05
*** Significant at p < .01

Figure 5. School Enrollment Rates by Age and Poverty Condition. Mexico, 2000 and 2005



Source: INEGI and Cortes, Rodriguez and Zenteno (2005)

Table 5. Mean Score in Student Performance on the Science, Reading and Mathematics Scale. OECD Countries, Chile and Brazil 2006. (descending order)

Science		Reading		Mathematics	
Finland	563	United States	na	Finland	548
Canada	534	Korea	556	Korea	547
Japan	531	Finland	547	Netherlands	531
New Zealand	530	Canada	527	Switzerland	530
Australia	527	New Zealand	521	Canada	527
Netherlands	525	Ireland	517	Japan	523
Korea	522	Australia	513	New Zealand	522
Germany	516	Poland	508	Belgium	520
United Kingdom	515	Sweden	507	Australia	520
Czech Republic	513	Netherlands	507	Denmark	513
Switzerland	512	Belgium	501	Czech Republic	510
Austria	511	Switzerland	499	Iceland	506
Belgium	510	Japan	498	Austria	505
Ireland	508	United Kingdom	495	Germany	504
Hungary	504	Germany	495	Sweden	502
Sweden	503	Denmark	494	Ireland	501
OECD average	500	OECD average	492	OECD average	498
Poland	498	Austria	490	France	496
Denmark	496	France	488	United Kingdom	495
France	495	Iceland	484	Poland	495
Iceland	491	Norway	484	Slovak Republic	492
United States	489	Czech Republic	483	Hungary	491
Slovak Republic	488	Hungary	482	Luxembourg	490
Spain	488	Luxembourg	479	Norway	490
Norway	487	Portugal	472	Spain	480
Luxembourg	486	Italy	469	United States	474
Italy	475	Slovak Republic	466	Portugal	466
Portugal	474	Spain	461	Italy	462
Greece	473	Greece	460	Greece	459
Turkey	424	Chile	442	Chile	411
Mexico	410	Mexico	410	Mexico	406

Source: OECD 2007 Executive Summary PISA 2006: Science Competencies for Tomorrow's World. www.pisa.oecd.org.

Table 6. How Socio-economic Background Relates to Student Performance in Science

	Mean score	Mean score if the mean ESCS[1] would be equal in all OECD countries	Percentage of explained variance in student performance	Score point difference associated with one unit on the ESCS[2] (gradient)
Mexico	410	435	16.8	25
United States	489	483	17.9	49
OECD Average	500	500	14.4	40

Source: PISA 2006: Science Competencies for Tomorrow's World, Vol.1. Figure 4.6

[1] ESCS: the PISA index of economic, social and cultural status.
[2] Single-level bivariate regression of science performance on the ESCS, the slope is the regression coefficient for the ESCS.

Table 7. Selected Characteristics of 15-year-old Students for the Analyzing of Student Performance on the Science Scale. Mexico and U.S., 2006. (means and standard deviations) .

	Mexico	U.S.
Observations	30971	5611
Science Test Score	409.60	488.57
	80.42	*106.09*
Highest Parental Education	10.42	13.65
	4.36	*2.48*
Highest Parental Occupation	41.92	52.53
	18.55	*16.77*
Home Educational Resources	-0.69	-0.34
	1.14	0.86
Cultural Possesions	-0.32	-0.09
	0.89	1.01
Self-study 0.1 to 2 hours	0.39	0.31
Self-study 2 or more hours	0.44	0.49
Grade	9.52	10.02
	0.88	*0.62*
Female	0.52	0.49
Age	15.68	15.82
	0.29	*0.30*
Immigrant First Generation	0.02	0.06
Immigrant Second Generation	0.01	0.09
Speak Spanish at Home	0.96	0.07
School Size	912.30	1393.68
	813.09	*904.66*
Rural	0.35	0.35
Semiurban	0.18	0.31
Urban	0.26	0.23
Metropolitan	0.22	0.10
Private School	0.10	0.07
% Native Students	96.40	92.60
	6.10	*8.90*
Student/Teacher Ratio	27.60	15.40
	10.00	*4.30*
Computer/Student Ratio	0.07	0.23
	0.09	*0.13*

Source: Author's estimations based on the Programme for International Student Assessment (2006).

