# Birth Registration

## The Key to Social Inclusion in Latin America and the Caribbean

Steve Brito, Ana Corbacho, and René Osorio

With Preface by Mia Harbitz

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# About the Authors

**Steve Brito** has been a consultant in the Institutions for Development Sector (IFD) of the Inter-American Development Bank (IDB) since 2011. He has carried out research on economic growth, productivity, the under-registration of births, education, health, microenterprises, and fiscal policy. Steve has a master's degree in Economics (with distinction) from Chile's Pontifical Catholic University and a degree in Economics and Finance (magna cum laude) from the Francisco Marroquín University. He was awarded merit based scholarships by the Francisco Marroquín University and the Organization of American States (OAS).

**Ana Corbacho** joined the IDB in 2010 as principal economic advisor to IFD, with responsibility for knowledge management and dissemination. Previously, she was deputy chief of the division that prepares the International Monetary Fund's biannual report entitled *Regional Economic Outlook, Western Hemisphere*. Ana has worked on emerging economies of Latin America and Eastern Europe, carrying out research on institutional, fiscal, and macroeconomic issues, including education and growth, fiscal institutions and public investment and, more recently, citizen security and the social consequences of not having a legal identity. She has a Ph.D. in Economics (with distinction) from Columbia University and a licentiate in Economics (summa cum laude) from the University of San Andrés in Buenos Aires, Argentina. She was a fellow of Columbia University's Public Policy Consortium, OAS, the Bradley Foundation, and the University of San Andrés.

**René Osorio** joined the IDB in 2010 as a research fellow in IFD. Previously, he was senior economist at Nicaragua's Central Bank, where he carried out research on institutional, fiscal, and macroeconomic subjects. At the IDB, he has led the research agenda on the causes and social consequences of not having a legal identity. He has a Ph.D. in Economics from Boston University, a master's degree in Applied Macroeconomics (with distinction) from Chile's Pontifical Catholic University, and a degree in Civil Engineering (summa cum laude) from Nicaragua's National University of Engineering. He was awarded merit based scholarships by Boston University and the National University of Engineering.

# Executive Summary

- Birth registration is a fundamental human right and constitutes legal proof of a child's existence and nationality. Without adequate documentation to verify identity, a person can become excluded from the benefits of living in society and can be condemned to social exclusion.
- In the Latin American and Caribbean (LAC) region, 9 percent of children from zero to four years of age do not have a birth certificate.
- Not having a birth certificate is associated with lower educational attainment and a lower level of immunization in all LAC countries included in this study (Bolivia, the Dominican Republic, Guatemala, Nicaragua, and Peru). Both outcomes highlight the importance of birth registration as a fundamental public policy goal.
- There are numerous factors that might explain the under-registration of births. In general, children from very poor or rural households with mothers whose own level of education is low are more likely to lack a birth certificate. Children born in hospitals and health centers have better chances of being registered than those children born at home without medical assistance. In some countries, such as Bolivia and the Dominican Republic, long distances between households and civil registry offices can also be an impediment to registration. In the Dominican Republic, children of foreign and/or undocumented parents also face lower chances of being registered, which suggests an inter-generational transmission of the lack of a legal identity.
- In order to promote birth registration, action must be taken on various fronts, both to improve the registration services provided by governments and to stimulate interest and demand by citizens. Some specific actions that arise from this analysis include:

    - Work on countries' institutions to eliminate the barriers and costs associated with birth registration and to promote campaigns that show its benefits.
    - Ensure that schools are equipped to identify the problems of under-registration and to help families to overcome them.
    - Carry out registration campaigns in hospitals, during vaccination campaigns, and as part of social programs targeting vulnerable families.
    - Seek to improve the geographic distribution of civil registry offices to facilitate access and reduce the distance between households and providers of registration services.
    - In countries with large migratory flows, catalyze inter-country dialogue to regulate the registration of children of undocumented parents.

Many countries in the LAC region are making progress on these issues, but there is still a long way to go before this fundamental human right can be guaranteed for the population as a whole.

# Preface

## Universal Birth Registration in Latin America and the Caribbean: A Pending Challenge

One of the most demeaning experiences that a person can suffer is to be denied access to public or social services due to the lack of a valid identity document. Yet, this is the daily reality for millions of individuals. Although an identity document does not, in itself, guarantee access to services, social benefits, or the exercise of civil rights, without one, access becomes practically impossible, and those affected remain socially excluded. Setel et al. (2007) describe this situation as "the scandal of invisibility." It is hard to believe that in this day and age there are still people in this world who are born, live, and die without leaving a trace through either a civil registry or official statistics.

The right to a name and a nationality is a basic and fundamental human right, which is required to access any other right provided by the State, and it is obtained by the registration of an individual's birth and biographical details at a civil registry. The United Nations defines civil registration as "the continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events pertaining to the population as provided through decree or regulation in accordance with the legal requirements of a country."

A civil registry has three main purposes: (i) to record a person's biographical information, (ii) to guarantee the veracity of the information expressed in the certificates issued and, (iii) to gather and provide data regarding vital statistics to the pertinent national statistics institute. Civil registration is the first step to establish a person's unique and legal identity.

Unfortunately, birth registration is neither universal nor timely in the majority of developing countries around the world. At present, the births of hundreds of thousands of boys and girls go unrecorded. According to the United Nations Children's Fund (UNICEF, 2012), the average rate of under registration of births in the Latin American and Caribbean (LAC) region has been reduced to less than 10 percent. Although this figure may represent a considerable improvement compared to the 18 percent recorded nearly 10 years ago (UNICEF, 2004), it still means that a significant number of people of all ages lack a legal identity.

Until recently, governments did not fully comprehend the implications of universal and timely civil registration as a matter of public interest, and the subject was absent from political agendas. This means that many civil registration systems in the region have suffered from both financial and institutional neglect. At the same time, there are notable cases, such as Chile's Civil Registration and Identification Service and Uruguay's Civil Registry, where investments in this area have indeed been made and where birth registration rates compare favorably with those found in Organisation for Economic Co-operation and Development (OECD) countries. Although rates of under-registration

of births in the LAC region might not be as high as the rates in other regions of the world, the consequences are no less serious. Without a legal identity, an individual, and even an entire family, can be excluded from the social protection system, economic opportunities, and civic participation.

To access rights, benefits, and public services, it is a fundamental requirement for all citizens to possess documents that authenticate their identity. For example, if a child does not have a legal identity, his or her education might be restricted if a school decides not to provide its services to individuals without proper identification. Likewise, the child may be denied access to the services at a public health center if the center requires legal identification. At the same time, if the parents of a family lack the aforesaid documents, they will likely encounter difficulties in accessing the formal labor market, in registering a property, in becoming beneficiaries of social programs, in voting, in receiving full protection from the law, and so on.

Over 10 years ago, the Inter-American Development Bank (IDB) took an active interest in the matter of exclusion from social, economic, and civic rights, and it was acknowledged that the lack of identity documents might be one of the factors behind this exclusion. Since then, many LAC countries have made progress toward providing citizens with identity documents and improving and modernizing their civil registration systems. Notwithstanding laudable progress, the problem of undocumented citizens persists.

The factors that might account for the under-registration of births can be divided into supply and demand. There has been a series of successful interventions on the demand side through social programs as well as information campaigns and birth registration promotion. Although the programs have had positive short-term results, there are no studies that demonstrate their effectiveness in the medium and long term. In many countries, birth registration is almost universal in all the large cities. In rural areas, however, where populations are more geographically dispersed, under-registration rates are high—sometimes alarmingly so. Likewise, there are also cultural and socioeconomic factors that affect parents' decisions when it comes to registering their newborn children. Based on the traditional cultures of certain indigenous peoples, for example, they may delay registering their children until they have reached a certain age, or until their hair has been cut for the first time. In some countries, late registration, or registration that takes place outside the legally stipulated time limit, is subject to a fine, or an administrative or judicial procedure that might prove too costly for families with scant resources.

On the supply side, progress has been slower. Civil registries in the LAC region vary, both with regards to their institutional location and the way in which they are administered. The registries are set up with different legal frameworks, ranging from highly centralized systems that have integrated technology, to older, decentralized registries in which hand-written records are still used. In most countries, the registrars are public civil servants, although in others, the system relies on unpaid volunteers. In some countries, the registrars are not selected on the basis of a competitive process. Timely, efficient, and secure service provision is often beyond the capacity of poorly paid, inadequately trained, and undervalued staff in an organizational structure that covers the entire national territory. Discrimination against certain groups, such as single mothers, indigenous peoples, and poorly educated people, is palpable.

The national authorities recognize these problems and challenges to a certain extent, but often the scope and the relationship between legal identity, an efficient and reliable civil registration system, and timely vital statistics-gathering have not yet been fully examined and understood.

However, it is clear that the importance of this topic is becoming widely acknowledged, thanks to the increased exchange of knowledge and information. Furthermore, recognizing that only that which can be measured can be improved, there is increasing international recognition that universal civil registration and the vital statistics that it underpins may jeopardize the objectives laid out in the UN's Millennium Development Goals (MDGs).

This monograph has been written to examine the relationship between social and economic development and the right to a unique, legal identity. The impact of being undocumented goes beyond the difficult situation of an individual and his or her family; it affects society and national economies, contributing to great asymmetries in access to rights and benefits. This has become increasingly accepted among the national authorities and has meant that most civil registries in LAC countries are taking measures to tackle both the demand- and the supply-side problems in order to bring the services closer to the clients, and thereby to be able to guarantee each person's legal and unique identity.

The IDB will continue to support the LAC countries by providing financing for projects and by offering new information to help them better understand and confront the challenges in the registration process. This monograph is meant to be a contribution to this effort, and we hope that it will be of great interest to all.

**Mia Harbitz**
**Lead Specialist, Registries**
**Inter-American Development Bank**

# Introduction

Birth registration is a fundamental human right and constitutes legal proof of a child's existence and nationality (UNICEF, 1989). Although a birth certificate is not the only document that can be used for legal identification, it is a prerequisite for requesting other documents, such as a national identity card or a passport.[1] Likewise, it is the first step toward establishing a unique, legal, and secure identity.

Without adequate identity documents, a child or young person can become marginalized from the benefits of mainstream society and be condemned to a life of social exclusion (Harbitz and Tamargo, 2009). In many countries, identity documents are required to obtain civil rights and to gain access to benefits, such as school certificates; health services; conditional cash transfers; pensions; banking services; adoption, divorce, and marriage certificates; and inheritance. Moreover, people who lack identity documents are at greater risk of becoming victims of human trafficking and sexual exploitation, since without such documents, their existence cannot be proven.

At the same time, if governments lack accurate information about their citizens, their capacity to improve socioeconomic conditions is hampered. Any public institution that embarks on a campaign to universalize opportunities will encounter considerable difficulties if it cannot identify underprivileged people because they lack legal identity documents. Therefore, understanding and quantifying the causes and consequences of the lack of identity documents is crucial for public policy making.

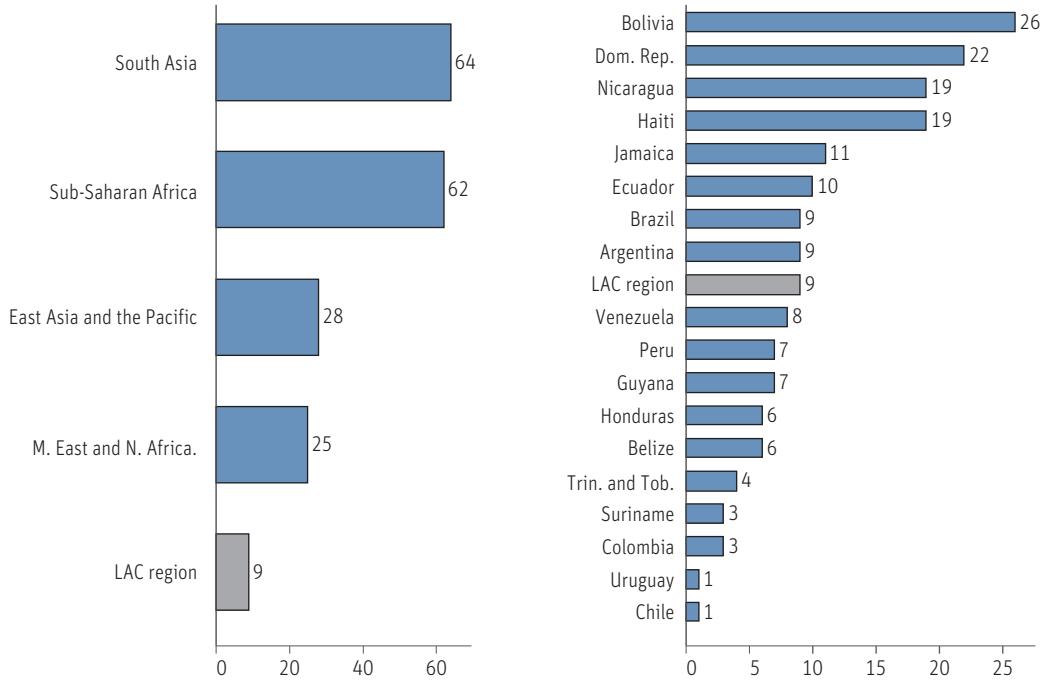
In 2010, an estimated 9 in 100 children in the Latin American and Caribbean (LAC) region between the ages of 0 and 4 were not registered at birth. In Bolivia and the Dominican Republic, more than 20 out of every 100 children (see Figure 1) were not registered. How can this phenomenon be explained? What does it mean for the children? What are the consequences for the social and economic development of their countries? The purpose of the three chapters in this monograph is to shed light on the possible causes and consequences of the under-registration of births in various LAC countries.

Chapter 1 analyzes the relationship between lack of birth registration and access to education and educational attainment in the LAC region. The chapter reviews information from Bolivia, Brazil, the Dominican Republic, Guatemala, and Peru. The percentage of unregistered school-age children and young people varies greatly among these countries, from less than 1 percent in Brazil to almost 10 percent in the Dominican Republic. Academic performance also varies. Primary education enrollment rates reach nearly 100 percent, but completion rates for primary education and enrollment rates in secondary education fall drastically, to between 30 and 50 percent.

A graphical analysis reveals a significant gap between children with and without a birth certificate with regard to both school enrollment rates and years of completed schooling. This difference

[1] Due to a lack of reliable statistics, establishing the rates of under-registration of births is complex. Therefore, in spite of limitations, comparisons of under-registration rates in this publication are mainly based on demographic and health surveys and on multipurpose household surveys.

**FIGURE 1.** Under-Registration of Births of Children Ages 0 to 4, 2000–12* *(in percentage)*




*Source:* UNICEF (2012), Multiple Indicator Cluster Surveys (MICS), Demographic Health Surveys (DHS), and other official sources.
* Most recent available year.

grows as age increases. Likewise, in the five countries studied, unregistered young people are less likely to remain in school beyond a certain age than are legally registered young people.

An econometric analysis confirms the negative relationship between the lack of a birth certificate and access to education and educational attainment. Not having a birth certificate is associated with a lower probability of being in school of between 3 and 18 percent, depending on the country. It is also correlated to a lower probability of enrollment in primary school of between 5 and 10 percent (with the exception of Peru, where no such relationship has been established) and a lower probability of completing the final (or only) cycle of primary education of around 10 percent, 25 percent, and 20 percent in Bolivia, the Dominican Republic, and Guatemala, respectively. Finally, it is also associated with a lower probability of between 10 and 20 percent of gaining access to secondary education. Furthermore, children who have no birth certificate lag in overall educational attainment by around half a year compared with registered children.

These results are as important quantitatively as those of the other factors that determine educational attainment, such as the mother's level of education or household wealth. Although it is impossible to establish an immediate causality between the lack of birth registration and educational attainment, there is a robust negative relationship, even after controlling for characteristics of children, mothers, and households. The negative relationship between the lack of birth registration and access to education and educational attainment reinforces the importance of birth registration as a development goal.

Birth under-registration may also impede children's access to immunization services at the appropriate age. For children under the age of 1, missing out on the routine vaccines against

tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles can have serious consequences. Moreover, access to immunization services is a good overall indicator of access to health services in general, given that this is the kind of medical service administered universally to all children.

Chapter 2 examines whether the lack of birth registration reduces access to immunization services. The chapter reviews information from Bolivia, the Dominican Republic, Guatemala, Nicaragua, and Peru. Immunization rates vary from country to country and among types of vaccines. Immunization rates against tuberculosis are above 90 percent. In the case of the first dose of the DPT vaccine, the percentage of children vaccinated is nearly 90 percent, but some 30 percent of children receive the vaccine later than the age recommended by medical standards. The percentage of children who fail to receive the third dose of the DPT vaccine increases significantly.[2] The proportion of children not vaccinated against measles ranges from 12 percent in Guatemala to 26 percent in the Dominican Republic, and the percentage of children vaccinated later than recommended is also high at roughly 40 percent.

A graphical analysis reveals a significant gap between registered and unregistered children with regard to the number of vaccines received. As the child gets older, this difference remains constant. Among registered children, the percentage of children vaccinated is high for each of the eight vaccines under consideration, compared to unregistered children.

An econometric analysis reveals the existence of a significant negative relationship between the lack of a birth certificate and the number of vaccines received. In particular, children lacking birth certificates receive between one half and one fewer vaccines on average, depending on the country. Moreover, there is a negative relationship between being unregistered and the probability of being vaccinated at the appropriate age, measured within the threshold ages of 7 to 13 months. The negative result of not having a certificate on the probability of being appropriately inoculated before the age of 7 months ranges from 6 percent in Bolivia to 13 percent in Peru. The negative relationship of being unregistered on the probability of receiving the appropriate vaccination before the age of 13 months is 7 percent in Bolivia, 9 percent in the Dominican Republic, and 6 percent in Guatemala. Finally, having no birth certificate is related to a reduction in the percentage of immunizations received at the appropriate age of 8 percent in Bolivia, nearly 9 percent in the Dominican Republic and Nicaragua, and 14 percent in Peru.

These correlations remain robust, even after controlling for characteristics of the child, the mother, and the household. The fact that a negative relationship is confirmed between the lack of a birth registration and adequate immunization makes an argument in favor of making birth registration a key goal of public policy.

Chapters 1 and 2 demonstrate that the lack of birth registration is associated with lower educational attainment and inadequate immunization among children. Given these negative circumstances, why do some mothers fail to register their children at birth? What factors come into play? And, finally, what policy options might be considered that would promote universal birth registration?

Chapter 3 sets out the possible causes of the under-registration of births. There are various socioeconomic factors linked to this phenomenon. One possible obstacle that often crops up in

[2] The DPT vaccine combines the vaccines against diphtheria, pertussis (whooping cough), and tetanus.

qualitative studies is the distance between the civil registry office and the location of the birth, which increases the costs associated with the registration process. Based on the Global Positioning Satellite (GPS) data, the distance between household clusters and the nearest civil registry office was calculated in Bolivia, the Dominican Republic, and Peru. The country with the most uneven distribution of civil registry offices, with an average distance of 17 kilometers from the household to the nearest registry, is Bolivia, which also records the highest rate of under-registration of births for children less than 5 years of age (26 percent). In both the Dominican Republic and Peru, the average distance from the household to the nearest registry is 5 kilometers.

A graphical analysis of the distribution of civil registry offices within each country shows that in some zones there is a complete lack of civil registry offices, particularly in Bolivia. In the Bolivian departments of Beni, Cochabamba, and Santa Cruz, registries are grouped around the larger cities, leaving sizable areas without access.

Econometric analysis reveals that longer distances between households and civil registry offices are associated with a lower probability of birth registration in both Bolivia and the Dominican Republic. In Peru, however, distance does not seem to be a statistically significant factor. Other important variables include the mother's education level, the household income level, and, in the Dominican Republic, having foreign and/or undocumented parents.

These findings prompt the following policy recommendations to increase birth registration in the region:

- Reducing the distance between households and civil registry offices by creating new registry offices, redistributing existing ones, and promoting mobile registration campaigns
- Educating the population on the importance of birth registration, especially during the rainy season, when access to services can be compromised
- Conducting registration campaigns in conjunction with campaigns for vaccination and conditional cash transfers, as well as awareness-raising campaigns for mothers-to-be during the prenatal care stage
- Ensuring that schools are equipped to identify problems of under-registration and to help families solve them
- Catalyzing dialogue between countries to regulate the registration of children born of undocumented parents in countries with heavy migration flows

# 1

# Birth Registration and Educational Attainment

## Introduction

Educational attainment has been widely studied in the economic literature. The explicative factors on access to education and educational attainment that have been most often analyzed are parents' level of education, the number of children, total income, and participation in conditional cash transfers, among others. However, little attention has been paid to the role of birth registration in access to education and educational attainment in the Latin American and Caribbean (LAC) region.

The lack of birth registration can jeopardize a child's education to the extent that an educational center may refuse to offer its services to children that have no documents to prove their identity and family situation. Among the few studies on this matter, those conducted by Bracamonte and Ordoñez (2006) and Harbitz and Tamargo (2009) find that the lack of adequate identification is an obstacle to enrolling children in school and obtaining academic certificates. Similarly, Castro and Rud (2011) find a difference of between 10 and 20 percentage points in enrollment rates for children with and without birth certificates between the ages of 5 and 17 in the Dominican Republic and Peru.[3]

This chapter reviews the relationship between birth registration and educational attainment in Brazil, Bolivia, the Dominican Republic, Guatemala, and Peru.[4] There is a negative correlation between lack of a birth certificate and enrollment rates, the average number of years of successfully completed schooling, and the probability of continuing on to higher education for young people ages 16 to 18. Although a causal relationship between lacking a birth certificate and educational attainment cannot be established, their negative correlation survives after controlling for other determining factors, such as characteristics of the child, the family, and the household.[5]

[3] This is after controlling for characteristics of the child, the head of household, and the household itself. If the sample is divided according to primary and secondary levels, it becomes apparent that the gap is narrower at the former than at the latter.

