

ACTORS, INSTITUTIONS, AND GLOBAL FORCES
ESSAYS ON EDUCATIONAL EXPANSION AND ATTAINMENT

By

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ABSTRACT

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This dissertation is a collection of three essays that consider the role of national and global political, economic, and social forces in educational expansion and attainment. The first essay engages the prevailing theories of global educational expansion and argues that existing explanations neglect the possibility that individual political leaders may act in autonomous and unexpected ways to expand educational opportunities, particularly for marginalized groups. The second essay empirically models the expansion of educational attainment as a function of national political and global economic institutions, using a global data set of countries from 1960-2010. The third essay examines the relationship between children's transnational migration experience and their educational outcomes, specifically completed years of schooling and their likelihood of dropping out of school.

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Introduction

Recently, a friend asked me what my dissertation was about. After I briefly described how I was exploring the ways in which various global forces, such as democracy, participation in the global economy, foreign aid, and child migration, support or hinder the attainment of international education goals, such as the Education for All initiative, she looked at me and said, “Why would you ever choose to do that?” This was not the first time I had been asked this question. People tend to expect that, because I am pursuing a doctoral degree in education policy, I should be interviewing teachers or studying local schools, doing some kind of hands-on work that will help teachers improve their teaching or schools become more effective. Most people cannot understand why I would spend so much time and effort trying to address such big questions that have seemingly little practical application.

While I would love to interview teachers or study local schools, this particular pursuit taps into my desire to make sense of patterns and my love of problem-solving. The first two essays, in particular, were driven by simple curiosity. Early on in my graduate school career, I became interested in global efforts to achieve universal basic education for all children. Data demonstrated that education systems and enrollments had steadily increased over time in most of the world’s countries. Clearly, there was a puzzle here. Why do countries expand education? Do they do so uniformly? If not, why are some countries more likely to invest in schooling than others?

Yet, the literature I was reading at the time examined participation and persistence in formal education entirely as a function of individual, family, and school level factors. There did not seem to be any academic interest in exploring these macro-level questions. Of course, I later learned this was not case, that some scholars have spent their careers thinking about these issues

and that there are well-defined bodies of literature devoted to macro-level explanations of education's global expansion. By synthesizing theories of educational expansion across disciplines, considering how prominent perspectives both contribute to and limit our understanding of this phenomena, and empirically testing existing assumptions, I have tried to contribute something meaningful to this research program.

My third essay, which considers the relationship between child migration from Mexico to the United States and children's educational attainment, was motivated more by personal experience. Being married to a man from Mexico City, I have spent a considerable amount of time traveling throughout Mexico over the past ten years. We currently live in Laredo, Texas, five miles from the U.S.-Mexico border, where my husband teaches at the university. My husband's students are generally from the area; many are first generation Americans born to Mexican parents, other students cross the border from Mexico daily to attend school.

Many of his students have interesting stories to tell about their lives and educational experiences. One student spent her childhood migrating between Mexico and the United States with her parents, seasonal agricultural workers. Her binational upbringing exposed her to the education systems of both countries, and she found schools in the United States to be superior. Further, in the United States, she received additional support from programs tailored to meet the needs of migrant students. She is now a first generation college student. The experience of this student belies the research indicating that Latinos in the United States have relatively poor educational outcomes. My curiosity about the experiences of students who move across national borders and experience multiple education systems led to the development of my third essay, which extends my study of the relationships between global processes and educational attainment to include the phenomena of transnational migration.

The next section describes each essay in more detail, defines the research questions, situates each study within the existing literature, and discusses challenges and limitations. In the final section, I consider the value of this research.

Essay 1

This essay addresses the general question, “why do states expand schooling?” I specifically examine the prevailing explanations for the expansion of primary school around the world, particularly following World War II, synthesize theories from disparate academic fields, and make the case that the predominant perspectives fail to account for the role of individual actors, specifically, political leaders, in education expansion. I argue that the two most prominent explanations, stemming from world culture theory and the public good provision perspective, provide overly deterministic models for state behavior.

Although the two theoretical perspectives have irreconcilable understandings of why states expand schooling, neither approach accounts for the fact that states are comprised of individuals and that political leaders may act in idiosyncratic and unexpected ways. Although I do not propose an alternative theoretical model of education expansion, I do suggest that increased attention to the role of individual leaders may help build a more comprehensive and accurate understanding of countries’ education expansion. I illustrate the role of particular leaders through three vignettes of education expansion in Cuba, Saudi Arabia, and the United States.

The primary limitation of this study is that, while I argue that the role of leaders has been neglected by scholars interested in why states expand schooling, I do not develop a framework for understanding leaders’ motivations and behavior. Therefore, although my three examples can illuminate the need to investigate the function that leaders play in expanding education, they

cannot serve as case studies testing a formal theory. In the future, I would be interested in developing a theory of leadership that could be tested using historical case studies of education expansion around the world.

Essay 2

The second essay empirically tests some of assumptions held by the world culture and public good provision perspectives as well as those of globalization scholars. World culture theory presupposes that education expands despite national variation in political, economic or cultural landscapes. Political scientists who study public good provision argue that democratic institutions incentivize leaders to broadly provide public services, including education. Globalization scholars contend that education agendas are adopted through power dynamics between rich donor countries/agencies and developing countries, played out through economic reliance on trade relationships and/or aid assistance. I consider these assumptions simultaneously and examine the question, “what effect do national and international institutions, namely democracy, integration in the global economy, and foreign aid, have on the expansion of educational attainment over time and across countries?”

This essay contributes to the existing literature in two ways. First, it synthesizes theoretical approaches across disciplines and introduces a framework for understanding educational expansion in light of such disparate explanations. Second, it improves upon the standard statistical approaches to modeling educational investment and outcomes at the country level. I explicitly account for the several of the issues that arise from data that has both time-series and cross-sectional dimensions, namely unit heterogeneity and cluster-confounding effects. Ultimately, my approach yields a more precise estimation of how global forces influence countries’ average educational attainment.

The statistical analysis of country level data presents several challenges. One of the tenets of empirical analysis is that researchers must have enough observations to draw reliable inferences. Because countries represent a finite number of cases, researchers cannot realistically draw repeated random samples from the population; rather, analyses of countries typically depend on a nonrandom selection of countries for which data is available. With a restricted number of countries, researchers must try to expand the number of total observations by adding a time-series dimension. For example, suppose a researcher has a cross-sectional data set of 100 countries. By adding 20 years of annual historical data for each country, the total number of observations could be increased from 100 to 100×20 , or 2,000. Arguably, the inferences one is able to draw based on 2,000 observations are stronger than those based on only 100 observations.

The challenge then is to find adequate time-series data with broad cross-sectional coverage. International data collection, spearheaded by agencies such as the World Bank, UNESCO, and the OECD, has dramatically improved in recent years. However, international data sets still tend to have a high degree of missing values, often do not predate 1960 or 1970, and may not include annual observations. Therefore, it can be difficult to build a strong country level data set. Drawing from multiple data sources, I built a broad data set of 128 countries with relatively little missing data, an improvement upon many existing studies. Due to data limitations, the time-series dimension of the data set I use for this study reflects 5-year, rather than yearly, periods, from 1960-2010. Empirical studies can always be improved with the availability of updated and more comprehensive data. This study is no exception. If and when more data becomes available, this study could be enhanced by increasing the number of observations for a given country over time to more fully estimate the effect of national and global institutional forces on within-country expansion of educational attainment.

Essay 3

With essays 1 and 2, I try to establish a context for understanding the role of global forces in educational attainment by looking at international trends and national outcomes. Essay 3 shifts the focus to individuals. In this essay, I examine how the global process of transnational migration shapes children's schooling outcomes. Specifically, I explore the question, "what is the relationship between Mexico-U.S. child migration and educational attainment?" Unlike the majority of studies conducted in the United States that compare the educational attainment of Mexican, or, more broadly, Latino, students to U.S. born white students, I use Mexican non-migrant children from the same communities as the comparison group. Although the literature suggests that Mexican students (and Latinos in general) experience an educational disadvantage relative to U.S. born white students, my research design allows me to consider whether Mexican children with U.S. migration experience actually have an educational advantage relative to their non-migrant peers.

I situate my theoretical framework, in part, in human capital and the culture of migration theories. Both perspectives provide explanations for why migration, or the likelihood of future migration, may disincentivize young people's investment in education. Put simply, low returns to schooling acquired abroad and the prevalence of unskilled employment opportunities may discourage migrants from investing in education in both their home and destination countries. These theories illuminate demand-side aspects of migrants' educational attainment. My framework further incorporates consideration of the unique barriers, such as language, that young migrants may face to schooling. I hypothesize that age at migration is an important determinant of transnational students' educational outcomes.

Similar to essay 2, data limitations presented the biggest challenge. An ideal research design would include either (a) longitudinal data that tracks individuals over time or (b) life history data that provides detailed retrospective information on migration experience and educational outcomes. Collecting the first kind of data would require tracking people across borders, a logistically difficult and expensive undertaking. It is more realistic to develop survey instruments that collect retrospective data.

Researchers with the Mexican Migration Project (MMP), the most developed source of data on Mexico-U.S. migration, have developed migration and labor history data sets for household heads. Because I was interested in disaggregating my analysis by gender, and the majority of household heads in the sample are men, I decided to build a pooled cross-sectional data set that includes young males and females. This type of data allows for associative, rather than causal, inferences. The next step I would like to take with this research is to test my hypotheses using the MMP migration and labor history data sets in order to determine whether my inferences hold up to a more sophisticated analysis.

Lessons learned: The value of this kind of research

According to the *2011 EFA Global Monitoring Report*, 67 million children of primary school age remained out of school in 2008. This statistic indicates that universal basic education is not yet a reality and that, despite global efforts, there are significant hurdles to its achievement.

The issue of educational attainment is complex and provides opportunity for analysis at individual, family, community, city, state, national, and global levels. Empirical work in education is increasingly oriented towards micro-level explanations of educational participation and attainment. Teacher gender, child labor, parent education, inadequate school facilities and prohibitive schooling costs typify the causes researchers often ascribe to non-attendance or lack

of school completion in numerous countries. While this research is valuable, it fails to consider how the broader institutional context in which decisions about national education provision occur influences children's opportunities to enroll in or complete school.

The macro-level perspective this dissertation provides can add to our understanding of educational decision-making by introducing the larger context in which educational decisions are made. Too often, education scholars and policy-makers use international comparisons to advocate for education policy prescriptions. If democratization efforts like decentralization, for example, prove to increase civic participation and school quality in one country, the argument goes, then it will do the same somewhere else. Yet, education policy "borrowing" frequently does not lead to the intended results. Our failure to understand the complex global processes, such as political context, global economic pressures, and transnational migration, may be partly to blame.

This research challenges the assumption that education policy regarding a wide range of participation issues can be successfully formulated and implemented without a clear understanding of the role that national and supranational forces play in education attainment. If all children, regardless of race, gender, or income, are to participate in and complete, at the very least, a basic education, then education policy experts, scholars, and practitioners must consider the political, economic, and social context that shapes countries' commitments to education for all.

Essay 1

Making Room for Leaders: A Critique of Prevailing Explanations for Why States Expand Schooling

Introduction

Education systems around the world experienced mass expansion during the second half of the twentieth century, a trend which continues in many countries today. Education statistics indicate that the global gross primary school enrollment rate increased by 43.1 percent from 1950-1970 and by 19.1 percent from 1970-2011. The expansion of secondary school enrollment during the same time periods is even larger, with increases of 140.2 percent and 75 percent from 1950-1970 and 1970-2010, respectively (Meyer, Ramirez, Robinson, & Boli-Bennet, 1977; World Bank, 2012).

This unprecedented educational expansion worldwide cannot be divorced from state involvement in education policy and provision. As of 2011, primary school was compulsory in almost all countries worldwide; lower secondary school was compulsory in 80 percent of countries (UIS, 2011).¹ Why do political leaders invest in and expand their educational systems? Is it that they have adopted a world ideal of universal and expansive education for all children? Do political leaders use public resources, such as education, strategically to gain the favor of constituencies in order to secure or hold office? Or, are decision-makers guided by market forces and economic progress and the ensuing demand for an increasingly educated workforce?

Two primary perspectives provide the dominant scholarly explanations for the global expansion of education. The normative explanation comes from the world culture perspective which argues that education expands despite national differences in political, economic, and

¹ Primary and lower secondary schools are generally made up of grades 1-5 and 6-8, respectively.

social conditions and, therefore, the cause of expansion resides in unexpected similarities between seemingly disparate nations (see, for example, Meyer, Ramirez, & Sosyal, 1992). It assumes these similarities are found in a common set of world cultural norms and beliefs that inform the modern state and cause it to act in certain predictable and uniform ways. According to this perspective, the global expansion of education is a function of states' adoption of a world model of education, one formed by the belief that every child has a right to attend school; states, particularly developing countries, adopt this model in order to gain legitimacy within a world society. The world culture argument is supported by an extensive body of theoretical and empirical evidence spanning several decades and holds a commanding position within education scholarship.

Yet, evidence also suggests that there is national variation both in education expansion patterns and in how states respond to various incentives to expand schooling. Easterlin (1981) provides individual enrollment trajectories for 25 of the world's most populated countries from 1840 to 1980.² He measures primary enrollment as the number of primary school enrollees relative to the total population. Many of the developing countries (i.e. Turkey, Iran, Egypt, India, Indonesia, Burma, Nigeria, China, and Ethiopia) included in his descriptive analysis exhibit a persistently low and relatively stagnant enrollment rate until 1940 when enrollments explode and rise rapidly. Although this trend appears quite similar across countries, it is not universal. Argentina and Mexico, for example, both defy the pattern. By 1940, Argentina already had a relatively high enrollment rate roughly equivalent to Mexico's. Whereas Mexico's primary enrollment rate dipped considerably in the next decade and a half and then steeply and consistently rose thereafter, Argentina's dipped and increased only slightly by 1980. Easterlin's

² Data for each country begins in 1840 or whenever data is first available.

data allow for a closer inspection of expansion trends and suggest variation in enrollment trajectories, particularly in developing countries.

What causes this variation in educational expansion across countries? Publications by numerous international organizations, among them USAID (2003) and UNESCO (2008), suggest that international education reform and universal access to basic education depend on political will and democratic governance. It is assumed that countries' political and economic characteristics matter and that they matter in predictable ways; democracy and wealth, for example, spawn increased educational opportunities. Political scientists and international relations scholars closely examine these assumptions in their study of states' provision of public goods such as "low crime, good schools and health care, adequate sanitation, and clean drinking water" (Habyarimana, Humphreys, Posner, & Weinstein, 2007, p.709). Unlike the world culturalists, public goods scholars attribute state action to incentives associated with its internal political institutions, such as political participation and electoral competition. When political participation and electoral competition are high, as in democracies, state actors are incentivized to provide public goods, including education, more universally. This perspective supports the claims that increases in democracy improve access to education.

Both world culturalists and public goods scholars seek to explain the same phenomena, educational expansion, yet hold fundamentally different assumptions about the incentives that drive state action. Consequently, they rarely seriously engage each other. The former conceptualizes the state as a culturally-constructed actor, sensitive to the beliefs and ideas of a world society, seeking legitimacy on the world stage. The latter theorizes that state policy decisions are motivated by domestic political institutions, whereby decision-makers self-interestedly act to maintain office. While both perspectives offer a compelling argument, they

each are limited by their narrow understanding of the relationship between the state and the expansion of schooling.

In this essay, I argue that the prevailing explanations for educational expansion neglect or severely restrict the role of political leaders in education provision. In fact, both perspectives assume that states behave in predictable ways and preclude the possibility that leaders ever act autonomously, outside of the constraints established by world norms or domestic political institutions, in order to expand schooling. By overlooking or mitigating the role of leaders, world culture theory and public goods scholars oversimplify educational processes and fail to comprehensively explain the complex phenomena of educational expansion.

In the following sections, I first provide an overview of the two prevailing theories of educational expansion, discuss seminal empirical findings, and evaluate their methodology. I then introduce the idea of leaders as independent actors and provide three examples of leaders in Cuba, Saudi Arabia, and the United States who expanded educational opportunities to their citizens in ways that defy the constraints assumed by the world culture and public goods perspectives. Lastly, I conclude and offer recommendations for future research.

Why do states expand schooling? A review of prevailing theories

Both the world culture and public goods perspectives explain states' expansion of schooling as a function of incentives established by either cultural or political institutions. The world culture perspective introduces the concept of institutions as "cultural scripts" or "world models", cultural and social "rules" derived from Western norms and beliefs (Meyer, Boli, Thomas, & Ramirez, 1997, Ramirez & Ventresca, 1992). World models define the modern state and provide the rules by which states must abide if they are to be admitted to, and accepted by, the world society. States modernize through the adoption of world political, cultural, and social

norms; as states seek legitimacy in the world system, their policies converge and national differences are subsumed and replaced by global similarities.

The idea of mass schooling, the belief that all children deserve an opportunity to attain an education, defines the world model of education. According to this perspective, the world model of education has existed for more than two centuries; the idea of mass schooling was evident in northern Europe and the United States in the eighteenth century (Meyer et al., 1992). Following World War II, this model became increasingly important with the unprecedented cultural and organizational development of the world society (Meyer et al., 1997, p. 145). Clemens (2004) chronicles the growing global influence of the mass schooling model in the postwar era. The United Nation's 1948 declaration of education as a basic human right evinces a dominant set of norms and beliefs that influenced international education policy and led to new declarations, international collaborations, and global efforts, most recently in the form of the Education for All initiative and the Millennium Development Goals. Adoption of this world model of education, world culturalists argue, explains the rise of mass schooling across states in spite of variation in national political, social, and economic characteristics.³ This theory supposes that (a) universal education is a Western norm, (b) the desire for legitimacy incentivizes states to expand schooling, and (c) the diffusion of this idea around the world stems from states' linkages to the "central models" of the world system, made up primarily of Northern and Western Europe and the United States (Meyer et al., 1977).

³ The world culture argument evolved from scholars' growing dissatisfaction with functionalist explanations of educational expansion, or the rise of mass schooling. These explanations interpret expansion as a function of endogenous national political, economic, and social characteristics such as economic and political development, state strength, ethnic fractionalization, and colonization.

These assumptions are tested empirically in two seminal papers. Meyer et al. (1977) take a two-part approach to hypothesis testing using a diffusion model and basic panel model from 1955-1970. The diffusion model predicts change in primary educational expansion (measured by gross enrollment) between 1955 and 1970 as a function of enrollment levels in 1955, the percent of the school-age population not enrolled in school in 1955, a measure of population growth for the primary-age population, and the primary population in 1970. They find that the size of the uneducated primary-age population and the primary-age population growth rate are important determinants of education expansion. Further, they find that primary education expansion follows an S-shaped diffusion pattern whereby countries with low and high enrollment rates expand slowly and countries with middle-range enrollments expand rapidly. In order to test the effects of national political, economic, and social characteristics on expansion, the authors then create a single term from their diffusion model and incorporate it into a panel model where they regress one national characteristic indicator at time-1 and the diffusion term on primary enrollment growth scores at time-2. They report that none of these factors significantly explains expansion when accounting for the diffusion process effects. Instead, they argue, the expansion of education is a self-generating process. In other words, once a system of mass education is established, it will expand independently of endogenous conditions and pressures.

The authors clearly state that the explanatory power of their analysis is limited to a specific time period following World War II and do not discount the possibility that endogenous national characteristics may explain education expansion during other historical periods. They conclude, however, that postwar primary education expansion cannot be explained by functionalist theories and propose a possible world system effect. Meyer et al. (1992) build on this work using a more comprehensive dataset of 120 countries from 1870-1980, and analyze

both rate of entry into a mass education system and the subsequent growth of those systems. The authors again empirically test functionalist accounts of education expansion as well as their own world culture hypothesis by constructing a measure of linkage to the world society. Countries are categorized and assigned placement on a continuum of proximity to, what they term, the “central models” of the world system (the core countries primarily consist of Northern and Western Europe and the United States), based on exposure to state formation models. Using a basic model of rate of entry, Meyer and his colleagues find that rates of entry into mass education systems were relatively constant prior to WWII and rose substantially afterward.⁴ Results from a more sophisticated event-history model suggest that linkages to the world society strongly affect countries’ rate of entry although internal national characteristics (such as urbanization, race, religion, and presence of a compulsory education rule) do not. This finding leads to the conclusion that where linkages were strong, world models were diffused quicker and mass education systems were formed earlier. World models spread more slowly in cases where countries had distant ties to the world society, explaining why these countries developed systems of mass education significantly later.

The second part of the paper examines educational expansion (measured as primary enrollment) once countries enter into mass education. The authors argue that the most important control variable when modeling effects of explanatory factors on enrollment expansion is prior enrollment. Using a subset of the panel data from 1870-1940, the authors model primary school enrollment as a function of prior enrollment. Unsurprisingly, they find a strong statistical relationship. To this basic model, they add the same indicators of endogenous national

⁴ Rate of entry into mass education is defined in two ways, (a) as the moment a country enters the dataset with an enrollment rate of less than 10 percent and (b) more broadly, as the moment a country enters the dataset with an enrollment rate of less than 50 percent.

characteristics previously used in the event-history model. Consistent with Meyer et al. (1977), they report that the addition of endogenous national factors do not sufficiently improve upon the basic model. In their final analysis, the authors model the effects of linkages to the world society on enrollment expansion and find that the inclusion of these variables does little to improve the baseline effect of prior enrollment on later enrollment. These studies point to three important conclusions: (a) domestic forces do not compel states to expand education, (b) states are responsive to linkages to the world society, particularly when establishing systems of mass education, and (c) neither domestic pressures nor world cultural linkages promote educational expansion once states have entered into the world of mass education; rather, education is a self-perpetuating institution and the state has no role in further expansion.

World culture theory, and its associated empirical literature, describes a very predetermined path that states take to expand schooling. States adopt a world norm of universal education, create and introduce a system of mass schooling to gain acceptance into a world society, and then step aside as the system expands on its own. One weakness with this logic is that it completely fails to consider the role of political leaders in educational processes and decision-making. In part, the public goods perspective addresses this gap by examining why some political leaders invest in public services while others do not.