Table 8. OLS Regressions of Student Performance on the Science Scale. Mexico and U.S., 2006.

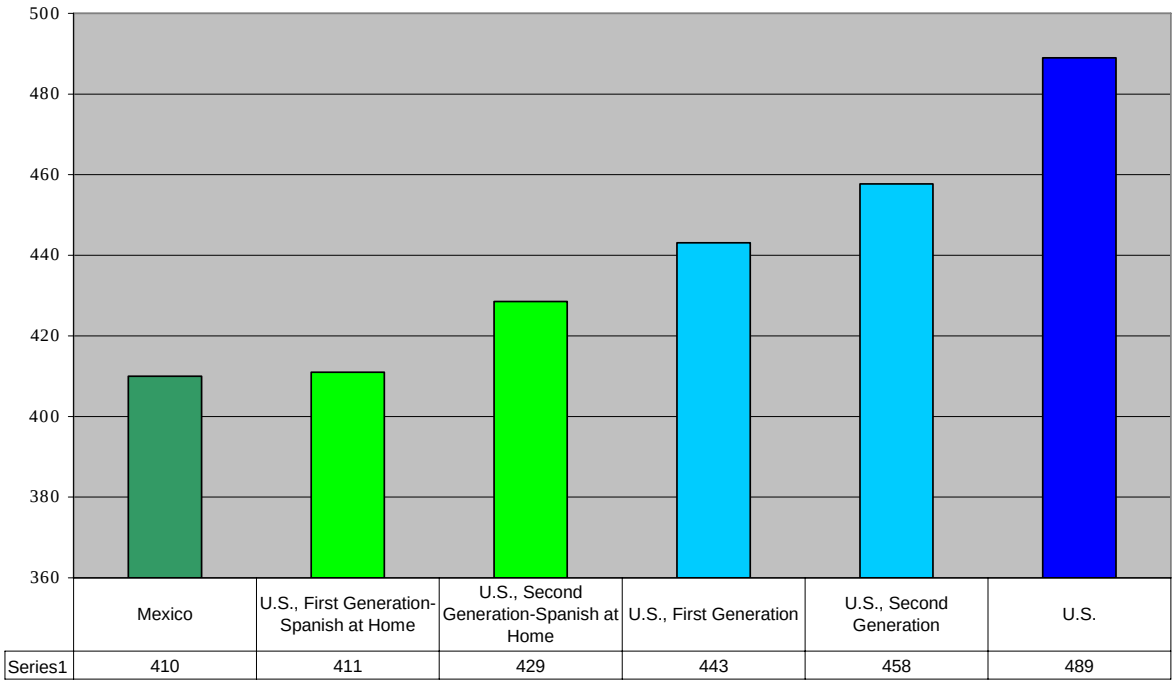
	MEXICO		USA	
	(1)	(2)*	(3)	(4)*
R^2	0.15	0.36	0.15	0.28
Num. Observations	30,971	29,672	5,611	5,443
	B	***B***	***B***	***B***
Student Level				
Highest Parental Education	3.60 ***	0.45 ***	8.22 ***	4.44 ***
	0.29	*0.23*	*0.65*	*0.59*
Highest Parental Occupation	1.03 ***	0.41 ***	1.67 ***	1.02 ***
	0.06	*0.06*	*0.09*	*0.09*
Home Educational Resources		7.30 ***		1.56
		0.78		*2.09*
Cultural Possesions		3.04 ***		14.55 ***
		1.15		*1.68*
Female		-12.55 ***		-14.58 ***
		1.74		*2.88*
Age		-6.79 **		-18.44 ***
		3.18		*5.74*
School Grade		15.51 ***		39.29 ***
		1.77		*3.07*
Self-study Less 2 hours (ref: No self-study)		7.77 ***		28.47 ***
		2.29		*3.73*
Self-study 2 or more hours (ref: No self-study)		11.06 ***		39.19 ***
		2.22		*4.32*
Immigrant First Generation		-48.66 ***		-14.25 **
		6.07		*6.36*
Immigrant Second Generation		-16.43		-0.97
		16.26		*5.31*
Speak Spanish at Home		21.98 ***		-11.22 *
		7.35		*6.06*
School Level				
School Size		0.02 ***		-0.01
		0.00		*0.01*
School Size Squared		0.00 **		0.00
		0.00		*0.00*
Semi-urban (ref: rural)		5.17		8.25
		4.02		*7.84*
Urban (ref: rural)		17.70 ***		0.59
		4.40		*8.58*
Metropolitan (ref: rural)		7.88		-28.14 **
		5.63		*13.01*
Private		5.74		8.06
		7.94		*9.55*
% Native Students		0.67 **		0.95 ***
		0.29		*0.37*
Student/Teacher Ratio		-0.66 ***		0.59
		0.16		*0.71*
Computer/Student Ratio		44.89		-8.45
		30.73		*19.69*
Constant	329.21 ***	252.95 ***	289.24 ***	163.38 **
	2.59	*57.58*	*7.51*	*92.86*