[4] There are few extant surveys that include information regarding legal identity (birth certificate or birth registration) and education. The surveys used were the following: Demographic and Health Surveys (Encuestas Demográficas y de Salud) (Endes) for Bolivia (2008), the Dominican Republic (2007), and Peru (2004–08); the National Survey of Living Conditions (Encuesta Nacional de Condiciones de Vida) (Encovi) for Guatemala (2000); and the National Household Survey (Encuesta Nacional por Muestra de Viviendas) (PNAD) for Brazil (2009). These are the few surveys that offer information on the registration of children and youths between the ages of 0 and 18 in the LAC region. This chapter studies the household members between the ages of 7 and 18, given that these are the ages of students attending primary and secondary school.

[5] Corbacho, Brito, and Osorio Rivas (2012) demonstrate a causal negative effect of the lack of birth registration and educational attainment in the Dominican Republic.

**TABLE 1.1.** Percentage of Unregistered Children, by Age Group

| Age (years) | Bolivia | Brazil | Dom. Rep. | Guatemala | Peru |
|---|---|---|---|---|---|
| **0 to 18** | 8.49 | 0.44 | 11.38 | 1.51 | 2.17 |
| **0 to 6** | 17.44 | 1.05 | 21.20 | 2.26 | 5.17 |
| **7 to 18** | 3.02 | 0.15 | 9.77 | 0.92 | 0.53 |

*Source:* Authors' elaboration.

## Birth Registration and Education: An Overview

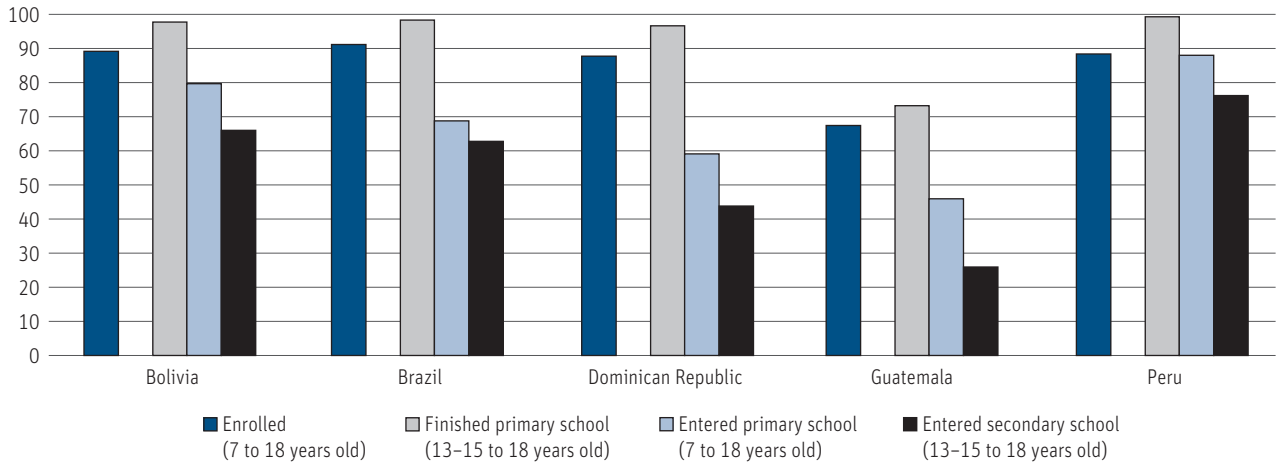
Table 1.1 shows the percentage of children without birth certificates by age group in the five LAC countries discussed in this chapter. Brazil has the lowest percentage of unregistered children; the Dominican Republic displays the highest percentage. In all countries, birth under-registration rates are most acute among children between the ages of 0 and 6. For children between the ages of 7 and 18, when school attendance is most common, the rates vary widely, ranging from less than 1 percent in Brazil to nearly 10 percent in the Dominican Republic.

Figure 1.1 shows different indicators of school enrollment and access to primary and secondary education for children between the ages of 7 and 18. Although primary school enrollment rates are quite high (nearly 100 percent in most countries), they fall dramatically at the secondary level. In Bolivia, almost all children are enrolled in primary school, but only 80 percent complete it, and only 65 percent continue on to secondary education. In Guatemala, where all indicators are less encouraging, 70 percent of children enter primary education, but only 25 percent continue to secondary education.

Figure 1.2 shows the average number of years of successfully completed schooling for each of the five countries under review. The countries with the highest average number (nearly 5.5) of successfully completed years are Brazil, Bolivia, and Peru, followed by the Dominican Republic, with an average of 4.7 completed years, and Guatemala, with an average of 3 years completed.

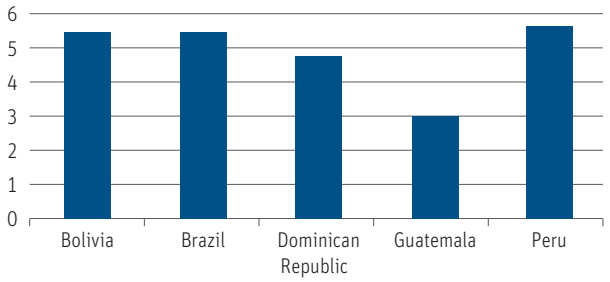
In all countries in the LAC region, the aim of primary education is to teach basic and essential skills,

**FIGURE 1.1.** Percentage of Children in School




*Source:* Authors' elaboration with data from Bolivia (DHS, 2008), Brazil (PNAD, 2009), the Dominican Republic (DHS, 2007), Guatemala (Encovi, 2000), and Peru (DHS, 2004–08).

**FIGURE 1.2.** Average Number of Years of Completed Schooling *(children between the ages of 7 and 18)*




*Source:* Authors' elaboration with data from Bolivia (DHS, 2008), Brazil (PNAD, 2009), the Dominican Republic (DHS, 2007), Guatemala (Encovi, 2000), and Peru (DHS, 2004–08).

while secondary education provides technical, applied, or more specific knowledge. However, the number of years needed to complete each level varies by country, as illustrated in Table 1.2. This information helps to determine the age at which children would normally finish primary education and begin secondary education. The first column shows the theoretical age in which children should be enrolled in the corresponding level. In practice, however, some children do not start school at the expected age; therefore, this study focuses on children between the ages of 7 and 18.

## Graphical Analysis

To assess the relationship between the lack of a birth certificate and educational attainment, the sample of children and young people is divided into two groups: those with a birth certificate and those without one. It can then be determined whether or not there are differences in the proportion of children in the two groups enrolled in school and in the number of successfully completed years at school.

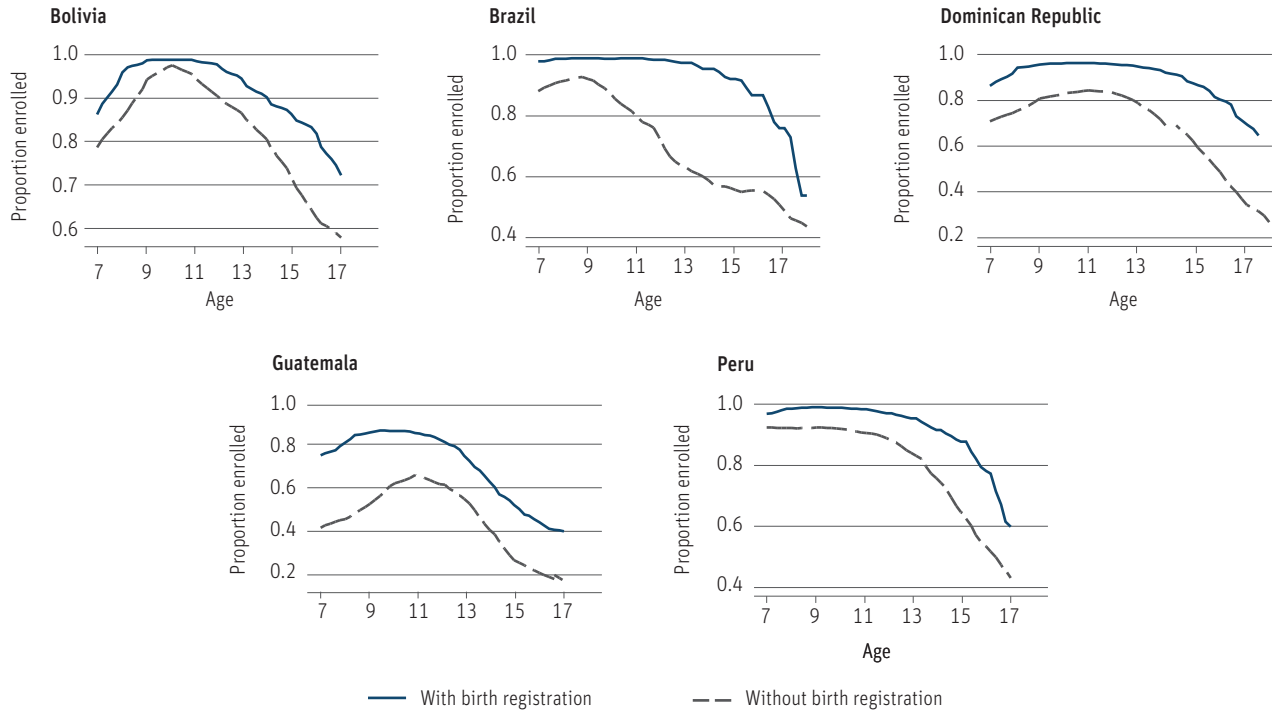
Figure 1.3 shows the proportion of children enrolled in schools in the registered and unregistered groups between the ages of 7 and 18. In the five countries examined, those children lacking a birth certificate have a lower enrollment rate when compared with registered children. For example, in the Dominican Republic, the proportion of registered children enrolled

**TABLE 1.2.** Structure of Education Systems at the Primary and Secondary Levels

| Child's age | Bolivia | Brazil | Dominican Republic | Guatemala | Peru |
|---|---|---|---|---|---|
| 18 | | | Secondary education, second cycle (two years) | Secondary education, second cycle (three years) | |
| 17 | Secondary education, second cycle (two years) | Secondary education (three years) | | | |
| 16 | | | Secondary education, first cycle (two years) | | Secondary education (five years) |
| 15 | Secondary education, first cycle (two years) | | | Secondary education, first cycle (three years) | |
| 14 | | Primary education, second cycle (four years) | Primary education, second cycle (four years) | | |
| 13 | Primary education, third cycle (two years) | | | | |
| 12 | | | | Primary education (six years) | |
| 11 | Primary education, second cycle (three years) | | | | Primary education (six years) |
| 10 | | Primary education, first cycle (five years) | Primary education, first cycle (four years) | | |
| 9 | | | | | |
| 8 | Primary education, first cycle (three years) | | | | |
| 7 | | | | | |
| 6 | | | | | |

*Source:* UNESCO (2011).

**FIGURE 1.3.** Birth Registration and School Enrollment *(young people between the ages of 7 and 18)**




*Source:* Authors' elaboration with data from Bolivia (DHS, 2008), Brazil (PNAD, 2009), the Dominican Republic (DHS, 2007), Guatemala (Encovi, 2000), and Peru (DHS, 2004–08).
* Smoothed local polynomial.

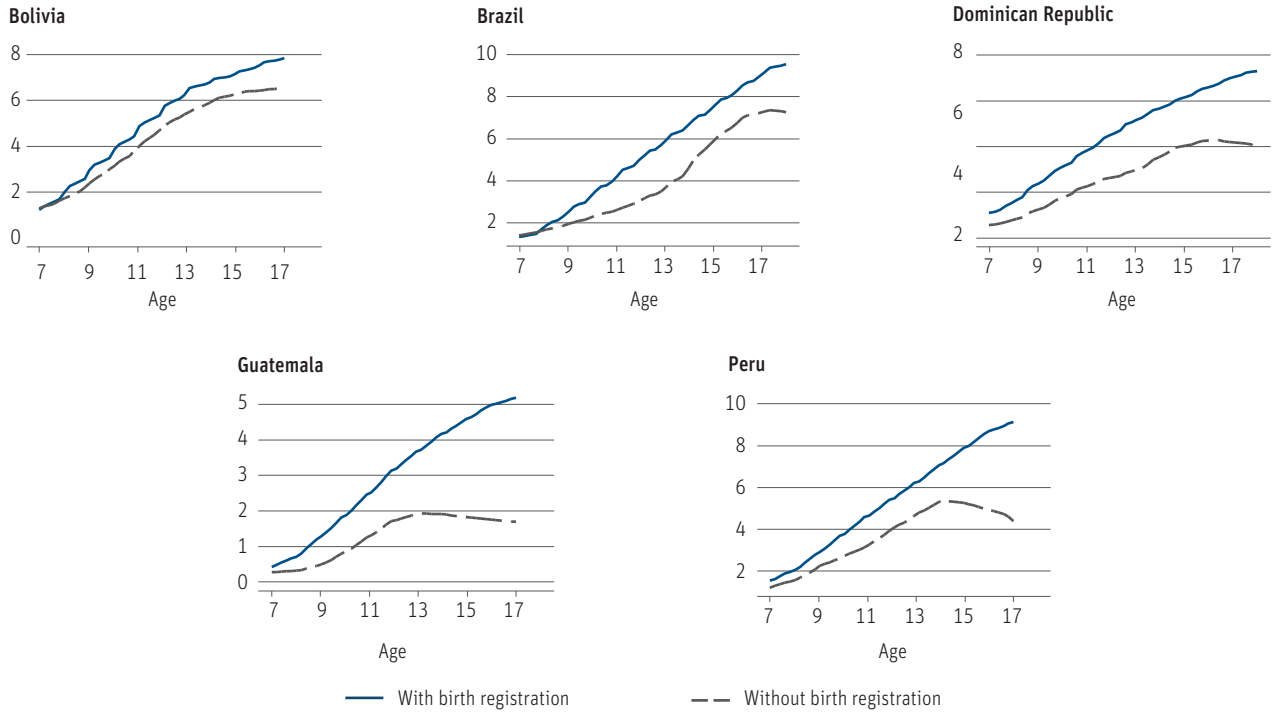
in school at the age of 15 is nearly 0.90, whereas the proportion of unregistered children of the same age is only about 0.60.

An analysis of school enrollment, however, does not take into consideration the fact that some children start school later or might have abandoned their studies for a period of time. It is therefore also valid to analyze the difference in the total number of years of schooling in each group. Figure 1.4 shows the relationship between the number of years of completed schooling and age for registered and unregistered children. There is also a gap between these two groups, which widens with age. For example, in the Dominican Republic, young people aged 18 that are registered have three more years of completed schooling than those with no birth certificate.

Figure 1.5 shows the probability of remaining in school for youth between the ages of 16 and 18.[6] In the five countries under review, this probability is lower for those without a birth certificate. In Bolivia, an unregistered child has an almost 20 percent lower probability of finishing primary school when compared with a registered child. This gap widens as the school years progress. This could be an indication that, over time, unregistered children do not obtain the certificates and diplomas that would allow them to keep advancing toward a higher education level. In other words, although the unregistered children have attended school and may have complied with all academic requirements, their lack of a birth certificate may prevent them from obtaining the documentation that accredits their level of studies. This creates a barrier, especially if a child transfers from one school to

[6] These figures correspond to a survival analysis. The Kaplan-Meier estimator of the survival function allows the fraction of children from each group that remains at school to be measured.

**FIGURE 1.4.** Birth Registration and Years of Completed Schooling *(young people between the ages of 7 and 18)**




*Source:* Authors' elaboration with data from Bolivia (DHS, 2008), Brazil (PNAD, 2009), the Dominican Republic (DHS, 2007), Guatemala (Encovi, 2000), and Peru (DHS, 2004–08).
* Smoothed local polynomial.

another, or if a child finishes primary education and wishes to continue on to secondary school.

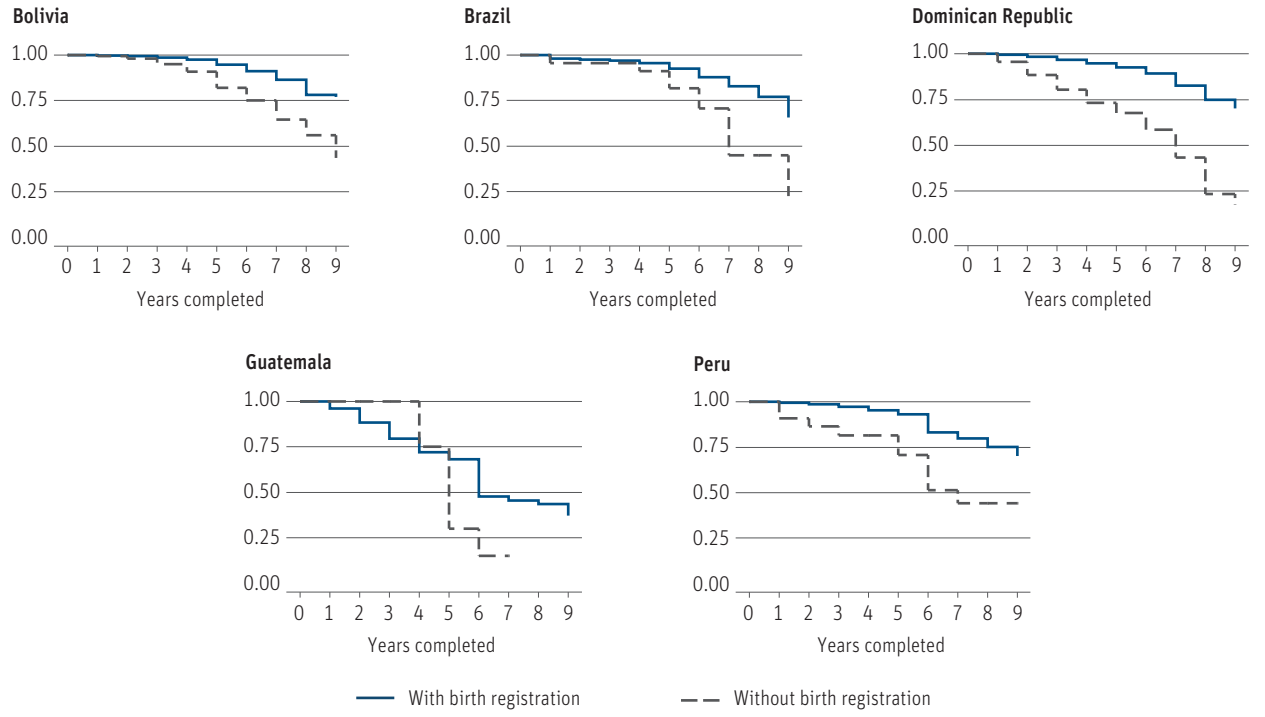
## Econometric Analysis

Educational attainment can be influenced by many factors, such as family structure, family characteristics, parents' level of education, and characteristics of the wider community (Cameron and Heckman, 1999; McKenzie and Rapoport, 2005). Children of the same age might achieve different results due to discrepancies in the ways in which households view the benefits and costs of education. Furthermore, children's results vary according to their own idiosyncrasies, such as, for example, their individual abilities to study.[7] The distance between the place of residence and the school may also affect a child's educational attainment.[8] Household structure can influence the level of human capital as well, given that, for the same level of household income, more children in the household, or the absence of one of the parents, may make it more difficult to educate the children. Finally, the lack of a birth certificate may affect a child's educational attainment. The purpose of this chapter is to analyze this last channel.

[7] Unfortunately, this cannot be observed in the data. The literature on the subject tends to tackle this problem by controlling for characteristics of the parents' level of education. It is considered more likely that children with well-educated parents see benefits from better educational attainment and that well-educated parents invest more in the education of their children, take more of an interest in it, and value it more highly.

[8] As there is no available information on the exact location of the households or the geographic distribution of the schools, a household's access to running water and electricity is used as a substitute variable, or proxy. If the home lacks access to these basic public services, it is also likely to be far from an education center. This is the strategy employed by Cox-Edwards and Ureta (2003) in a study conducted in El Salvador on education and remittances.

**FIGURE 1.5.** Probability of Remaining in School (*young people between the ages of 16 and 18*)*




*Source:* Authors' elaboration with data from Bolivia (DHS, 2008), Brazil (PNAD, 2009), the Dominican Republic (DHS, 2007), Guatemala (Encovi, 2000), and Peru (DHS, 2004–08).
* Kaplan-Meier Analysis.

To take into consideration all of these variables, an econometric analysis was undertaken, which is described more fully in Appendix 1. Although this analysis cannot establish a definite causal relationship between the lack of birth registration and educational attainment, it can verify whether a negative correlation persists when controlling for other variables that might potentially determine educational attainment. Figures 1.6 through 1.10 summarize the results of this analysis, showing the relationship of the variables examined on children's educational attainment, measured in terms of whether they enroll in school, attend primary school, and finish primary school, and then go on to secondary school, as well as in terms of the overall number of years of schooling that they successfully complete.