Public goods scholars argue that political institutions provide incentives and disincentives that guide political behavior. Bueno de Mesquita, Smith, Silversson, and Morrow (2003) argue that democratic institutions, such as electoral competition, the presence of term limits, restrictions on political leaders' power, and citizen involvement, influence public policy decisions and compel leaders to invest in public goods. These authors propose a selectorate theory; in democracies, leaders are chosen through elections and victory depends on leaders'

selection by a majority of voters, or selectorate. Undoubtedly, political candidates desire to attain and retain office. According to this selectorate theory, dependency on a large selectorate to maintain office motives democratic leaders to distribute non-exclusive public goods widely among the population, increasing public welfare. Conversely, leaders in autocracies typically gain power with the support of political or military elite and do not rely on a popular vote. As a result, autocratic political leaders, reliant on a constituency that represents a smaller fraction of society, may be less sensitive to the interests of the broader public. Thus, they provide exclusive private goods to their loyal supports, thereby enhancing the welfare of some individuals at the exclusion of the majority of citizens.

Following a similar theoretical vein, Lake and Baum (2001) and Baum and Lake (2003) explicitly argue why democracy leads to educational expansion. Their argument assumes that all politicians are utility-maximizers, interested in increasing their own welfare, or capitalizing on the benefits of their office, by using the power of the state. Yet, institutional constraints, particularly political participation, differ across political regimes. Under autocracy, where costs to political participation are high, political participation is severely constrained. Citizens are unable to discipline the government. Without a large constituency as a restraining force, an autocratic government has an incentive to channel public money (tax revenue) and state resources towards private ends and under-provide public goods vis-à-vis citizen demand. In democracies, participation costs are low. Citizens can freely exercise their voice option at the voting booth. This prevents the government from acting as a “monopolist”; instead, democratic governments have an incentive to match the demand for education with its supply. Lake and Baum (2001) further theorize that public good provision, including education, will increase

rapidly in countries where significant regime shifts produce democratic leaders eager to legitimize their office and government.

In order to test their theory, Lake and Baum (2001) model a variety of public good provision indicators, including primary and secondary gross enrollment, as outcome variables. Using cross-sectional regression, and a global sample of developing and developed countries, they find primary and secondary enrollment levels are positively and significantly associated with democracy (lagged one year) in 1985 and 1970, controlling for per capita GNP, land area, population, urban population and OECD membership. This same relationship holds for secondary enrollments in 1990. Using time-series-cross-section (TSCS) data, the authors first difference their secondary enrollment variable to model changes in secondary enrollments over time from 1975-1993. Democracy is first differenced as well and an additional variable is created interacting democracy with an absolute value change in democracy. This interaction variable allows for estimation of a nonlinear relationship between democracy, regime transition, and education. A year dummy is included to account for time trends. They find that secondary educational expansion is positively and significantly related to the democracy-regime transition interaction term (lagged 3 years). The authors interpret this finding as follows, “among countries that have moved by more than 1.2 points on the 21-point Democracy Scale, more democratic countries enjoy a higher ratio of students enrolled in secondary school, relative to the total cohort, than their less democratic counterparts” (Lake and Baum, 2001, p 614). GNP per capita and population are similarly associated with increases in secondary enrollment.

Baum and Lake (2003) examine the effects of democracy on female gross secondary enrollment. They argue that there is more variance in secondary education rates than primary and that female education is a better way to capture regime differences because all governments may

prioritize the education of boys. Like Lake and Baum (2001), the authors use the Polity III score, which is a composite index of democracy based on six measures of political competition, restraints on executive power and executive recruitment. The composite score ranges from -10 (fully autocratic) to 10 (fully democratic) and is a widely used measure of democracy in political science literature. Using a 30-year panel dataset of 128 developing and developed countries from 1967-1997, the authors find an effect of democracy in non-poor countries. Their lagged measure of national wealth, per capita GDP, is also positively and significantly associated with secondary enrollment rates for females. They conclude that secondary education is a proxy for “high end” human capital and is, therefore, more relevant to developed countries. One implication of their findings is that attention to the provision of primary education may be more pressing in developing countries.

Brown (1999) tests this hypothesis with an unbalanced panel dataset including years 1960, 1965, 1970 and 1975-1987 and observations for 94 developing countries. Using a parsimonious model in which he predicts primary school enrollment as a function of per capita GDP, an interaction term between GDP and democracy (also measured using Polity III data), and regional dummies, he finds that democracy in poor countries is an important force behind primary educational expansion. He also reports the disappearance of this relationship as countries become richer.

Evaluation of methodology

The empirical findings from the world culture and public goods research literature are often contradictory. It is useful to briefly summarize them here. Most studies consider the causes of educational expansion once states have already entered into mass education. Public goods scholars have not empirically tested their theory on states’ rate of entry into mass education. The

only research done on this suggests that the rate at which states enter into mass education depends on their linkages to the world system (Meyer et al., 1992). Further educational expansion is a result of education's self-generating characteristics independent of other forces (Meyer et al., 1977; Meyer et al., 1992), democracy at the primary level (Brown, 1999; Lake & Baum, 2001), and democracy at the secondary level (Baum & Lake, 2003; Lake & Baum, 2001). On what grounds can we compare these findings and the methodologies used to generate them? This section highlights important concerns and evaluates several key methodological issues, namely the measurements of democracy and education expansion, the use of prior enrollment as an appropriate control variable, and sample identification, which may call into question substantive claims made by scholars from both perspectives.

Measures of democracy and education expansion

The strength of the empirical findings presented by the world culturalists depends, to a large degree, on how convincingly they account for national political institutions and the theoretical argument proposed by public goods scholars. Meyer et al. (1977) use two measures of democratic institutions: Cutright's (1969) index of political representation and Adelman and Morris's (1973) measure of political participation. They conclude that neither has significant effects on primary school enrollment growth. There are several problems with this conclusion. The first is that the outcome is the difference between primary enrollment in 1970 and primary enrollment in 1955. Both democratic institutions are measured as averages from earlier time periods.⁵ In sum, they assume that a state's average degree of democracy at the frontend of their postwar period of observation should explain a 15 year change in enrollment levels. This model

⁵ Specifically, political representation is measured as one averaged score from 1951-1955, political participation from 1957-1962.

is imprecise and treats political conditions as stagnant. Yet, Plank (1987) and others suggest it is the change in state's political institutions that drives educational expansion, not a baseline level of democracy.

World culturalists account for the effect of political institutions on long-run enrollment growth, but do not examine short-term effects. In contrast, Lake and Baum (2001) find that changes in democracy positively impact enrollment growth within 2 to 3 years. As time goes on, the effect of democratic change at a fixed, early point in relation to the whole time period becomes insignificant. This finding raises questions about time effects previously unexamined by world culturalists and suggests that it is not useful to measure enrollment changes over large periods of time. Rather, a more nuanced analysis, which measures enrollment growth from year to year and examines the short term effects of political change on educational expansion, may be more useful.

An important difference in the empirical approaches of each perspective is the measurement of education expansion. World culturalists measure expansion with primary school enrollment rates, while public goods scholars also examine secondary school enrollment. For several reasons, secondary enrollment growth may better reflect the ways in which political institutions incentivize leaders to expand education. Arguably, all states have reason to expand basic education. Pritchett (2003) argues that nearly all governments expand schooling, not because they follow a world cultural norm, but because educational expansion is a manifestation of supply and demand pressures. His argument is consistent with that of the public goods scholars in so far as citizens in democracies, those with the ability to exercise voice, force governments to respond to their demand for education. However, he argues that equally strong incentives, such as control over curricular content and the dissemination of ideas and beliefs,

motivate autocratic regimes to expand education (see Corrales (2006) for similar conclusions).

While one might expect more autocratic regimes to invest in basic education in order to spread a common ideology to its citizens, these supply side incentives are less likely to explain educational expansion at the secondary level where autocratic states are prone to restrict access to a select group of citizens. Therefore, increased variation in the degree to which states prioritize and expand secondary education might allow for a clearer understanding of democracy's effect.

Prior enrollment, an appropriate control?

Empirical models testing world culture hypotheses tend to include some measure of prior school enrollment and find it to be the most significant determinant of future enrollment levels (Meyer, et al., 1977; Meyer et al., 1992; Schafer, 1999). This finding informs their concept of educational expansion as a self-generating process. There are some questions about the validity of this approach. Achen (2000) illuminates several problems with including lagged dependent variables in statistical models, most notably that they pick up the effects of unmeasured variables as well as the effects of included variables, particularly if they are trended. An unrelated example might help explain the nature of this problem. Suppose we were to assess the yearly fitness of a marathon runner. Her most recent level of fitness would certainly be related to her fitness levels in years past. It might also be a function of other factors such as diet, training, and having the support of other runners. If we were to enter all of these variables equally into a regression model, the marathon runner's prior fitness level would likely account for most of her current fitness level and possibly mask the effects of all other factors. In part, prior fitness already accounts for diet, training and support. Unless one of these elements changed dramatically within a year, it would be unlikely that any of these factors would influence current fitness above and

beyond the influence they exert on prior fitness. According to Achen's argument, the coefficient on our runner's prior fitness would also pick up unobserved characteristics, such as genetics. We might conclude then that fitness, rather than diet, training, support, or genetics, begets fitness.

Although this argument offers a compelling explanation for why the world culturalists' conclusion that education is a self-generating institution may be misleading—that their inclusion of prior enrollment as an explanatory factor may reduce the effect sizes of other relevant covariates or conceal them entirely—there is considerable resistance to this argument. Beck and Katz (2011), for example, use several examples with time-series data to demonstrate that the inclusion of the lagged dependent variable does not “dominate the regression”. Based on their findings, they argue that the “real”(i.e. causal) effects of other independent variables will not be concealed or washed out by including the lagged dependent variable on the right-hand side of the model (p.350).

An alternative approach to this issue could be to formally model educational expansion using more sophisticated methods. Growth curve analysis could be used to explicitly account for countries' individual education expansion trajectories, thus mitigating the need to include the lagged dependent variable in the model. This approach may provide more precise estimates and uncover interesting effects of political institutional forces previously masked in the world culture empirical models.

Sample identification

It is not easy to empirically test hypotheses about global educational expansion. Doing so requires longitudinal data with adequate coverage across countries and over time. There is abundant missing data, particularly on educational outcomes, and it is difficult, if not impossible, to get complete data for a globally representative dataset. Rather, the sample often is defined by

available data, rather than its representative nature. Many of the quantitative studies reviewed in this essay suffer from poor identification of their samples.

Despite thorough explanation of their methods, Meyer et al. (1977) fail to clarify the sample for each analysis, and interpret each analysis as though the findings are relevant for all 117 countries in their total sample. In reality, the samples in their panel models represent 32 to 62 countries. The authors provide no identification of these countries. Although Lake and Baum (2001) acknowledge that their models represent anywhere from 37 to 110 countries, they do not identify which countries are ultimately included in their empirical analyses. In both cases, without knowing which countries the findings represent, and whether they have markedly different characteristics from the countries excluded from the sample, it is difficult to accept the authors' broader inferences. In general, the studies included here could benefit from a closer consideration of how sample confines might limit potential inferences.

What about leadership?

In addition to methodological limitations, the world culture and public goods perspectives share a theoretical limitation; they both nullify the possibility of political leaders as independent actors and, thereby, fail to consider the role of political leaders in educational processes and decision-making. From the perspective of world culture theory, individual leaders are irrelevant; all leaders of states will act in similar ways regardless of their political motives, personal beliefs, or idiosyncrasies. Public goods scholars also circumscribe leaders' authority by assuming that behavior is solely a function of political incentives to remain in power.

In this section I argue that states do expand education around the world. As states are comprised of individuals, however, this section looks specifically at how three very different leaders used their political will and influence to expand education in a three very different ways.

I specifically use examples from Cuba, Saudi Arabia, and the United States to illustrate the expansion of education under three distinct political regimes: a socialist autocracy, a monarchy, and a democracy.

Cuba

Prior to 1959, education in Cuba was not universal. Although education was compulsory for children aged 6-14, it primarily served the urban elite; during 1942-43 only one-third of the country's one million primary school-aged children attended school (Roucek, 1964). Low educational attainment, on average, reflected the country's high illiteracy and drop-out rates, poor infrastructure and lack of schools, particularly in rural areas, and an education system that reinforced class divisions (Carnoy & Wertheim, 1979; Roucek, 1964). The revolution of 1959 gave rise to a one-party state led by Fidel Castro, driven by his revolutionary ethos. One of Castro's first actions was to use state resources to dramatically expand education.

Fidel Castro desired an economic and political transformation of Cuba; part of that transformation required severing Cuba's close economic and political ties to the United States and mobilizing Cuba's masses to engage in productive work (Carnoy & Wertheim, 1970; Torres, 1991). His economic goals, such as the redistribution of wealth and the expansion of employment opportunities, were closely linked to his education policy. Castro believed that universal education could help build a new egalitarian society comprised of "practically minded and pragmatically trained laborers" (Cheng & Manning, 2003, p.360).

Soon after Castro assumed power, the state began building schools, particularly in rural areas. From 1958-1961, the number of rural schools more than doubled and the total number of children enrolled in primary school increased from 717,000 to 1,136,277 (Carnoy & Wertheim, 1979). Access to, and participation in, secondary school also increased dramatically during this

initial period of expansion; enrollments increased from 26,278 to 91,482 between 1958 and 1961 (Carnoy & Wertheim, 1979).⁶ The state's rapid and extensive expansion of formal schooling in Cuba was accompanied by a massive literacy campaign and the implementation of adult education programs.

Castro's takeover of the state in general, and expansion of education in particular, met resistance early in his regime, particularly from the political and economic elite who, in some cases, had experienced the state's appropriation and subsequent nationalization of their companies (Masud-Piloto, 1996; Pedraza, 1998). Opposition to the regime was expressed by the exodus of Cuban immigrants to the United States. The first wave of immigrants (1959-1962) primarily included middle and upper class business executives and professionals, the most highly educated Cuban citizens. By 1962, 116,000 exiled Cubans resided in the United States (Masud-Piloto, 1996; Pedraza, 1998).⁷ Among them were over 14,000 children who were sent to the United States, unaccompanied, by their parents as part of Operation Pedro Pan. This program, administered by the Catholic Welfare Bureau in Miami, was created in response to a growing fear, particularly among middle class parents, that Castro would use the expanding, nationalized education system to indoctrinate their children with socialist ideology (Walsh, 1971).

The 1959 revolution, and Fidel Castro's subsequent rule, allowed for the state's rapid and extensive expansion of school, but not without a cost. It also provoked the mass exodus of Cubans to the United States and the draining of the country's most skilled human resources. Over time, however, the state has remained committed to providing free, quality education for

⁶ This period reflected the state's focus on simply expanding formal schooling. By 1974, 1,923,000 primary students were enrolled in school. 200,488 secondary students were enrolled by 1972 (Carnoy & Wertheim, 1979).

⁷ This was followed by three additional waves of immigration, resulting in the immigration of more than one million Cubans to the United States between 1959 and 1995 (Pedraza, 1998).

all. Today, Cuba enjoys universal school enrollment, gender parity at all education levels, nearly universal adult literacy, and high academic achievement, particularly relative to other Latin American countries (Carnoy, 2007; Gasperini, 2000).

Saudi Arabia

Saudi Arabia is one of six gulf monarchies and has been ruled by the Al Saud family since its formal creation in 1932. The state's involvement in education traces back to the 1926 establishment of the General Directorate of Education for Boys and the subsequent creation of the Ministry of Education in 1954. Both of these government departments were responsible for the public education of boys. Prior to 1960, public formal education for girls in Saudi Arabia did not exist (Rawaf & Simmons, 1991). Widespread resistance to the very notion of girls' public education was shared by the public as well as religious authorities, who perceived the education of girls as a threat to Islamic culture (Bahgat, 1999).

The movement to establish public education for girls was driven by the Saudi ruling family. In 1959, King Saud publically declared the role of the state in the promotion of girls' education. The government mitigated opposition to this action by creating a system of education for girls that acknowledged Saudi customs, such as gender segregation, and implementing an office specifically for female education, the General Presidency of Girls' Education, which fell under the purview of religious authorities (Jawad, 1998; Bahgat, 1998). The reign of King Faisal bin Abdul Aziz Al Saud from 1964-1975 coincided with particularly liberal education reform and significant expansion of education for girls.

King Faisal's wife, Iffat, held exceptionally progressive views about education and believed in a comprehensive, modern education for boys and girls that included the study of science, language, and other academic subjects. She opened several schools with her husband

and privately funded the first girls' school in 1956 (Lacey, 1981). King Faisal also believed that Saudi Arabia should embrace the benefits of modernization, including the equal education of girls and boys, but that change had to be slow and rooted in tradition rather than revolution (Hamdan, 2005; Mann, 2012). He argued that education for girls was sanctioned and even prescribed by God, evidenced by the absence of any decree against girls' education in the Koran (Lacey, 1981). By building a coalition with religious conservatives, he was able to funnel the state's oil revenues into building and financing public schools for girls from elementary to the college level (Rawaf & Simmons, 1991). By 1975, a quarter of a million girls in Saudi Arabia were enrolled in school (Lacey, 1981). From 1965 to 1988 the gross primary enrollment for girls increased from 11 to 65 percent (Moghadam, 1992).⁸

Current statistics indicate that the effects of the state's drive to change public perception and expand girl's education are evident today. Recent estimates indicate that the net primary enrollment rates are nearly equivalent for girls and boys, while girls' enrollment in secondary school exceeds that of boys (UIS, 2012).⁹

The United States

The United States has a long history of local and state control over the provision of public education. Federal education legislation, such as The Elementary and Secondary Education Act of 1965, and its reauthorization in 2001 as The No Child Left Behind Act, has dramatically increased the role of the federal government in the past 45 years. However, there was no precedent for federal involvement in education in 1933, when Franklin D. Roosevelt took office

⁸ 1988 data is actually an average based on the gross enrollment rates from 1986-1988.

⁹ In 2009, the net primary enrollment rates for girls and boys in Saudi Arabia were 89 and 90 percent, respectively. In 2010, the net secondary enrollment rates for girls and boys were 83 and 78 percent, respectively.

as president of the United States during the worst economic depression in the history of the country. Among other social problems, the Great Depression exposed vast educational inequalities (Campbell, Bair, & Harvey, 1939). Without challenging the established education system, Roosevelt and his administration explicitly increased educational opportunities for many people.

Roosevelt's New Deal legislation greatly increased the federal government's authority to address social issues, set economic policy, and create massive work projects. Although education was not specifically targeted initially, agencies such as the Civilian Conservation Corps (CCC), the National Youth Administration (NYA), and the Works Progress Administration (WPA) developed educational programs designed to provide education to all, particularly to those most affected and marginalized by the depression. According to Fass (1982), the New Deal initiatives were "an implicit criticism of established educational offerings" and demonstrated that "the inattention of traditional educational institutions had failed to awaken or feed the legitimate educational needs of all the people" (p. 47).

The CCC was Roosevelt's pet project. It employed youth in conservation work and targeted young, unemployed men, including African-Americans and American Indians, who often had no work experience and little education. Within four months of Roosevelt's inauguration, 300,000 young men occupied 1,500 CCC camps (Pfaff, 2010). Roosevelt was heavily involved in expanding the program, lobbying Congress for support, and securing federal funds; after the CCC's first year, he procured an additional fifty million dollars from Congress to continue the program (Pfaff, 2010).

Almost immediately, the CCC expanded educational opportunities for its enrollees. On December 7, 1933 President Roosevelt approved nearly a million and a half dollars for the

CCC's education program; less than four months later, six hundred and fifty-four educational advisers were working in the camps (Gower, 1967). The education program included vocational training, basic literacy, and elementary, high school and college academic courses. Over time, involvement in these non-compulsory courses grew. In 1936, 74 percent of all CCC enrollees participated in the education program (Gower, 1967); by 1938-39, participation had increased to 90 percent (Fass, 1982). The education program was remarkably popular and successful. Young people who were formerly illiterate left the CCC knowing how to read. Thousands received eighth grade and high school diplomas. Some even earned college degrees (Fass, 1982; Gower, 1967). During its nine years, the CCC alone employed, trained, and educated 2.5 million young people (Pfaff, 2010). Many young people educated by the CCC ultimately pursued careers in the United States Forest Service, the National Park Service, and other federal agencies (Maher, 2002).

The CCC, along other New Deal agencies, expanded educational opportunities for millions of people who otherwise would have remained unskilled, poorly educated, and unlikely to participate in the workforce. There was a particularly strong effort to make the CCC a permanent federal program, in part because it provided an alternative education to hundreds of thousands of boys who were falling through the cracks of the formal education system (Gower, 1967). These efforts were not shared by Roosevelt. Although he proposed in 1944 that the nation adopt a "Second Bill of Rights", which included the right to a good education, Roosevelt did not seek to transform his youth programs into long-term solutions. It was never his intention to revolutionize the education system by inserting federal authority into the province of local and state government. His projects were initiated in order to respond to the immediate social and

economic needs of the public, and many were disbanded, including the CCC, with the country's entry into World War II (Fass, 1982; Pfaff, 2010).

Strategic leadership and educational expansion

The world culture and public goods perspectives both make fundamental assumptions about what incentivizes leaders to expand education. For world culturalists, just as the state is culturally-constructed, so too are the political actors within it, “the many individuals both inside and outside the state who engage in state formation and policy formulation are enactors of scripts rather more than they are self-directed actors” (Meyer, et al., 1997, p. 150). World culture theory dissolves individual autonomy and replaces it with the idea that leaders are defined by world norms and their relative position to a world system. Their actions are driven by legitimacy concerns and world society membership. Yet, each of the three cases provided in the previous section challenge world culture's assumptions.

On the surface, Fidel Castro, King Faisal, and Roosevelt acted in the exact manner that world culture theory predicts—despite different national contexts, education expanded in similar ways. However, each leader's motives for expanding education runs counter to the theory. Education expansion in Cuba and Saudi Arabia was not explicitly driven by Western (liberal) norms. In fact, Castro's education policies were driven by socialist ideology, not liberal democracy, the Western political model. Arguably, he was also less incentivized by gaining acceptance into a Western-oriented world system than by rejecting that system and building a country representative of a new world order. King Faisal believed it was imperative for Saudi Arabia to modernize; however, his expansion of education was grounded in a religious argument, that Islam endorses the learning of all individuals, not in Western doctrine. As such, Saudi Arabia's educational expansion took on a decisively conservative guise. Roosevelt's call to

establish education as a human right in the United States anteceded the UN's declaration of universal education for all, and supports the world culture conception of a Western-origin model of education. Yet, he was unwilling to increase the official capacity of the state in public education provision.