Source: Author's estimations based on the Programme for International Student Assessment (2006).

Note: Standard errors are in italics. * Regressions include school level measures related to admittance and selection abilities, managing and funding, parental pressure and choice, accountability policies, school autonomy and school resources.

* Significant at p < .10 ** Significant at p < .05 *** Significant at p < .01

Figure 6. Mean Score in Student Performance on the Science Scale. Mexico, U.S. and Immigrant and Spanish Ethnic Groups in the U.S. 2006.



	Mexico	U.S., First Generation-Spanish at Home	U.S., Second Generation-Spanish at Home	U.S., First Generation	U.S., Second Generation	U.S.
Series1	410	411	429	443	458	489

Table 9. OLS Regressions of Student Performance on the Science Scale.U.S., 2006.

	USA	
	(1)	(2)*
R^2	0.04	0.28
Num. Observations	5,611	5,443
	B	***B***
Student Level		
Highest Parental Education		4.48 ***
		0.59
Highest Parental Occupation		1.01 ***
		0.09
Home Educational Resources		1.57
		2.09
Cultural Possesions		14.61 ***
		1.68
Female		-14.66 ***
		2.86
Age		-18.43 ***
		5.72
School Grade		39.25 ***
		3.06
Self-study Less 2 hours (ref: No self-study)		28.38 ***
		3.75
Selef-study 2 or more hours (ref: No self-study)		39.21 ***
		4.35
Immigrant First Generation	-28.20 ***	-15.79 **
	8.48	7.45
Immigrant Second Generation	-20.15 ***	-6.37
	6.10	5.68
Speak Spanish at Home	-79.86 ***	-34.09 ***
	10.17	11.81
First generation * Speak Spanish Home	23.03	24.44
	15.11	15.11
Second generation * Speak Spanish Home	32.44 **	35.12 ***
	13.16	12.67
School Level		
School Size		-0.01
		0.01
School Size Squared		0.00
		0.00
Semi-urban (ref: rural)		8.28
		7.84
Urban (ref: rural)		0.60
		8.55
Metropolitan (ref: rural)		-28.48 **
		12.93
Private		7.95
		9.52
% Native Students		0.91 ***
		0.37
Student/Teacher Ratio		0.60
		0.71
Computer/Student Ratio		-7.62
		19.63
Constant	496.03 ***	167.72 **
	1.73	92.32

Source: Author's estimations based on the Programme for International Student Assessment (2006).

Note: Standard errors are in italics. * Reggressions include school level measures related to admittance and selection abilities, managing and funding, parental pressure and choice, accountability policies, school autonomy and school resources.

* Significant at p < .10 ** Significant at p < .05 *** Significant at p < .01