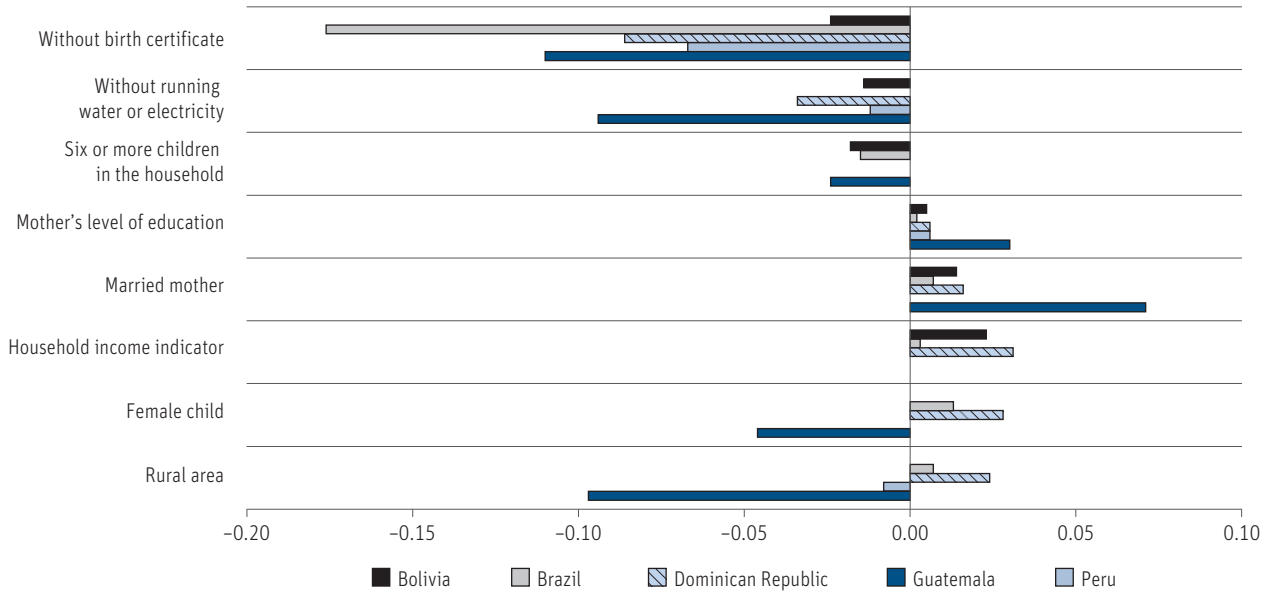
### *Enrollment*

Figure 1.6 shows the relationship between the variables considered and the probability of school enrollment. The negative values (to the left of the vertical axis) denote a negative effect on the probability of enrollment, and the positive values (to the right) a positive effect.

In the five countries examined, not having a birth certificate is associated with a reduction in the probability of being enrolled in school, ranging from 3 percent in Bolivia to 18 percent in Brazil. In the Dominican Republic, the probability is reduced by 9 percent, in Guatemala 11 percent, and in Peru 7 percent. Castro and Rud (2011) find similar results.

With regard to the remaining variables, the following results are worth mentioning:

**FIGURE 1.6.** Relationship between the Lack of a Birth Certificate and School Enrollment
*(children between the ages of 7 and 18)**




*Source:* Authors' elaboration.
* These results represent the marginal effects evaluated in the averages for some variables of the econometric estimates presented in Table A1.1 of Appendix 1.

1. In nearly all of the countries studied (except Brazil), the probability of school enrollment is lower in households that lack access to running water and electricity (this variable seeks to measure the constraints faced by households located far from public services, including education centers).
2. Having six or more children in the household is associated with a lower probability of school enrollment in Bolivia, Brazil, and Guatemala.
3. In all countries, each additional year of the mother's education is associated with a greater probability of school enrollment.
4. The fact that a mother is married is associated with a higher probability of school enrollment (except in Peru).
5. A higher level of household wealth is associated with a greater probability of school enrollment in Bolivia, Brazil, and the Dominican Republic. [9]
6. Girls have a greater chance of enrolling in school in Brazil and the Dominican Republic, whereas boys have a greater probability of being enrolled in Guatemala.
7. Living in rural areas can have a negative or positive effect on the probability of school enrollment, depending on the country.

### *Access to Primary School*

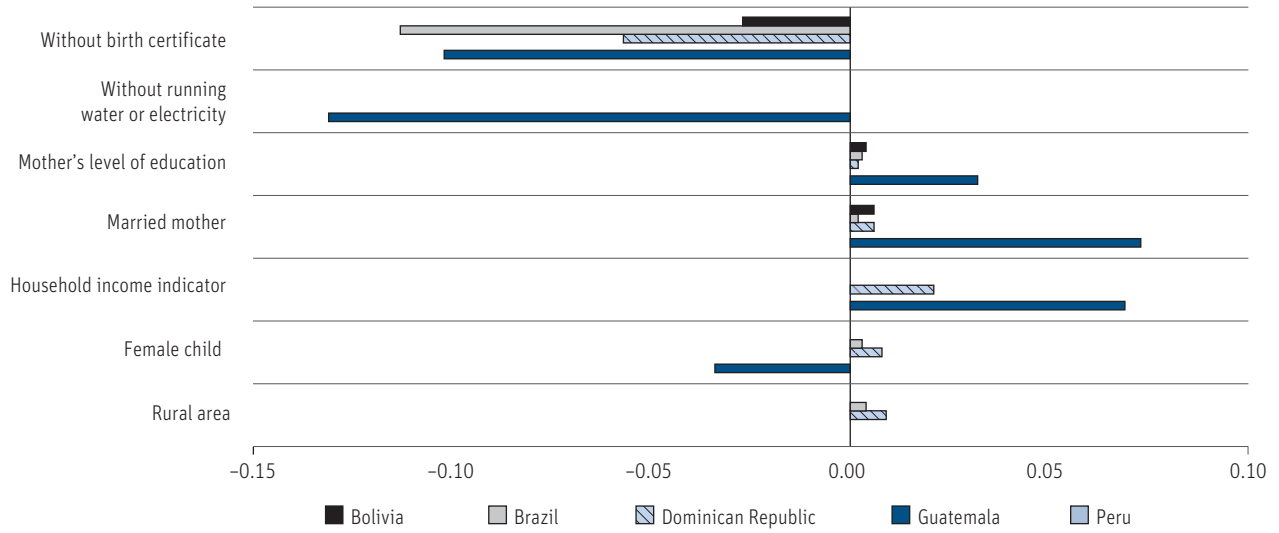
Figure 1.7 shows the relationship between all the variables under consideration and access to primary education. With the exception of Peru, where no such relationship was discovered, the lack of a birth certificate reduces the probability of entering into the primary education system by between 5 and 10 percent.

With regard to the remaining variables:

1. Households that do not have access to running water or electricity have a lower associated probability of accessing primary education in Guatemala.

[9] Household income is measured according to the quintile in which the household is situated, with 1 corresponding to the lowest income levels and 5 to the highest income levels.

**FIGURE 1.7.** Relationship between the Lack of a Birth Certificate and Access to Primary Education
*(children between the ages of 7 and 18)**




*Source:* Authors' elaboration.
* These results represent the marginal effects evaluated in the averages for some variables of the econometric estimates presented in Table A1.2 of Appendix 1..

2. In most countries, a higher education level of the mother, the fact that the mother is married, and higher household income are associated with a higher probability that a child has access to primary education.
3. Girls enjoy a higher probability of accessing primary education in Brazil and the Dominican Republic, and a lower probability in Guatemala.
4. Children in rural areas have higher probabilities of attending primary school in Brazil and the Dominican Republic.

### *Finishing Primary School*

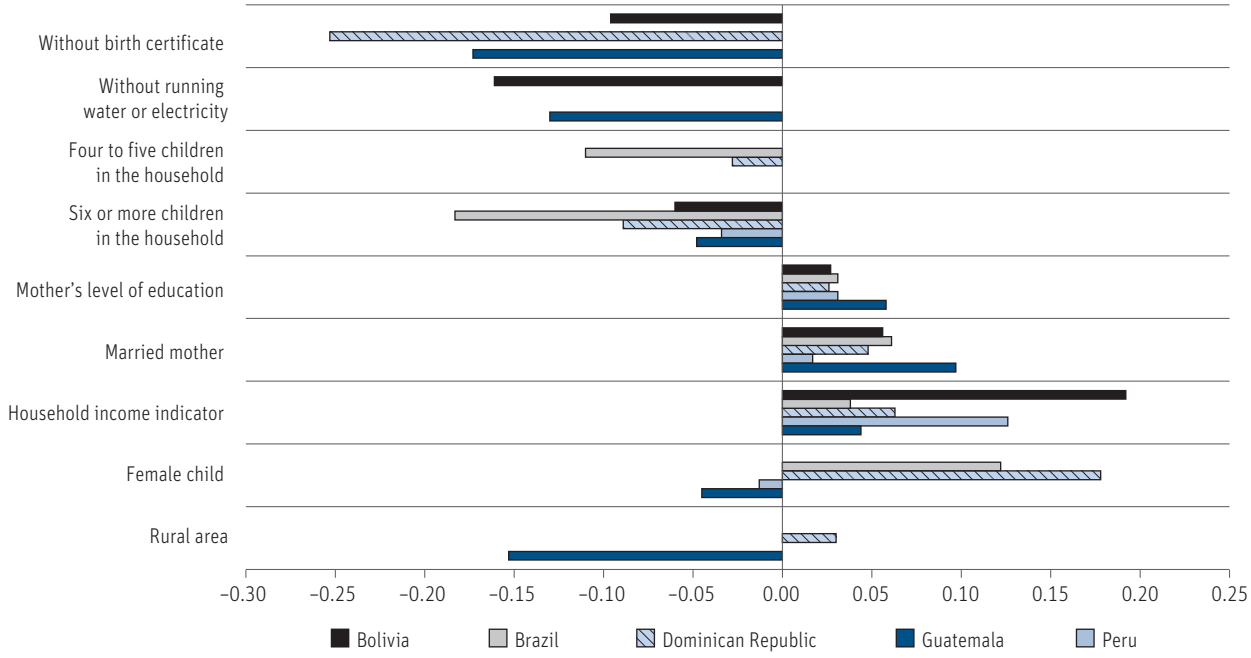
The fact that a child lacks a birth certificate might mean that when he or she finishes the final (or only) cycle of primary education, no certificate is awarded. This might prevent the child from continuing onto secondary studies and eventually reduce the child's employment prospects. Figure 1.8 shows the relationship between the variables considered and the probability of successfully completing primary education. In Bolivia, Guatemala, and the Dominican Republic, not having a birth certificate is associated with a lower probability of finishing primary school of around 10 percent, 20 percent, and 25 percent, respectively.

Similar results are obtained with respect to other variables, but they are more significant for all countries compared to access to primary education. This difference might be due to the fact that enrollment in the first years of primary school are very high in most countries, with little variation. The importance of household income and the mother's education level is also noticeable.

### *Access to Secondary School*

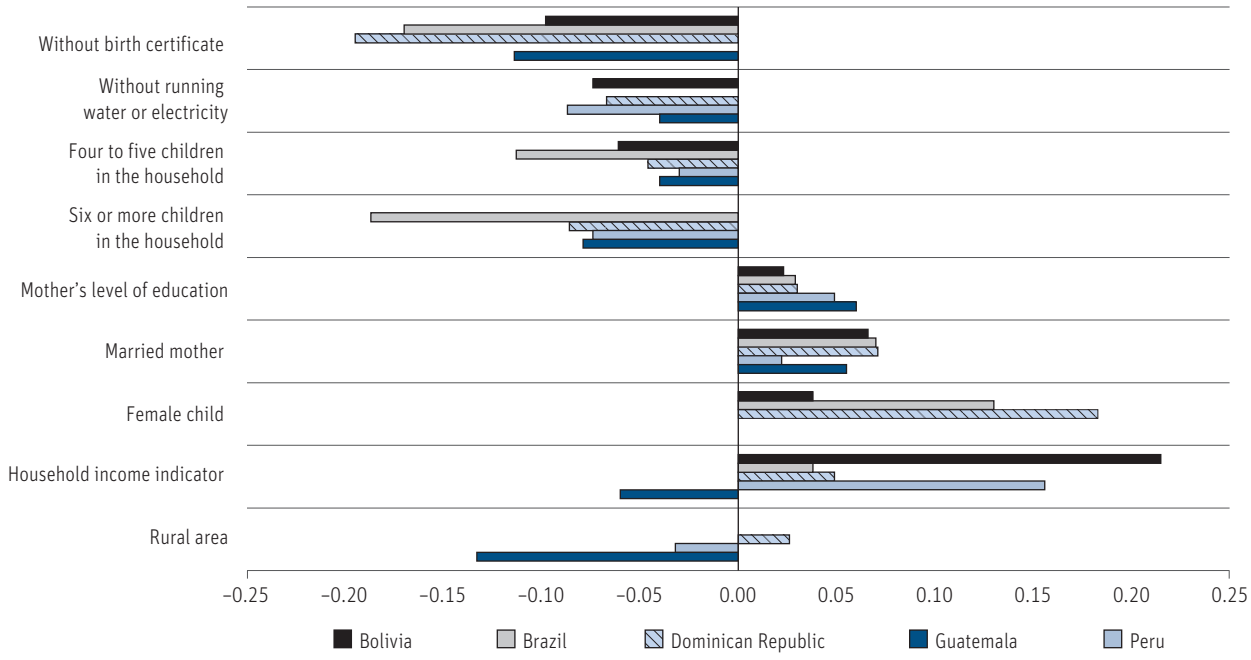
Figure 1.9 shows the relationship between the variables considered and the probability of attending secondary school. Not having a birth certificate is associated with a lower probability of accessing secondary education of between 10 and 20 percent (with the exception of Peru, where no such relationship was established).

**FIGURE 1.8.** Relationship between the Lack of a Birth Certificate and Finishing Primary School
*(children between the ages of 7 and 18)**



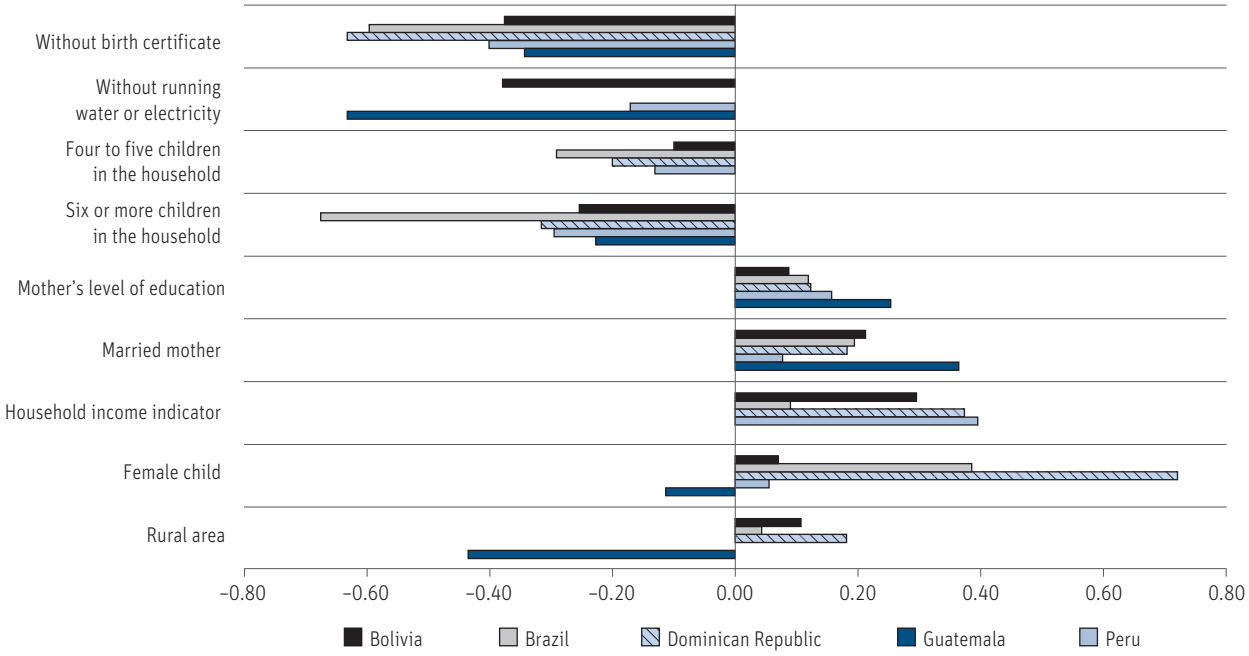

*Source:* Authors' elaboration.
* These results represent the marginal effects evaluated in the averages for some variables of the econometric estimates presented in Table A1.3 of Appendix 1.

**FIGURE 1.9.** Relationship between the Lack of a Birth Certificate and Access to Secondary Education
*(children between the ages of 13 and 18) **




*Source:* Authors' elaboration.
* These results represent the marginal effects evaluated in the averages for some variables of the econometric estimates presented in Table A1.4 of Appendix 1.

**FIGURE 1.10.** Relationship between the Lack of a Birth Certificate and Years of Completed Schooling
*(children between the ages of 7 and 18)**




*Source:* Authors' elaboration.
* These results represent the marginal effects evaluated in the averages for some variables of the econometric estimates presented in Table A1.5 of Appendix 1.

With regard to the rest of the variables, the results are similar to previous ones, with the exception that the probability of accessing secondary education is greater among girls in Bolivia, Brazil, and the Dominican Republic. The lack of a birth certificate can therefore be seen as a possible obstacle to furthering one's education.

### *Years of Completed Schooling*

Figure 1.10 shows the relationship between the variables examined and the years of completed schooling. There is a negative relationship between the lack of a birth certificate and the years of completed schooling in all five countries studied. Not having a birth certificate translates to a gap in overall educational attainment of about half a year. With regard to other variables, results are similar to those already mentioned.

## Conclusions

In general, in the five countries examined, the lack of a birth certificate is associated with lower rates of enrollment, a lower probability of going on to secondary school, and fewer years of completed schooling. Although a causal relationship cannot be clearly established between the lack of a birth certificate and educational attainment, a strong negative relationship can be confirmed by controlling for other determining factors, such as characteristics of the child, the family, and the household.

# 2

# Birth Registration and Immunization

## Introduction

Understanding the factors that determine immunization levels is critically important for several reasons. First, adequate vaccination protects children from diseases such as tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles, which can have permanent consequences for their wellbeing and development and can even cause premature death. Vaccination at the appropriate age has positive effects on cognitive development, educational attainment, and productivity in developing countries (Bloom, Canning, and Seigner, 2010) and reduces infant morbidity and mortality rates. Furthermore, the fact that a community has been immunized also reduces the risks of contagion for neighboring communities (Koenig, Bishar, and Khan, 2001; Breiman et al., 2004). Finally, immunization is a good yardstick of the extent of a country's general coverage of the public health service (Khaleghian, 2003; Pebley, Goldman, and Rodríguez, 1996).

Much progress has been made in the Latin American and Caribbean (LAC) region in combating infectious diseases among newborn children. According to the Pan American Health Organization (PAHO, 2011), immunization corresponding to the main vaccines for children under the age of 1 is better than 90 percent in the region.

The fact that a child has no legal identity (measured by the possession of a valid birth certificate) might lead to a less-than-adequate level of immunization. Health centers may be reluctant to vaccinate a child without the legal documentation that proves his or her identity and the true relationship to the parents. Furthermore, the lack of written certainty about the child's exact date of birth might lead to delays in immunization.

This chapter is one of the first studies on the relationship between the lack of birth registration and the vaccination of children under the age of 5.[10] There is a negative relationship between the lack of a certificate and the number of vaccines received per child, the chances of being appropriately immunized before the age of 7 to 13 months, and the vaccines received as a percent of the number recommended at any particular age. Although a causal relationship cannot be claimed, the strong negative relationship between lacking a birth certificate and immunization rates can be established, even when controlling for other factors, such as the characteristics of the child, the family, and the household.

[10] The countries reviewed are Bolivia, Guatemala, Nicaragua, Peru, and the Dominican Republic. For this group of countries, there is information available regarding vaccination and birth registration for children under 5 years of age. The surveys consulted are Demographic Health Surveys (DHS) for Bolivia 2008, Nicaragua 2001, Peru 2004–08, and the Dominican Republic 2007, and the National Survey of Living Conditions (Encuesta Nacional de Condiciones de Vida) (ENCOVI) for Guatemala 2000.

## Immunization: An Overview

Vaccination at the appropriate age is vital for boosting the effectiveness of immunization and reducing the risk of contagion from certain infectious diseases. Table 2.1 presents the principal vaccines that should be administered to children during the first months of their lives.

Figure 2.1 shows the optimal vaccination schedule. Based on Clark and Sanderson (2009), the BCG vaccine should be given at birth (minimum-maximum target age range: 0–8 weeks). The DPT and polio vaccines should be jointly administered: the first dose at 6 weeks (4 weeks–2 months), the second dose at 10 weeks (8 weeks–4 months), and the third at 14 weeks (12 weeks–6 months). The vaccine against measles should be given at 9 months (36 weeks–12 months).

Figure 2.2 presents the percentage of children who are vaccinated, not vaccinated, and vaccinated outside the appropriate age range for each of these vaccines in Bolivia, Guatemala, Nicaragua, Peru, and the Dominican Republic.[11] A child is considered inappropriately immunized if the vaccination date falls outside the threshold established for each vaccine.