In contrast to world culture theory, public goods scholars consider the incentives for expanding education as a function of domestic political institutions rather than world models. According to the public goods perspective, there are multiple motivations behind an individual's decision to seek public office, including "perquisites of office, prestige, public respect and adulation, privileged access to scarce commodities, and the elusive goal of influence" (Lake and Baum, 2001, p. 591). This perspective allows that an individual's internal drives can be an important force behind political action, although it argues that such drives are tempered by the constraints of political institutions.

An examination of the three cases using this framework suggests that leaders do and do not behave in anticipated ways. As autocratic rulers, public goods theory anticipates that both Castro and King Faisal would have invested in the education of their elite supporters rather than the masses. Yet, they both acted to expand, rather than limit, educational opportunities. In Castro's case, the assumptions of public goods scholars are complicated by the fact that his reign was guided by a particular ideology that promoted the advancement of the working class. Despite the political incentive to use public funds to keep the military and bureaucrats loyal, Castro had a stronger ideological incentive to funnel the state's resources into educational expansion, which ultimately won him public support and added legitimacy to his rule.

King Faisal's case suggests the potential for leaders to rise above their political constraints in pursuit of a higher ideal. He was the leader of an autocratic regime, but, on the

issue of girls' education, King Faisal appears to have been an enlightened monarch and progressive ruler. Not only did Faisal ignore the incentives of his office, but he also defied the disincentives, using his position to challenge social and religious norms, in spite of opposition from the public and religious leaders.

In a number of ways, Roosevelt responded more predictably to institutional constraints as set forth by public goods theorists. As an ambitious leader, Roosevelt had a strong belief in his abilities to lift the country out of the Great Depression and, later, lead it through war (Landy & Milkis, 2000). As a democratic president, his opportunity to use his abilities depended on maintaining his popular appeal. Roosevelt's opposition to permanent federal involvement in education provision can be seen as part of his political calculus. When he took office, his priority was to provide broad economic relief and give people a sense of purpose; his education programs served immediate economic and social needs (Fass, 1982). Any foray into federal education reform would have been politically disadvantageous; it was not a foremost public concern. Instead, he maneuvered around the established system to expand educational opportunities, particularly to the poor, without incurring the wrath of state and local authorities and educators. Roosevelt's attention to the most pressing public needs garnered him huge popularity and awarded him an unprecedented three terms in office.

These cases suggest that political leaders are more autonomous than either the world culture or public goods perspectives presume. Their actions are neither predetermined by world norms nor completely constrained by their office. While norms of universal education may drive state's actions to expand schooling, this ideal is also rooted in multiple, including non-Western, origins. Although political institutions can constrain or encourage particular behavior, leaders do not always act as anticipated. The examples of Castro, Faisal, and Roosevelt suggest that leaders

make strategic decisions about education provision that take into account both their idiosyncratic ideas about education and the political environment they face. Each case illustrates leadership as an exercise in judgment: Castro completely revolutionized education to fit his socialist vision; Faisal was visionary but used a cautious approach steeped in tradition; Roosevelt understood himself as the right leader to take America out of depression, as such, he carefully navigated the political system in order to both expand education and maintain public support and his office.

Reconsidering a framework for understanding expansion in a global age

There is significantly more variation in how and why states expand schooling than either world culture theory or the public goods perspectives presume. Using specific examples, I have argued that neither perspective is particularly adept at explaining cases in which individual actors play significant roles in shaping educational policies. The cases examined in this essay suggest that educational expansion is not solely a function of world norms or entrenched institutional rules of domestic politics.

Rather, these examples demonstrate that autonomous decision-making plays a role in educational expansion; the nature of that expansion depends upon how leaders adapt their vision to present circumstances. This is not to suggest, however, that leaders make decisions that are based entirely on idiosyncratic beliefs and values. On the contrary, leaders face global constraints and political incentives. However, these influence the policy choices of leaders in the broadest sense. This essay points to the conclusion that leaders involved in education provision, particularly in the current age of unprecedented global economic integration between developed and developing countries, navigate both national and global contexts and prioritize conflicting incentives to expand education. As such, decision-makers must maneuver strategically between these multiple contexts when forming and implementing educational policy.

The predominant explanations of educational processes presented here have real and very different policy implications for how to achieve international education goals, particularly universal basic education. The world culture perspective implies that education will expand through increased linkages to the world society. Proponents of this approach might advocate for an increased role for international organizations, such as the World Bank or UNESCO, in state policy decisions. Public good scholars argue that internal political conditions drive educational expansion. This perspective might prioritize democratization efforts over international education policy mandates. However, both approaches to policy formation may ultimately be insufficient as they disregard the role of political leaders in international education reform.

This essay exposes two areas for future research on educational expansion. Future research could further develop a framework for understanding the role of individual leaders in expanding schooling as well as elaborate on the examples presented here. Additional research in this area could examine more recent history for examples of how and why leaders, particularly of developing countries, do or do not expand education in light of the ever increasing global pressure to achieve education for all.

Future empirical work could also contribute to the current literature by (a) simultaneously testing tenets of the world culture and public goods hypotheses by accounting for ways in which world culture possibly spreads, such as international organization partnerships or donor-aid recipient relationships and controlling for states' economic conditions, political institutions, and participation in the global economy, and (b) paying attention to some of the methodological concerns discussed here, including a comparison of primary vs. secondary enrollment outcomes, other methodological approaches, and clear sample specification.

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Essay 2

Democracy, the Global Economy, and Foreign Aid A Study of the Institutional Determinants of Educational Attainment

Introduction

Educational systems around the world have greatly expanded since the mid-20th century. Between 1960 and 2010, the average world population aged 15 and over with any formal education increased by 49 percent. In developing countries, the average increased by a striking 82 percent. Concurrently, the average years of schooling increased from 3.7 to 7.8 for the world population, and from 2.6 to 7.1 years for developing countries (Barro & Lee, 2010).¹⁰ More children than ever before are enrolling in school; many are staying there longer. Despite global increases in access to and persistence in formal schooling, educational expansion is not uniform across countries. According to the *2011 EFA Global Monitoring Report*, 67 million children of primary school age remained out of school in 2008 (UNESCO, 2011). Understanding the causes of national variation in educational attainment is important if recent international educational goals, such as the Education for All (EFA) initiative to provide quality basic education to all children, are to be realized.

This essay identifies states as central actors in educational expansion and examines the effect of national and global institutions, specifically democracy, global economic integration, and receipt of foreign aid on the expansion of educational attainment from 1960-2010 using data from a global sample of 128 developed and developing countries. I construct random coefficient models to analyze the effects of national and global institutions on two education outcomes: the average years of education attained in the population and the average years of education attained

¹⁰ Education statistics are from Barro and Lee's (2010) educational attainment dataset. "World" averages reflect data for 146 countries, of which 122 are classified as developing.

in the female population. The first section introduces a framework for studying educational expansion as a function of institutional forces. The second section reviews literature on education expansion from the perspectives of world culture theorists, public goods scholars, and researchers interested in globalization and education. I then make a case for paying particular attention to education attainment rather than more frequently used education expansion measures, such as enrollment rates. The third section presents data and methods. The fourth section discusses empirical findings. The final section concludes.

Institutions and incentives for educational expansion

States can and do expand education by, for example, mandating compulsory schooling, funneling national funds into education, building schools, and sending teachers to rural communities. But why do states behave in these ways? What forces motivate these actions?

In the study of global educational expansion, an institutional framework is often relied upon to address these questions. According to Douglass North, institutions are “the humanly devised constraints that structure human interaction” (North, 1990, p. 3). North, an economic historian, describes institutions as society’s rules of the game. Just as baseball’s rules—three strikes and the batter is out, three outs ends an inning, close calls are left to the umpire’s discretion—organize the game and govern players’ behavior (never would a professional athlete demand a fourth pitch after three strikes), so to do institutions set limits for society and regulate individual and collective human behavior. Political scientists and economists emphasize the structural and organizational features of institutions (Finnemore, 1996); conversely, education sociologists, namely John Meyer and his colleagues, focus on the cultural and social features.

World culture theory, education scholars’ foremost explanation of expansion, argues that all states have an incentive to belong to a broader world society; doing so requires the adoption

of world cultural models, or cultural and social “rules” derived from Western norms and beliefs (Meyer, Boli, Thomas, & Ramirez, 1997, Ramirez and Ventresca, 1992). These scholars attribute worldwide education trends, such as enrollment expansion, to the global adoption of Western cultural norms, such as the belief that all children deserve an education, which constitute an acceptable world culture model for the modern nation-state (Meyer, Ramirez, & Sosyal, 1992). By developing systems of mass schooling, modern nation-states move towards establishing legitimacy (Ramirez & Boli, 1987). Not only do all states adopt world education models in order to establish legitimacy, but the world culture perspective further suggests that once states do establish education systems, education is a self-generating institution that expands regardless of political, economic, or cultural context (Meyer, Ramirez, Robinson, & Boli-Bennet, 1977; Meyer et al., 1992).

One critique of this perspective is that the process through which education trends are diffused globally and adopted nationally is not adequately explained (Cummings, 1999, 2003; Dale, 2000). Cummings (2003) proposes that rather than one world culture, or one institution of education, there are six modern institutions of education that have developed and spread throughout the world concurrently. He attributes each institution to a core society and discusses colonialism’s role in the diffusion of these institutions. Cummings presents two important challenges to world culture theorists: (a) there is not one clearly defined Western set of educational norms and ideals that is distributed around the world and (b) the diffusion of educational institutions is not independent of powerful dynamics between nations.

Cummings (2003) and world culture theory both propose that models of education have been adopted by states around the world. Each perspective, however, fails to adequately explain the diffusion process. Even if these approaches can potentially explain *why* states expand

schooling, they cannot explain *how*. This study seeks to address this gap by offering a more systematic examination of the institutional incentives that motivate states' educational decision-making.

It may be that states expand schooling for entirely different reasons than those proposed by diffusion theories of education models. Researchers as early as Tocqueville (2000) speculated that greater political equality is associated with universal education. Publications by numerous international organizations, among them USAID (2003) and UNESCO (2008), suggest that successful international education reform and universal access to formal schooling are handmaidens of democratic governance. The rhetoric of the relationship between democracy and education is powerful. Yet, if democratic nations are truly more invested in educating their citizens, how can we explain the success of countries with non-democratic institutions, such as Singapore and China, who in the span of 50 years have both reduced the percentage of their populations (aged 15 and over) with no formal schooling by more than 80 percent (Barro & Lee, 2010)?¹¹ Despite a widespread and earnest belief in democracy's role in promoting educational access and participation, there is little empirical analysis examining whether the presence of democratic institutions is systematically related to nations' expansion of formal education and, particularly, attainment of universal primary education

While understanding whether democratic institutions more effectively incentivize nations to expand education than non-democratic institutions is an important consideration of this study, it seems clear that educational decision-making is influenced by global forces as well.

Proponents of a world systems analysis argue that understanding education reform requires a

¹¹ In 1960, 58.3 percent of China's population aged 15 and over had no formal schooling. In 2010, the share had dropped to 6.5 percent. In Singapore, the share fell from 49.4 percent in 1960 to 8.2 percent in 2010.

comprehensive consideration of global power dynamics evidenced, in part, by the global economy and foreign aid recipient-donor relationships (Arnove, 1999; Ginsburg, Cooper, Raghu, & Zegarra, 1990). It may be that these power dynamics are one mechanism through which world cultural models of education spread. Consequently, this study also examines how integration in the global economy and dependency on foreign aid influences decisions about education provision and educational attainment in both democracies and non-democracies. The world systems literature on education reform, however, is often theoretical or oriented towards the study of particular cases. This study seeks to improve on earlier work by explicitly and comparatively testing the effect of global systems on the expansion of educational attainment from 1960-2010 using a data set of 128 countries. Its focus on democratic institutions and global economic pressures will hopefully help to demystify the spread of education and explain, in part, why students in some countries are more likely to enter school and attain more years of education.

The following review of literature examines how the institutions of democracy, the global economy, and aid assistance may incentivize states to expand educational attainment. Political leaders may be incentivized by the desire to establish legitimacy, gain or retain positions of political leadership, build and maintain positive trade relationships, and attract and preserve relationships with aid agencies. Although the tendency in most research is to model and assess the effects of one of the above dimensions, the reality is that all of these institutions may simultaneously, and inconsistently, influence education decision-making and reform. As part of their political calculus, leaders must consider the rewards and sanctions associated with each and prioritize accordingly. This study seeks to build on the existing literature by simultaneously considering the incentives to expand education provided by multiple institutions.

Review of literature

Democratic institutions and the public provision of education

Public good provision scholars argue that domestic political and economic institutions are inextricably connected to education expansion. Democratic institutions, for instance electoral competition, the presence of term limits, restrictions on political leaders' power, and citizen involvement (Besley & Case, 2003), provide incentives for political leaders to invest in public goods. In democracies, leaders are chosen through elections; victory depends on the selection by a relatively large number of voters, or selectorate (Bueno De Mesquita, Smith, Silversson, & Morrow, 2003). In theory, dependency on a large selectorate to retain office motivates democratic leaders to distribute non-exclusive public goods widely among the population, increasing public welfare. Conversely, leaders in autocracies typically gain power with the support of political or military elite and do not rely on a popular vote. As a result, autocratic political leaders may be less sensitive to the interests of the broader public because their constituents tend to be part of a smaller group within society. Thus, they provide exclusive private goods to their loyal supporters, thereby enhancing the welfare of some individuals at the exclusion of the majority of citizens.

In testing these hypotheses, several scholars use education enrollment data as an outcome variable (Baum & Lake, 2003; Deacon, 2003; Lake & Baum, 2001) and find that, generally, democracies provide public goods more broadly than autocracies. In their cross-national analysis of 110 developed and developing countries, Lake and Baum (2001) determine that democracy positively affects public good provision, specifically secondary school enrollment and public health indicators (see also Baum & Lake, 2003). Deacon (2003) also

reports that democracies provide a higher level of education (measured by secondary school enrollment) and health services, as well as better roads and pollution control, than autocracies.

In these studies, however, education is often one of several indicators of public good provision and the emphasis is on public services in general, not education specifically. Brown (1999) is particularly interested in education and models the relationship between democracy and primary school enrollment. He does not, though, consider the broader transnational context of political decision-making. I explicitly include a measure of globalization, economic integration, as an important explanatory variable.

Another body of literature examines the relationship between democracy and education spending (Ansell, 2008; Brown, 2002; Brown & Hunter, 2004; Hecock, 2006; Kaufman & Segura-Ubiergo, 2001; Stasavage, 2005). Using longitudinal data for 14 Latin American countries, Kaufman and Segura-Ubiergo (2001) find a positive effect of democracy on health and education (grouped together) spending. In Brazil, democratization is associated with increases in government spending on education in general and primary education specifically (Brown, 2002). Presumably, as voters gain power to elect officials and competition for government positions increases, political actors are compelled to garner public support by appealing to the ideal of social justice.

Researchers have reported similar findings concerning democratization, increased electoral competition, and increased educational funding for expansion (particularly for primary education) in Africa (Stasavage, 2005a, 2005b), Mexico (Hecock, 2006), and Argentina, Colombia, Venezuela, and Spain (Hanson, 1996, 1997). Brown and Hunter (2004) corroborate these studies with their analysis of longitudinal data from 17 Latin American countries. Similarly, Ansell's (2008) longitudinal analysis of a global sample further finds that democratic

states are more likely to funnel education funds towards publically-provided primary education. Education spending represents one aspect of political investment in education, but cannot ultimately capture educational outcomes. The measure of education expansion I use in this study, countries' average educational attainment, emphasizes educational outcomes and provides another, perhaps more comprehensive, gauge of nations' commitment to educating all citizens.

Global economic integration, foreign aid and education reform

Undoubtedly, public policy is tied to domestic political institutions; yet, countries' human development policies are also shaped by participation in the global economy. To what extent does economic integration, and the demand it places on countries to increase economic growth, change the focus and incentives of governments' provision of public goods? In part, scholars argue that globalization has shifted the attention of nation-states from nationalist projects to economic production (Carnoy, 1999). Increased production requires a skilled labor force; a skilled labor force depends on education and training; an educated population is the engine of economic growth (Barro, 1997). According to the World Bank (2007), success in the global economy requires workers to be better-educated, adaptable, team-oriented, and excellent problem-solvers. Presumably, countries are under pressure to educate all their children in order to stimulate job growth and attract foreign investment.

Despite arguments that globalization has little effect on national education systems (McGinn, 1997), there is limited research on the relationship between economic integration and the expansion of educational attainment. However, there is some evidence to suggest that economic integration is positively associated with public education spending in both autocracies and democracies (Ansell, 2008). This finding indicates that global economic forces may promote state investment in education regardless of national political institutions. My framework,

discussed in detail in the next section, expands on the idea that global economic competition, and its accompanying demands, may propel some nations to increase public education provision, regardless of regime type.

World systems approaches to education reform consider the distribution of dominant norms and ideas, the processes of the global economy, and the effects of aid agencies (Ginsburg et al., 1990). These topics are not mutually exclusive but highly interwoven. Dale (2000) describes one effect of global economic change as the, “ceding (of some) of individual states’ powers to supranational bodies, which consequently become major actors in the determination of their educational agendas” (p. 441). Research suggests this is particularly the case in poor countries. During the 1990s, Arnove, Franz, Mollis and Torres (1999) find that the Latin American debt crisis forced countries to rely on organizations such as the World Bank and the IMF for financial support. In exchange, nations adopted the education policy agenda of the donor agencies. Samoff (1999) reports similar findings from Africa, where a strong postcolonial political will to expand education was unmatched by the material resources to sustain expansion. African countries, like countries in Latin America and other areas of the world, turned to foreign funding and thus opened themselves to the education ideas and reforms touted by donors, “although external resources amounted to a very small portion of total spending on education, their direct and indirect influence on policy and programs was often substantial” (p. 427). This evidence suggests that the donor-aid recipient relationship is an important pathway through which international educational goals are disseminated and implemented and may help explain the expansion of educational attainment.

Educational attainment: An improved measure of expansion

Educational expansion can be defined in a variety of ways. Research approaches based in political science or economics often measure expansion in regards to educational spending. Cummings (2003) describes expansion in terms of quantity of education and distinguishes between enrollment expansion and access expansion. Enrollment expansion refers to an increase in sheer numbers of students enrolling in school; access expansion is measured by the proportion of school enrollees to the total number of children in an age cohort. Although enrollment ratios provide a sense of how widespread initial access to education is, and are frequently used in the expansion literature, they incompletely capture the school experience of children after they enroll. Yet, educators, national governments, and international organizations such as the World Bank and UNESCO are increasingly interested in whether enrolled students actually attend school, remain in school or dropout, repeat grades, and complete the number of school years deemed appropriate for a basic education.

With that in mind, I propose an alternative definition of educational expansion: attainment expansion. Attainment expansion is the increase of not only children within a school age cohort enrolling in school, but also the amount of years that children around the world are, on average, remaining in school. Attainment expansion, in so far as it captures persistence in school, may indicate education quality in addition to quantity. As such, completion data rather than enrollment data may better capture attainment expansion in education. Using education data compiled by UNESCO, as well as their own estimates of completion levels, Barro and Lee (2010) estimate a complete set of educational attainment data for 146 countries in five-year intervals from 1950-2010. Descriptive analyses provided by the authors indicate that, over time and in all regions of the world, the average number of years of schooling in the population 15

years and older has steadily increased. Barro and Lee's 2010 data set updates and improves upon earlier measures of educational attainment published in 1993, 1996 and 2001. Designed as a measure of human capital and commonly used in analyses of economic growth (for instance, Easterly & Levine, 1997), this data is underutilized by scholars wishing to explain educational phenomenon. As such, it provides an exciting testing ground on which to explore theories of national and global institutional effects on attainment expansion.

A framework for understanding education attainment

The institutions of interest in this study are categorized as operating in distinct national and global environments. Unlike world culture or public good provision research, the framework proposed here does not assume that global institutions reproduce without the aid of national institutions or that national institutions provide incentives to increase educational opportunities independently of global forces. Instead, it acknowledges that there are different levels of institutions (and their accompanying incentives) and suggests that, under certain conditions, some countries will be more responsive to national institutions and others to global incentives.

Countries that do not depend on larger, richer nations or donor agencies (either through trade or aid relationships) contend less with external forces dictating their policies. As a result, they are likely more responsive to national pressures. Under these conditions, the argument provided by the public provision scholars is convincing. Not only does their logic suggest that democratic institutions incentivize leaders to respond to public demand for services, like education, it also indicates that autocratic institutions (which, for example, constrain public participation in elections and give unrestricted authority to leaders) provide incentives for leaders to make services available to their elite supporters (Baum & Lake, 2003; Lake & Baum, 2001).

Autocracies that are not dependent on global institutions can restrict public services without serious international repercussions.

Democratic institutions may not provide the same incentives in developing nations, defined here as aid recipient countries. In his analysis of education in third world countries, Bruce Fuller (1991) argues that the postcolonial political context of developing countries encourages educational expansion as fragile states seek legitimacy. The building of schools and production of teachers provides a palpable way to gain public trust and support. This perspective suggests that a relatively developing country with non-democratic institutions has a strong incentive to spread schooling opportunities. Consequently, in developing countries, both democracies and autocracies may expand schooling, although they may not do so uniformly. Democratic institutions may provide additional incentives to equally invest in girls' education, something that, for many countries, has lagged behind the expansion of schooling for boys (UNESCO, 2003).

Additionally, for many developing nations, global pressures to expand educational attainment may overshadow the incentives provided by national institutions. Governments' quests for legitimacy require resources. Regardless of a particular regime's educational agenda, implementing it is secondary to gaining resources. The possible ramifications of failing to comply with international educational goals, such as withdrawal of foreign aid or trade sanctions, could be catastrophic for a poor country. As such, countries that are dependent on economic integration and/or foreign aid subsidies may have strong incentive to expand educational attainment. Despite the presence of national institutions and agendas, countries operating under these conditions are likely more responsive to global incentives and more willing to promote the international ethos of education for all.

I hypothesize that, in general, national, democratic institutions promote increases in educational attainment. However, in developing countries, I expect that global institutions guide the expansion of educational attainment while the effect of national, democratic institutions is trivial.

Description of data

The data set for this study consists of observations for 128 countries in 5-year periods from 1960 to 2010. Of these 128 countries, 108 are recipients of foreign aid and therefore classified as developing. In political science, data characterized by repeated measures of fixed political units (such as countries) is commonly referred to as “time-series-cross-section” (TSCS) data (Beck, 2001). Multiple data sources were drawn from to create a comprehensive TSCS data set that includes measures of educational attainment, democracy, economic integration, foreign aid and other country characteristics. Table 1 provides a description of all variables, while Appendix A provides summary statistics.

As discussed below, the dependent variable is an estimate of educational attainment at 5-year intervals. In order to avoid analysis of contemporaneous covariates, observations for each independent variable represent the average value of that variable during the 5 year period ending with year t . The value of independent variable X in year t is thus an average of X over years t , $t - 1$, $t - 2$, $t - 3$, and $t - 4$. For example, the 2010 observation for democracy in country k represents the average of all values of democracy in country k from 2006 to 2010. This coding allows the independent variables to reflect a country’s average political, economic, and demographic climate prior to its current education attainment status. The only independent variable to which this coding does not apply is the lagged dependent variable. The inclusion of the lagged dependent variable reflects a country’s average educational attainment from the previous period

Table 1: Independent variables used to explain the expansion of educational attainment

<i>Variable</i>	<i>Operationalization</i>	<i>Source</i>
Lagged dependent variable	Continuous variable, lagged one 5-year period	Barro and Lee (2010)
Democracy	5 year average derived from “polity2”, 20-point scale from -10 (most autocratic) to 10 (most democratic)	Polity IV project
Economic integration	5 year average derived from logged “openk”, a measure of total trade (imports+exports)/GDP in constant 2005 international dollar values	Penn World Table 7.1
Development Aid	5 year average derived from logged “Net official development assistance and official aid received (constant 2010 US\$)”, a measure of total ODA in constant 2010 U.S. dollars, divided by World Bank estimates of total population by country-year	World Development Indicators
Wealth	5 year average derived from logged “Rgdpl”, a measure of PPP converted GDP per capita in constant 2005 international dollar values	Penn World Table 7.1
Rural	5 year average derived from “Rural population (% of total population)”, signifying the percent of rural population relative to the total population	World Development Indicators
Population growth	5 year average derived from “Population growth (annual %)”, a measure of annual percent change in total population	World Development Indicators

and is therefore denoted with the subscript “ $t-5$ ”. This means that the 2010 observation for the lagged dependent variable in country k represents country k ’s average educational attainment in 2005.

Dependent variable

This study uses Barro and Lee’s (2010) educational attainment data set to measure attainment expansion. This data set includes estimates for 146 countries in 5-year periods from 1950-2010. Unlike other longitudinal data sets which measure student enrollment, Barro and Lee estimate completion rates at the primary, secondary, and post-secondary levels, in addition to average years of schooling and percentage of no schooling in the population. Attainment data offers a better indication of nations’ commitment to providing sustained education than mere enrollment rates, which do not indicate whether students actually attend or stay in school. Education attainment in this study is specifically measured by average years of schooling attained in the population aged 15 and older. In order to test the hypothesis that all countries have an incentive to expand schooling in general, but democratic countries may further expand educational opportunities for girls, I also examine the average years of schooling attained for the female population.

Primary independent variables

Political institutions are measured by a country’s polity. The Polity IV project’s “Polity 2” variable measures regime type on a continuous scale of -10 to 10 (Marshall & Jaggers, 2011). A -10 score on the polity scale refers to a “fully institutionalized autocracy” while a score of 10 indicates a “fully institutionalized democracy”. The polity scores are derived from six measures of political competition, restraints on executive power and executive recruitment and are a widely used measure of democracy in political science literature. Although this scale is

sometimes used to create a dichotomous democracy variable (Kaufman & Segura-Ubiergo, 2001), the continuous measure of regime type is most commonly used to represent democratization in the public good provision literature (Ansell, 2008; Baum & Lake, 2003; Brown & Hunter, 2004; Lake & Baum, 2001). Similarly, I also use the continuous polity score to measure democracy. The use of this measure defines what democracy means in this study. When the terms democracy or democratic institutions are used, they refer specifically to how leaders are selected into the executive, the extent to which their power is limited, and the degree of political participation by a broad constituency.¹²

Economic integration is most commonly measured as a trade-to-GDP ratio. This ratio is often derived from the World Bank's *World Development Indicators* (2012). However, the more comprehensive source of data for this variable is the *Penn World Table 7.1* (Heston, Summers, & Aten, 2012). This study uses the *Penn World Table 7.1* variable "openk" as the measure of economic integration. Derived from World Bank and United Nations data, "openk" is total trade (imports+exports)/GDP in constant 2005 international dollar values.

There are several ways to measure aid assistance. I use a fairly comprehensive measure of official development assistance and aid (measured in constant 2010 U.S. dollars) from the *World Development Indicators* database. This variable captures the total disbursements of loans and aid flows from official donors to recipient countries. As is conventional in the literature, I log all economic variables. This improves the clarity of interpretation as well as shrinks the range of values, mitigating the influence of potential outlying observations.

¹² Although the Polity IV project data is commonly used to measure countries' political institutions, it is not the only way to define and measure democracy. Another popular measure comes from the Freedom House index which accounts for political rights and civil liberties. Although these measures define and operationalize democracy differently, the Polity IV and Freedom House data are highly correlated, $r=.91$ (Lake & Baum, 2001).

Control variables

It is imperative to control for country wealth. This variable is measured by GDP per capita and comes from the *Penn World Table 7.1*. Presumably, richer countries have more resources to devote to education. Indeed, a number of studies suggest that there is a positive relationship between country wealth and school enrollment (Baum & Lake, 2003), as well as country wealth and education spending (Ansell, 2008). Therefore, it is necessary to account for a likely positive relationship between national wealth and education attainment.

Additional control variables include the percent of the population living in a rural area and the annual population growth rate. Countries with a higher percentage of city dwellers may also have higher educational attainment rates as education resources, particularly in developing countries, tend to be more concentrated in cities. Evidence suggests that school infrastructure and teacher quality often is inadequate in rural areas and rural children are more likely to never attend or drop out of school (UNESCO, 2008). Females in rural areas, especially in developing countries, may have particularly low educational attainment due to a number of reasons such as a shortage of appropriate facilities, family responsibilities, and financial constraints (UNESCO, 2003).

I also include a measure of the annual population growth rate. The inclusion of this variable is relevant for two reasons. First, countries with high population growth may struggle to provide education on a scale that matches the demand. Second, these countries may invest in basic education at the expense of advanced educational opportunities. Therefore, in such cases, average educational attainment may be low. Data for rural population and population growth are from the *World Development Indicators* (2012).

Lastly, a final control is the lagged dependent variable. The inclusion of this variable accounts for each country's prior level of educational attainment. In part, it controls for the world culture thesis that education is a self-generating phenomenon. It also ensures that the effect of other explanatory variables is constrained to the change in educational attainment from one period to the next.

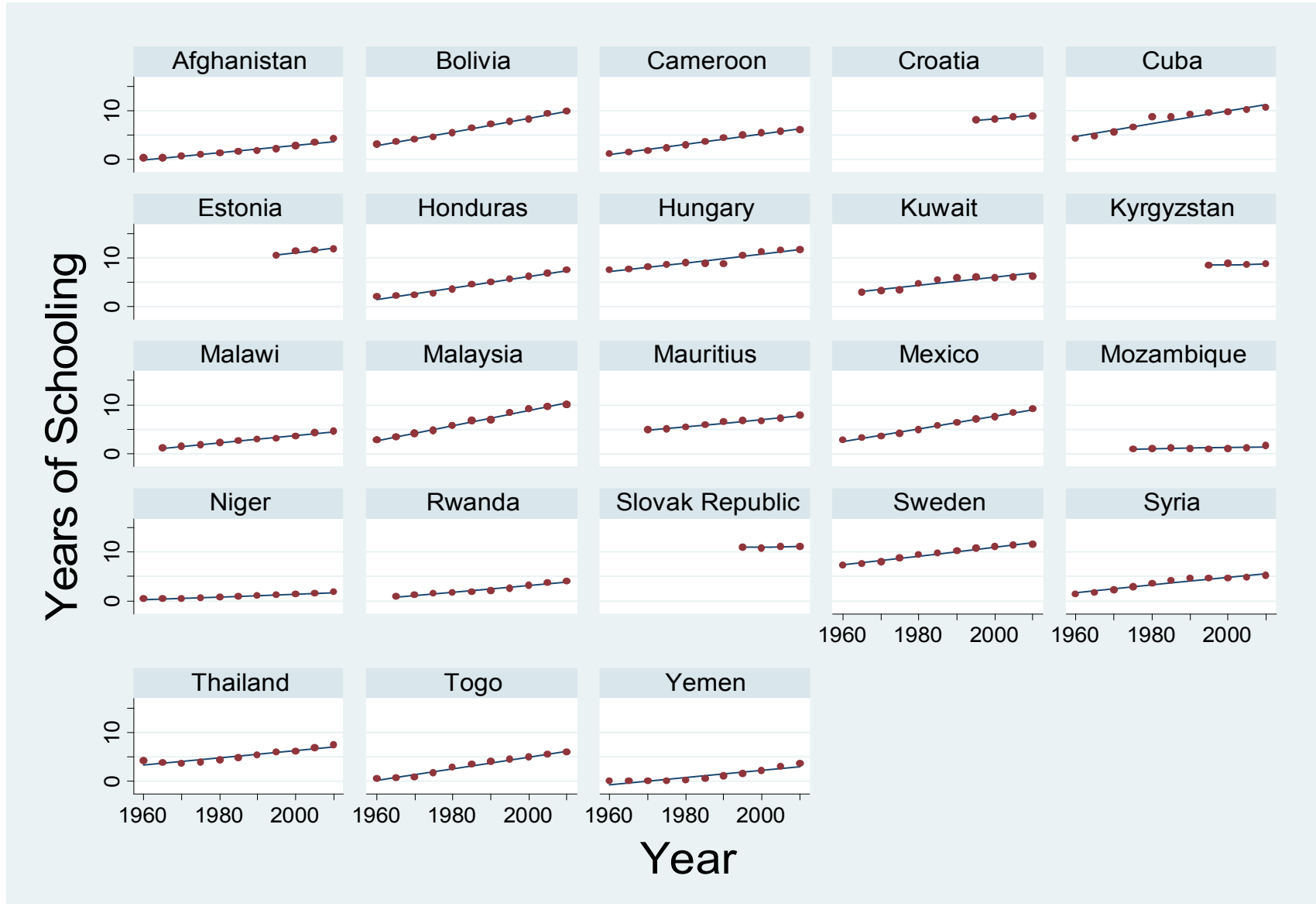
Descriptive analysis

Attainment expansion

Before specifying the empirical approach, I first report some basic patterns in the data. Figure 1 displays the trajectory of education attainment over time for 23 countries, randomly selected from my data set of 128 countries. Individual country graphs indicate that the data set is unbalanced; the number of years for which data is available varies by countries. Croatia, for example, does not enter the data set until 1995. However, observations from enough time periods are available for all countries to still construct a trajectory of education attainment. Further, the unbalanced nature of the data does not pose a problem for statistical analysis as the empirical approach described in the next section does not require data to be balanced.

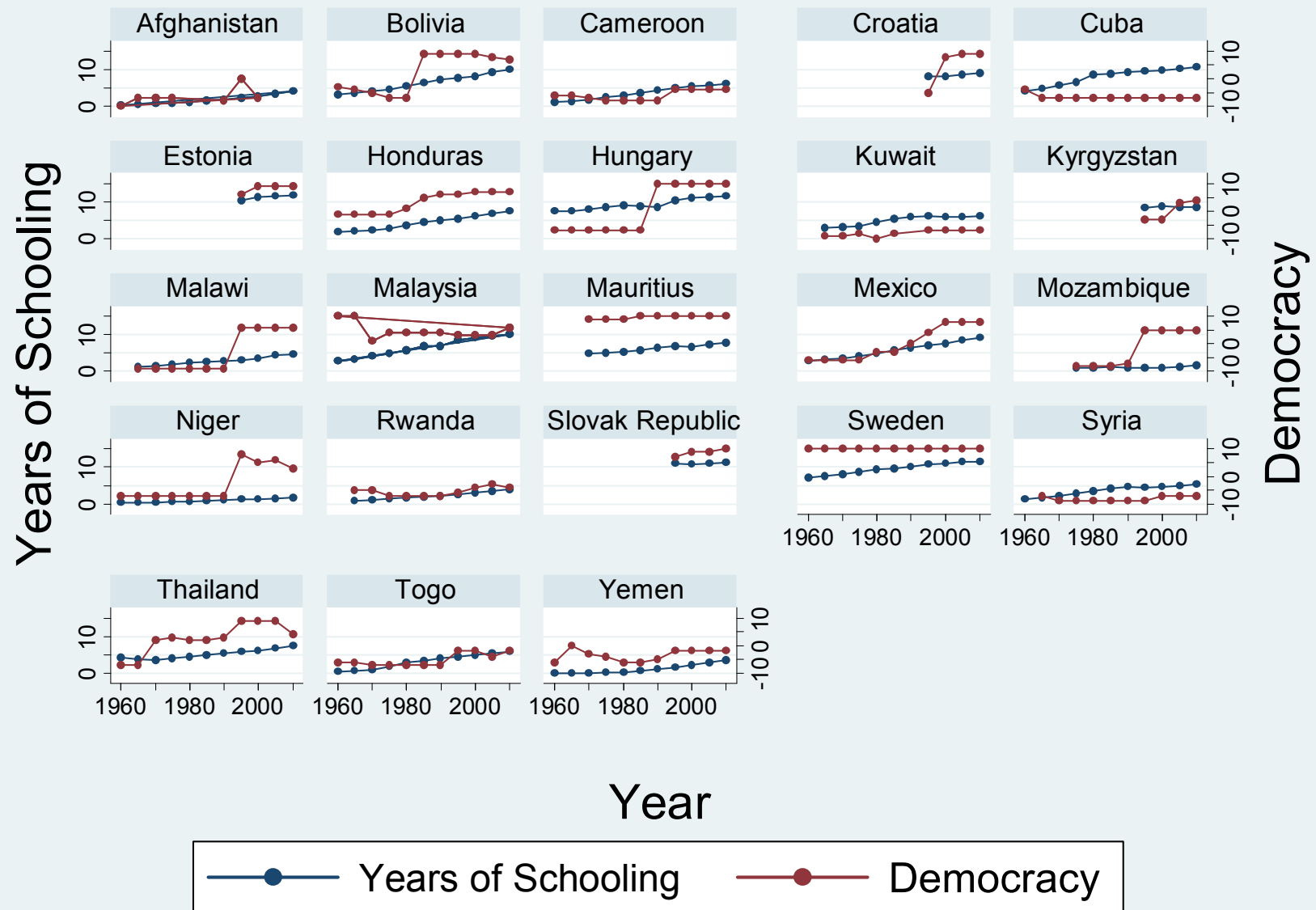
Figure 1 verifies that, for most countries, educational attainment has expanded over time. The country-specific growth plots also suggest that the intercepts of the trajectories vary across countries. In 1960, for example, Afghanistan enters the data set with less than half a year of average schooling attained in the population aged 15 and older. In contrast, Cuba's average schooling attainment in 1960 is nearly 5 years. It is also evident that countries do not expand educational attainment at the same rate. The slopes of the growth trajectories differ across countries. For instance, while Mozambique and Syria enter the data set with low levels of average attainment, the slope of Mozambique's trajectory is nearly flat while Syria's

Figure 1: Trajectory of average years of schooling attained from 1960-2010, by country



*For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this dissertation.

Figure 2: Trajectories of democracy and average years of schooling attained from 1960-2010, by country



demonstrates a more rapid rate of change. In all cases, the growth plots suggest a linear relationship between time and the expansion of educational attainment.

Democracy and attainment expansion

Of course, the intention of this study is to explain the expansion patterns of educational attainment evident in Figure 1. Figure 2 adds each country's democracy trajectory to its education growth plot. A visual inspection of the data reveals that, in most cases, education attainment follows a positive trajectory over time regardless of political context. Although some countries, such as Mexico, display parallel processes of attainment expansion and democratization, others experience attainment expansion despite little variation in political institutions. Sweden, for example, enters the data set as a democracy and stays that way throughout the study period. Conversely, Cuba enters as an autocracy under the rule of Fidel Castro and remains autocratic for the entire study period. Yet, both countries experience a steady growth in education attainment.

Based on the visual depictions of data, it is unclear whether the presence of democratic institutions fosters education attainment. The next section describes the statistical methods used to analyze this relationship in more detail.

Empirical approach

The TCSC data used in this study is a form of clustered data, where repeated measures are nested within countries. Total variation in the dependent variable can be explained by both within-country changes over time and between-country differences. Clustered data can promote unobserved heterogeneity, where the means of the dependent variable vary across countries (or any unit, I use "country" throughout the discussion of methods simply because that is the unit of analysis in this study) due to unobserved country-specific characteristics or factors. Often, it is

not possible to measure these characteristics, yet the omission of these factors can result in biased estimates.

Researchers have dealt with the challenge of heterogeneity bias in a number of ways. Some researchers simply ignore this issue, pool their data across time and countries, and analyze the pooled data using OLS regression. This approach assumes that all countries are homogenous, an assumption that likely does not hold when considering educational expansion. A more conservative approach is the fixed-effects method, which solely models the within-country variation and accounts for unobserved country characteristics by essentially using each country as its own control. Although this method is widely used, particularly in political science and economics research, it neglects the between-country variation in the dependent variable. This approach may be too restrictive (Beck & Katz, 2007), particularly if only a small proportion of the total variation in a particular data set can be explained by within-unit variation.

Beck and Katz (2007) demonstrate that random coefficient models provide an underused but valuable approach to the analysis of TCSC data. Random coefficient models, also known as growth models, mixed models, multilevel models, and hierarchical models (Singer & Willett, 2003), allow for analysis of both within and between-country variation. Unobserved heterogeneity represents the differences between countries in the average level of the dependent variable; the random coefficient model explicitly accounts for this difference by parceling random error into within-country (ε_{ij}) and between-country (μ_{0i} and μ_{1i}) components (Bartels, 2008; Raudenbush & Bryk, 2002; Singer & Willett, 2003). This method mitigates the problem of a cluster-correlated error which biases pooled OLS results, and can explain more of the total variation in the outcome of interest relative to the fixed-effects approach.

Clustered data may also potentially confound inferences about the effects of predictor variables, particularly when those variables are time-varying (Bartels, 2008; Curran & Bauer, 2011; Zorn, 2001). In many cases of TCSC data, it is likely that time-varying predictors have distinct within-country (longitudinal) and between-country (cross-sectional) effects, yet these disaggregated effects are not generally modeled. The time-series cross-sectional nature of such data can be captured by subscripts i and j , which denote the unit of measurement (country, in this case) i at time j . Bartels (2008) proposes a method that allows each time-varying predictor, X_{ij} , to have two effects on the dependent variable: a within-effect over time (where $\dot{X}_{ij} = X_{ij} - \bar{X}_{i0}$) and a between-effect across units ($\bar{X}_{i0}$). The within-effect, $\dot{X}_{ij}$, reflects the variation of a predictor from its unit-specific mean, $\bar{X}_{i0}$, while the between-effect is derived from the unit-specific mean over time. This method, in fact, is analogous to the group-mean centering approach in multilevel models (Raudenbush & Bryk, 2002; Singer & Willett, 2003). Horney, Osgood, and Marshall (1995), for example, use this variable specification in their analysis of time-varying predictors in a multilevel model.

I use the following random coefficient model to analyze countries' educational attainment:

$$\begin{aligned} DV_{ij} = & \gamma_{00} + \beta_1(\text{LaggedDV}_{ij(t-5)} - \overline{\text{LaggedDV}}_{i0}) + \beta_2(\text{Democracy}_{ij} - \overline{\text{Democracy}}_{i0}) \\ & + \beta_3(\text{Econ int}_{ij} - \overline{\text{Econ int}}_{i0}) + \beta_4(\text{Wealth}_{ij} - \overline{\text{Wealth}}_{i0}) + \beta_5(\text{Rural}_{ij} - \overline{\text{Rural}}_{i0}) \\ & + \beta_6(\text{Pop}_{ij} - \overline{\text{Pop}}_{i0}) + \gamma_{01}\overline{\text{Democracy}}_{i0} + \gamma_{02}\overline{\text{Econ int}}_{i0} + \gamma_{03}\overline{\text{Wealth}}_{i0} + \gamma_{04}\overline{\text{Rural}}_{i0} \\ & + \gamma_{05}\overline{\text{Pop}}_{i0} + \text{Time}_{ij} + [\mu_{0i} + \mu_{1i}\text{Time}_{ij} + \varepsilon_{ij}] \end{aligned}$$

Where DV represents either average years of schooling attained in the total or female population aged 15 and above, β_1 - β_6 represent the within-effects of each explanatory variable, and γ_{01} - γ_{05} represent the between-effects. γ_{00} represents the average initial status (years of schooling attained in 1960); γ_{10} represents the average rate of change, controlling for all predictors (Singer & Willett, 2003). A between-effect for the lagged DV is not included as it is not substantively meaningful (Bartels, 2008).

The composite error term is provided in brackets. This equation illustrates how the random coefficient model allows the values of each country's growth parameters (initial status and rate of change) to vary around the average population trajectory. The between-country residual, μ_{0i} , accounts for random variation in country differences in average initial educational attainment, while μ_{1i} allows the rate of educational expansion to vary across countries. The last error term, ε_{ij} , is the within-country residual and reflects the remaining portion of the DV for country i at time j that is not explained by the included predictors. This equation reflects the statistical model for analysis of the full sample of 128 countries. The only change to this model using the subsample of aid-recipient countries is the inclusion of both the within and between effects of foreign aid. All random coefficient models are estimated using maximum likelihood.

Results

Table 2 provides estimates for the random coefficient model where the dependent variable is average years of schooling attained in the total population aged 15 and older. The table displays within and between-effect sizes for each explanatory variable of interest, the random error variance components, and goodness-of-fit measures. The variance components

simply represent the variance of the residuals ε_{ij} , μ_{0i} , and μ_{1i} as σ_{ε}^2 , σ_0^2 , and σ_1^2 , respectively.¹³

Although it is possible to construct pseudo R^2 statistics from the variance components to compare goodness-of-fit across models, these statistics cannot be used in conjunction with time-varying covariates. Instead, Singer and Willett (2003) propose examining deviance, AIC, and BIC statistics to compare models that fit identical data. For each statistic, the model with the smaller value implies a better fit and is preferable.