In all five countries, tuberculosis shows the highest rates of vaccination administered at the appropriate age. With regard to the first dose of DPT and polio vaccine, immunization rates are high, but the vaccination is often administered late: although nine out of ten children receive the dose, only six out of ten get it at the right age. With respect to the second dose of DPT and polio, the breakdown in terms of children that are vaccinated, unvaccinated, and vaccinated outside the appropriate time frame varies by country. Peru has the highest percentages of children vaccinated at the appropriate age, and the Dominican Republic has the greatest percentage of children either not vaccinated or vaccinated before or after the appropriate age. With regard to the third dose of DPT and polio, the percentage of children that are not vaccinated and vaccinated late is high for all countries. For example, in the Dominican Republic, 40 percent of children do not receive the third dose of DPT and 32 percent receive it late. Finally, with respect to the vaccine against measles, the rates of children that are not vaccinated range from 12 percent in Guatemala to 35 percent in the Dominican Republic, and the rates of children that are vaccinated before or after the appropriate age are high, surpassing 40 percent in Bolivia and Nicaragua.

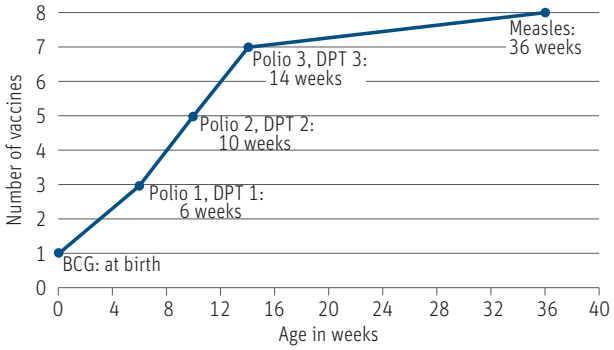
Figure 2.3 analyzes the delay in immunization in some children from a different perspective. It shows the age distribution of the children vaccinated in each country (except in Guatemala due to the lack of relevant data in the survey) and for each vaccine (except

**TABLE 2.1.** Principal Vaccines Administered during First Months of a Child's Life

| Vaccine | Description | Dose |
|---|---|---|
| BCG | (Bacillus Calmette-Guérin) Vaccine against tuberculosis | 1 |
| DPT | Vaccine against diphtheria, whooping cough, and tetanus | 3 |
| Polio | Vaccine against polio | 3 |
| MMR | Vaccine against measles, mumps, and rubella | 1 |

*Source:* Authors' elaboration based on standard medical practice.

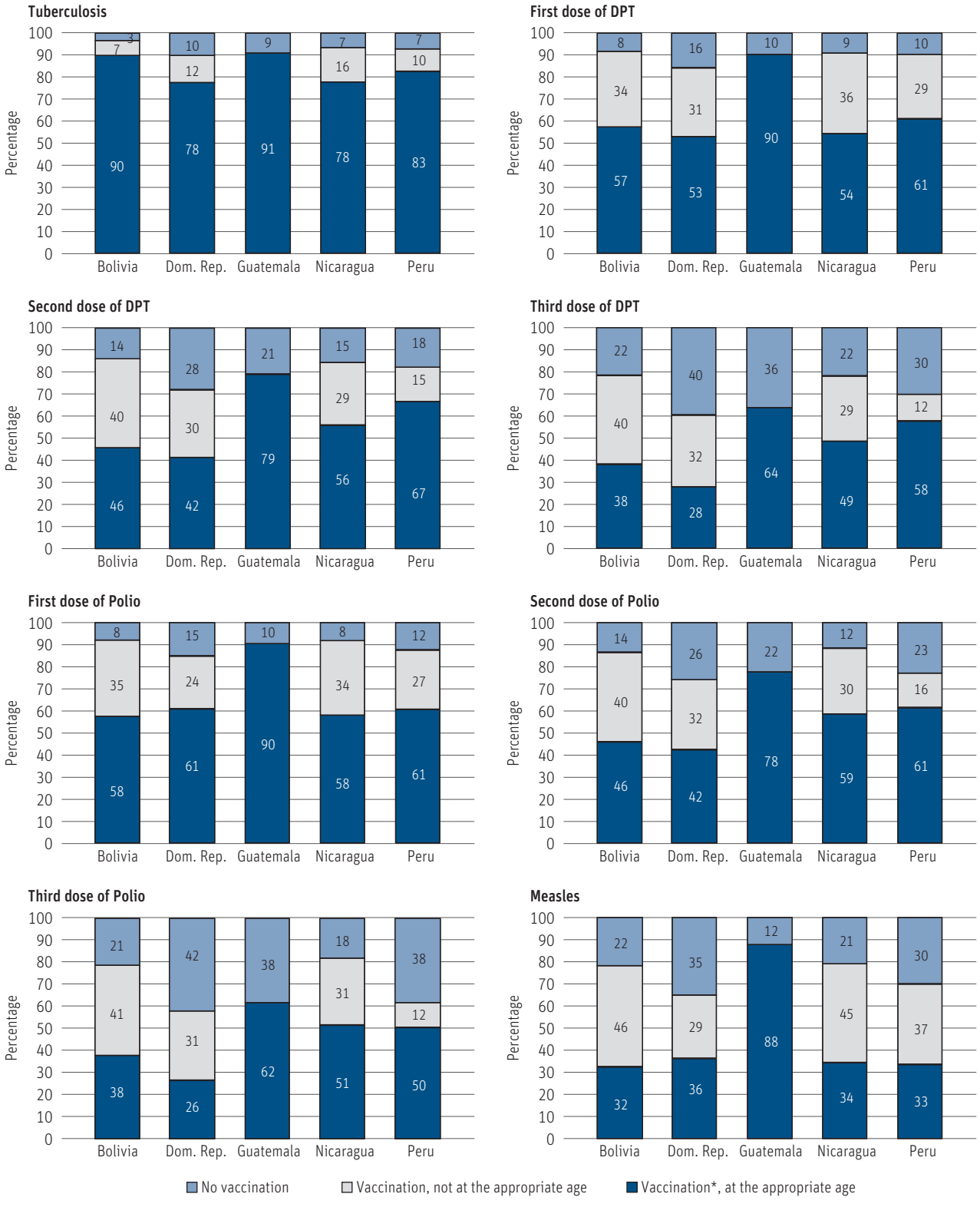
**FIGURE 2.1.** Optimal Vaccination Schedule




*Source:* Authors' elaboration based on Clark and Sanderson (2009).

[11] The figures for Guatemala do not show the percentages of vaccination beyond the threshold age, given that the survey only indicates whether the child received the vaccine but not the child's age at the time of vaccination.

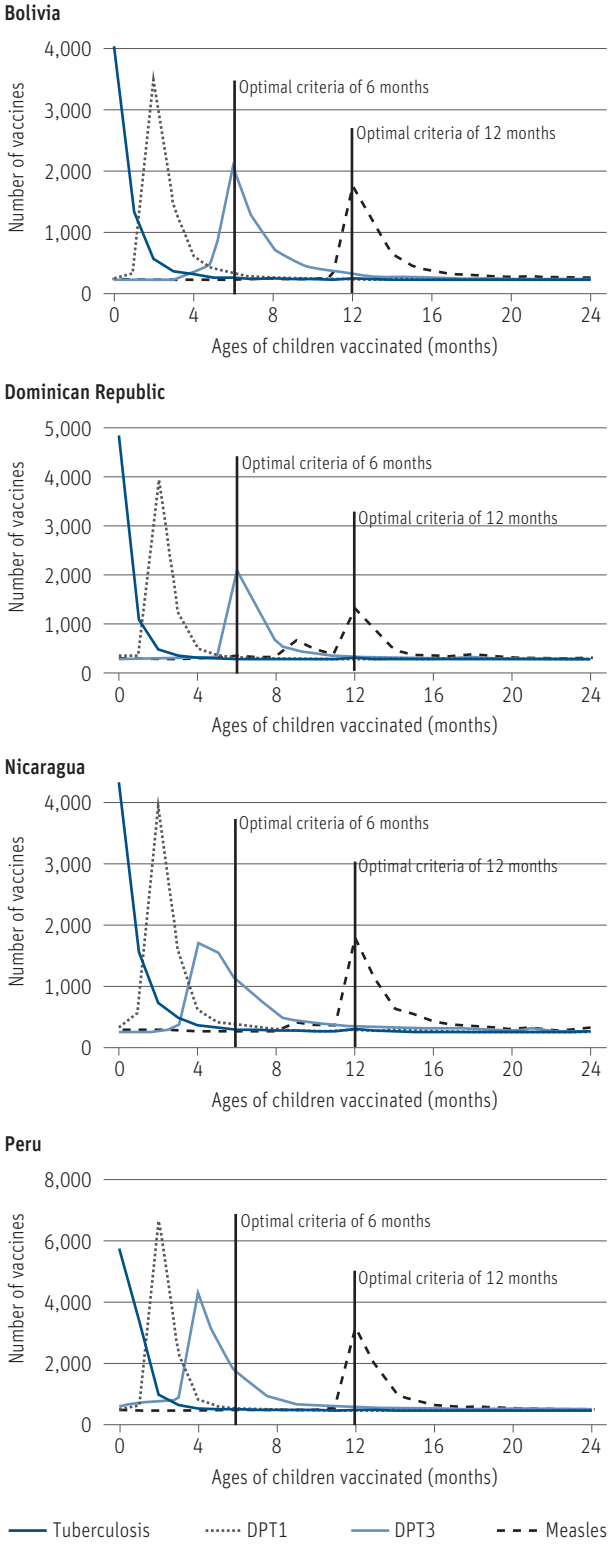
## FIGURE 2.2. Percentage of Unvaccinated Children




*Source:* Authors' elaboration based on data from Bolivia (DHS, 2008), Guatemala (ENCOVI, 2000), Nicaragua (DHS, 2001), Peru (DHS, 2004–08), and the Dominican Republic (DHS, 2007).

* For Guatemala, the information indicates only whether the vaccine was administered, not the date on which it was given.

**FIGURE 2.3.** Number and Ages of Children Vaccinated between 0 and 24 Months




*Source:* Authors' elaboration based on data from Bolivia (DHS, 2008), Nicaragua (DHS, 2001), Peru (DHS, 2004–08), and the Dominican Republic (DHS, 2007).

for polio given that its distribution is very similar to the DPT vaccine). These distributions reveal the number of children that receive each vaccine at any given age. For example, by the age of 6 months, most children had already received the vaccine against tuberculosis and the first dose of DPT, but only approximately half of the children had received the third dose of DPT. At the age of 12 months, most children had already received all vaccines, except the vaccine against measles, which more than half of the children still lack at that age.

## Graphical Analysis

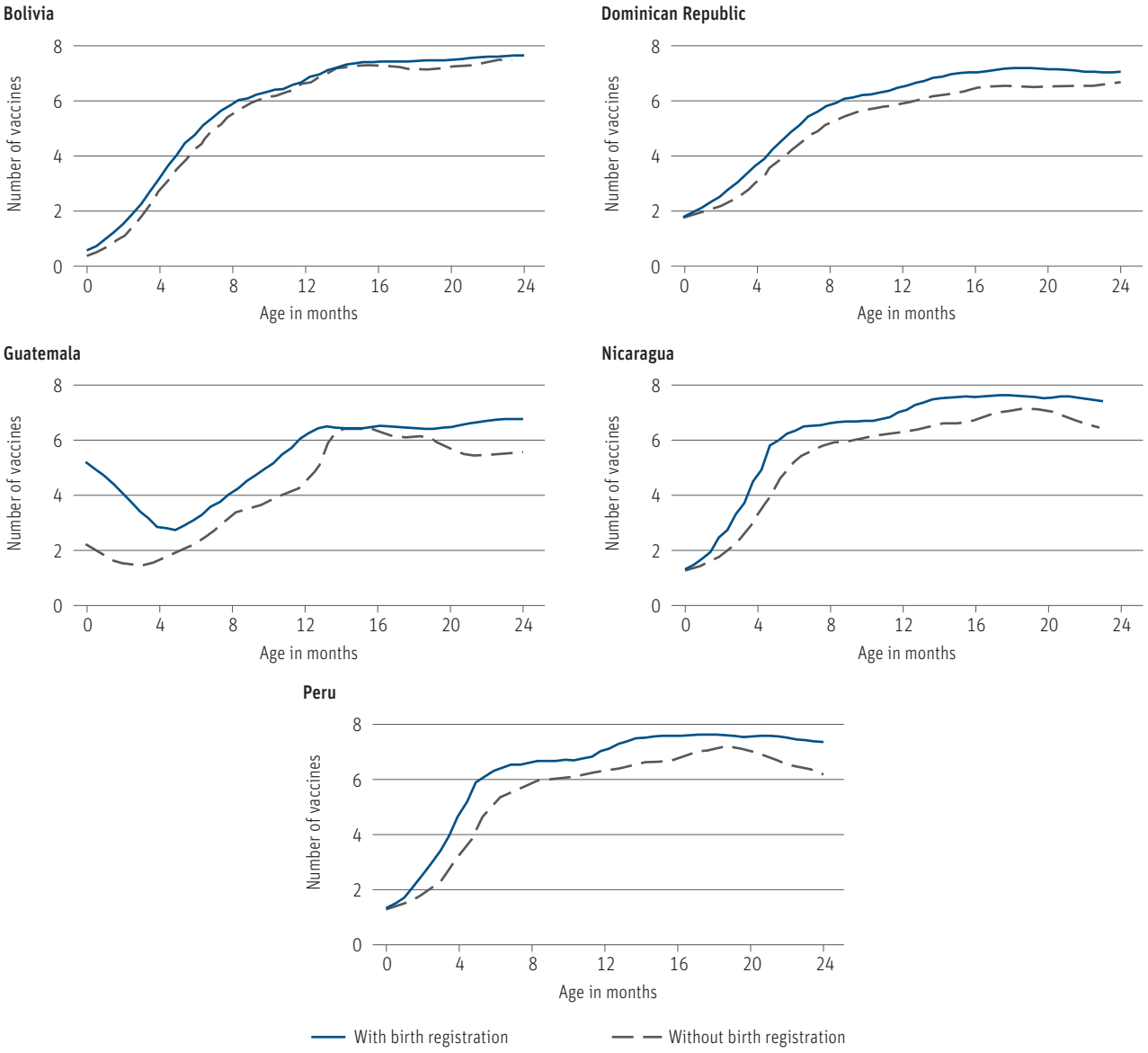
Figure 2.4 shows the relationship between the lack of a birth certificate and the number of vaccines a child receives by a certain age. The sample, children from birth to age 24 months, is divided in two groups: registered and unregistered children. Children without certificates receive fewer vaccines than registered children in all countries. For example, in the Dominican Republic, at the age of 16 months, unregistered children are missing one vaccine on average. The gap between both groups is constant as age increases for most countries.

Figure 2.5 shows the number of children immunized according to each type of vaccine. In most cases, the group of registered children has a higher immunization rate than the group of children without birth certificates. For example, in Peru, vaccination against tuberculosis is almost total for the registered group but is just above 80 percent for the unregistered group. The greatest differences are observable with regard to the third doses of DPT and polio and the vaccine against measles.

## Econometric Analysis

As in the case of educational attainment, the mere fact of having a birth certificate is obviously not the only variable that can explain the scope and opportunity of immunization among children. The economic and public health literature associates the levels

**FIGURE 2.4.** Birth Registration and Number of Vaccines *(children between 0 and 24 months) **

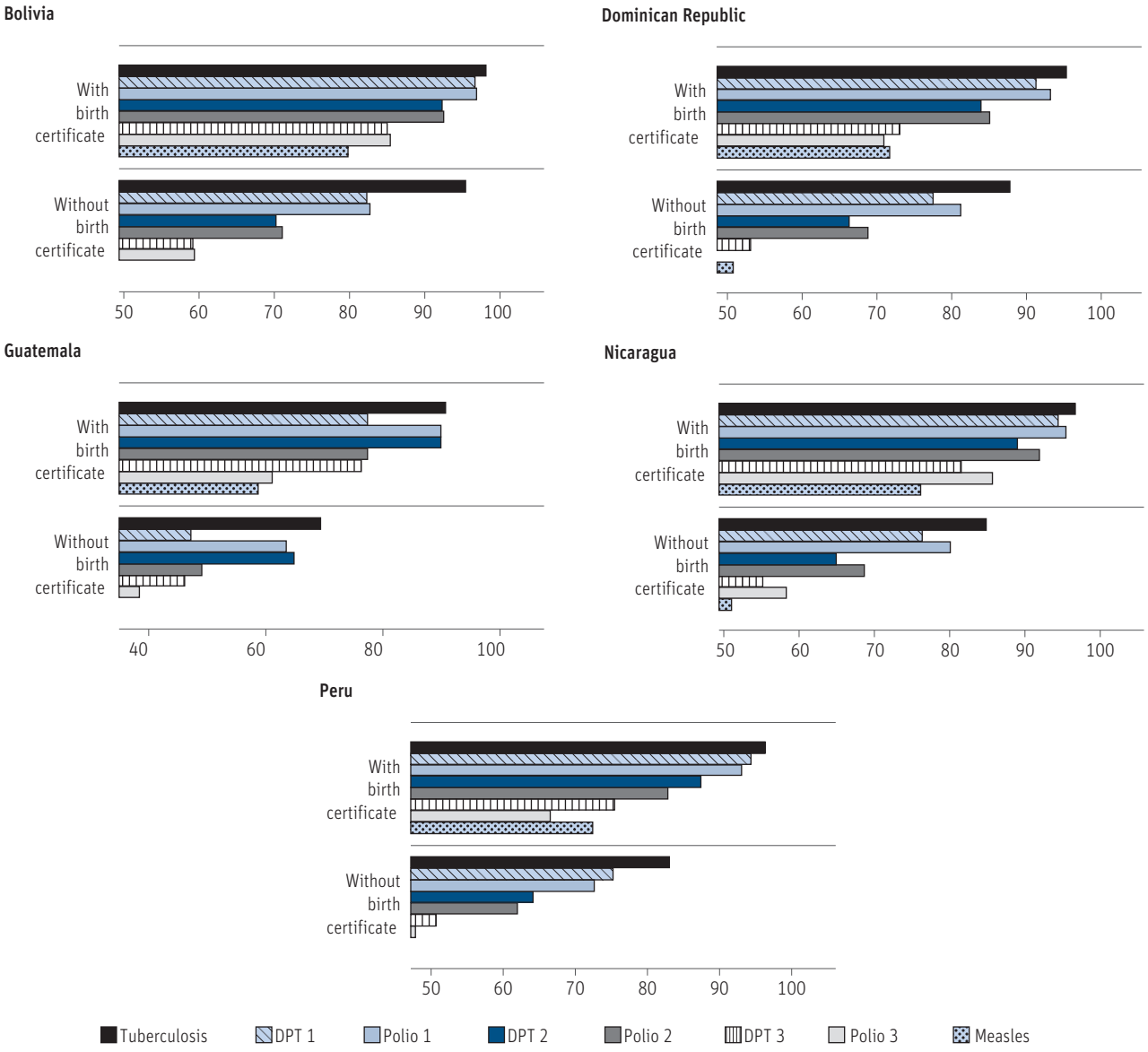



*Source:* Authors' elaboration based on data from Bolivia (DHS, 2008), Guatemala (ENCOVI, 2000), Nicaragua (DHS, 2001), Peru (DHS 2004–08), and the Dominican Republic (DHS, 2007).
* Smoothed local polynomial.

of immunization among children with different socioeconomic characteristics of the child, the parents, the household, and the wider community (Pebley, Goldman, and Rodríguez, 1994).

The characteristics of children that can affect their immunization levels are age, sex, and birth order, among others. According to Yoong (2007), the more children in a household, the greater the difficulty and/or the less time available to take newborn children to be vaccinated, which suggests that the youngest children in the household will receive comparatively fewer vaccines than their older siblings. Another variable that is associated with immunization levels (mainly in the case of the BCG vaccine) is whether or not the child was born in a hospital, in which case he or she is more likely to receive the first vaccination.