Models A, B, and C in Table 2 provide progressively more sophisticated models for countries' expansion of educational attainment and represent the full sample of 128 countries. Model A is a simple unconditional growth model. This model divides the total variation in the outcome into within-country variance and between-country variance. This allows for estimation of the interclass correlation coefficient (ICC), which describes the share of between-country variance in relation to total variance. The equation to calculate the ICC is:

$$\rho = \frac{\sigma_0^2}{\sigma_0^2 + \sigma_{\varepsilon}^2}$$

Using this model to calculate the ICC for Model A yields:

$$\hat{\rho} = \frac{7.711}{7.711 + 2.211} = .77717$$

This indicates that 77.7 percent of the variation in educational attainment is attributable to differences between, rather than within, countries.

¹³ There is not a standard way to label variance components. I adopt Singer and Willett's (2003) approach.

Table 2: Random coefficient model results, total population

Dependent Variable: Average years of schooling, total population aged 15 and older

	Model A Unconditional Means Model	Model B Unconditional Growth Model	Model C Growth Model: All countries		Model D Growth Model: Aid recipient countries	
			Within- country effects	Between- country effects	Within- country effects	Between- country effects
Lagged DV			0.699*** (0.020)	---	0.754*** (0.022)	
Democracy			-0.002 (0.003)	0.069* (0.028)	-0.004 (0.003)	0.060* (0.029)
Economic integration			-0.046 (0.036)	0.456* (0.216)	-0.012 (0.034)	0.501+ (0.271)
Development Aid			---	---	0.007 (0.009)	0.086 (0.127)
Wealth			0.101* (0.047)	0.914*** (0.200)	0.082+ (0.044)	1.047*** (0.227)
Rural			-0.015*** (0.003)	-0.020* (0.010)	-0.014*** (0.003)	-0.018+ (0.011)
Population growth			-0.013 (0.011)	-0.688*** (0.123)	-0.000 (0.013)	-0.801*** (0.127)
Time		0.466*** (0.016)	0.101*** (0.012)		0.089*** (0.013)	
Constant	6.294*** (0.250)	3.523*** (0.264)	-1.621 (2.168)		-2.913 (2.291)	
Observations		n=128, T(avg.)=8.9 Tot. Obs.=1,136			n=108, T(avg.)=8.1 Tot. Obs.=871	
Variance Components						
σ_{ε}^2	2.211***	0.0885***	0.0612***		0.0550***	
σ_0^2	7.711***	8.766***	2.335***		2.147***	
σ_1^2		0.0304***	0.00247***		0.00146***	
Goodness of fit						
Deviance	9140.4	1689.3	919.7		630.7	
AIC	4570.2	1701.3	953.7		668.7	
BIC	4585.3	1731.5	1039.3		759.4	

Model B describes the unconditional growth model, where the only predictor is time. This model helps determine whether there is any statistically significant variation in the growth parameters that could be further explained by the inclusion of additional explanatory variables. The within-country residual variances, σ_{ε}^2 , for the unconditional growth model is smaller relative to the unconditional means model, suggesting the presence of a time trend, or a linear relationship between average educational attainment and time. It is also statistically significant ($p < .0001$), meaning the null hypothesis that the population variance equals 0 can be rejected. This indicates that additional time-varying predictors should be added to the model to further explain within-country variation in educational attainment. The null hypotheses for both between-country residual variances can also be rejected ($p < .001$), suggesting there is between-country variation in educational attainment that can be further accounted for by adding additional predictors to the model.

Model C provides results for the full model, including all explanatory variables. The group-mean centering of all time-varying covariates allows for examination of two main questions: (a) how do deviations in covariate X_{ij} from its group-mean affect educational attainment? and (b) do countries with higher average values of an explanatory variable over time, $\bar{X}_{i0}$, have higher educational attainment on average? Interpretation of coefficients' magnitude can be difficult; in particular, there is not a universal approach to interpreting between-effects derived from the method described in the previous section. Allison (2009) does not interpret them; Bartels (2008) and Zorn (2001) do interpret the between-effects, but emphasize the practical nature of a given effect rather than the magnitude. I follow Bartels and Zorn and describe the direction and statistical significance, rather than the magnitude, of the within and between-effects.

The results suggest that the within-country effect of the lagged DV is positive and statistically significant ($p < .001$). For a given country, past increases in educational attainment are related to current increases. In other words, as the population becomes educated, it continues to become more educated over time. This finding provides some support to world culture arguments that education is a self-generating process; however, these results do not suggest that prior educational attainment provides the only explanation for attainment expansion.

Within-country variation in the average years of schooling attained can, in part, be explained by country wealth and the percent of the rural population. Technically, the coefficient on wealth indicates that deviations from country-mean wealth levels have a positive impact on educational attainment. Practically, the implication is that as a given country becomes richer, the average years of schooling attained in the population increases ($p < .05$). This finding is consistent with other research that suggests wealthier countries may be more able to invest in education (Ansell, 2008; Baum & Lake, 2003). Conversely, increases in the proportion of rural inhabitants over time negatively impact the educational attainment of a given country ($p < .001$). This finding is expected and likely represents the documented challenges of basic educational provision, attendance, and quality in rural areas, particularly in developing countries.

Model A indicates that the majority of the total variation in the DV can be explained by between-country variation. Therefore it is not surprising that the between-effects have more explanatory power than the within-effects in the conditional model (Model C). All of the between-country effects are statistically significant. Countries that are more democratic, on average, have higher average levels of educational attainment ($p < .05$). How can the overall effect of democracy on educational attainment be interpreted, especially considering the statistically insignificant within-country effect? These findings suggest that democratization for a given

country over time does not significantly increase educational attainment; however, sustained high levels of democracy are associated with more schooling attained by the population. The results suggest a relationship between democracy and educational attainment, but may not fully capture within-country effects. As only 11 time periods are measured, it may be that there is simply not enough within-country variation in the data to capture the true effects of democratization.

Countries that are generally more economically integrated through trade in the world economy also have higher levels of educational attainment on average, relative to less integrated countries ($p < .05$). Although relatively little research has examined this relationship, and therefore it is hard to situate this finding within a body of literature, this result complements Ansell's (2008) finding that economic integration has a positive effect on public education spending. This relationship between economic integration and educational attainment suggests that sustained integration into the world economy may induce countries to (a) increase their skilled labor force and/or (b) adopt international education goals.

Results from control variables are as expected. Similar to the within-country effect, the between-country effect of wealth positively and significantly predicts educational attainment. Not only does educational attainment expand as countries become richer, but the population in wealthier countries generally has attained more years of schooling, on average, relative to the population in less wealthy countries ($p < .001$). The between-country effect of rural population also mirrors that of the within-country effect; generally, countries with a higher proportion of their total population residing in rural areas have fewer average years of schooling attained by the population compared to more urbanized countries ($p < .05$). Lastly, countries that have

experienced greater average levels of population growth have significantly lower educational attainment relative to countries with lower average levels of population growth.¹⁴

Since time-varying predictors change the interpretation of the variance components, variance components from Models A and B cannot be compared to Model C. Therefore, the goodness-of-fit statistics provide the best way to compare models. Across Models A through C, the deviance, AIC, and BIC statistics all get progressively smaller. This implies that, of the three models, Model C fits the data the best.

Model 4 displays results for the sample of developing countries. The magnitude and statistical significance of effect sizes are similar to those of the full sample. The inclusion of development aid as an explanatory variable does not have a significant within or between-country effect. This finding is consistent with other research on foreign aid effectiveness in promoting educational outcomes. Michaelowa and Weber (2007) find that foreign aid does not exhibit a strong effect on school enrollments at the primary, secondary, and tertiary levels for a sample of low to middle-income countries. Where findings are significant, the effect sizes are small. The authors surmise that the level of aid received by the countries in the sample is simply not high enough to significantly impact educational outcomes.

¹⁴ An alternative specification, more commonly used in growth curve analysis, is to remove the lagged DV from the model. Results (not displayed here) indicate that removing the lagged DV does not drastically change the general findings. For all four conditional growth models (Models C and D in Tables 2 and 3), the exclusion of the lagged DV does not dramatically change the effect sizes or statistical significance of the between-country effects. However, for the within-country effects, country wealth is no longer statistically significant. Thus, when the lagged DV is excluded from the model, the size of the rural population is the only significant within-country effect. The effect size remains relatively the same and negative. Another, less common, specification is to include the lagged DV in its raw metric, rather than mean-deviated, form. Results (not displayed here) indicate that the inclusion of the raw lagged DV renders all other effects, with the exception of the within-country effect of the rural population, statistically insignificant, including the time effect.

Table 3: Random coefficient model results, female population

Dependent Variable: Average years of schooling, female population aged 15 and older						
	Model A Unconditional Means Model	Model B Unconditional Growth Model	Model C Growth Model: All countries		Model D Growth Model: Aid recipient countries	
			Within- country effects	Between- country effects	Within- country effects	Between- country effects
Lagged DV			0.716*** (0.020)	---	0.766*** (0.021)	---
Democracy			0.000 (0.003)	0.086** (0.030)	-0.003 (0.003)	0.077* (0.032)
Economic integration			-0.074* (0.036)	0.532* (0.237)	-0.043 (0.035)	0.542+ (0.295)
Development Aid					0.003 (0.009)	0.094 (0.138)
Wealth			0.140** (0.048)	1.033*** (0.219)	0.124** (0.045)	1.182*** (0.246)
Rural			-0.012*** (0.003)	-0.020+ (0.011)	-0.011*** (0.003)	-0.018 (0.012)
Population growth			-0.017 (0.011)	-0.667*** (0.135)	-0.010 (0.013)	-0.805*** (0.138)
Time		0.492*** (0.017)	0.110*** (0.012)		0.098*** (0.012)	
Constant	5.891*** (0.271)	2.930*** (0.268)	-3.448 (2.375)		-4.715+ (2.490)	
Observations		n=128, T(avg.)=8.9 Tot. Obs.=1,136			n=108, T(avg.)=8.1 Tot. Obs.=871	
Variance Components						
σ_{ε}^2	2.360***	0.0924***	0.0654***		0.0571***	
σ_0^2	9.109***	9.007***	2.607***		2.412***	
σ_1^2		0.0340***	0.00233***		0.00140***	
Goodness of fit						
Deviance	4651.0	1758.8	998.8		673.4	
AIC	4656.9	1770.8	1032.7		711.3	
BIC	4672.0	1801.0	1118.3		802.0	

The results for educational attainment in the female population, provided in Table 3, also do not vary markedly from the findings already described. The relationships discussed for Table 2, Model C essentially hold whether the outcome is educational attainment for the total or female population, and regardless of whether the sample consists of all countries or developing ones. The hypothesis that democratization, especially in developing countries, may lead to increased educational attainment for girls is not supported by the evidence.

The only result that distinguishes the models is a negative and statistically significant within-country effect of economic integration on educational attainment for the female population. However, the coefficients, standard errors, and direction of the relationship for the economic integration variable for both the total and female population models are nearly identical.

Rather than pointing to a strong difference between models, the significant finding ($p < .05$) for the female population model suggests that, across models, the within-country effect of economic integration is, if anything, only weakly significant. In addition, there is nothing in the extant literature to suggest the negative direction of this relationship, although research on the relationship between trade integration and educational outcomes has focused on education spending rather than attainment (Ansell, 2008; Avelino, Brown, & Hunter, 2005; Kaufman & Segura-Ubiergo, 2001). Avelino, Brown, and Hunter (2005) find, for example, a positive effect of economic integration on education spending. Increased spending does not necessarily produce equal educational opportunities and outcomes, however, and it may be that global economic pressures may incentivize countries to invest in education generally but not in girls education in particular. Future research could further explore this relationship.

Although the findings presented here suggest similar effects of national and economic institutions across models, these results should be interpreted with caution. One of the limitations of using country-level data is that a significant amount of variation in the variables is averaged out and the analysis becomes less nuanced. A data set that uses a lower level of analysis, such as individual, community, district, or state, may better reflect the variation in female's education attainment and may therefore better capture differential effects of democracy on education attainment in the total vs. female populations. Furthermore, one reason why this study does not find strong differences between the full sample of all countries and developing countries may be that the two samples are not drastically different; the full sample includes the developing countries plus twenty additional developed countries. A data set that includes more comprehensive time series coverage would increase the overall sample size and allow for separate analyses of developed and developing countries. This approach may allow for a better comparison of the potentially differential effects of political and economic institutions in developing countries.

Conclusion

Prominent theories of educational expansion offer narrow explanations for why states expand schooling. The world culture approach suggests all legitimacy-seeking states build systems of education as a response to world norms; once created, these systems naturally expand. Theories in political science hypothesize that democratic institutions incentivize states to broadly provide public goods, including education. World systems scholars argue that power dynamics between countries influence state action, particularly in aid-dependent developing countries.

This study integrates these theories by providing a model to simultaneously test their assumptions in relation to education attainment expansion. In a departure from the typical

empirical approach to TCSC data, I pay particular attention to the clustered nature of the data and parcel out within and between-country effects of the explanatory variables. Doing so provides a more precise explanation of attainment expansion. I find that past levels of education attainment, country wealth and a growing rural population have significant within-country effects on education attainment expansion. Education systems that have expanded in the past are likely to expand in the present; however, attainment expansion requires resources and can be adversely affected by an increasing rural population. Democratic institutions, integration in the world economy, and country wealth have positive between-country effects on education attainment. Countries with higher average population growth and rural populations have lower average education attainment. Foreign aid does not have significant within or between-country effects on education attainment in developing countries.

My research represents a unique contribution to our knowledge about the determinants of international educational policy outcomes, particularly basic education attainment. By synthesizing theoretical frameworks across multiple disciplines, my model picks up on the rich and nuanced connection between political institutions, economic incentives, and educational expansion. This study is particularly salient in light of the *2009 EFA Global Monitoring Report's* focus on the importance of democratic governance in achieving the six goals of Education for All (UNESCO, 2008). While international agencies, such as the World Bank, and developed Western nations encourage democratization reform worldwide, relatively little empirical research examines the relationship between democratic institutions and education outcomes.

The results of this study suggest that the process of democratization itself does not immediately affect attainment expansion. Rather, sustained, high levels of democracy over time are associated with higher average educational attainment. Future research could explore this finding using data

with more comprehensive time-series coverage to better estimate within-country effects of democratization.

APPENDICES

Appendix A

Table 4: Summary statistics, full sample

Variables		Mean	Std. Dev.	Min.	Max
Average years of schooling	o	6.071	3.082	0.236	13.097
	b		2.846	0.907	12.000
	w		1.4010	2.027	9.829
Average years of schooling, female	o	5.64	3.306	0.061	13.152
	b		3.088	0.505	12.008
	w		1.448	1.450	9.578
Democracy	o	1.416	7.266	-10	10
	b		6.085	-10	10
	w		4.109	-12.124	12.756
Wealth	o	8.316	1.282	5.516	11.588
	b		1.252	5.950	11.005
	w		0.335	6.891	10.088
Economic integration	o	3.948	0.681	1.596	6.036
	b		0.583	2.669	5.369
	w		0.361	2.227	5.63
Rural	o	51.063	24.599	0	97.858
	b		23.617	0	94.433
	w		7.298	24.402	88.079
Population growth	o	1.839	1.361	-4.880	15.238
	b		1.250	-0.867	6.868
	w		0.806	-5.729	10.819

Note: For all variables, n=128, T(avg)=8.9, and N=1,136. Standard deviations are broken down into overall “o”, between “b”, and within “w” components.

Table 5: Summary statistics, aid recipient countries

Variables		Mean	Std. Dev.	Min.	Max
Average years of schooling	o	5.172	2.740	0.236	11.784
	b		2.680	0.907	11.336
	w		1.413	1.126	8.929
Average years of schooling, female	o	4.679	2.952	0.061	11.599
	b		2.927	0.505	11.122
	w		1.443	0.489	8.617
Democracy	o	-0.275	6.696	-10	10
	b		5.536	-10	10
	w		4.210	-12.615	11.065
Wealth	o	7.869	1.054	5.516	10.999
	b		1.096	5.950	10.986
	w		0.315	6.473	9.157
Economic integration	o	3.982	0.669	1.596	5.781
	b		0.571	2.669	5.216
	w		0.3425	2.512	5.664
Development aid	o	3.243	1.638	-6.908	6.995
	b		1.304	-1.871	5.817
	w		1.053	-4.952	7.286
Rural	o	57.568	23.219	0	97.858
	b		22.829	0	94.433
	w		7.784	30.908	94.584
Population growth	o	2.107	1.167	-4.880	7.485
	b		1.173	-1.361	5.402
	w		0.744	-5.461	6.903

Note: For all variables, n=108, T(avg)=8.1, and N=871. Standard deviations are broken down into overall “o”, between “b”, and within “w” components.

Appendix B

List of Countries Used in Analysis

Afghanistan	Ecuador	Laos	Sudan
Albania	Egypt	Latvia	Swaziland
Algeria	El Salvador	Lesotho	Rwanda
Argentina	Estonia	Liberia	Saudi Arabia
Armenia	Fiji	Libya	Senegal
Australia*	Finland*	Lithuania	Sierra Leone
Austria*	France*	Malawi	Singapore
Bahrain	Gabon	Malaysia	Slovak Republic
Bangladesh	Gambia	Mali	Slovenia
Belgium*	Ghana	Mauritania	South Africa
Benin	Greece*	Mauritius	Spain*
Bolivia	Guatemala	Mexico	Sri Lanka
Botswana	Guyana	Moldova	Sweden*
Brazil	Haiti	Mongolia	Switzerland*
Bulgaria	Honduras	Morocco	Syria
Burundi	Hungary	Mozambique	Tajikistan
Cambodia	India	Nepal	Tanzania
Cameroon	Indonesia	Netherlands*	Thailand
Canada*	Iran	New Zealand*	Togo
Central African Republic	Iraq	Nicaragua	Trinidad
Chile	Ireland*	Niger	Tunisia
China	Israel	Norway*	Turkey
Colombia	Italy*	Pakistan	UAE
Congo Brazzaville	Ivory Coast	Panama	Uganda
Costa Rica	Jamaica	Papua New Guinea	Ukraine
Croatia	Japan*	Paraguay	United Kingdom*
Cuba	Jordan	Peru	United States*
Cyprus	Kazakhstan	Philippines	Uruguay
Czech Republic	Kenya	Poland	Venezuela
Denmark*	Korea South	Portugal*	Vietnam
Dominican Rep	Kuwait	Qatar	Yemen
	Kyrgyzstan	Russia	Zambia
			Zimbabwe

*Denotes those countries excluded from aid recipient models

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Essay 3

Education across Borders: The Relationship between Age at Migration and Educational Attainment for Mexico-U.S. Child Migrants

Introduction

What does it mean to educate children in an increasingly globalized world? Economic integration, global modes of communication and instantaneous access to information have, indisputably, changed the nature and goals of education systems around the world. Education is more closely dictated by market needs than ever before (Stromquist, 2002); technology has made it possible for students to collaborate with peers around the world. While the international flows of goods, services, and ideas are changing the landscape of education systems worldwide, it is less clear how education systems are responding to another aspect of globalization—the flow of people, particularly school-aged children, across international borders.

In 2010, 3.1 percent of the world’s population was comprised of international migrants, foreign-born individuals who moved to another country, often unauthorized, for a myriad of economic, familial, or cultural reasons (United Nations, 2011). This number reflects a trend in the last decade of increasing flows of people across international borders (OECD, 2012). Evidence suggests that these flows are not one-directional. In many cases, there is a high degree of fluidity across borders; international migrants often return to their home country after a temporary time abroad (Dustmann & Weiss, 2007; Reyes, 1997). Increasingly, youth make up a fair share of the international migrant community. Recent estimates suggest that one-third of migrants from developing countries are young people (World Bank, 2006).

These young people, international migrants who may travel back and forth across borders and generally maintain connections to their home countries while establishing new ties to their destination country, are the embodiment of what anthropologists call “transnational migration”

(Schiller, Basch, & Blanc, 1995), and increasingly constitute a new student population—the transnational student. Historically, education systems around the world have been national projects that reflect the ideals, norms, and aspirations of a country. Success in these systems depends, in part, on students’ ability to continue through the educational process with relatively little disruption, familiarity with the home culture, and knowledge of the home language. In many ways, the underlying structure and requirements of national education systems are at odds with the experiences of transnational students who may navigate multiple education systems and lack cultural knowledge and language fluency in the destination country. Although considerable research has been conducted on how parental migration affects the educational outcomes of their children who stay behind in their home country, relatively little is known about how the movement of children themselves across international borders influences their educational attainment.

This study begins to address this gap by examining the interesting case of child migration from Mexico to the United States. I argue that child migrants face incentives and barriers to investment in education and that these differ by age at migration. I examine age at migration as the key predictor for how well transnational students integrate into the U.S. educational system and persist in attaining a formal education. I specifically examine the relationship between Mexico-U.S. child migration and children’s (a) completed years of schooling and (b) likelihood of dropping out of school, relative to Mexican children who never migrate. I further investigate, of those children who drop out of school, what do they do instead?

This case warrants research attention for three reasons. First, the movement of children across the Mexico-U.S. border is a growing trend. As of 2010, 20 percent of all international migrants were residing in the United States alone (United Nations, 2011). Data from the Pew

Hispanic Center indicate that, of the 40 million foreign-born immigrants in the United States, nearly 12 million are Mexican (Patten, 2012), slightly more than half of whom are unauthorized (Passel & Cohn, 2011). The magnitude of movement across the Mexico-U.S. border indicates a sizable population of transnational migrants, many of whom are children. According to recent results from the American Community Survey, administered by the U.S. Census Bureau, 7.9 percent of Mexican-born migrants in the United States are under the age of 18 (Grieco, et al., 2012). This amounts to approximately 945,000 children. Further, the trend of young people crossing the border is increasing. From late fall 2011 to midsummer 2012, the number of unaccompanied and unauthorized minors detained at the Mexico-U.S. border rose to 21,842, a 48 percent increase from the previous year (Preston, 2012).

Second, this is a politically salient issue. Not only is the flow of children into the United States from Mexico intensifying, but so too is the national debate in the United States about the rights and privileges of migrants, particularly those who arrive in the country as undocumented children. Recent legislation, such as 2011's California DREAM Act and the Deferred Action for Childhood Arrivals (DACA) initiative, has increased access to higher education and opportunities for legal employment for unauthorized young people who moved to the United States as children. These laws may presage a new direction for immigration policy in the United States and increased educational and work opportunities for young migrants.

Lastly, the nature of transnational migration is two-directional. In the United States, researchers are primarily concerned with how the educational attainment of foreign-born children compares to U.S.-born individuals and the implications for employment prospects in the United States. While this approach provides necessary insight into the educational outcomes of migrant children in the context of their destination country, it only illuminates one aspect of the

transnational student experience. Given the likelihood that many child migrants will acquire only a share of their education in one country, and may eventually enter the labor market in their origin country, it is imperative to also understand how the educational attainment of migrant children compares to their origin-country peers. This study complements the existing literature that suggests Mexican students have an educational disadvantage relative to native-born children in the United State by considering whether they may, in fact, have an educational advantage relative to their counterparts in Mexico.