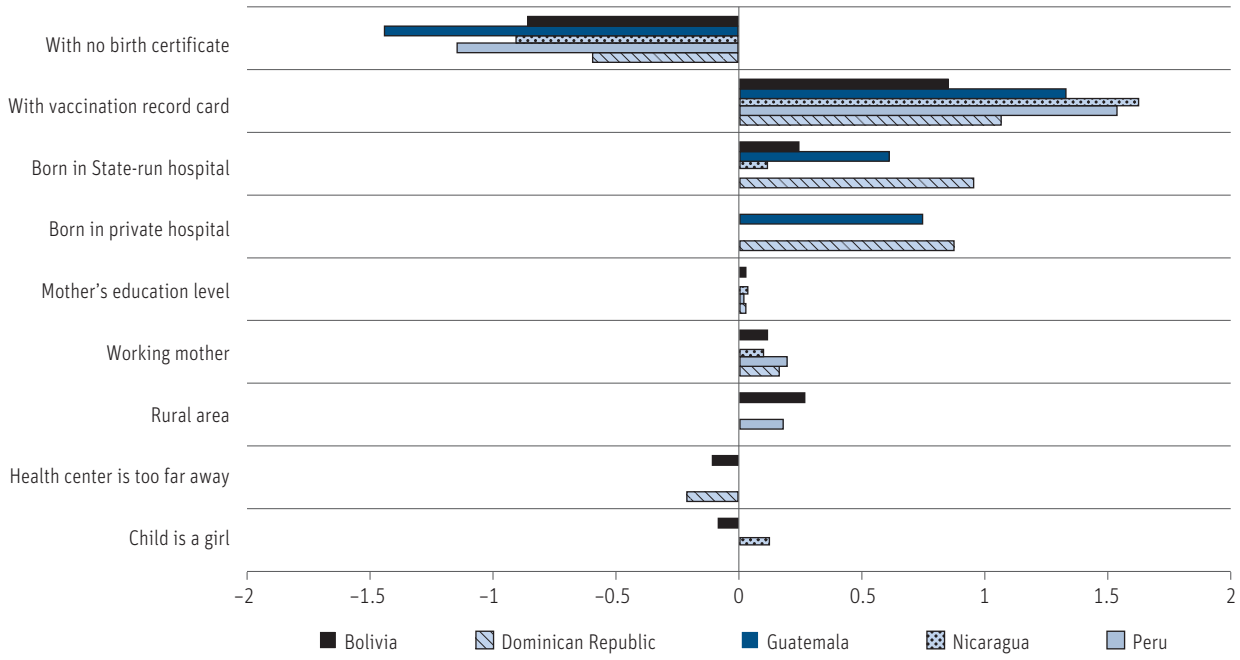
**FIGURE 2.5.** Percentage of Children Vaccinated According to Type of Vaccine *(age 0 to 60 months)*




*Source:* Authors' elaboration based on data from Bolivia (DHS, 2008), Guatemala (ENCOVI, 2000), Nicaragua (DHS, 2001), Peru (DHS, 2004–08), and the Dominican Republic (DHS, 2007).

With regard to the parents, the most important characteristics are the mother's education level and whether or not she works, as well as the parents' ethnic group. A higher education level can be linked to greater awareness of the importance of immunizing children at the right age, which means that the better educated the mother, the higher the rate of immunization of the children in that household. The fact that the mother works can sometimes be negatively associated with the number of vaccines due to less time or flexibility to be able to take the children to the health center. With regard to the ethnic group of the parents, a lower level of immunization can be anticipated among indigenous groups or those of African descent, as these groups face more obstacles accessing the health system in general. Regarding

**FIGURE 2.6.** Relationship between the Lack of a Birth Certificate and the Number of Vaccines Given *(children from 0 to 59 months)**




*Source:* Authors' elaboration.
* These results correspond to certain variables of the econometric estimation presented in Table A2.1 in Appendix 2.

the household, the two most important characteristics are income and location. In terms of income, the higher the household income, the better the chances that children will be immunized during the appropriate time frames. In the case of location, the distance between the home and the nearest health center can be a factor.[12] Also, living in a rural area, where the access to health care is often more erratic, can decrease immunization levels.

Finally, the lack of a birth certificate can lead to lower immunization levels, which is the main focus of this chapter. Health centers may be unwilling to vaccinate a child that is unregistered, as neither the child's identity nor its real relationship to the mother can be legitimately verified. As social assistance centers and immunization campaigns have sought to solve this problem through the use of parallel registers and vaccination record cards (a document bearing the infant's name used to keep a record of the vaccines received and the dates on which they are given), possession of a vaccination record card (even without a birth certificate) can also affect immunization levels.

The current study accounts for these variables through an econometric analysis, which is described in detail in Appendix 2. Although the analysis does not categorically demonstrate the causal relationship between birth registration and immunization levels, it does verify whether the negative relationship suggested by the graphical analysis is maintained, even when controlling for other observable variables that might potentially determine the scope and the opportunity for immunizations.

Figures 2.6 to 2.9 summarize the result of the analysis, showing the relationship between the variables of interest and childhood immunization rates, measured as the total number of vaccines received

[12] In this analysis, the distance variable corresponds to the perception of survey respondents as to whether distance makes it more difficult to access health services.

between the ages of 0 to 59 months, the rate of appropriate vaccination in children aged 7 to 59 months and 13 to 59 months, and the number of vaccines received as a percent of the stipulated doses.[13]

### *Number of Vaccines*

Figure 2.6 presents the relationship between the variables of interest and the total number of vaccines received. The bars to the right of the vertical axis indicate a positive relationship and the bars to the left of the vertical axis indicate a negative relationship. For all countries, children without a birth certificate receive 0.5 to 1.5 fewer vaccines than children with birth certificates. For example, in Peru, children without birth certificates receive, on average, one less vaccine.

With respect to the other variables, there is a positive relationship between the mother's education level and the number of vaccines that a child receives in Bolivia, the Dominican Republic, Nicaragua, and Peru. Contrary to what might be expected, children from households in rural areas of Bolivia and Peru receive more vaccines than in urban areas. But the fact that a household considers the distance to the nearest health center as a deterrent is associated with lower immunization rates in Bolivia and the Dominican Republic. Household income was not a significant factor in the estimations. Children born in a hospital generally have higher immunization rates in comparison with those born at home (except in Peru). Being born in a private hospital is associated with a higher number of vaccines in the Dominican Republic. The fact that a child's mother works has a positive relationship with the number of vaccines in all countries except Guatemala. Finally, girls generally receive fewer vaccines in Bolivia but more vaccines in the Dominican Republic.

### *Adequate Vaccination by the Age of 7 Months*

Figure 2.7 presents the relationship between the variables under consideration and the chances of a child being correctly vaccinated before reaching the age of 7 months. Not having a birth certificate is associated with a reduced probability of being vaccinated at the appropriate age of 6 percent in Bolivia and 13 percent in Peru.

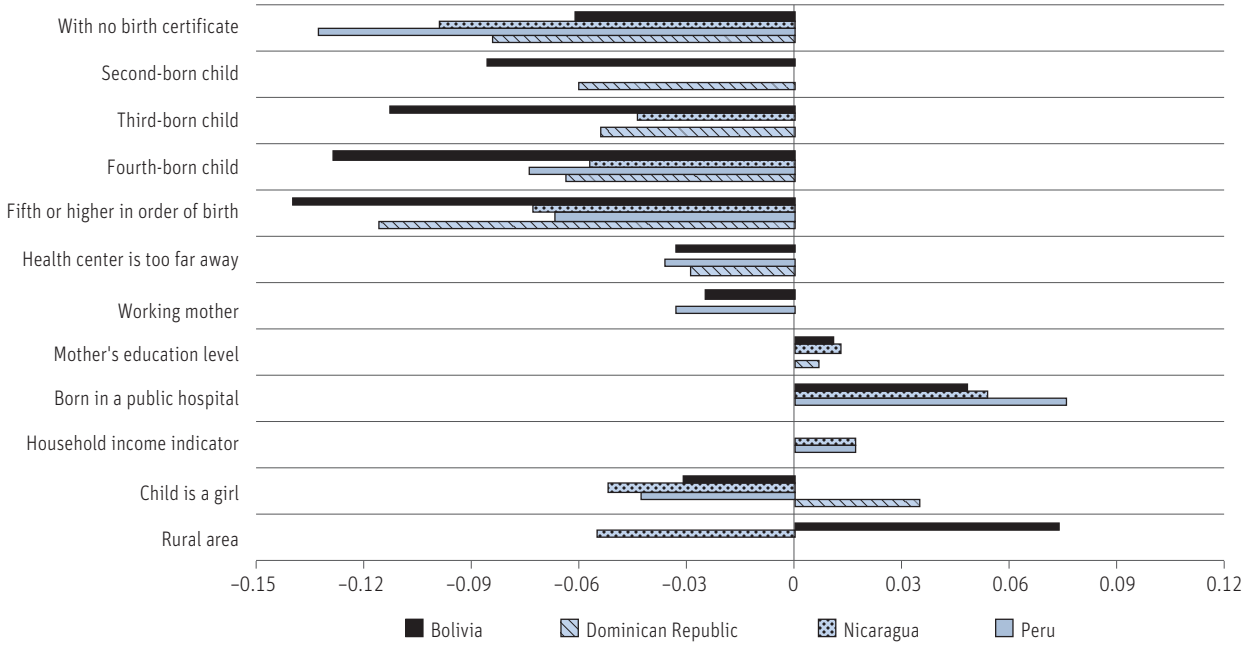
With regard to the other variables, having more children in the household is associated with lower chances of newborns being vaccinated at the appropriate age. This is the case in most countries, mainly in families that have more than three children. When households perceive that the distance to a health center is a problem, there is an associated reduction in the probability that a child will be immunized at the appropriate age of approximately 5 percent. The fact that the mother works has a negative association with immunization levles (although, in some countries, this factor is associated with children receiving a higher overall number of vaccines). Children born in public hospital have greater chances of receiving vaccinations at the appropriate age in Bolivia, Nicaragua, and Peru. Furthermore, in the latter two countries, children in households in the higher-income quintiles have a greater chance of being vaccinated at the right time. With regard to gender, girls have a lower probability of receiving vaccines at the appropriate age, except in the Dominican Republic. Finally, the fact that a household is situated in a rural area is related to a decrease in the probability of adequate vaccination in Nicaragua, but an increase in the probability in Bolivia.

### *Adequate Vaccination by the Age of 13 Months*

Figure 2.8 presents the relationship between the variables examined and the probability of receiving the eight recommended vaccines before the age of 13 months. The fact that a child has no birth certificate diminishes the probability of having all vaccines in three of the four countries reviewed (by 7 percent in

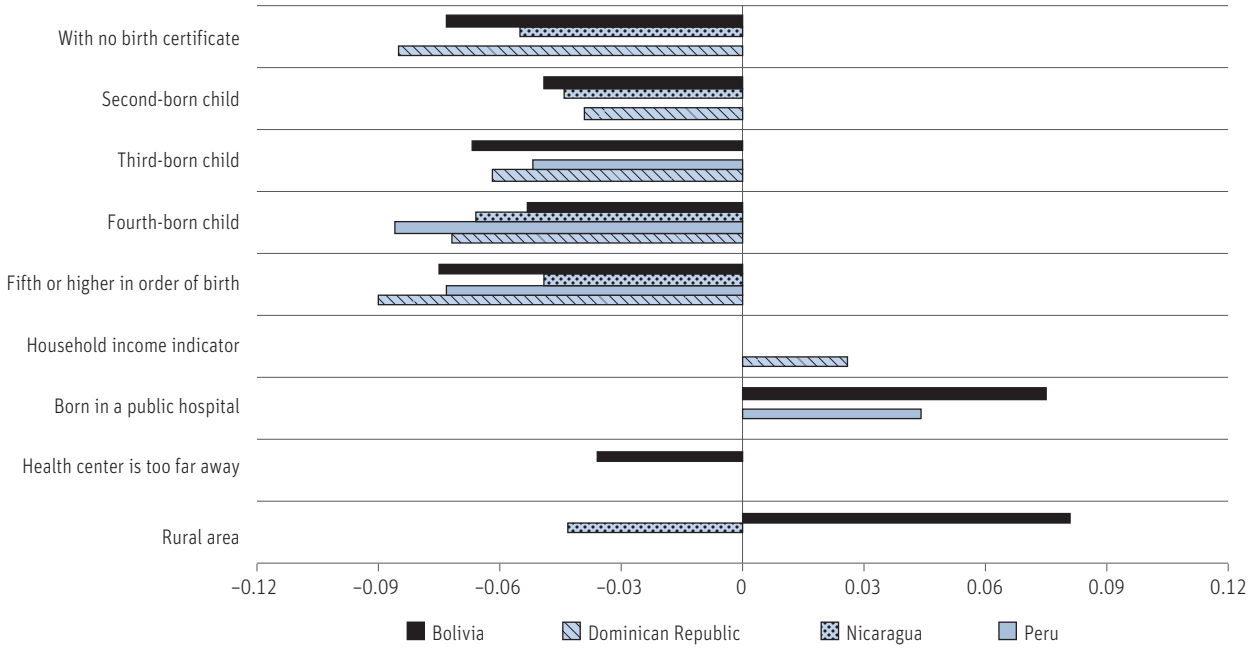
[13] The number of vaccines received as a proportion of the required number according to the child's age can be calculated by using Yoong's method (Yoong, 2007). It is not necessary to consider vaccines administered before or after the appropriate age, since they fall outside the optimal vaccination schedule.

**FIGURE 2.7.** Relationship between the Lack of a Birth Certificate and Optimal Vaccination before the Age of 7 Months *(children from 7 to 59 months) **




*Source:* Authors' elaboration.
* These results represent the average marginal effects evaluated for certain variables in the econometric estimation presented in Table A2.2. in Appendix 2.

**FIGURE 2.8.** Relationship between the Lack of a Birth Certificate and Receiving the Appropriate Vaccinations before the Age of 13 Months *(children from 13 to 59 months) **




*Source:* Authors' elaboration.
* These results represent the average marginal effects for certain variables in the econometric estimation presented in Table A2.3. in Appendix 2.

Bolivia, 6 percent in Guatemala, and 9 percent in the Dominican Republic).

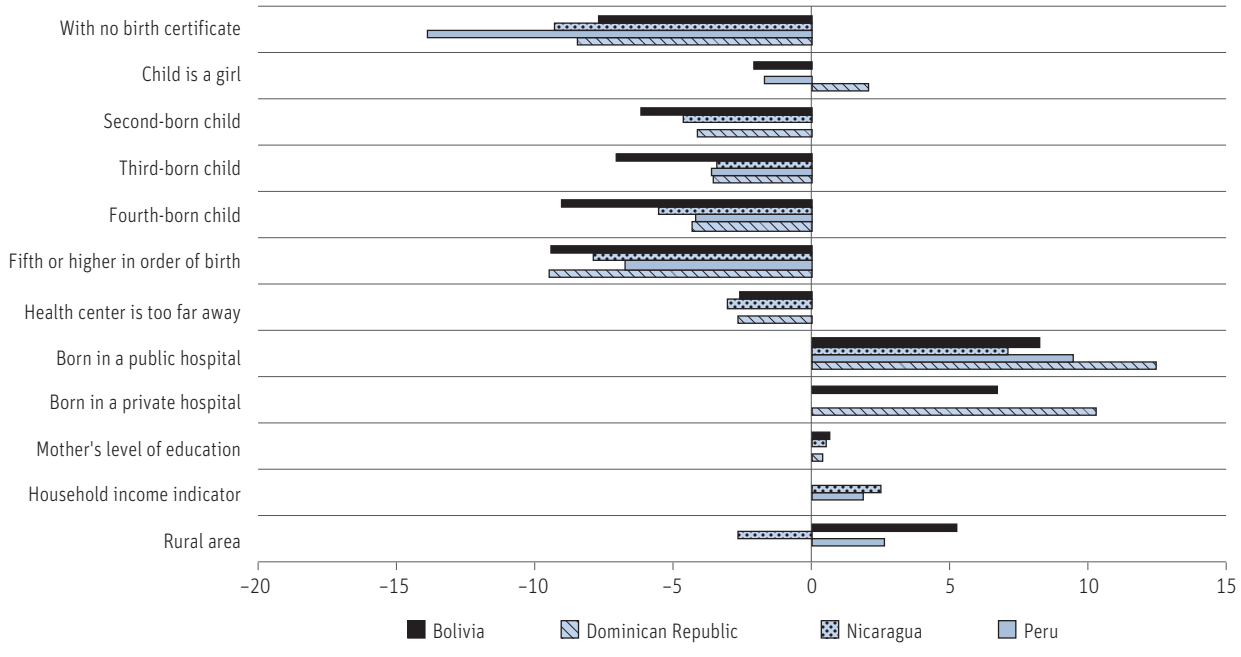
With respect to the other variables, birth order is negatively associated with the chances of receiving all immunizations according to the optimal schedule. Being born in a public hospital is associated with a higher probability in Bolivia and Peru. The fact that distance between the home and the health center is perceived as a problem is negatively associated only in Bolivia. Finally, living in a rural area has a positive association with this probability in Bolivia, but a negative association in Nicaragua.

### *Vaccines Received as a Proportion of the Recommended Number*

Figure 2.9 presents the relationship between the variables considered and the percentage of vaccines received relative to the required number at any given age. In four of the countries examined, the fact that a child lacks a birth certificate is associated with a decrease in this percentage (by 8 percent in Bolivia, nearly 9 percent in the Dominican Republic and Nicaragua, and 14 percent in Peru).

With regard to the other variables, female gender is associated with a lower proportion of vaccines received at the appropriate age in Bolivia and Peru, but a greater proportion in the Dominican Republic. Birth order and the fact that the distance to the nearest health center is perceived as a problem are factors that are associated with a decrease in the percentage of adequate vaccination in nearly all cases. Being born in a public hospital is associated with an increase in the percentage of children vaccinated on time in all four countries, whereas being born in a private hospital does so only in Bolivia and the Dominican Republic. The fact that a child's mother is better educated, or that the child lives in a higher-income household, is associated with an increase in the percentage of adequate vaccination. Finally, living in a rural area has a

**FIGURE 2.9.** Relationship between the Lack of a Birth Certificate and Percentage of Vaccines Received at the Appropriate Age *(children from 0 to 59months) **




*Source:* Authors' elaboration.
* These results correspond to certain variables of the econometric estimation presented in Table A2.4. in Appendix 2.

positive association in Bolivia and Peru, but a negative one in Nicaragua.

## Conclusions

As discussed in this chapter, the lack of a birth certificate is, in general, associated with a lower number of vaccines per child and a lower percentage of children immunized according to the recommended schedule. Although a causal link cannot be affirmed, the econometric analysis finds that lacking a birth certificate has a negative influence on immunization levels, even after controlling for other determining factors, such as characteristics of the child, the family, and the household.

Chapters 1 and 2 present consistent and robust evidence that children without birth certificates lag in educational attainment and immunization rates when compared to their peers with birth certificates. This evidence highlights the importance of birth registration as a primary development goal in the LAC region.


Registro Civil de Cap

# 3 Understanding the Problem: Why Do Parents Fail to Register Their Children?

## Introduction[14]

The previous chapters have shown that the failure to register births is associated with lower educational attainment and inferior immunization levels among children. These results confirm that under-registration can be a significant barrier to access basic public services and ultimately lead to social inclusion and economic development.

Given these negative consequences, why do some parents fail to register their children? What are the underlying drivers and what policies could be developed to tackle this problem?

A variety of factors lead to the under-registration of births. There are quantitative studies that highlight factors such as the mother's level of education, the place of birth, the child's age, household income, and geographical location (UNICEF, 2005; Duryea, Olgiati, and Stone, 2006; Castro and Rud, 2011). Qualitative studies reveal that another significant factor is the distance between the household and the nearest registration office (Bracamonte and Ordóñez, 2006; Harbitz and Tamargo, 2009).

This chapter reviews the possible causes of under-registration of births in three Latin American and Caribbean (LAC) countries: Bolivia, the Dominican Republic, and Peru.[15] In particular, it focuses on those factors that are susceptible to the influence of public policy: the distance of civil registry offices from households and (where relevant) the documentation of the parents. In regards to the former, the current study uses an innovative approach that takes advantage of Global Positioning System (GPS) data to (i) calculate the distance between households and civil registry offices and (ii) incorporate this data in a quantitative analysis to understand the importance of distance to registry offices versus other drivers of under-registration.

## GPS Information

Thanks to GPS data, the distance between each cluster of households and the nearest civil registry office can now be determined.[16] The country with the

[14] This chapter is based on Corbacho and Osorio Rivas (2012).

[15] Demographic and Health Surveys (DHS) are used for the three LAC countries included in this chapter. These include specific questions related to birth registration of children under the age of 5 and the GPS coordinates of the household, as well as socio-demographic variables. Furthermore, GPS data were collected on the geographical distribution of the civil registry offices. The limited number of countries included in the study is due to the lack of this kind of information for other cases.

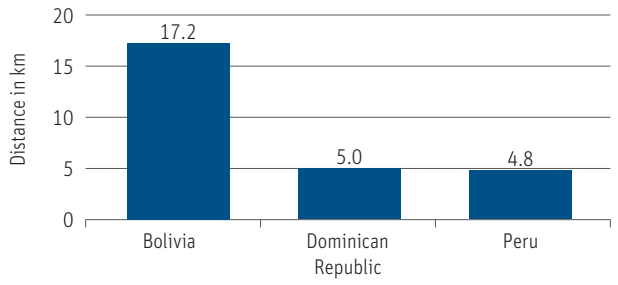
[16] Haversine's formula was used, which calculates the distance between two points based on the geographic coordinates (latitude and longitude).

greatest average distance between households and the nearest registration office is Bolivia, followed by the Dominican Republic and Peru (Figure 3.1).

The long average distance between registry offices and households in Bolivia suggests that distance may be a factor in its high rate of under-registration of births. In turn, the moderate average distance from households to civil registry offices in the Dominican Republic suggests that its high rate of under-registration is due to other factors as well. In Peru, the moderate average distance between households and registries coincides with a moderate rate of non-registration of births, which is lower than the regional average.

The GPS data also facilitates visual analysis of the distribution of household clusters and of civil registry offices, coupled with the probabilities of under-registration. In Bolivia (Map 3.1), the majority of household clusters (top panel) are found high up on the Andean plateau (the *altiplano*), which extends from the department of La Paz to Tarija. However, in the Cochabamba and Santa Cruz departments, civil registry offices are concentrated in the big cities, which means that large areas of rural territories are left unattended. There are a large number of households in these departments situated at more than 25 kilometers from a civil registry, and also the greatest probability of under-registration, which seems to suggest a strong relationship between distance from the registry office and lack of birth registration.

**FIGURE 3.1.** Average Distance to the Nearest Civil Registry Office




*Source:* Authors' elaboration.

In the Dominican Republic (Map 3.2), civil registries are more evenly distributed. This might be due to a more strategic placement, combined with a more favorable terrain in a smaller territory. It is noticeable, however, that the provinces with the highest probability of under-registration are those that border Haiti, which suggests that another significant factor driving under-registration may be that immigrant parents lack the necessary identification documents required to register their children.

In Peru (Map 3.3), three distinct geographical regions can be distinguished: the narrow, arid coastal region; the forest; and the altiplano. The departments with higher probabilities of under-registration are located in the Peruvian Andes: San Martín, Huanuco, and Madre de Dios.

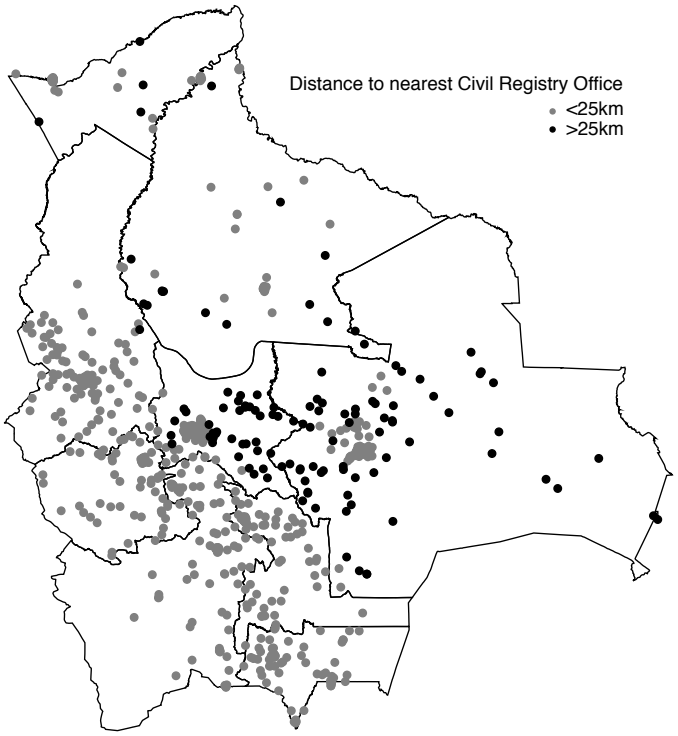
## Econometric Analysis

To take into account the other variables that affect the decision of whether or not to register a birth, this study incorporates a multivariate econometric analysis, which is described in detail in Appendix 3. Figure 3.2 summarizes the result of this analysis, showing the relationship between the different variables and the probability of not registering a birth.

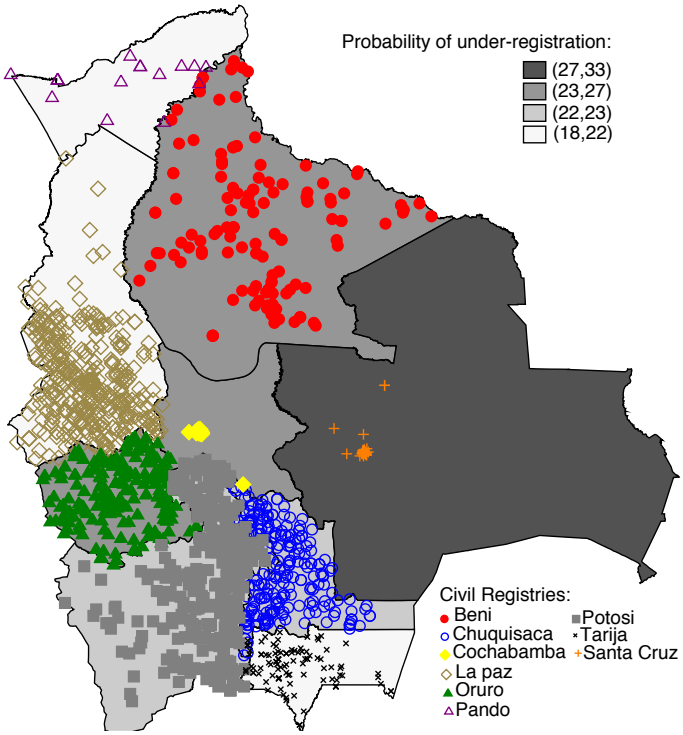
The results indicate that each additional kilometer of distance from the home to the civil registry office is associated with an increase in the probability of a child not being registered of 0.1 percent in Bolivia and 0.6 percent in the Dominican Republic. In Bolivia, the increase in distance from 0 to 17 kilometers (the average) would increase the probability of under-registration by two percentage points. However, as 12 percent of Bolivian households are located more than 25 kilometers from the nearest civil registry, the deterrent result of the distance is even greater for them. It is also worth noting that in Bolivia, children born in winter have a 6 percent greater probability of not being registered, which again illustrates the problem posed by the distance of the journey to the registry office. In the Dominican Republic, an increase in the distance from 0 to 5 kilometers (the average) would be associated

## MAP 3.1. Distance and Under-Registration in Bolivia, 2008

Clusters of households



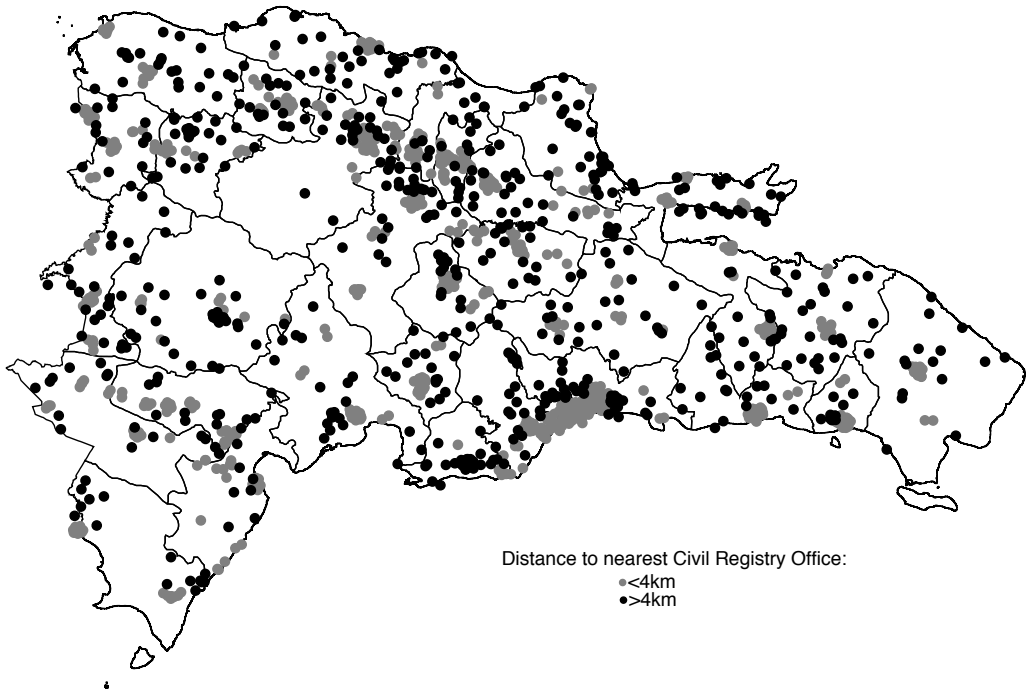

Civil registry offices and probability of under-registration



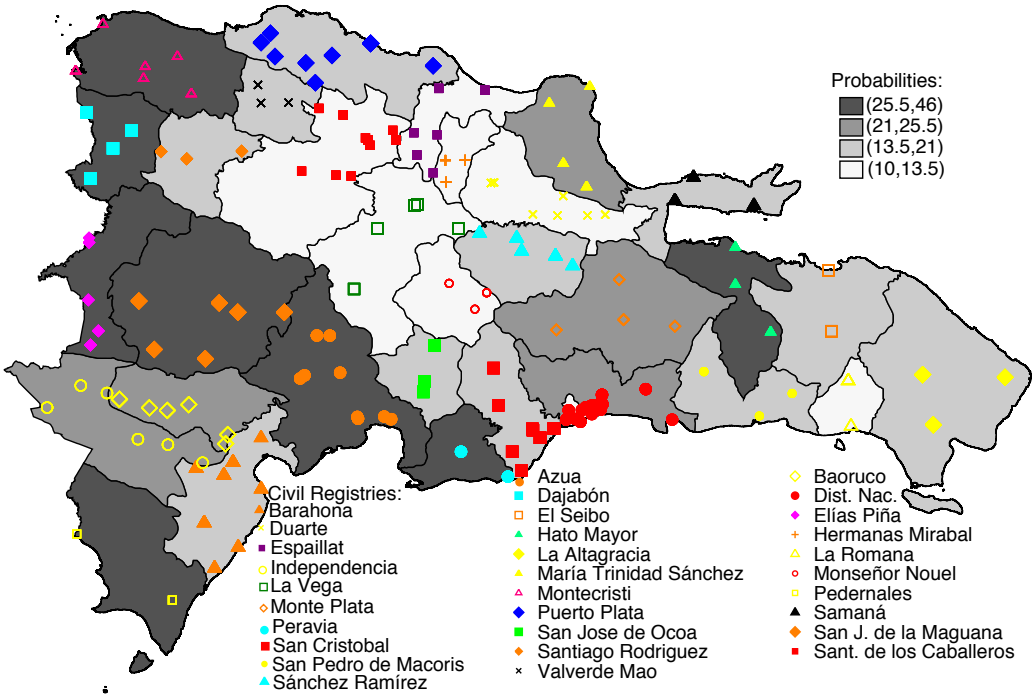

*Source:* Authors' elaboration.

## MAP 3.2. Distance and Under-Registration in the Dominican Republic, 2007

Clusters of households



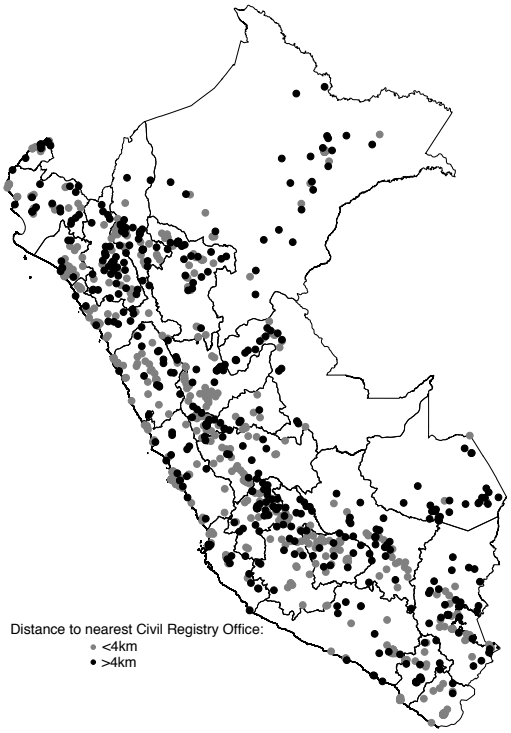

Civil registry offices and probability of under-registration



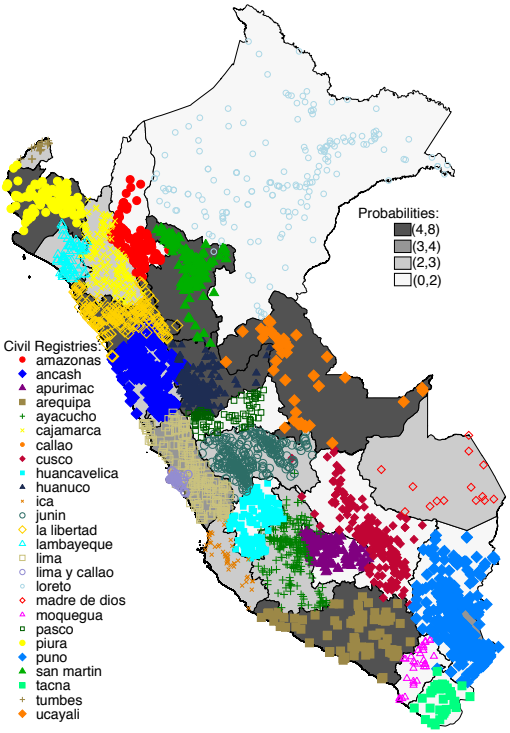

*Source:* Authors' elaboration.

## MAP 3.3. Distance and Under-Registration in Peru, 2004–08

Clusters of households




Civil registry offices and probability of under-registration




*Source:* Authors' elaboration.

with an increase in the probability of failure to register of four percentage points. However, the distance factor does not seem to be associated with under-registration in Peru.

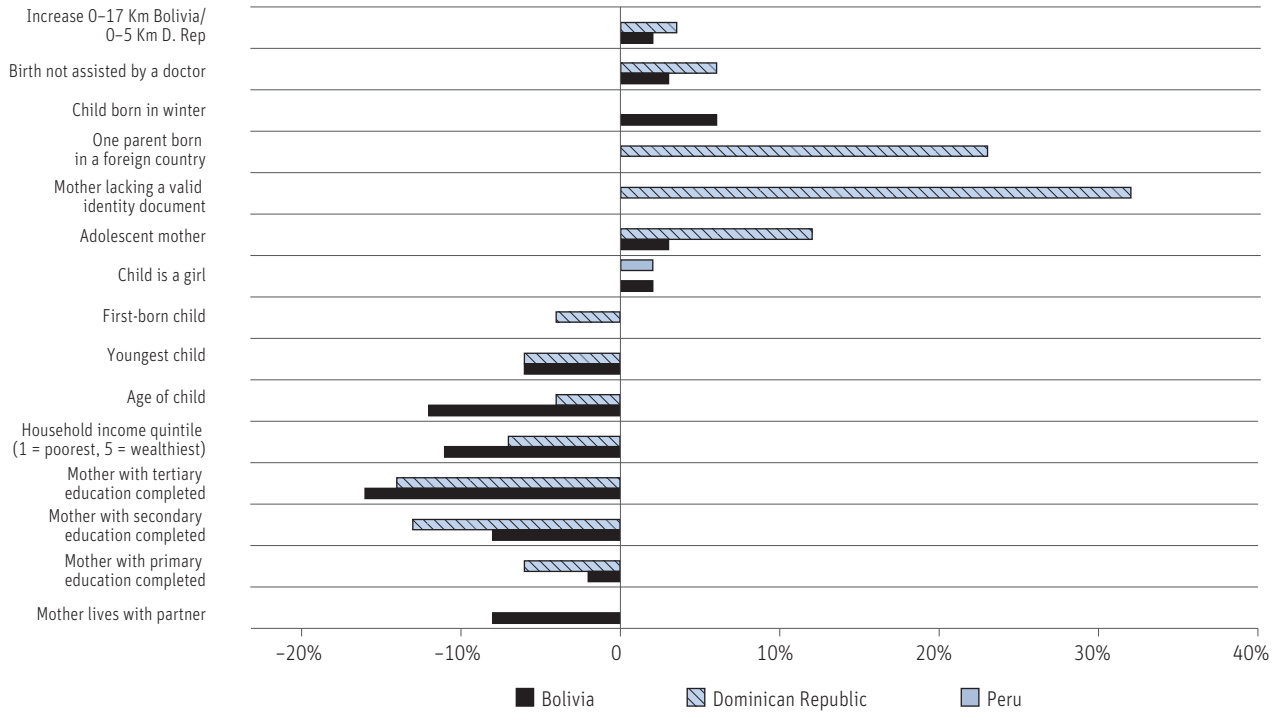
In the Dominican Republic, the most noticeable factor that lowers the probability of birth registration is when the mother lacks valid identity papers (+32 percent) and/or when the parents are non-native (+23 percent). This phenomenon might be related to the high movement of undocumented migrants, as Map 3.2 suggests.

The current study also examined certain characteristics of registry offices in Bolivia, such as the level of computerization, which was not found to be statistically significant. This does not necessarily mean that civil registry offices should not be modernized, but rather that to improve birth registration rates, it is also important to adopt policies that facilitate access to them.

The children of indigenous parents do not seem to suffer higher probabilities of under-registration. However, two factors—the mother's having completed secondary education and higher household income (factors that tend to be less prevalent in indigenous communities)—are associated with reduced chances of under-registration by 8 percent and 11 percent, respectively, in Bolivia, and by 12 percent and 6 percent in the Dominican Republic. Better-educated mothers are more likely to understand the benefits that ensue from registering their children. Moreover, the greater prevalence of under-registration in poorer households indicates that the economic costs of registering children may be an impediment.

With regard to characteristics of the children, being a girl increases the chances of under-registration by 2 percent in Bolivia and Peru, but not at all in the Dominican Republic. In Bolivia and the Dominican Republic, the youngest son or daughter of the family

**FIGURE 3.2.** Relationship between Different Variables and the Probability of Not Registering a Birth *




*Source:* Authors' elaboration.

* These results represent the average marginal effects evaluated for certain variables in the econometric estimation presented in Tables A3.1, A3.2, and A3.3. in Appendix 3.

has a 6 percent lower probability of remaining unregistered. This seems to suggest that parents become more aware of the importance of birth registration as more children enter the family and time goes by.

Another factor that can increase the probability of under-registration is being born at home, rather than in a health center, clinic, or hospital (by 3 percent in Bolivia and 6 percent in the Dominican Republic). This may be due to the fact that these centers can facilitate the issuance the certificate of live birth, which is required to obtain a full birth certificate, and that some civil registry offices may operate within these types of medical facilities.

## Conclusions

Based on analysis of the data on the distance of households from the civil registry offices (and the inclusion of these data for the first time in a quantitative analysis), this chapter has identified the various factors that influence the probability of a child being registered at birth. These factors include the distance from the child's home to a civil registry office and other deterrents in accessing these offices, the mother's education level, household income levels, and the age and gender of the children themselves. In the Dominican Republic, the fact that a child's parents are non-native or lack valid identity documents also plays a role in explaining under-registration of births.

Some of the problems identified, such as poverty and low education levels of mothers, require long-term structural solutions. But the results also reveal certain factors that targeted public policies can address. On this basis, the following policies are recommended:

- Shortening the distances between households and civil registry offices by, for example, creating new offices, improving the distribution of existing ones, and strengthening mobile birth registration campaigns to reach more remote areas.
- Intensifying awareness-raising campaigns about birth registration via radio and television during the rainy seasons and supporting them with mobile registration drives.
- Distributing informative pamphlets in health centers and hospitals to inform mothers about the importance of registering their children's births, the steps required for registration, and the location of nearby civil registry offices.
- Organizing workshops with traditional midwives to encourage them to participate in the birth registration awareness-raising campaigns for mothers.
- Facilitating the establishment of civil registries in health centers, hospitals, private clinics, and schools.
- Conducting mobile registration drives in conjunction with immunization and conditional cash transfers campaigns in schools.
- Fostering inter-country dialogue to regulate the registration of children of illegal immigrants in countries with considerable movements of undocumented migrants.
- Ensuring that mothers have valid identity documents as soon as they seek prenatal care in the health centers.

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# Appendix 1

## Model to Explain Educational Attainment

The current study uses the following specification to explain educational attainment:

$$\text{Education}_{i,x} = \alpha\ \text{Without Birth Certificate}_{i,x} + \beta\ \text{Child}_{i,x}\ \gamma + \text{Mother}_{i,x} + \delta\ \text{Household}_{i,x} + \varepsilon_{i,x}$$

The variable $\text{Education}_{i,x}$, which represents the level of education reached by the child *i*, in the household *x*, is defined as a *dummy* variable that takes the value of 1 if the child has no birth certificate and 0 if the child has one (which would mean that the expected result of would be negative). The vector $\text{Child}_{i,x}$ represents characteristics of the child, such as age or gender. The vector $\text{Mother}_{i,x}$, represents characteristics of the mother, and the vector $\text{Household}_{i,x}$ represents characteristics of the household and the wider community. The variable $\varepsilon_{i,x}$ represents the errors of the model.

The study uses the following dependent variables to measure educational attainment:

- ***Enrollment:*** measured as a dichotomous variable that takes the value of 1 when the children are enrolled in school and 0 when they abandon their studies.
- ***Access to primary school:*** measured as a dichotomous variable that takes the value of 1 when the children are enrolled at least for the first year of primary school and 0 otherwise.
- ***Finishing primary education:*** measured as a dichotomous variable that takes the value of 1 when the children complete the final year of primary school and 0 otherwise.
- ***Access to secondary education:*** measured as a dichotomous variable that takes the value of 1 when the children are enrolled for at least the first year of secondary level education and 0 otherwise.
- ***Years of schooling:*** the number of successfully completed years at school.

In the case of the dichotomous variables, the current study uses a probit model to determine the relationship between the lack of a birth certificate and the different measures of educational attainment. With regard to the years spent in school, the study adopts the ordinary least squares model.

The empirical model does not seek to analyze the causal relationship, but rather to examine whether a relationship exists between the lack of a legal identity (measured as the possession of a birth certificate) and the child's educational attainment. This is due to a problem of simultaneity in the model that implies the possible presence of unobserved factors that influence both the household's decision to register a child and the child's educational attainment. For example, the fact that a child does not possess a birth

certificate might affect his or her continuity in school, but the fact that the parents want their child to continue studying might encourage them to seek a birth certificate for the child. This possibility is consistent with the data presented in Table 1.1 on page 2, which reveals that the percentage of unregistered children is much higher in the group of 0- to 6-year-olds than it is in the group of 7- to 18-year-olds. This problem implies a bias in the measured results; the true effect of not having a birth certificate will be lower than the observed effect.