This essay is organized in five sections. In the first section, I introduce the theoretical framework and present hypotheses. In the second section, I review the research on how international migration may impact children's educational outcomes, describe the Mexican education system, and provide context for migrant education in the United States. In the third section, I describe the data and methods used to pursue the research question. In the following section, I present and discuss results of the empirical analyses modeling the relationship between child migration and (a) years of completed schooling and (b) dropping out of school. The final section concludes.

Theoretical framework

Human capital theory (Becker, 1967) essentially posits that labor market demands for particular skills incentivize investments in schooling and drive educational attainment. Although employment prospects are certainly not the only reason individuals pursue schooling, formal education and economic opportunities are clearly linked. This theory provides a useful framework for considering the incentives to invest in schooling for transnational students who may move across multiple labor markets.

Are education credentials internationally transferable in regards to labor market entry and income? Chiswick (1978) explores this question in his application of human capital theory to the context of migration. In a study of male adults' income in the United States, he finds that an additional year of schooling for foreign-born and educated men working in the United States has a lower return than an additional year of education for native men. His conclusion is that the education and skills gained in a migrant's home country are not necessarily transferable to a migrant's destination country.

How does this affect the value that Mexican migrants place on education both at home and in the United States? Migration scholars have observed that non-migrants, particularly males, with close family, friends, and community members with migratory experience often eventually migrate themselves. Deemed the culture of migration (e.g. Kandel & Massey, 2002), this theory posits that the increased access to information and networks among migrants eases the challenges of moving across borders, normalizes the process of doing so, and disincentivizes investment in education. This disinvestment is driven by the utility of a Mexican education in the United States as well as by labor market opportunities. Similar to Chiswick's (1978) findings, these scholars argue that an education credential in Mexico is not as valuable as the one produced by completing the same years of education in the United States. The purchasing power of a Mexican high school diploma, for example, is higher in Mexico than in the United States; it will elicit better employment opportunities at home than abroad. Therefore, if a child anticipates migrating, they are less likely to invest in their education in Mexico (Kandel & Massey, 2002; McKenzie & Rapoport, 2011). Second, most work available to Mexican migrants, particularly undocumented workers, is largely unskilled and does not require much education. Unless labor

market restrictions are relaxed, there is little incentive for temporary labor migrants to invest in education once in the United States (McKenzie & Rapoport, 2011).

The culture of migration literature suggests that the U.S. migration of young people should ultimately have deleterious effects on their educational attainment. However, this theory does not account for the differential effects of child migration by age at migration. Individuals of or approaching the legal working age who migrate (or anticipate migrating) to the United States for work constitute a very different population from children who first migrate when they are very young. This latter group forms the transnational student population and their educational opportunities and outcomes may be less determined solely by economic considerations.

Therefore, I look specifically at the educational attainment of young people who migrate to the United States for the first time before the age of 16. I argue that age at first migration is a critical factor in determining how transnational students from Mexico fare relative to their peers who stay behind.¹⁵ I break my sample of international migrant children into distinct groups, those who first migrated between the ages of 0-6 and 7-15. These two groups reflect distinct tracks into the U.S. education system and, arguably, face different incentives to invest in education.

Migrant parents often have high aspirations for their children's education (Goldenberg, Gallimore, Reese, & Garnier, 2001); these aspirations reflect the assumption that education provides a pathway to a better life and that schooling and economic opportunities are intrinsically linked. Particularly when parents migrate to the United States with their young

¹⁵ This is an extension of the argument that age at migration matters when comparing the educational attainment of foreign-born and native-born adults in the United States. Chiswick & DebBurman (2004) find that foreign-born adults who migrated to the United States between 0-4 and 5-12 years of age acquired more education than native-born adults. However, migrating at 13 years old or older was negatively related to educational attainment relative to the native-born adults.

children (0-6 year olds), parents' investment in their children's education may be driven by the knowledge that a U.S. education will be valuable whether a child ultimately ends up working in the United States or Mexico. Although this logic can similarly be applied to children who migrate when they are older (7-15 year olds), this group is also of the age where they can begin to make their own decisions regarding their futures and start to anticipate the life they want for themselves. If they see themselves following the path of parents and family friends who have entered into the U.S. labor market, as the culture of migration predicts, they may be less likely to invest in their U.S. education.

Although human capital theory provides an entry into hypothesizing about the relationship between child migration and educational attainment, it only allows for demand side considerations of educational outcomes. Put simply, the theory suggests that if individuals want and need additional education to fulfill labor market requirements then they will acquire it. Yet, educational attainment is not driven solely by demand. Particularly in the case of child migrants, educational attainment may be limited by various impediments to access and success.

The effects of certain barriers to educational attainment for child migrants, such as limited English-language proficiency and cultural differences, may differ by age at migration. Research shows a strong link between age and language acquisition; very early exposure to a new language is associated with peak proficiency (see Newport (2002) for a review). Young children who migrate between the ages of 0-6 are likely to acquire English skills more quickly and easily, and may therefore have a more seamless entry into the education system, than children who migrate between the ages of 7-15. Children who migrate at a younger age, and enter the U.S. system without exposure to the Mexican educational system, may also benefit from the lack of schooling disruption and challenge of navigating two distinct educational

systems. Earlier integration into the U.S system may also set students on an educational trajectory where 75.5 percent of all students graduate high school (Balfanz, Bridgeland, Bruce, & Fox, 2012), a much higher rate than Mexico's 45 percent (OECD, 2011).

Due to the different incentives to invest in education, as well as barriers to educational attainment, I hypothesize that age at migration is an important determinant of transnational students' educational outcomes. Specifically, I hypothesize that early migration is associated with higher educational attainment than students who stay behind in Mexico. Based on findings from the research literature, I suspect that children who first migrate to the United States at an older age have a more difficult time integrating into the U.S. system and may be motivated to enter into the labor market rather than acquire additional years of education.

Review of literature

Parental migration and children's educational outcomes

Most of the research on migration and children's educational outcomes addresses how parental migration to the United States impacts the educational attainment of children who are left behind. The existing literature primarily examines the effect of migration from two angles, receipt of remittances and parental absence. Conflicting evidence precludes a general consensus about how parental migration influences educational outcomes for children remaining in their origin country. Findings from empirical studies suggest both positive and negative effects of parental migration on children's education.

Remittances are payments sent by migrants to their family or friends at home. Research suggests that remittances received from family members in the United States do offset some of the costs of schoolings and may improve the likelihood that children will attend and stay in school. Bredl (2011) finds an association between remittances and a decreased probability of

dropping out of school in Haiti, particularly for children in poor households. In Mexico, remittances are associated with increased years of completed education as well as college aspirations (Nobles, 2011). Hanson and Woodruff (2003) similarly find positive effects of remittances on educational attainment in Mexico, particularly completed years of education for girls in rural areas. Ethnographic research from Mexico supports these findings that parents use remittances to improve children's educational opportunities (Dreby, 2010).

While evidence suggests that remittances may bolster children's educational attainment, other findings indicate that parental absence due to temporary labor migration has negative repercussions. Research findings support the culture of migration theory. Kandel & Massey (2002) report that Mexican children whose families are involved in U.S. migration are more likely to aspire to work in the United States; likewise, they are less likely to express interest in continuing their schooling in Mexico. Estimating a causal relationship, McKenzie & Rapoport (2011) find that living in a migrant household not only increases the migration probability of boys ages 13-18, but also decreases the likelihood that both boys and girls will complete high school. The negative effect of parental migration is further evidenced by increased work hours and reduced study hours for 12-15 year old boys in Mexico (Antman, 2011), the decreased probability of transitioning from primary to lower secondary school as well as from lower to upper secondary school for 15-18 year olds in Mexico (Halpern-Manner, 2011), and fewer completed years of education for 15-18 years old and an increased probability of experiencing schooling disruption for 15-20 year olds in Peru (Robles & Oropesa, 2011).

Child migration, educational aspirations, and dropping out

Clearly, the literature on parental migration and children's educational attainment suggests that various aspects of migration may have contradictory impacts on the education of

children left behind. Yet, what happens to children's educational attainment when they migrate themselves?

Empirical findings suggest that children's age at migration matters in regards to educational attainment. Using U.S. census data, Chiswick and DebBurman (2004) sample 25-64 year olds and find that foreign-born adults who migrated to the United States as young children (0-4/5-12 years old) acquired .8/.4 more years of education compared to native-born adults. Adults who migrated as teenagers (13-19 years old) completed 1.03 fewer years of education relative to the native-born sample. These findings are consistent with the theory that young people of secondary school age, anticipating entering the labor market, face fewer incentives to invest in schooling. One limitation of census data is that it undercounts undocumented individuals who are generally hesitant to identify themselves (Lopez, 2011; Massey & Capoferro, 2004). As such, these findings may underrepresent the experiences of the undocumented population in the United States, which includes nearly 6.5 million Mexicans (Passel & Cohn, 2011). I define migration more comprehensively and use data that accounts for both documented and undocumented migration to the United States.

Further research points to positive associations between Mexican children's U.S. experiences and educational aspirations (Kandel & Kao, 2001) and the decreased probability of dropping out of school (Kandel, 2003). These results seem to be driven by the type of travel undertaken to the United States. Kandel and Kao (2001) find that Mexican children who traveled to the U.S. on a tourist visa are more likely to have higher university aspirations, although results are not significant for children with more extended travel to the United States. Kandel (2003) does not control for length of time spent in the United States or age at migration and therefore cannot adequately explain the relationship between a child's U.S. experience and decreased

probability of leaving school. However, the author infers that the finding is likely reflective of either a child's early exposure to the U.S. as a tourist, and is therefore from a family who can afford to vacation internationally, or migration to the U.S. at a young age, allowing for time to develop strong English language skills. I improve upon this model by explicitly accounting for age at migration and duration of time spent in the United States.

The two previous studies (Kandel & Kao, 2001; Kandel, 2003) both use samples of children located in Mexico. Suárez-Orozco, Suárez-Orozco, & Todorova (2008), conduct a longitudinal study of the experiences of foreign-born students, including children from Mexico, in the United States. The study sheds light on the educational attainment of transnational students who are currently enrolled in the U.S. educational system. Using GPA as a measure of academic success, the authors find foreign-born students fare worse academically the longer they remain in the U.S. system. However, they also find variation in achievement by gender and discover that girls are more likely to be high academic achievers or improvers than boys.

These findings are consistent with other research that indicates that, relative to their U.S.-born peers, Mexican-born students encounter less quality educational opportunities and have lower educational attainment (Alba & Silberman, 2009), are more likely to drop out (Crosnoe and Lopez-Turley, 2011), and are less likely to enroll in U.S. schools (Oropesa & Landale, 2009). Compared to other Hispanic populations in the United States, Mexicans rank among the lowest in terms of educational attainment. For 26 percent of U.S.-based Mexicans aged 25 and older, a high school diploma is the highest level of education acquired; only 9 percent hold a degree from a 4-year university (Motel & Patten, 2012).

This literature illuminates the educational experiences of Mexican child migrants in the context of their destination country. However, as previously described, transnational students

may enter into multiple labor markets and eventually settle in their country of origin. I contribute to the existing literature by addressing this overlooked characteristic of the transnational experience and compare the educational attainment of children with U.S. migration experience to the attainment of their origin-country peers.

The Mexican education system, migrant education in the U.S., and barriers to success

The Mexican and U.S. education systems are similarly organized into four levels. In Mexico, primary school (*primaria*) includes grades 1-6. Students are expected to enroll in first grade at the age of 6. The system is then divided into lower secondary school (*secundaria*), grades 7-9, and upper secondary school (*preparatoria*), grades 10-12. Students are eligible to enter higher education after completing the 12th grade. The government is responsible for the provision of compulsory basic education, grades 1-9, although it is also involved in the provision of preschool, upper secondary school, and higher education (Santibañez, Vernez, & Razquin, 2005).

Despite improvements over the past five decades, average educational attainment in Mexico remains relatively low (OECD, 2011). Although primary school enrollment is nearly universal and 86 percent of eligible students are enrolled in lower secondary schools, the enrollment rate at the upper secondary school level is only 51 percent, which may in part be driven by the government's poor provision of upper secondary schools (Santibañez, Vernez, & Razquin, 2005). Low enrollment, coupled with high dropout rates, has resulted in low educational attainment among adults. Of 25-34 year olds in Mexico, 42 percent have a high school education (OECD, 2011); approximately 8 percent of the 18 and older population has a bachelor's degree (Santibañez, Vernez, & Razquin, 2005).

How does the educational attainment of transnational students compare to these national statistics? In part, the answer to this question depends on the extent to which a) the United States is perceived to offer better educational opportunities, b) increased educational opportunities drive child migration, c) the U.S. education system accommodates the transnational student population, and d) barriers to educational success hinder migrant children in the United States.

Evidence suggests that migrant parents from Mexico have high educational aspirations for their children. In a longitudinal study of Latino immigrant parents in the United States, Goldenberg and colleagues find that 90 percent have college aspirations for their children (Goldenberg, Gallimore, Reese, & Garnier, 2001). This finding suggests that migrant parents do perceive that educational opportunities are available to their children in the United States. Additionally, 25 percent of the children in the study were born in Mexico, again suggesting that educational considerations may drive parents' decisions to migrate with their children. Further research finds that migrant parents in the United States often choose to send for their young children in the hope of providing them a better future, despite the costs and dangers associated with crossing the border (Orellana, Thorne, Chee, & Lam, 2001; Suárez-Orozco, Suárez-Orozco, & Todorova, 2008). It seems likely that parents who migrate with their young children are at least partially driven by their aspirations for their children's futures. Therefore, it also seems logical to hypothesize that, due to parental engagement and investment, experience with the U.S. education system increases children's educational attainment relative to children who stay behind.

However, this hypothesis must be considered in the context of the opportunities available to migrant children in the United States and the barriers to educational advancement. Legislative history in the U.S. reflects a contentious debate about the rights of migrant children, particularly

the undocumented majority. In the 1982 case of *Plyler v. Doe*, the U.S. Supreme Court ruled against the state of Texas's attempt to deny undocumented children a free public education by charging them K-12 school tuition. This ruling has not prevented states from attempting to limit educational access to undocumented children. Most notably, California's 1994 Proposition 187, a ballot initiative passed by voters, restricted access to public services, including education, to unauthorized migrants. Although this proposition was ruled unconstitutional by the federal district court, it reflects a suspicion of, and hostility to, non-citizens (Lopez, 2011; Petronicolos & New, 1999). This debate played out on the national stage when, in 1996, the House of Representatives passed the Gallegly Amendment to the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA). Although this amendment was excluded from the final bill, it essentially overturned the Supreme Court's *Plyler v. Doe* decision and empowered states to charge undocumented students school tuition or completely deny them access to public education (Green, 2003).

In spite of the national debate, federal government has long funded programs, namely the Migrant Education Program (MEP), to promote the educational attainment of migrant children. Established in 1966, MEP provides a range of services designed to support the unique needs of migrant students, specifically the children of seasonal agricultural and fishery workers. Evidence indicates that the government's attention to this population has favorable consequences. Findings from a longitudinal study in California suggest that MEP support services boost high school persistence and the academic success rates of migrant Mexican children, particularly in relation to their U.S.-born Mexican peers (Gibson & Bejinex, 2002; Gibson & Hidalgo, 2009).

One current focus of the public discourse about immigration is a consideration of the rights that young people who migrated to the United States as children are entitled to. The

DREAM Act, which would grant provisional legal status to several million undocumented youth who arrived in the United States before the age of 16, has been voted down by Congress twice, most recently in 2010. In response, President Barack Obama introduced the Deferred Action for Childhood Arrivals (DACA) initiative in 2011, intended to defer deportation for 2 years for undocumented young people who came to the United States as children and have resided in the U.S. for at least 5 continuous years while allowing them to work legally.¹⁶ Also in 2011, California's governor, Jerry Brown, signed the California DREAM Act into law, allowing undocumented immigrants who came to the United States before the age of 16 to apply for student financial aid known as Cal Grants and ultimately increasing access to higher education. At the start of the 2012-2013 academic year, 289 private and public colleges, universities, and technical schools in California were eligible to receive these grants.¹⁷ The passage of this law may be suggestive of a shifting perspective in the United States regarding the country's responsibility to provide access to education and encourage educational attainment for foreign-born individuals who come to the country without proper documentation as children.

In light of the contentious political environment, and despite the apparent successes of targeted MEP services, migrant children continue to face daily barriers to educational success. Educational advancement is often complicated by fears of deportation, living in impoverished conditions, and, particularly for the children of agricultural workers, frequent movement across state lines and schooling disruption (Lopez, 2011; Prewitt, Trotter, & Rivera, 1990). Foreign-born children in the United States frequently end up in the lowest-quality public schools where the environment is often dangerous and where the staff is ill-prepared to address the particular

¹⁶ <http://www.immigrationpolicy.org/just-facts/deferred-action-childhood-arrivals-qa-guide-updated>.

¹⁷ http://www.csac.ca.gov/pubs/forms/grnt_frm/eligible_cal_grant_schools.pdf.

cultural and language needs of migrant students (Suárez-Orozco, Suárez-Orozco, & Todorova, 2008). Further, work and family responsibilities often lead to high rates of absenteeism among migrant students (Gibson & Bejinez, 2002).

The context for migrant education in the United States is complicated. Many parents have high hopes for their children's education and futures, federal funds provide increased opportunities for migrant children, yet there is not a national consensus about the rights of undocumented children. As such, many transnational students may face discrimination, inadequate school quality, and responsibilities that compel them to leave school. Age at migration may determine how seamlessly children are able to integrate into the U.S. education system. The following section describes the data I used to test my hypotheses and provides rationale for examining other factors that may drive the educational attainment of Mexican-born children in my sample.

Description of data and methods

This study uses household survey data collected as part of the Mexican Migration Project (MMP), a collaborative research project to understand Mexican-U.S. migration based at Princeton University and the University of Guadalajara. Since 1982, researchers have surveyed households in migrant-sending communities in Mexico, collecting demographic and migration data on each member of the household, as well as more detailed migration histories from the household head and the head's spouse. With few exceptions, researchers have surveyed several new communities annually since the project's inception. These communities are specifically chosen because they have some degree of out-migration to the United States, although there is significant variation in the prevalence of migration across communities in the sample, and represent various levels of urbanization. Researchers have purposively included communities

that represent four sizes, ranging from ranchos (population less than 2,500) to larger urban cities (population greater than 100,000). This study specifically uses the most updated dataset, MMP134, which provides information on 144,258 people, 22,541 households, and 134 communities.

Sampling of communities for inclusion in the MMP dataset is not random. As such, MMP data is representative at the community, rather than national, level. However, multiple studies indicate that, although MMP data is geographically skewed, it provides a good representation of documented and undocumented migration to the United States (Massey & Zenteno, 2000; Orrenius & Zavodny, 2005). For this study, we can therefore assume that the characteristics of migrants from the MMP communities do not differ remarkably from characteristics of migrants from other parts of Mexico, and that results are not driven by community idiosyncrasies.

Sample identification

My sample is derived from repeated cross-sectional survey data collected from 1987-2011. The main purpose of this study is to examine the relationship between children's U.S. migration and educational attainment. Accordingly, the sample includes individuals between the ages of 7 and 22 years old. The lower bound represents the age at which children would be expected to have completed one year of education under the Mexican system. The upper bound is meant to allow time for students to clear the educational system. The sample was further identified using the following criteria: (1) relationship to household head, (2) birth place, (3) child's age at first U.S. migration, and (4) presence of education data.

The sample includes individuals identified as members of a household and not as the head of their household. Moreover, individuals were only included in the sample if they

identified as the son/daughter, stepson/daughter, or the adopted child of the household head. 99.63 percent of the sample is described as the son/daughter of the household head. In addition to surveying households in Mexico, MMP researchers also survey migrants from the same communities who have moved permanently to the United States. In order to maintain a fair comparison group, I excluded 1,015 cases where a child from such a household was born and raised in the United States. All individuals in the sample were born in Mexico. Due to the opportunities presented to children of legal working age (16), I excluded 1,449 cases where children migrated to the U.S. for the first time after 15 years of age. It is likely that individuals migrating to the United States after the age of 15 do so primarily for economic reasons and are qualitatively different from children who migrate at a younger age. 73 percent of the children with migration experience first entered the U.S. without documentation. Lastly, I excluded 106 cases missing any education data. The resulting final sample includes 33,705 individuals.

Variables

Dependent and independent variables used in the analysis are displayed in Table 1. The two primary educational outcome variables are completed years of education and whether an individual dropped out of school. A child was coded as having dropped out if his/her primary occupation was not “student” or “student and worker” (for a similar approach, see Bredl, 2011). One limitation of this method is that it may overestimate the dropout rate by not accounting for the fact that older individuals may be high school graduates who are not pursuing higher education at the time of the survey. Such individuals would not appear in the dataset as “student” and could therefore erroneously be coded as having dropped out of school. To account for this, I recoded all individuals 18 years or older as non-dropouts if they completed 12 or more years of education. All individuals coded as dropping out completed at least one year of school.

Table 1: Description of variables

Dependent variables	
Completed years of education	=count of total completed years of education
Child drops out of school	=1 if child's principal occupation at the time of survey is not "student" or "student and worker"
Independent variables	
Migration experience	
Child migration to U.S.	
No migration experience	=1 if child has never migrated to United States (U.S).
0-6 years old	=1 if child migrated for the first time before age 7
7-15 years old	=1 if child migrated for the first time between the ages of 7-15
25% of child's life in U.S.	=1 if child spent at least 25% of his/her life in the U.S.
HH ever migrated to U.S.	=1 if the household head (HH) has migrated to the U.S. at least once
HH trips to U.S. during child's school years	
0 trips	=1 if HH made no trips to the U.S. since child turned 6 years old
1-2 trips	=1 if HH made 1-2 trips to the U.S. since child turned 6 years old
3+ trips	=1 if HH made 3 or more trips to the U.S. since child turned 6 years old
Household characteristics	
Parent education	
0-5 years	=1 if highest education level of HH or spouse is 0-5 years of schooling
6-8 years	=1 if highest education level of HH or spouse is 6-8 years of schooling
9+ years	=1 if highest education level of HH or spouse is 9 or more years of schooling
Household size	= number of people living in a household
Family asset index	=sum of household assets (land, house, water, electric, sewer, stove, refrigerator, washing machine, sewing machine, radio, television, stereo, phone, cellular phone, computer, internet)
Child characteristics	
Age	Child's age at time of survey
Female	=1 if child is female
Preschool	=1 if completed years of education included at least one year of preschool
Oldest sibling	=1 if child is the oldest sibling in the family
Table 1 (cont'd)	
Community characteristics	
% migrant adults	=average share of adults in community with migration experience, 1980-2010
Locale	
Urban	=1 if community population is >100,000
Small town/city	=1 if community population is 2,500-100,000
Rural	=1 if community population is <2,500

This approach adds validity to the identification method, ensuring that the phenomena of dropping out of school, rather than never enrolling in school, is being captured. The independent variables capture child and parental migration experience, as well as household, child, and community characteristics.