## Results

**TABLE A1.1.** Relationship between the Lack of a Birth Certificate and the Probability of School Enrollment

*Dependent variable: 1 if the child is enrolled in school*

| Ages | (1) Bolivia 7–18 | (2) Brazil 7–18 | (4) Dominican Republic 7–18 | (3) Guatemala 7–18 | (5) Peru 7–18 |
|---|---|---|---|---|---|
| Without birth certificate | −0.023** | −0.176*** | −0.086*** | −0.110* | −0.067** |
| | (0.012) | (0.063) | (0.014) | (0.063) | (0.052) |
| Child's age | −0.006*** | −0.013*** | −0.009*** | −0.042*** | −0.014*** |
| | (0.001) | (0.000) | (0.001) | (0.002) | (0.001) |
| Child is a girl | 0.002 | 0.013*** | 0.028*** | −0.046*** | −0.001 |
| | (0.004) | (0.001) | (0.004) | (0.009) | (0.002) |
| Four or five children in household | 0.002 | −0.009*** | 0.001 | −0.018 | −0.003 |
| | (0.004) | (0.002) | (0.005) | (0.012) | (0.002) |
| Six or more children in household | −0.017*** | −0.015*** | −0.000 | −0.024* | −0.004 |
| | (0.006) | (0.003) | (0.009) | (0.013) | (0.004) |
| Mother's education level | 0.005*** | 0.002*** | 0.006*** | 0.030*** | 0.006*** |
| | (0.001) | (0.000) | (0.001) | (0.004) | (0.001) |
| Mother's education level squared | −0.000 | −0.000 | −0.000*** | 0.000 | −0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Mother is married | 0.014*** | 0.007*** | 0.016*** | 0.071*** | 0.001 |
| | (0.004) | (0.001) | (0.005) | (0.011) | (0.002) |
| Mother is head of household | −0.002 | −0.002 | 0.005 | −0.001 | 0.002 |
| | (0.006) | (0.002) | (0.004) | (0.014) | (0.003) |
| Household income index | 0.022*** | 0.003* | 0.031*** | 0.017 | 0.004 |
| | (0.007) | (0.002) | (0.008) | (0.018) | (0.005) |
| Household income index squared | −0.001 | 0.000 | −0.003** | 0.006* | 0.000 |
| | (0.001) | (0.000) | (0.001) | (0.003) | (0.001) |
| No water or electricity | −0.014** | −0.020 | −0.034** | −0.094*** | −0.012** |
| | (0.006) | (0.025) | (0.015) | (0.014) | (0.005) |
| Rural area | −0.001 | 0.007*** | 0.024*** | −0.097*** | −0.008*** |
| | (0.006) | (0.001) | (0.005) | (0.011) | (0.003) |
| Indigenous group | −0.012** | 0.006 | | 0.021 | 0.005 |
| | (0.006) | (0.008) | | (0.013) | (0.003) |
| African descent | | 0.004* | | | |
| | | (0.002) | | | |
| Mixed race | | 0.002* | | | |
| | | (0.001) | | | |
| Other minorities | | −0.013 | | | |
| | | (0.012) | | | |
| One non-native parent | | | −0.046** | | |
| | | | (0.020) | | |
| Regional dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | No | No | No | No | Yes |
| Observations | 12.513 | 64.694 | 14.451 | 9.038 | 15.337 |
| R2 | 0.110 | 0.238 | 0.108 | 0.187 | 0.271 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A1.2.** Relationship between the Lack of a Birth Certificate and Access to Primary Education

*Dependent variable: 1 if the child started primary education*

| Ages | (1) Bolivia 7–18 | (2) Brazil 7–18 | (3) Dominican Republic 7–18 | (4) Guatemala 7–18 | (5) Peru 7–18 |
|---|---|---|---|---|---|
| Without birth certificate | −0.027** | −0.113*** | −0.057*** | −0.102* | −0.037 |
| | (0.012) | (0.043) | (0.011) | (0.054) | (0.024) |
| Child's age | 0.008*** | 0.004*** | 0.005*** | 0.052*** | 0.001*** |
| | (0.001) | (0.000) | (0.000) | (0.001) | (0.000) |
| Child is a girl | 0.001 | 0.003*** | 0.008*** | −0.034*** | −0.001 |
| | (0.003) | (0.001) | (0.002) | (0.008) | (0.001) |
| Four or five children in household | −0.002 | −0.004** | −0.003 | 0.002 | −0.003* |
| | (0.003) | (0.002) | (0.003) | (0.010) | (0.001) |
| Six or more children in household | −0.010** | −0.003 | −0.006 | −0.018 | −0.004 |
| | (0.005) | (0.003) | (0.008) | (0.011) | (0.003) |
| Mother's education level | 0.004*** | 0.003*** | 0.002*** | 0.032*** | 0.002*** |
| | (0.001) | (0.001) | (0.000) | (0.003) | (0.001) |
| Mother's education level squared | −0.000** | −0.000*** | −0.000*** | −0.002*** | −0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Mother is married | 0.006* | 0.002* | 0.006** | 0.073*** | 0.001 |
| | (0.003) | (0.001) | (0.003) | (0.010) | (0.001) |
| Mother is head of household | −0.006 | 0.000 | 0.001 | 0.011 | 0.000 |
| | (0.004) | (0.002) | (0.003) | (0.012) | (0.002) |
| Household income index | 0.004 | 0.001 | 0.021*** | 0.069*** | −0.001 |
| | (0.006) | (0.002) | (0.005) | (0.016) | (0.003) |
| Household income index squared | −0.001 | −0.000 | −0.003*** | −0.006** | 0.000 |
| | (0.001) | (0.000) | (0.001) | (0.003) | (0.000) |
| No water or electricity | −0.009 | −0.013 | 0.004 | −0.131*** | −0.000 |
| | (0.006) | (0.021) | (0.010) | (0.013) | (0.003) |
| Indigenous group | −0.005 | 0.004 | | −0.045*** | 0.001 |
| | (0.005) | (0.011) | | (0.012) | (0.002) |
| African descent | | 0.003 | | | |
| | | (0.002) | | | |
| Mixed race | | 0.001 | | | |
| | | (0.001) | | | |
| Other minority | | −0.019 | | | |
| | | (0.013) | | | |
| Rural area | −0.002 | 0.004** | 0.009*** | −0.013 | −0.002 |
| | (0.005) | (0.002) | (0.003) | (0.010) | (0.002) |
| One non-native parent | | | −0.070*** | | |
| | | | (0.021) | | |
| Constant | 0.870*** | 0.911*** | 0.853*** | −0.063* | 0.982*** |
| | (0.014) | (0.006) | (0.013) | (0.033) | (0.007) |
| Regional dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | No | No | No | No | Yes |
| Observations | 12,534 | 64,694 | 14,549 | 9,021 | 15,351 |
| R2 | 0.039 | 0.021 | 0.044 | 0.247 | 0.007 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A1.3.** Relationship between the Lack of a Birth Certificate and Finishing Primary Education

*Dependent variable: 1 if the child finishes primary education*

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Bolivia | Brazil | Dominican Republic | Guatemala | Peru |
| Ages | 15–18 | 15–18 | 15–18 | 13–18 | 13–18 |
| Without birth certificate | −0.096* | −0.108 | −0.253*** | −0.173** | −0.161 |
| | (0.050) | (0.114) | (0.039) | (0.070) | (0.133) |
| Child's age | 0.051*** | 0.093*** | 0.100*** | 0.073*** | 0.030*** |
| | (0.009) | (0.002) | (0.005) | (0.005) | (0.003) |
| Child is a girl | 0.011 | 0.122*** | 0.178*** | −0.045*** | −0.013* |
| | (0.015) | (0.005) | (0.012) | (0.014) | (0.007) |
| Four or five children in household | −0.013 | −0.110*** | −0.028* | 0.012 | −0.010 |
| | (0.017) | (0.009) | (0.016) | (0.017) | (0.009) |
| Six or more children in household | −0.060** | −0.183*** | −0.089*** | −0.048*** | −0.034** |
| | (0.025) | (0.016) | (0.033) | (0.019) | (0.016) |
| Mother's education level | 0.027*** | 0.031*** | 0.026*** | 0.058*** | 0.031*** |
| | (0.005) | (0.002) | (0.002) | (0.005) | (0.003) |
| Mother's education level squared | −0.001*** | −0.001*** | −0.000*** | −0.002*** | −0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Mother is married | 0.056*** | 0.061*** | 0.048*** | 0.097*** | 0.017** |
| | (0.017) | (0.008) | (0.015) | (0.016) | (0.007) |
| Mother is head of household | 0.019 | −0.012 | 0.029** | 0.023 | −0.002 |
| | (0.021) | (0.009) | (0.014) | (0.021) | (0.010) |
| Household income index | 0.192*** | 0.038*** | 0.063*** | 0.044* | 0.126*** |
| | (0.038) | (0.011) | (0.024) | (0.026) | (0.024) |
| Household income index squared | −0.023*** | −0.002 | 0.002 | 0.002 | −0.015*** |
| | (0.005) | (0.002) | (0.004) | (0.004) | (0.003) |
| No water or electricity | −0.161*** | −0.031 | −0.079 | −0.130*** | −0.022 |
| | (0.045) | (0.102) | (0.049) | (0.018) | (0.022) |
| Indigenous group | −0.036 | −0.000 | | −0.093*** | −0.005 |
| | (0.027) | (0.065) | | (0.020) | (0.016) |
| African descent | | −0.072*** | | | |
| | | (0.013) | | | |
| Mixed race | | −0.030*** | | | |
| | | (0.006) | | | |
| Other ethnic group | | 0.019 | | | |
| | | (0.041) | | | |
| Rural area | 0.003 | 0.017 | 0.030** | −0.153*** | −0.010 |
| | (0.025) | (0.011) | (0.015) | (0.018) | (0.010) |
| One non-native parent | | | −0.104* | | |
| | | | (0.055) | | |
| Constant | −0.456*** | −1.180*** | −1.491*** | −0.753*** | 0.143** |
| | (0.160) | (0.049) | (0.097) | (0.085) | (0.062) |
| Regional dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | No | No | No | No | Yes |
| Observations | 2.236 | 20.523 | 4.507 | 3.600 | 6.781 |
| R2 | 0.211 | 0.212 | 0.275 | 0.349 | 0.144 |

*Note:* The robust standard errors are denoted in parentheses.

*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A1.4.** Relationship between the Lack of a Birth Certificate and Access to Secondary Education

*Dependent variable: 1 if the child begins secondary level education*

| Ages | (1) Bolivia 15–18 | (2) Brazil 15–18 | (4) Dominican Republic 15–18 | (5) Guatemala 13–18 | (6) Peru 13–18 |
|---|---|---|---|---|---|
| Without birth certificate | −0.098* | −0.170* | −0.195*** | −0.114* | 0.030 |
| | (0.053) | (0.089) | (0.032) | (0.061) | (0.122) |
| Child's age | 0.119*** | 0.127*** | 0.130*** | 0.075*** | 0.066*** |
| | (0.011) | (0.003) | (0.006) | (0.004) | (0.003) |
| Child is a girl | 0.038** | 0.130*** | 0.183*** | −0.002 | 0.002 |
| | (0.018) | (0.006) | (0.012) | (0.011) | (0.009) |
| Four or five children in household | −0.061*** | −0.113*** | −0.046*** | −0.040** | −0.030*** |
| | (0.021) | (0.009) | (0.015) | (0.016) | (0.011) |
| Six or more children in household | −0.046 | −0.187*** | −0.086*** | −0.079*** | −0.074*** |
| | (0.029) | (0.016) | (0.030) | (0.015) | (0.019) |
| Mother's education level | 0.023*** | 0.029*** | 0.030*** | 0.060*** | 0.049*** |
| | (0.006) | (0.003) | (0.002) | (0.005) | (0.004) |
| Mother's education level squared | −0.000 | −0.001*** | −0.000*** | −0.002*** | −0.002*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Mother is married | 0.066*** | 0.070*** | 0.071*** | 0.055*** | 0.022** |
| | (0.020) | (0.008) | (0.016) | (0.013) | (0.009) |
| Mother is head of household | −0.007 | −0.015* | 0.006 | 0.003 | −0.016 |
| | (0.026) | (0.009) | (0.014) | (0.018) | (0.013) |
| Household income index | 0.215*** | 0.038*** | 0.049** | −0.060*** | 0.156*** |
| | (0.042) | (0.012) | (0.024) | (0.021) | (0.028) |
| Household income index squared | −0.021*** | −0.001 | 0.004 | 0.017*** | −0.018*** |
| | (0.006) | (0.002) | (0.004) | (0.004) | (0.004) |
| No water or electricity | −0.074* | −0.009 | −0.067* | −0.040*** | −0.087*** |
| | (0.043) | (0.086) | (0.038) | (0.013) | (0.025) |
| Indigenous group | −0.038 | 0.013 | | −0.023 | −0.006 |
| | (0.031) | (0.068) | | (0.015) | (0.019) |
| African descent | | −0.076*** | | | |
| | | (0.013) | | | |
| Mixed race | | −0.045*** | | | |
| | | (0.007) | | | |
| Other ethnic group | | 0.029 | | | |
| | | (0.044) | | | |
| Rural area | 0.040 | 0.013 | 0.026* | −0.133*** | −0.032** |
| | (0.030) | (0.011) | (0.015) | (0.015) | (0.013) |
| One non-native parent | | | 0.012 | | |
| | | | (0.049) | | |
| Constant | −1.812*** | −1.753*** | −2.124*** | −0.911*** | −0.697*** |
| | (0.184) | (0.050) | (0.099) | (0.072) | (0.073) |
| Regional dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | No | No | No | No | Yes |
| Observations | 2.236 | 20.523 | 4.507 | 3.600 | 6.781 |
| R2 | 0.250 | 0.243 | 0.318 | 0.388 | 0.251 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A1.5.** Relationship between the Lack of a Birth Certificate and Number of Successfully Completed School Years

*Dependent variable: number of completed school years*

| Ages | (1) Bolivia 7–18 | (2) Brazil 7–18 | (3) Dominican Republic 7–18 | (4) Guatemala 7–18 | (5) Peru 7–18 |
|---|---|---|---|---|---|
| Without birth certificate | −0.376*** | −0.596*** | −0.632*** | −0.343* | −0.401** |
| | (0.073) | (0.185) | (0.067) | (0.204) | (0.162) |
| Child's age | 0.872*** | 0.846*** | 0.759*** | 0.543*** | 0.856*** |
| | (0.004) | (0.002) | (0.006) | (0.007) | (0.004) |
| Child is a girl | 0.070*** | 0.385*** | 0.720*** | −0.113*** | 0.055** |
| | (0.021) | (0.011) | (0.037) | (0.036) | (0.022) |
| Four or five children in household | −0.100*** | −0.291*** | −0.200*** | 0.010 | −0.131*** |
| | (0.024) | (0.018) | (0.045) | (0.047) | (0.027) |
| Six or more children in household | −0.254*** | −0.675*** | −0.316*** | −0.227*** | −0.295*** |
| | (0.036) | (0.034) | (0.069) | (0.052) | (0.046) |
| Mother's education level | 0.087*** | 0.119*** | 0.123*** | 0.253*** | 0.157*** |
| | (0.008) | (0.006) | (0.007) | (0.013) | (0.009) |
| Mother's education level squared | −0.002*** | −0.003*** | −0.001*** | −0.011*** | −0.006*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) |
| Mother is married | 0.212*** | 0.194*** | 0.182*** | 0.364*** | 0.077*** |
| | (0.023) | (0.014) | (0.038) | (0.042) | (0.023) |
| Mother is head of household | 0.033 | −0.054*** | 0.004 | 0.106* | −0.049 |
| | (0.031) | (0.018) | (0.044) | (0.058) | (0.033) |
| Household income index | 0.295*** | 0.090*** | 0.373*** | 0.030 | 0.395*** |
| | (0.047) | (0.023) | (0.075) | (0.069) | (0.061) |
| Household income index squared | −0.023*** | −0.000 | −0.015 | 0.041*** | −0.032*** |
| | (0.007) | (0.004) | (0.011) | (0.012) | (0.009) |
| No water or electricity | −0.379*** | −0.142 | −0.057 | −0.632*** | −0.171*** |
| | (0.046) | (0.132) | (0.249) | (0.051) | (0.054) |
| Indigenous group | −0.109*** | −0.091 | | −0.311*** | −0.067 |
| | (0.035) | (0.164) | | (0.050) | (0.043) |
| African descent | | −0.248*** | | | |
| | | (0.028) | | | |
| Mixed race | | −0.117*** | | | |
| | | (0.013) | | | |
| Other ethnic group | | 0.000 | | | |
| | | (0.107) | | | |
| Rural area | 0.107*** | 0.043** | 0.181*** | −0.435*** | −0.041 |
| | (0.033) | (0.021) | (0.042) | (0.046) | (0.032) |
| One non-native parent | | | −0.120 | | |
| | | | (0.116) | | |
| Constant | −5.933*** | −6.120*** | −6.554*** | −3.984*** | −6.407*** |
| | (0.095) | (0.060) | (0.140) | (0.141) | (0.128) |
| Regional dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | No | No | No | No | Yes |
| Observations | 12.520 | 64.694 | 14.549 | 9.021 | 15.351 |
| R2 | 0.847 | 0.799 | 0.605 | 0.592 | 0.795 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

# Appendix 2

## Models to Explain Immunization Levels

The current model uses the following dependent variables:

- The number of vaccines received before the age of 59 months.
- Whether the vaccine was administered at the appropriate age; in particular:
  - Whether or not children between 7 and 59 months old have received the vaccines against tuberculosis, the three doses of the DPT, and the polio vaccine.
  - Whether children between 13 and 59 months old have received the vaccines against tuberculosis and the three doses of the DPT, the polio vaccine, and the vaccine against measles.
- The percentage of vaccines received as a proportion of vaccines required at each stage of the child's development.

The model adopts the following specification to analyze the factors determining the number of vaccines received:

$$\text{Vaccines}_{i,x} = \alpha\ \text{WithoutCertificate}_{i,x} + \beta\ \text{WithCard}_{i,x} + \delta\ \text{Child}_{i,x} + \theta\ \text{Mother}_{i,x} + \pi\text{Household}_{i,x} + \varepsilon_{i,x}$$

The variable $\text{Vaccines}_{i,x}$, which measures the number of vaccines received for the child *i*, in the household *x* is defined as a *dummy* variable that takes the value of 1 when the child lacks a birth certificate and 0 if the child has one. $\alpha$ is expected to be negative. $\text{WithCard}_{i,x}$ is a *dummy* variable that takes the value of 1 if the child has a vaccination record card and 0 if the opposite is true. The vector $\text{Child}_{i,x}$ represents a series of the child's characteristics, such as age, gender, and birth order. The vector $\text{Mother}_{i,x}$ represents the mother's characteristics, and the vector $\text{Household}_{i,x}$ represents characteristics of the household and the wider community. Finally, the variable $\varepsilon_{i,x}$ represents errors of the model.

The model employs the following specification to analyze the factors determining whether or not vaccination was carried out at the right age:

$$\text{Optimal Immunization}_{i,x} = \alpha\ \text{WithoutCertificate}_{i,x} + \delta\ \text{Child}_{i,x} + \theta\ \text{Mother}_{i,x} + \pi\ \text{Household}_{i,x} + \varepsilon_{i,x}$$

The variable $\text{WithCard}_{i,x}$ was eliminated because all children included in this regression have a vaccination record card given that it is a requirement to determine the date of vaccination. The variable Optimal $\text{Immunization}_{i,x}$ is a *dummy* that takes the value of 1 when the child has received the required vaccines before the age of 7 months in one case and before the age of 13 months in the other. The rest of the variables represent the same parameters described in the specification above.

The model adopts the following specification to analyze the factors determining the vaccines received at the appropriate age of each child:

$$\text{Percentage of Vaccines}_{i,x} = \alpha\ \text{Without Birth Certificate}_{i,x} + \delta\ \text{Child}_{i,x} + \theta\ \text{Mother}_{i,x} + \pi\ \text{Household}_{i,x} + \varepsilon_{i,x}$$

where Percentage of Vaccines$_{i,x}$ is the proportion of vaccines received in accordance with the optimal criteria corresponding to the child's age, and the rest of the variables represent the same parameters described in the specification above.

As in the case of the model used to analyze the factors determining academic success, given the possible presence of non-observable factors that affect both the decision by households to register and immunize their children, these empirical models do not seek a causal relationship. Rather, their objective is to analyze whether or not a relationship exists between the lack of a legal identity (measured in terms of the lack of a birth certificate) and the level of vaccination received at the appropriate age.