Two aspects of child migration are measured: age at first migration and duration of an individual's life spent in the United States. Dummy variables identify children who first migrated to the United States between the ages of 0-6 and those who migrated between 7-15 years of age. Conceivably, children who migrate to the United States at a younger age may integrate more easily into the educational system in the United States and experience less disruption to their schooling than students who migrate once they are already of school age. Another dummy variable represents whether an individual spent at least 25 percent of his/her life in the United States. This variable reflects the stability of a child's migratory experience and accounts for exposure to culture, the English language, and educational opportunities in the United States.

Table 2 provides information on the migration experiences of the children included in the sample. In general, it shows a pattern of migration to the United States for an extended period of time. The majority of individuals make only one U.S. trip and stay for at least a year. The length of time spent in the United States is strongly determined by age at migration. Among compulsory school-aged children (7-15), those who migrated between 0-6 years old have spent, on average, 5.6 years in the United States compared to 1.6 years for those who migrated between 7-15 years old. The difference is more striking among elective school-aged individuals (16-22). For this group, the average number of years in the United States is 11 years for those who migrated between 0-6 years old and 4.9 years for those who first migrated between 7-15 years old. These numbers clearly indicate that children who migrate between 0-6 years old, on average, have

prolonged, uninterrupted exposure to the United States and its educational system. Children who migrate between 7-15 years old have less exposure to the United States and likely navigate the education systems in both Mexico and the United States.

Table 2: Duration of time spent in United States by children's age at first migration

Age at migration	N	At least one year in U.S. (%)	Only one U.S. trip (%)	Average years spent in U.S. 7-15 year olds	Average years spent in U.S. 16-22 year olds
0-6 years old	300	86	82	5.6	11.1
7-15 years old	627	80	75	1.6	4.9

Parental migration may impact children's educational attainment regardless of whether children themselves migrate. I control for parent migration in two ways. First, a dummy variable indicates whether the household head ever migrated to the United States. In 90.9 percent of all cases in the sample, the household head represents an individual's father. In the remaining 9.1 percent of cases, the household head is the individual's mother. In addition, a set of three mutually exclusive dummy variables measures the extent of the head's U.S. migration during an individual's school years, or once a child turned 6 years old. It is possible that the extent of migration during a child's school years may have a more direct relationship to educational outcomes than simply whether or not the household head has ever migrated.

Additional control variables measure a slew of household, child, and community background characteristics. Parent education, household size, and family wealth indicators provide important information about each individual's household and are common controls in statistical models of children's educational attainment. Parent education, measured as three dummy variables, captures the highest level of education completed by either parent in the household. The three categories align with the years of education associated with primary (0-5 years), lower secondary (6-8 years), and upper secondary school (9 or more years) in Mexico. There are a number of reasons for creating a single variable that reflects the highest combined

education of both parents. Mother and father education levels are typically highly correlated; in this sample, $r = .67$. Moreover, due to the presence of single parent households in the sample, 3,502 cases are excluded when both mother and father education levels are controlled for. Creating one parent education variable maintains the sample size and provides a valid representation of household education levels (Bredl, 2011; Edwards & Ureta, 2003). Household size may promote or hinder children's educational opportunities. In smaller families with one or two children, parents may be able to allocate more resources to their children's education. Larger families may face more financial constraints, children may need to work to supplement income, and there may be less investment in formal schooling.

It is well documented that household wealth is a strong predictor of children's educational attainment (e.g. Filmer & Pritchett, 1999). However, there is considerable debate in the literature regarding how to best measure family wealth. One popular approach is to create an asset index that captures household ownership of durable goods and housing characteristics. Arguably, such an index is indicative of a household's long-run economic status and provides a more stable representation of economic well-being than a measure such as current income (Filmer & Pritchett, 2001; McKenzie, 2005). This approach is particularly useful when working with a dataset that includes migrant households where income may significantly fluctuate by season. Although there are various ways to build an asset index, a common approach is to create a simple sum of equally weighted items (e.g., Case, Paxson, & Ableidinger, 2004; Nobles, 2011). Despite the availability of more sophisticated statistical techniques, evidence suggests that the count approach yields a good proxy for wealth. For example, Bollen, Glanville, and Stecklov (2002) find that asset indices created using a principal component approach as well as the simple

count method both perform well as predictors of fertility in developing countries. For simplicity, this study uses the count method for the construction of a 16-item asset index.

Individuals' age, gender, and sibling rank are also common control variables. There is a strong correlation, particularly when children are young and eligible for compulsory school, between a child's age and the amount of schooling attained. In many developing countries, girls face more challenges to educational access and attainment (UNESCO, 2003). In Mexico, Parker and Pederzini (2000) find a higher dropout rate after primary school for girls, although this difference does not tend to show up in overall educational attainment until after age 20. In part, they surmise this may be due to boys' increased likelihood of falling behind in school. Further, this study controls for whether an individual is the oldest sibling. Families may be inclined to invest more in the education of their firstborn. Conversely, firstborn children may feel pressure to join the labor market at an early age or leave school to help at home, particularly in lower-income households.

The final control for child characteristics is a dummy variable indicating whether an individual likely included years of preschool when providing information on completed years of education. Children in Mexico enter primary school at 6 years old and are expected to complete their first year of schooling by age 7. Therefore, the expected difference between a child's age and the number of completed years of education should be at least six. However, the MMP data contains a number of cases where the difference is less than six. It is likely that some survey participants included up to three possible years of preschool, in Mexico known as K1, K2, and K3, in the final count of years of education. Following Bredl (2011), the preschool dummy variable represents cases where the difference between an individual's age and years of education was less than six but greater than or equal to three. I excluded 233 cases where the

difference was less than three, and therefore could not be accounted for by the preschool dummy variable. It is important to note that this variable likely does not capture the preschool experiences of everyone in the sample and therefore cannot be interpreted as a “preschool effect”.

The remaining control variables capture community characteristics that may impact children’s educational attainment. The first is the extent of community migration to the United States, measured as the percentage of adults with migration experience. Children in communities with high migration rates may encounter opportunities, resources, and networks that make it easier to migrate as well. Migration experience may lead to increased educational opportunities in the U.S. or a departure from school and entrance into the labor market. The community migration variable represents the average share of the adult population with migration experience from 1980-2010. Finally, this study controls for locale. It is well documented that students from rural areas face more challenges to educational access and attainment, including fewer resources and increased distance to school (UNESCO, 2007). Three dummy variables reflect the different degrees of urbanization represented by the communities in the sample.

Table 3 provides the means and standard deviations for all dependent and independent variables. The average completed years of schooling is 6.5 while the dropout rate is 35.3 percent. Approximately one-third of the sample has a household head with U.S. migration experience. 3 percent of children have migrated to the United States themselves.

Table 3: Descriptive statistics

	Mean	SD
Dependent Variables		
Completed years of education	6.540	3.462
Child drops out of school	0.353	0.486
Independent variables		
Migration experience		
Child migration to U.S.		
No migration experience	0.972	0.164
0-6 years old	0.009	0.094
7-15 years old	0.019	0.135
25% of child's life in U.S.	0.014	0.117
HH ever migrated to U.S.	0.331	0.470
HH trips to U.S. during child's school years		
0 trips	0.875	0.331
1-2 trips	0.103	0.303
3+ trips	0.023	0.149
Household characteristics		
Parent education		
0-5 years	0.380	0.488
6-8 years	0.312	0.463
9+ years	0.299	0.458
Household size	7.754	3.128
Family asset index	9.023	2.484
Child characteristics		
Age	14.632	4.472
Female	0.509	0.500
Preschool	0.168	0.374
Oldest sibling	0.220	0.414
Community characteristics		
% migrant adults	17.550	15.818
Locale		
Urban	0.213	0.401
Small town/city	0.571	0.495
Rural	0.216	0.411
Observations	33,705	

Empirical approach

Repeated cross-section pooled OLS and logistic regression models are used to examine the relationship between U.S. migration experience and educational outcomes. The basic empirical model underlying the analysis can be written as follows:

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y represents one of two educational outcomes: completed years of schooling or whether a child dropped out, X_1 - X_4 represent the vectors of migration, household, child, and community characteristics, respectively, and ε is the error term. Pooled OLS regression is used to estimate the association between U.S. migration-related and control variables on individuals' completed years of education. Pooled logistic regression is used to estimate the association between U.S. migration-related and control variables on whether or not a child drops out of school.¹⁸ This model predicts the odds of an event (coded as a binary variable) occurring, in this case the odds of dropping out of school.

To account for the repeated cross-sectional nature of the data, I include individual year dummies for all but the first year in the sample (Wooldridge, 2009). Additionally, I use robust standard errors clustered at the household level. Doing so takes into account that educational outcomes are not completely independent from one person to the next and that outcomes of children from the same families are likely similar to each other. Accounting for other household head characteristics, namely gender and marital status, did not result in significant findings. The inclusion of these variables also did not change the coefficients or significance levels of other variables in the model, and thus are excluded from the analysis. For both outcomes, I conduct

¹⁸ In this model, Y is estimated as $\text{prob}(Y=1)$.

additional analyses by gender and compulsory/elective schooling age (7-15 and 16-22, respectively).

Data limitations

The repeated cross-sectional nature of the data is a result of researchers implementing the same survey annually but with different communities and households. Therefore, it is not possible to track the migratory patterns and educational progress of the same children over time. The data provides a snapshot of each individual's educational attainment at the time of the survey and does not allow for modeling the effect of migration in light of each individual's entire educational lifecycle. Due to this limitation, results must be viewed as associative rather than causal.

Results

This section is organized into three parts. First, I present OLS regression results where the outcome of interest is completed years of education. Next, I present logistic regression results where the outcome is whether a child dropped out of school. Lastly, I take a closer descriptive look at who drops out and what these children do instead of attending school.

Mexico-U.S. migration and completed years of education

Table 4 displays OLS regression results. Column (1) provides estimates for the full sample, ages 7-22, and shows a strong relationship between children's U.S. migration experience and completed years of school. As hypothesized, the direction of the relationship depends on a child's age at first migration. Relative to children who never migrate to the U.S., individuals who migrate for the first time between 0-6 years old acquire .45 additional years of education.

Table 4: OLS regression results where outcome is completed years of schooling

Dependent Variable: Completed years of schooling					
	(1)	(2)	(3)	(4)	(5)
	7-22	7-22	7-22	7-15	16-22
Independent Variables	All	Male	Female	All	All
Migration experience					
Child migration to U.S.					
No migration (reference)	---	---	---	---	---
0-6 years old	0.449** (0.170)	0.439* (0.218)	0.437+ (0.252)	0.216* (0.107)	0.267 (0.304)
7-15 years old	-0.451*** (0.114)	-0.726*** (0.140)	-0.057 (0.179)	-0.308** (0.118)	-0.602*** (0.144)
25% of child's life in U.S.	-0.359* (0.176)	-0.332 (0.205)	-0.407 (0.275)	-0.156 (0.146)	0.341 (0.222)
HH ever migrated to U.S.	-0.034 (0.038)	0.003 (0.049)	-0.069 (0.049)	-0.007 (0.025)	0.028 (0.072)
HH trips to U.S. during child's school years					
0 trips (reference)	---	---	---	---	---
1-2 trips	0.052 (0.055)	0.026 (0.069)	0.074 (0.071)	0.051 (0.035)	-0.188* (0.095)
3+ trips	-0.202+ (0.122)	0.093 (0.145)	-0.449** (0.156)	-0.066 (0.109)	-0.486** (0.165)
Household characteristics					
Parent education					
0-5 years (reference)	---	---	---	---	---
6-8 years	0.814*** (0.040)	0.703*** (0.052)	0.911*** (0.050)	0.345*** (0.028)	1.191*** (0.067)
9+ years	1.019*** (0.045)	0.951*** (0.058)	1.078*** (0.057)	0.400*** (0.031)	1.894*** (0.078)
HH size	-0.067*** (0.007)	-0.082*** (0.008)	-0.052*** (0.008)	-0.019*** (0.005)	-0.116*** (0.010)
Family asset index	0.207*** (0.007)	0.205*** (0.010)	0.210*** (0.009)	0.076*** (0.005)	0.347*** (0.012)
Child characteristics					
Age	0.598*** (0.004)	0.605*** (0.005)	0.593*** (0.005)	0.858*** (0.004)	0.229*** (0.010)
Female	0.070** (0.024)	---	---	0.067*** (0.017)	0.145*** (0.042)
Preschool	2.268*** (0.030)	2.264*** (0.039)	2.269*** (0.040)	1.991*** (0.017)	3.702*** (0.071)
Oldest sibling	0.015 (0.029)	0.046 (0.041)	-0.015 (0.042)	0.028 (0.020)	0.075 (0.050)
Community characteristics					
% migrant adults	-0.008*** (0.001)	-0.008*** (0.002)	-0.007*** (0.002)	-0.003** (0.001)	-0.013*** (0.002)

Table 4 (cont'd)

Locale					
Urban (reference)	---	---	---	---	---
Small town/city	-0.075+ (0.042)	-0.019 (0.054)	-0.130* (0.054)	0.038 (0.028)	-0.137+ (0.070)
Rural	-0.177** (0.055)	-0.088 (0.069)	-0.264*** (0.070)	-0.032 (0.037)	-0.325*** (0.091)
Time dummies ¹⁹	Yes	Yes	Yes	Yes	Yes
Constant	-4.605*** (0.143)	-4.488*** (0.183)	-4.687*** (0.182)	-6.130*** (0.101)	0.792** (0.298)
Observations	33,705	16,561	17,144	18,660	15,045
R-squared	0.629	0.636	0.625	0.798	0.428

Note: Robust standard errors, clustered at the household, in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

This finding suggests that, on average, children who first migrate to the U.S. before they are of primary school age have an educational advantage over their Mexican peers who stay behind.

Conversely, children who first migrate between the ages of 7-15, once they are of school age, complete approximately .45 fewer years of education than students who never migrate from Mexico. These results support the hypothesis that children who migrate between 0-6 years old may have more incentive to invest in the U.S. education system and encounter fewer barriers to doing so than children who migrate between the ages of 7-15. Controlling for age at migration, duration of time spent in the United States is negatively associated with completed years of education. Individuals who have spent at least 25 percent of their lives in the U.S. acquire .36 fewer years of schooling. This result reinforces other research findings that educational outcomes decline the longer a migrant remains in the U.S. system (Suárez-Orozco, Suárez-Orozco, & Todorova, 2008).

Columns (2) and (3) report results for males and females, respectively. The final two columns, (4) and (5), provide estimates for children of compulsory school age and older

¹⁹ For estimates for each survey year dummy variable, see Appendix.

individuals for whom school is elective. The positive relationship between migrating at 0-6 years of age and completed years of education is particularly significant for males, .44 additional years of education, and children of compulsory school age, .22 additional years of education. These improved outcomes for boys and younger students relative to students who stay behind in Mexico may to some extent reflect the prevalence of grade repetition in Mexico. Boys in Mexico, in particular, experience grade delays at high rates; by the age of 10, 20 percent of boys in the Mexican education system have already fallen behind (Parker & Pederzini, 2000). Early migration to the United States seems to mitigate the likelihood that boys will experience problems with normal grade progression.

The significant negative association between migration at 7-15 years old and completed years of education is found for all subsamples, with the exception of females. The magnitude of the effect is relatively large for boys, .73 fewer years of education, and individuals of elective school age, .6 fewer years of education. These results are consistent with the culture of migration argument that adolescent migrant males have economic incentives to disinvest in the U.S. education system. Duration of time spent in the United States is not significantly related to completed years of education for any of the subsamples.

Across all models, whether or not the household head has ever migrated to the U.S. is not statistically associated with children's completed years of school. However, the extent of parental migration during a child's school-aged years is negatively related to completed years of education for girls and elective school-aged individuals. Relative to girls whose household head never migrated to the United States during their school-aged years, girls whose household head made three or more trips complete .45 fewer years of education. Elective school-aged individuals acquire .2 and .49 fewer years of school depending on whether their household head made 1-2 or

more than three trips to the U.S., respectively. These findings suggest that girls bear the brunt of the household head's absence and may attend to household responsibilities in place of completing school. For elective school-aged individuals, having a household head with extensive U.S. migration experience suggests family integration into the migrant culture, which may reduce educational attainment as young people anticipate their own migration. Both findings are consistent with prior research from Mexico indicating that living in a migrant household increases housework for girls and the likelihood of migration, particularly for 16-18 year old boys, at the expense of school participation (McKenzie & Rapoport, 2011).

Consistent with other findings in the literature, parent education level is highly associated with children's educational attainment. Children of parents with 6-8 years of education complete .81 additional years of school relative to children of parents with 0-5 years of education. Children of parents with 9 or more years of school complete a full year of education more than the reference group. These findings are consistent across all subsamples, although parental education has a particularly pronounced effect on elective school-aged individuals' completed years of school.

Household size is also significantly related to children's completed years of education. The household size coefficient suggests that in a household with four more people, a child is estimated to receive about $.067(4) = .268$ fewer years of education. Household wealth is substantively and statistically significantly related to completed years of education. Relative to children at the bottom of the asset index distribution, children of families with the highest asset index value complete $.207(16) = 3.3$ more years of education. Household wealth appears to have an even stronger influence on education attainment for individuals of elective school age. Moving from the lowest end of the asset index distribution to the highest is associated with a

.347(16) = 5.55 year increase in educational attainment. This effect, although statistically significant, is much smaller for children of compulsory school age, $0.076(16) = 1.22$ year increase. This finding suggests that poorer families may struggle to send their children to school beyond a publicly-provided basic education.

Of the child characteristics, child age, gender, and whether a child attended preschool are statistically significantly related to completed years of education. Unsurprisingly, the coefficients on age and preschool are high. In fact, in a scenario where all children enter school at the expected age and progress through school at the expected rate, the projected age coefficient would be one, meaning that as a child gains a year in age they also gain a year in education. In this case, the preschool coefficient can be interpreted as the average years of preschool completed by individuals who included preschool in their count of completed years of education. There seems to be a slight increase in completed years of education for female. Although this relationship is statistically significant at the .01 level, the magnitude is small. On average, girls complete .07 additional years of schooling than boys.

The relationship between coming from a community with higher levels of out-migration to the U.S. and completed years of education is negative. In the sample, the share of community adults with U.S. migration experience ranges from .5 to 86 percent. Relative to the least migratory community, a child coming from the most migratory community is predicted to complete about $.008(85.5) = .68$ less years of schooling. The effect of coming from a heavily migrant community is larger for elective school age individuals who complete $0.013(85.5) = 1.11$ fewer years of education relative to the least migratory. In comparison to children in urban areas, rural students acquire .18 fewer years of education. This effect is amplified for females and individuals of elective school age.

Mexico-U.S. migration and dropping out of school

Table 5 provides dropout rates for the sample by age group and U.S. migration experience. The dropout rate for 7-12 year olds with U.S. migration experience is slightly lower than those without U.S. experience. However, 13-15 year olds, as well as individuals over 16 years of age, with U.S. migration experience have higher dropout rates than their non-migrant counterparts. Dropout rates for Mexican children with no U.S. migration experience reflect the relatively low levels of educational attainment in Mexico.

Table 5: Share of children dropped out of school by U.S. migration experience

Age Group	Children w/ U.S. migration experience (%)	Children w/ no U.S. migration experience (%)
7-12 years old	4.92	6.37
13-15 years old	33.54	27.30
16+ years old	73.47	61.10

Table 6 reports logistic regression results for the likelihood of dropping out of school. Results are reported as odds ratios. Column (1) displays findings for the full sample. Once again, age at migration has a differential effect on the likelihood that a child drops out of school. U.S. migration between the ages of 0-6 neither increases nor decreases the likelihood of dropping out relative to Mexican children who stay behind. There is no statistical difference between the two groups. However, migration between the ages of 7-15 has a strong statistical negative association with leaving school. The odds of dropping out increase by 2.77 times for children who migrate between 7-15 years old relative to those who never migrate. The direction and significance of this finding is consistent for all subsamples save the compulsory school-aged group. The odds of dropping out of school decrease for children who have spent at least 25 percent of their lives in the United States. This finding is consistent in magnitude for all subsamples. Interestingly, while *when* children migrate to the U.S. is associated with an increased likelihood of dropping out, the *duration* of time spent decreases the odds of doing so.

Table 6: Logistic regression results, displayed as odds ratios, where outcome is the likelihood of dropping out

Dependent Variable: Whether a child drops out of school					
	(1)	(2)	(3)	(4)	(5)
Independent Variables	7-22 All	7-22 Male	7-22 Female	7-15 All	16-22 All
Migration experience					
Child migration to U.S.					
No migration experience	---	---	---	---	---
0-6 years old	1.066 (0.269)	1.366 (0.463)	0.799 (0.299)	1.591 (0.590)	1.061 (0.351)
7-15 years old	2.772*** (0.394)	3.805*** (0.693)	1.691** (0.332)	1.194 (0.307)	4.040*** (0.906)
25% of child's life in U.S.	0.388*** (0.086)	0.391** (0.114)	0.394** (0.118)	0.373+ (0.207)	0.333*** (0.095)
HH ever migrated to U.S.	1.068 (0.056)	1.118 (0.077)	1.034 (0.068)	1.122 (0.082)	1.040 (0.071)
HH trips to U.S. during child's school years					
0 trips	---	---	---	---	---
1-2 trips	1.160* (0.080)	1.107 (0.103)	1.218* (0.107)	1.028 (0.101)	1.194+ (0.112)
3+ trips	1.279* (0.144)	1.101 (0.167)	1.460** (0.212)	0.965 (0.160)	1.465* (0.241)
Household characteristics					
Parent education					
0-5 years	---	---	---	---	---
6-8 years	0.622*** (0.028)	0.685*** (0.041)	0.571*** (0.032)	0.674*** (0.047)	0.568*** (0.033)
9+ years	0.298*** (0.018)	0.321*** (0.025)	0.277*** (0.022)	0.401*** (0.038)	0.257*** (0.018)
HH size	1.079*** (0.008)	1.087*** (0.010)	1.072*** (0.010)	1.066*** (0.011)	1.094*** (0.011)
Family asset index	0.850*** (0.007)	0.855*** (0.010)	0.843*** (0.009)	0.890*** (0.012)	0.808*** (0.009)
Child characteristics					
Age	1.393*** (0.007)	1.399*** (0.010)	1.389*** (0.010)	1.505*** (0.021)	1.120*** (0.012)
Female	1.046 (0.032)			1.155** (0.055)	0.979 (0.040)
Preschool	0.290*** (0.021)	0.294*** (0.029)	0.286*** (0.027)	0.552*** (0.043)	0.084*** (0.011)
Oldest sibling	0.931+ (0.037)	0.954 (0.054)	0.898+ (0.051)	0.906 (0.062)	0.959 (0.048)
Community characteristics					
% migrant adults	1.014***	1.015***	1.013***	1.014***	1.015***

Table 6 (cont'd)

	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Locale					
Urban (reference)	---	---	---	---	---
Small town/city	1.355*** (0.077)	1.328*** (0.097)	1.390*** (0.101)	1.660*** (0.163)	1.133+ (0.076)
Rural	1.309*** 1.355***	1.197* 1.328***	1.434*** 1.390***	1.428** 1.660***	1.183+ 1.133+
Time dummies	Yes	Yes	Yes	Yes	Yes
Constant	0.007*** (0.001)	0.005*** (0.001)	0.010*** (0.002)	0.001*** (0.000)	0.755 (0.221)
Observations	33,087	16,243	16,844	18,250	14,837
Pseudo R-squared	0.350	0.347	0.357	0.226	0.223

Note: Robust standard errors, clustered at the household, in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Odds ratios can be difficult to interpret in a substantively meaningful way and it can be more useful to examine logistic regression results in terms of the probability that an event, in this case dropping out, will occur (Osborne, 2006). Based on the same models displayed in Table 6, Table 7 presents the results as percent changes in the probability of dropping out. These findings can be interpreted as the change in the probability of dropping out given a minimum to maximum value change in an independent variable, holding all other variables constant at their means. To improve the readability of Table 7, I have included only significant relationships.

Table 7 provides a more intuitive interpretation of the relationship between child migration at 7-15 years of age and children's increased likelihood of dropping out. Results from the full sample, column (1), indicate that children who migrate between 7-15 years of age are 23 percent more likely to drop out of school relative to their peers who stay behind. This effect is slightly larger for males and elective school-aged individuals, who are 30 and 24.6 percent more likely to drop out compared to their reference groups of non-migrants, respectively. Similar to the OLS regression findings, these results are likely indicative of U.S. labor market incentives for male migrants and older students to leave school in the pursuit of employment prospects. The

probability of dropping out for females increases by 11.4 percent for girls who migrate to the U.S. between 7-15 years old.²⁰

Overall, children who have spent at least 25 percent of their lives in the United States are 13.7 percent less likely to drop out of school. The direction, magnitude, and statistical significance of this relationship are nearly identical for males and females. The effect of time spent in the United States is largest for the elective school-aged sample. The probability of dropping out of school for the 16-22 year old sample decreases by 26.8 percent for those who have spent at least a quarter of their lives in the United States. This finding is consistent with Kandel's (2003) inference that prolonged exposure to the U.S. education system, culture, and English language is positively linked to migrant children's persistence in school.

The extent of a household head's migration to the U.S. during a child's school years is significantly related to the probability of dropping out for the full sample, although the effect sizes are small. Column (1) indicates that, relative to children whose household head never migrated to the United States during school-aged years, children whose head took 1-2 trips to the U.S are 2.9 percent more likely to drop out. The probability of dropping out increases by 4.9 percent for children whose household heads took 3 or more trips to the United States. There are also slight effects for some subgroups. In the subsample of females, displayed in column (3), children whose household head traveled to the United States three or more times during their school-aged years are 7.1 percent more likely to drop out of school.

²⁰ An alternative way to specify a child's age at first migration is to use a linear term rather than the categorical variable used in the analyses reported in Tables 4 and 6. I reran the first model in both tables using the linear term instead of the categorical dummy variables. Results for the linear age at migration term indicate that a one year increase in age at migration is associated with -0.093 fewer years of education ($p < 0.001$). The odds of dropping out increase ($OR = 1.13$) for each one year increase in age at first migration ($p < 0.001$). These results fail to account for the non-linear relationship between age at first migration and educational outcomes accounted for by the mutually exclusive dummy variables for age at migration.

Table 7: Percentage changes in the probability of dropping out, calculated from logistic regression results²¹

Independent Variables	(1) 7-22 All	(2) 7-22 Male	(3) 7-22 Female	(4) 7-15 All	(5) 16-22 All
Migration experience					
Child migrated to U.S. for first time between 7-15 years old compared to children who never migrated	.230***	.302***	.114**	NS	.246***
Child spent more than 25% of life in U.S. compared to all others	-.137***	-.129**	-.142**	NS	-.268***
HH made 1-2 trips to U.S. since child entered primary school age compared to no U.S. trips since child entered primary school age	.029*	NS	.040	NS	NS
HH made 3+ trips to U.S. since child entered primary school age compared to no U.S trips since child entered primary school age	.049*	NS	.080*	NS	.084*
Household characteristics					
Highest level of parental education is 6-8 years compared to 0-5 years	-.085***	-.066***	-.104***	-.026***	-.134***
Highest level of parental education is 9+ years compared to 0-5 years	-.200***	-.182***	-.218***	-.058***	-.324***
Children from largest household (23 people) compared to smallest households (2 people)	.339***	.363***	.313***	.126***	.370***
Having all asset indicators compared to no asset indicators	-.495**	-.465***	-.529***	-.152***	-.631***
Child characteristics					
Oldest children compared to youngest (ex: full sample, 22 to 7 year olds)	.767***	.767***	.767***	.261***	.156***
Female children compared to male children	NS	---	---	.010**	NS
Children with preschool experience compared to no preschool experience	-.186***	-.175***	-.197***	-.037***	-.524***
Community characteristics					
Children from most migrant-sending community (86%) compared to least migrant-sending community (.5%)	.252***	.261***	.239***	.115***	.249***
Children from small town/city compared to children from urban area	.057***	.051***	.064***	.034***	NS
Children from rural area compared to children from urban area	.053***	.033***	.073***	.027***	NS

Note: Table 7 only displays variables with at least one significant finding across models. Significant findings at $p < .1$ are not included. NS indicates “not significant”. Percentage change calculated using “prchange” in Stata/IC 12.1 (Long & Freese, 2001).

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

²¹ Percentage changes displayed as decimals.

Column (5) shows that individuals of elective school age are 8.4 percent more likely to leave school if their household head frequently traveled to the United States during their school years. These findings are consistent with the OLS results, and again suggest that (a) females may take on additional household responsibilities in the absence of the household head, and (b) adolescents with access to migrant networks through household head migration may be more inclined to migrate themselves and enter a U.S. labor market that does not reward additional years of schooling.

The percentage change in the probability of dropping out further allows for a more precise estimate of the other household, child, and community control variables. The probability of leaving school decreases by 8.5 percent for students whose parents have 6-8 years of education relative to 0-5 years. More strikingly, children whose parents have completed 9 or more years of education are 20 percent less likely to drop out. Parental education seems to be particularly important for the elective school-aged sample. While compulsory school-aged children whose parents completed 9 or more years of experience are 5.8 percent less likely to drop out than children whose parents acquired 0-5 years of education, the analogous comparison for the elective school-aged sample shows a 32.4 percent decrease in the probability of leaving school.

A similar pattern can be observed with household wealth. Column (1) indicates that, overall, children from households with all asset indicators are nearly 50 percent less likely to drop out than children from the poorest households, which reported no asset indicators. The influence of household wealth, like parent education, is particularly strong for individuals of elective school age. Using the same household wealth comparison group, students of compulsory school age from the wealthiest households are 15.2 percent less likely to drop out, while elective

school age individuals from the wealthiest households are 63.1 percent less likely to leave school. Similar to findings from the OLS regressions, these results suggest that household wealth is particularly important in promoting educational outcomes for elective school-aged students who persist in their studies beyond a basic education.

As to be expected, the oldest individuals in the sample have a much higher probability of dropping out, 76.7 percent, compared to the youngest individuals. Although the estimates for preschool are significant across all models, and particularly large in magnitude for the elective school-aged sample, these findings should be interpreted with caution. As discussed previously, the preschool variable likely does not represent preschool attainment for all individuals in the sample and is included in the model to control for a subset of survey respondents who may have included years of preschool in their total count of completed years of education. Therefore, it is inappropriate to make inferences about the relationship between attending preschool and the probability of leaving school.

Lastly, Table 7 also shows significant relationships between community characteristics and the probability of dropping out, particularly for the full sample. Column (1) indicates that children from the highest migrant-sending communities are 25.2 percent more likely to drop out than children from the least migrant-sending communities. This estimate is relatively stable across subsample models, although it is smaller for the compulsory school-aged group (11.5 percent). These findings provide further support for the culture of migration argument. Children from small towns or cities are 5.7 percent more likely to drop out than children from urban areas, while rural children are 5.3 percent more likely to drop out of school.

A closer descriptive look at who drops out

This section takes two approaches to better understand who drops out of school. First, I examine what children are doing if they are not attending school. One advantage of the MMP data is that it includes occupation information for all household members and allows for an examination of what children who leave school do instead. Second, I narrow the focus to only those children with U.S. migration experience. I compare the backgrounds of children who drop out with those who remain in school and identify significant differences in household, child, and community characteristics.

Table 8 reports the percentage of out of school children who work in various fields: housework, agriculture, mechanical/repair skilled and unskilled positions, sales, and services. In general, young people with U.S. migration experience are more likely to be employed as unskilled workers in manufacturing/repair and service workers than young people with no U.S. experience. The majority of girls who drop out of school are engaged in housework. The percentage doing so does not differ dramatically by U.S. migration experience; 55 percent of females with U.S. migration experience who have left school help around the house compared to 59 percent of non-migrants. The largest share of male drop outs, for migrants and non-migrants, is employed in agriculture, 30 and 32 percent, respectively. Compulsory school-aged children with U.S. migration experience are more likely to work as unskilled and skilled workers in manufacturing/repair than non-migrants. Non-migrants in this subsample are more likely to be engaged in housework and agriculture. Among the elective school-aged sample, U.S. migrants are more likely to be agricultural workers, unskilled workers, and service workers relative to non-migrants. U.S. migrants are less likely to be unemployed, although unemployment rates are quite low overall.

Table 8: Occupation of children who have dropped out of school by U.S. migration experience

	7-22		7-22		7-22		7-15		16-22	
	All		Male		Female		All		All	
	A	B	A	B	A	B	A	B	A	B
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Unemployed (seeking work)	2	5	3	6	1	4	0	5	2	5
Helps around the house ²²	18	32	0	0	55	59	19	27	17	34
Agricultural worker	19	14	30	32	3	1	0	13	22	15
Manufacturing/repair skilled worker ²³	11	10	14	15	0	5	12	5	10	10
Manufacturing/repair unskilled worker ²⁴	18	10	21	18	9	4	13	7	17	9
Sales worker ²⁵	6	8	6	8	7	7	9	5	8	9
Service worker ²⁶	14	4	15	2	13	7	7	3	16	4
Unspecified	3	6					20	27		

Note: All 'A' columns indicate children with U.S. migration experience. All 'B' columns include children with no U.S. migration experience. Percentages are rounded to nearest whole number.

²² Survey responses include “homemaker” and “helps around the house”.

²³ Sample responses include “tailor”, “carpenter”, “house painter”, “plumber”, and “electrician”.

²⁴ Sample responses include “construction unskilled workers”, “electrical equipment, electronics, and telecommunications installation and repair unskilled workers”.

²⁵ Sample responses include “workers in retail establishments”, “insurance and real estate agents”, and “delivery workers”.

²⁶ Category includes both “personal services workers in establishments” and “domestic service workers”. Sample responses include “gardener”, “doorman”, bartender”, and “clothes-cleaning service workers”.

These findings are consistent with OLS and logistic regression results in two key ways. First, they support the conclusion that household responsibilities disproportionately affect girls' educational attainment. Second, the low unemployment rates provide evidence that young people who drop out of school do so for economic reasons. The very low unemployment rate of 2 percent for those who migrate suggests that employment opportunities in the United States, which primarily consist of unskilled positions, provide a disincentive to invest in further schooling.

Table 9 compares the background characteristics of children with U.S. migration experience by whether or not they dropped out of school.

Table 9: T-test results comparing mean background characteristics of children with U.S. migration experience by dropout status

	No Dropout	Dropout	t-test
Household characteristics			
Parent education			
0-5 years	0.261	0.630	***
6-8 years	0.375	0.275	***
9 years	0.364	0.095	***
Household size	7.018	9.293	***
Family asset index	10.211	9.566	***
Child characteristics			
Age	14.053	18.507	***
Female	0.506	0.313	***
Preschool	0.188	0.026	***
Oldest sibling	0.334	0.135	***
Community characteristics			
% migrant adults	24.788	26.837	**
Locale			
Urban	0.156	0.085	**
Small town/city	0.634	0.564	**
Rural	0.211	0.352	***

*** p<0.001, ** p<0.01, * p<0.05

T-test results indicate that all household, child, and community mean differences are statistically significant. On average, children with U.S. migration experience who drop out have less educated parents than those who do not leave school early. In 63 percent of the drop out cases,

the highest level of parental education is 0-5 years. Children who drop out also, on average, come from larger families and poorer households. They are more likely to be male, less likely to be the oldest sibling, and come from slightly more heavily-migrant communities in Mexico. Relative to children with U.S. migration experience who do not drop out, those who do are more likely to come from rural Mexico.

Conclusion

In light of the increasing movement of people, particularly children, across international borders, and the burgeoning transnational student population, this study explored the educational attainment of transnational students using the particular case of Mexican-born children with U.S. migration experience. This study contributes to the existing literature in two primary ways. First, it focuses on an under-researched dimension of migration, children's own migration, in relation to children's educational attainment. In addition, it offers insight into how transnational students fare relative to their origin-country peers. This is a marked shift away from the literature which generally emphasizes the educational attainment of migrants in comparison to their destination-country counterparts.

I hypothesized that age at first migration has a differential influence on children's educational attainment. Pooled OLS and logistic regression findings support this hypothesis. Mexican children who migrate to the United States between the ages of 0-6 have an educational advantage relative to their peers who stay behind, while those who migrate between the ages of 7-15 have an educational disadvantage. These findings may be indicative of how seamlessly very young migrants are able to integrate into the U.S. education system relative to children who are already of school-age, and likely have some experience with the education system in their origin country, when they first arrive in the United States.

Mexican children who first migrate to the United States between 0-6 years of age acquire .45 years more schooling than those who stay behind. This positive relationship is also significant for males and compulsory school-aged children. There is no significant difference in the likelihood of dropping out for children who first migrate between 0-6 years of age and those who never migrate from Mexico. In other words, children who migrate when very young are as likely to remain in school as Mexican children without migration experience, yet, on average, they acquire more years of education. These findings suggest that, for children who migrate between 0-6 years of age, migration to the United States is positively associated with grade progression. In Mexico, young boys are particularly at risk of falling behind and repeating grades. Results from this study suggest that this risk is mitigated for children who first migrate to the United States when they are very young.

Conversely, U.S. migration experience is negatively associated with educational outcomes for children who migrate between 7-15 years of age relative to those who stay behind. On average, these individuals acquire .45 less years of education and are 23 percent more likely to drop out of school relative to their non-migrant peers in Mexico. Effect sizes are largest for males, who acquire .726 fewer years of schooling and are 30.2 percent more likely to drop out, and elective school-aged individuals, who complete .602 fewer years of education and are 24.6 percent more likely to leave school. U.S. migration between 7-15 years of age increases the probability of dropping out for females by 11.4 percent. Individuals who migrate between the ages of 7-15 may be more likely to ultimately enter the U.S. labor market, with its demand for unskilled workers, and may also face more barriers to entry and advancement in the educational system relative to their origin-country counterparts.

The analysis also finds particularly large effect sizes for parental education, household wealth, and being from a community with high migration rates. Children with a highly educated parent acquire 1.02 more years of education and are 20 percent less likely to drop out than children in households with low parental education. These findings are amplified for elective school-aged students who complete up to 1.89 additional years of school and are 32.4 percent less likely to leave school. Household wealth is also strongly associated with children's positive educational outcomes. Compared to coming from a household at the lowest end of the wealth distribution, children who come from the wealthiest households acquire 3.3 additional years of education and are 49.5 percent less likely to leave school. Lastly, being from a community with high migration rates is associated with acquiring .69 fewer years of education and a 25.2 percent increase in the probability of dropping out of school.

Further investigation of what young people who drop out of school do instead reveals that these individuals are almost all engaged in some kind of work. However, there are strong gender differences in the type of work individuals partake in. The majority of migrant females who drop out are engaged in housework, although a slightly larger percentage are employed in unskilled or service jobs relative to non-migrant females in Mexico. Males with U.S. migration experience are more likely to be agricultural, unskilled, or service workers compared to non-migrant males in Mexico. These findings complement the regression results and support the implication that, in general, increased access to unskilled jobs in the United States may contribute to migrant students' decisions to leave school.

This study has practical implications for Mexican migrant parents. For parents who are considering migrating with their children, this research suggests that early exposure to the United States and its educational system yields the most educational benefits. This research would

support parents' decisions to migrate with their children when they are young, 6 years old or younger, rather than waiting until they have already reached school age. At this older stage of development, children may encounter barriers to investment in education and are more likely to leave school prematurely.

This study also has two primary implications for policy and practice. First, the findings suggest that human capital considerations motivate children with U.S. migration experience to leave school; this may be particularly true for individuals who migrate later in childhood and face increased barriers to integration in the U.S. education system. For this population of transnational students, the majority of whom are undocumented, there is strong evidence that educational attainment is intrinsically linked to employment opportunities. Therefore, education policy considerations cannot be divorced from the larger national debate regarding the rights of immigrants in the United States and opportunities to participate in the skilled-job labor market.

Recent legislation has begun to open pathways into higher education and legal labor market opportunities, particularly for those who entered the U.S. as unauthorized children. Migrant children's incentives and barriers to acquiring additional years of schooling in the United States could well be altered if these political efforts gain traction and future legislation expands these opportunities. If labor market restrictions are relaxed, the economic incentives for young migrants to invest in education will change; higher skilled jobs require more training and offer a higher return to investment in additional education. In light of such an immigration policy incentivizing educational investment, education policy could seek to mitigate the barriers to educational advancement that transnational students face, particularly children who first migrate when they are between 7-15 years old and struggle to integrate into the U.S. education system, such as insufficient language skills, tracking into low quality schools, and ineffective teachers.

In the immediate future, this study has implications for school districts and programs like MEP that support the educational attainment of migrant children. Of Mexican children who migrate to the U.S., those who drop out are more likely to be poor, male, members of large families, and have parents with low levels of education. Schools and support services can particularly target this vulnerable population and the specific challenges to educational attainment it encounters. Results from this study indicate that Mexican students who leave school do so for financial reasons or to attend to household responsibilities. This population may benefit from more alternative schooling options, such as night or weekend programs, where children can both attend school and work.

In addition to targeting student needs, schools and support services can also increase outreach to the families of migrant students. Considering that migrant students who drop out are less likely to have highly educated parents, parental outreach could include adult literacy and community education classes. Such classes may provide a way to not only help parents improve basic skills and language acquisition, but also integrate migrant parents into school communities.

There are several opportunities here for future research. Although the results presented in this essay are consistent with a number of other findings in the literature, the cross-sectional nature of the data requires an associative, rather than causal, explanation of the relationship between child migration and educational attainment. A longitudinal study of Mexican transnational students, that tracks migration status and educational attainment annually, could provide researchers with a more nuanced understanding of the causal effect of child migration on educational attainment. Further research is also needed on the distinct experiences of migrant children in the U.S. education system by age at migration. Specific research questions include: do schools provide differential treatment to migrant children who enter the U.S. education

system at the beginning of their school careers compared to those who arrive in the United States with prior schooling experience in Mexico? In what ways do schools and support services help younger children integrate into the U.S. education system? How can these practices be adjusted and implemented for the population of children who migrate when they are older? Such a study could have significant education policy implications for improving the transition into the U.S. education system and the overall educational attainment for children who migrate to the United States between 7-15 years old.

APPENDIX

Appendix

The following table provides the regression coefficients for each survey year included in the models reported in Column (1) in Tables 4 and 6. All estimates are relative to the omitted survey year 1987.

Table 10: Survey year coefficients for models reported in Column (1), Tables 4 and 6

Survey Year	(1) Years of education	(2) Dropping out (Odds ratio)
1988	0.176 (0.121)	1.081 (0.164)
1989	-0.021 (0.157)	1.099 (0.178)
1990	0.463*** (0.122)	0.808 (0.120)
1991	0.645*** (0.117)	1.327+ (0.198)
1992	0.200 (0.124)	1.098 (0.169)
1993	0.726*** (0.160)	0.519** (0.126)
1994	0.515*** (0.116)	0.890 (0.132)
1995	0.668*** (0.127)	0.843 (0.131)
1996	0.633*** (0.122)	0.524*** (0.085)
1997	0.314* (0.128)	1.031 (0.189)
1998	0.084 (0.115)	1.067 (0.160)
1999	0.380** (0.122)	1.175 (0.193)
2000	0.013 (0.129)	4.166*** (0.773)
2001	-0.102 (0.124)	1.692*** (0.266)
2002	0.637*** (0.128)	0.817 (0.142)
2003	0.189	1.114

Table 10 (cont'd)

	(0.138)	(0.187)
2004	-0.281*	0.855
	(0.137)	(0.147)
2005	-0.008	1.546+
	(0.216)	(0.368)
2006	0.276*	0.757
	(0.136)	(0.134)
2007	0.580***	0.896
	(0.130)	(0.159)
2008	0.072	1.808**
	(0.134)	(0.331)
2009	0.299*	1.148
	(0.130)	(0.212)
2010	0.558***	1.633*
	(0.143)	(0.317)
2011	0.255+	1.587*
	(0.136)	(0.328)

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

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