## Results

**TABLE A2.1.** Relationship between the Lack of a Birth Certificate and the Number of Vaccines Received
*Dependent variable: number of vaccines received*

| Age (months) | (1) Bolivia 0–59 | (2) Dominican Republic 0–59 | (4) Guatemala 0–59 | (5) Nicaragua 0–59 | (6) Peru 0–59 |
|---|---|---|---|---|---|
| ***Characteristics of the child*** | | | | | |
| Without birth certificate | −0.861*** (0.061) | −0.597*** (0.089) | −1.445*** (0.249) | −0.906*** (0.079) | −1.149*** (0.127) |
| With vaccination record card | 0.846*** (0.057) | 1.062*** (0.069) | 1.322*** (0.069) | 1.620*** (0.076) | 1.526*** (0.051) |
| Child's age in months | 0.058*** (0.001) | 0.055*** (0.002) | 0.053*** (0.002) | 0.050*** (0.002) | 0.062*** (0.002) |
| Child is a girl | −0.086** (0.040) | 0.046 (0.055) | 0.021 (0.066) | 0.112** (0.044) | −0.053 (0.044) |
| Second child born | −0.114** (0.054) | −0.051 (0.072) | −0.014 (0.107) | 0.060 (0.059) | −0.032 (0.060) |
| Third child born | −0.069 (0.062) | 0.008 (0.077) | 0.071 (0.111) | 0.162** (0.069) | −0.082 (0.067) |
| Fourth child born | −0.236*** (0.077) | −0.118 (0.103) | 0.062 (0.122) | −0.002 (0.090) | −0.198** (0.086) |
| Fifth child or more | −0.185*** (0.065) | −0.086 (0.111) | 0.164 (0.101) | 0.094 (0.072) | −0.096 (0.077) |
| Born in a public hospital | 0.236*** (0.056) | 0.950*** (0.282) | 0.606*** (0.078) | 0.104* (0.054) | 0.096 (0.065) |
| Born in a private hospital | 0.138 (0.091) | 0.870*** (0.294) | 0.737*** (0.149) | −0.173 (0.131) | 0.062 (0.137) |
| ***Characteristics of the parents*** | | | | | |
| Mother's education level | 0.021*** (0.006) | 0.024*** (0.006) | 0.004 (0.011) | 0.026*** (0.008) | 0.016** (0.007) |
| Mother is working | 0.111*** (0.042) | 0.154** (0.061) | 0.109 (0.074) | 0.088* (0.047) | 0.191*** (0.050) |
| Mother from indigenous group | 0.031 (0.054) | | −0.131 (0.087) | | −0.024 (0.086) |
| Mother of African descent | | | | 0.232 (0.254) | |
| One non-native parent | | −0.670*** (0.169) | | | |

*(continued on next page)*

**TABLE A2.1.** Relationship between the Lack of a Birth Certificate and the Number of Vaccines Received (*cont.*)
*Dependent variable: number of vaccines received*

| Age (months) | (1) Bolivia 0–59 | (2) Dominican Republic 0–59 | (4) Guatemala 0–59 | (5) Nicaragua 0–59 | (6) Peru 0–59 |
|---|---|---|---|---|---|
| ***Characteristics of the household*** | | | | | |
| Household income index | −0.039<br>(0.027) | 0.008<br>(0.030) | 0.053*<br>(0.032) | −0.006<br>(0.026) | 0.027<br>(0.030) |
| Distance from home to health center is a major problem | −0.106**<br>(0.042) | −0.209***<br>(0.064) | 0.108<br>(0.118) | −0.067<br>(0.046) | 0.016<br>(0.047) |
| Rural area | 0.258***<br>(0.066) | 0.023<br>(0.066) | 0.091<br>(0.083) | 0.001<br>(0.062) | 0.172**<br>(0.067) |
| Constant | 4.774***<br>(0.156) | 2.731***<br>(0.343) | 3.663***<br>(0.199) | 4.068***<br>(0.155) | 3.703***<br>(0.307) |
| Regional dummy | Yes | Yes | Yes | Yes | Yes |
| Year dummy | No | No | No | No | Yes |
| Observations | 7.535 | 5.477 | 4.014 | 6.445 | 6.473 |
| R2 | 0.338 | 0.255 | 0.262 | 0.327 | 0.344 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A2.2.** Relationship between the Lack of a Birth Certificate and the Probability of Being Appropriately Immunized before the Age of 7 Months

*Dependent variable: 1 if the child receives vaccines by the age of 6 months (probit model)*

| Age (months) | (1) Bolivia 8–59 | (2) Dominican Republic 8–59 | (3) Nicaragua 8–59 | (4) Peru 8–59 |
|---|---|---|---|---|
| ***Characteristics of the child*** | | | | |
| Without birth certificate | −0.061*** (0.018) | −0.084*** (0.018) | −0.099*** (0.024) | −0.133*** (0.036) |
| Child's age in months | −0.003*** (0.000) | −0.002*** (0.000) | −0.006*** (0.001) | −0.001* (0.001) |
| Child is a girl | −0.031** (0.014) | 0.035** (0.014) | −0.052*** (0.016) | −0.043*** (0.015) |
| Second child born | −0.086*** (0.019) | −0.060*** (0.017) | −0.035 (0.022) | 0.014 (0.021) |
| Third child born | −0.113*** (0.021) | −0.054*** (0.018) | −0.044* (0.025) | −0.038 (0.023) |
| Fourth child born | −0.129*** (0.024) | −0.064*** (0.022) | −0.057* (0.032) | −0.074*** (0.027) |
| Fifth child or more in order of birth | −0.140*** (0.020) | −0.116*** (0.022) | −0.073*** (0.024) | −0.067*** (0.026) |
| Born in a public hospital | 0.048*** (0.019) | 0.074 (0.058) | 0.054*** (0.020) | 0.076*** (0.021) |
| Born in a private hospital | 0.030 (0.031) | 0.087 (0.076) | −0.031 (0.046) | 0.015 (0.044) |
| ***Characteristics of the parents*** | | | | |
| Mother's education level | 0.011*** (0.002) | 0.007*** (0.002) | 0.013*** (0.003) | −0.002 (0.002) |
| Mother is working | −0.025* (0.015) | 0.001 (0.016) | −0.004 (0.019) | −0.033** (0.017) |
| Mother from indigenous group | 0.032* (0.018) | | | 0.021 (0.029) |
| Mother of African descent | | | −0.284*** (0.072) | |
| One non-native parent | | −0.122*** (0.030) | | |
| ***Characteristics of the household*** | | | | |
| Household income index | 0.001 (0.009) | 0.001 (0.007) | 0.017* (0.010) | 0.017* (0.010) |
| Distance from home to the health center is a major problem | −0.033** (0.015) | −0.029* (0.016) | −0.001 (0.017) | −0.036** (0.016) |
| Rural area | 0.074*** (0.022) | −0.024 (0.017) | −0.055** (0.023) | 0.012 (0.022) |
| Regional dummy | Yes | Yes | Yes | Yes |
| Year dummy | No | No | No | Yes |
| Observations | 5.216 | 3.993 | 4.924 | 4.882 |
| Pseudo R2 | 0.06 | 0.05 | 0.19 | 0.05 |

*Notes:* The coefficients represent the marginal effects over the averages. The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A2.3.** Relationship between the Lack of a Birth Certificate and the Probability of Appropriate Immunization before the Age of 13 Months

*Dependent variable: 1 if the child receives all vaccines before the age of 12 months (probit model)*

| | (1) Bolivia | (2) Dominican Republic | (3) Nicaragua | (4) Peru |
|---|---|---|---|---|
| Age (months) | 13–59 | 13–59 | 13–59 | 13–59 |
| ***Characteristics of the child*** | | | | |
| Without birth certificate | −0.073*** (0.018) | −0.085*** (0.021) | −0.055** (0.023) | −0.032 (0.033) |
| Child's age in months | −0.002*** (0.001) | 0.000 (0.001) | −0.005*** (0.001) | −0.001** (0.001) |
| Child is a girl | −0.002 (0.014) | 0.007 (0.015) | −0.009 (0.014) | −0.011 (0.013) |
| Second child born | −0.049*** (0.019) | −0.039** (0.020) | −0.044** (0.019) | −0.013 (0.019) |
| Third child born | −0.067*** (0.021) | −0.062*** (0.020) | −0.030 (0.022) | −0.052*** (0.019) |
| Fourth child born | −0.053** (0.025) | −0.072*** (0.025) | −0.066** (0.027) | −0.086*** (0.021) |
| Fifth child or more in order of birth | −0.075*** (0.020) | −0.090*** (0.026) | −0.049** (0.021) | −0.073*** (0.021) |
| Born in a public hospital | 0.075*** (0.018) | 0.064 (0.066) | −0.027 (0.019) | 0.044** (0.018) |
| Born in a private hospital | 0.075** (0.032) | 0.030 (0.077) | −0.071* (0.037) | −0.004 (0.041) |
| ***Characteristics of the parents*** | | | | |
| Mother's education level | 0.001 (0.002) | 0.003* (0.002) | 0.003 (0.002) | −0.004* (0.002) |
| Mother is working | −0.002 (0.015) | −0.002 (0.017) | 0.001 (0.017) | −0.015 (0.015) |
| Mother from indigenous group | 0.014 (0.018) | | | −0.013 (0.025) |
| Mother of African descent | | | 0.016 (0.070) | |
| One non-native parent | | −0.169*** (0.031) | | |
| ***Characteristics of the household*** | | | | |
| Household income index | −0.007 (0.009) | 0.026*** (0.008) | 0.003 (0.009) | 0.012 (0.009) |
| Distance from home to health center is a major problem | −0.036** (0.015) | −0.016 (0.018) | −0.025 (0.015) | −0.000 (0.015) |
| Rural area | 0.081*** (0.022) | −0.006 (0.019) | −0.043** (0.020) | 0.018 (0.019) |
| Regional dummy | Yes | Yes | Yes | Yes |
| Year dummy | No | No | No | Yes |
| Observations | 4.671 | 3.586 | 4.383 | 4.325 |
| Pseudo R2 | 0.04 | 0.05 | 0.12 | 0.04 |

*Notes:* The coefficients represent the marginal effects over the averages. The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

**TABLE A2.4.** Relationship between the Lack of a Birth Certificate and Percentage of Vaccines Received

*Dependent variable: percentage of vaccines received*

| Age (months) | (1) Bolivia 0–59 | (2) Dominican Republic 0–59 | (3) Nicaragua 0–59 | (4) Peru 0–59 |
|---|---|---|---|---|
| ***Characteristics of the child*** | | | | |
| Without birth certificate | −7.713*** (1.130) | −8.469*** (1.528) | −9.308*** (1.301) | −13.909*** (2.086) |
| Child's age in months | −0.003 (0.028) | 0.041 (0.031) | −0.086*** (0.027) | 0.619*** (0.028) |
| Child is a girl | −2.076** (0.884) | 2.096* (1.075) | −0.376 (0.845) | −1.694* (0.878) |
| Second child born | −6.161*** (1.234) | −4.142*** (1.429) | −4.633*** (1.161) | −1.514 (1.221) |
| Third child born | −7.026*** (1.423) | −3.544** (1.532) | −3.439** (1.468) | −3.635*** (1.346) |
| Fourth child born | −9.038*** (1.660) | −4.293** (1.982) | −5.518*** (1.768) | −4.200** (1.701) |
| Fifth child or more | −9.434*** (1.437) | −9.493*** (2.095) | −7.863*** (1.390) | −6.710*** (1.545) |
| Born in a public hospital | 8.238*** (1.208) | 12.457*** (3.969) | 7.119*** (1.146) | 9.480*** (1.317) |
| Born in a private hospital | 6.703*** (1.985) | 10.303** (4.327) | −2.453 (2.411) | 4.199 (2.903) |
| ***Characteristics of the parents*** | | | | |
| Mother's education level | 0.685*** (0.135) | 0.441*** (0.093) | 0.570*** (0.142) | 0.121 (0.148) |
| Mother is working | −0.528 (0.915) | 0.721 (1.268) | 0.588 (1.048) | 0.919 (0.956) |
| Mother from indigenous group | 0.183 (1.165) | | | −0.320 (1.780) |
| Mother of African descent | | | −7.274* (4.049) | |
| One non-native parent | | −12.244*** (2.708) | | |
| ***Characteristics of the household*** | | | | |
| Household income index | 0.365 (0.573) | −0.318 (0.581) | 2.494*** (0.561) | 1.886*** (0.609) |
| Distance from home to the health center is a major problem | −2.564*** (0.943) | −2.658** (1.245) | −3.061*** (0.926) | −0.238 (0.939) |
| Rural area | 5.285*** (1.345) | −1.139 (1.287) | −2.623** (1.245) | 2.660** (1.296) |
| Constant | 56.859*** (3.052) | 37.128*** (5.578) | 65.834*** (2.837) | 52.549*** (7.359) |
| Regional dummy | Yes | Yes | Yes | Yes |
| Year dummy | No | No | No | Yes |
| Observations | 5.596 | 3.777 | 5.079 | 4.298 |
| R2 | 0.095 | 0.063 | 0.293 | 0.221 |

*Note:* The robust standard errors are denoted in parentheses.
*** p<0.01; ** p<0.05; * p<0.1.

# Appendix 3

## Model Explaining the Failure to Register a Child's Birth

The model employs the following specification:

$$\text{WithoutCertificate}_{i,x} = \alpha\ \text{MinimumDistance}_{i,x} + \beta\ \text{Child}_{i,x} + \gamma\ \text{Mother}_{i,x} + \delta\ \text{Household}_{i,x} + \varepsilon_{i,}$$

The variable $\text{WithoutCertificate}_{i,x}$ represents a *dummy* variable for the child *i*, in household *x*, which takes the value of 1 if the child lacks a birth certificate and 0 if the child possesses one. The term $\text{MinimumDistance}_{i,x}$ defines the distance from the nearest civil registry office to the household cluster. The distance can increase the probability of not having a birth certificate ($\alpha > 0$) due to transport costs or difficulties in accessing information regarding the requirements and procedures involved in registration. The vector $\text{Child}_{i,x}$ represents the characteristics of the child, such as gender, age, birth order, and whether or not the child was born in a health center. The vector $\text{Mother}_{i,x}$ represents the characteristics of the mother, such as ethnic group, educational attainment, and marital status. The vector $\text{Household}_{i,x}$ represents variables that define the structure of the household and the characteristics of the wider community, such as the head of household's gender and age, whether or not the mother makes financial decisions, income levels, access to water and electricity, population density (number of persons) in the cluster, whether or not the nearest health center is perceived to be a long way away, whether or not the household possesses a car, whether it is a rural community, and a *dummy* variable at the departmental, provincial, or municipal district level.

## Results

**TABLE A3.1.** Relationship between Different Variables and the Probability of Under-Registration in Bolivia, 2008

*Dependent variable is 1 if the child lacks a birth certificate and 0 if the child possesses one*

| | (1) OLS | | (2) PROBIT | | (3) OLS | | (4) PROBIT | |
|---|---|---|---|---|---|---|---|---|
| Distance to nearest civil registry office (Kms) | 0.001** | (0.0005) | 0.001* | (0.0005) | 0.001* | (0.0005) | 0.001* | (0.0006) |
| Computerized office | 0.079 | (0.062) | 0.097 | (0.087) | 0.063 | (0.096) | 0.057 | (0.123) |
| ***Characteristics of the parents*** | | | | | | | | |
| Quechua-speaking | −0.006 | (0.021) | −0.005 | (0.021) | −0.016 | (0.018) | −0.016 | (0.018) |
| Aymara-speaking | 0.007 | (0.025) | 0.016 | (0.027) | −0.007 | (0.022) | 0.002 | (0.023) |
| Speakers of another indigenous language | 0.081 | (0.054) | 0.066 | (0.052) | 0.055 | (0.059) | 0.036 | (0.061) |
| Adolescent mother | 0.033** | (0.014) | 0.033** | (0.015) | 0.033*** | (0.012) | 0.034*** | (0.012) |
| Mother lives with her partner | −0.076*** | (0.019) | −0.078*** | (0.023) | −0.077*** | (0.018) | −0.079*** | (0.022) |
| Mother has completed primary education | −0.014 | (0.028) | −0.021 | (0.026) | −0.014 | (0.023) | −0.021 | (0.024) |
| Mother has completed secondary education | −0.077** | (0.031) | −0.079*** | (0.026) | −0.079*** | (0.026) | −0.081*** | (0.023) |
| Mother has completed tertiary education | −0.157*** | (0.033) | −0.164*** | (0.020) | −0.161*** | (0.030) | −0.163*** | (0.017) |
| ***Characteristics of the child*** | | | | | | | | |
| Child is a girl | 0.021** | (0.010) | 0.023** | (0.010) | 0.024** | (0.010) | 0.027*** | (0.010) |
| Child's age | −0.109*** | (0.004) | −0.118*** | (0.005) | −0.109*** | (0.004) | −0.119*** | (0.004) |
| Child born in winter | 0.057*** | (0.010) | 0.063*** | (0.011) | 0.057*** | (0.010) | 0.064*** | (0.011) |
| First-born child | 0.004 | (0.012) | 0.003 | (0.013) | 0.007 | (0.012) | 0.005 | (0.013) |
| Youngest child | −0.034*** | (0.011) | −0.061*** | (0.015) | −0.032** | (0.013) | −0.059*** | (0.016) |
| Birth not attended by healthcare specialist | 0.033** | (0.016) | 0.035** | (0.016) | 0.031** | (0.013) | 0.032** | (0.014) |

*(continued on next page)*

**TABLE A3.1.** Relationship between Different Variables and the Probability of Under-Registration in Bolivia, 2008

*Dependent variable is 1 if the child lacks a birth certificate and 0 if the child possesses one* (*cont.*)

| | (1) OLS | | (2) PROBIT | | (3) OLS | | (4) PROBIT | |
|---|---|---|---|---|---|---|---|---|
| ***Characteristics of the household*** | | | | | | | | |
| Head of household is a man | 0.008 | (0.018) | 0.001 | (0.019) | 0.012 | (0.016) | 0.006 | (0.017) |
| Age of head of household | −0.001** | (0.001) | −0.001** | (0.001) | −0.001** | (0.000) | −0.001** | (0.000) |
| Mother makes financial decisions | −0.011 | (0.017) | −0.010 | (0.019) | −0.011 | (0.016) | −0.009 | (0.017) |
| Household income index (1–5) | −0.060*** | (0.016) | −0.102*** | (0.018) | −0.065*** | (0.018) | −0.105*** | (0.016) |
| No water or electricity | 0.008 | (0.027) | 0.007 | (0.024) | 0.025 | (0.024) | 0.023 | (0.025) |
| Number of persons in cluster | 0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) |
| Health center is far away | 0.054 | (0.036) | 0.045 | (0.037) | 0.052 | (0.032) | 0.040 | (0.036) |
| Household owns a car | −0.010 | (0.015) | −0.012 | (0.019) | −0.004 | (0.016) | −0.008 | (0.018) |
| Altitude (Kms) | −0.008 | (0.010) | −0.010 | (0.010) | 0.016 | (0.015) | 0.016 | (0.016) |
| Distance to nearest road (Kms) | 0.000 | (0.000) | 0.000 | (0.000) | −0.000 | (0.001) | 0.000 | (0.001) |
| Rural area | 0.034** | (0.016) | 0.031* | (0.016) | 0.032* | (0.017) | 0.028 | (0.018) |
| Constant | 0.488*** | (0.065) | | | 0.556* | (0.286) | | |
| Observations | 6,438 | | 6,438 | | 6,438 | | 6,433 | |
| R-Squared | 0.187 | | — | | 0.211 | | — | |
| Department dummy | Yes | | Yes | | No | | No | |
| Provincial dummy | No | | No | | Yes | | Yes | |

*Notes:* The robust standard errors are denoted in parentheses. There are marginal effects for discreet changes in the dummy variables from 0 to 1. The sample was limited to clusters of households located within 80 kilometers in order to eliminate extreme values, and to children that have lived in the same household during the last five years (93 percent).

* p < 0.1; ** p < 0.05; *** p < 0.01.

**TABLE A3.2.** Relationship between Different Variables and the Probability of Under-Registration in the Dominican Republic, 2007

*Dependent variable is 1 if the child lacks a birth certificate and 0 if the child possesses one*

| | (1) OLS | | (2) PROBIT | | (3) OLS | | (4) PROBIT | |
|---|---|---|---|---|---|---|---|---|
| Distance to nearest civil registry office (Kms) | 0.006** | (0.003) | 0.007** | (0.003) | 0.005* | (0.003) | 0.007** | (0.003) |
| ***Characteristics of the parents*** | | | | | | | | |
| Mother has valid identity document | 0.209*** | (0.015) | 0.168*** | (0.015) | 0.198*** | (0.011) | 0.165*** | (0.014) |
| One parent is born overseas | 0.156*** | (0.033) | 0.103*** | (0.032) | 0.166*** | (0.016) | 0.116*** | (0.021) |
| Adolescent mother | 0.085*** | (0.025) | 0.064*** | (0.024) | 0.080*** | (0.013) | 0.064*** | (0.015) |
| Mother has completed primary education | −0.105*** | (0.029) | −0.057*** | (0.017) | −0.092*** | (0.014) | −0.054*** | (0.011) |
| Mother has completed secondary education | −0.184*** | (0.030) | −0.117*** | (0.017) | −0.169*** | (0.015) | −0.115*** | (0.011) |
| Mother has completed tertiary education | −0.197*** | (0.030) | −0.127*** | (0.012) | −0.170*** | (0.017) | −0.117*** | (0.008) |
| ***Characteristics of the child*** | | | | | | | | |
| Child is a girl | −0.009 | (0.010) | −0.012 | (0.010) | −0.009 | (0.006) | −0.013* | (0.007) |
| Child's age | −0.041*** | (0.004) | −0.041*** | (0.004) | −0.040*** | (0.002) | −0.041*** | (0.002) |
| Child born in winter | −0.004 | (0.010) | −0.002 | (0.010) | −0.004 | (0.006) | −0.002 | (0.007) |
| First-born child | −0.056** | (0.024) | −0.052*** | (0.020) | −0.049*** | (0.014) | −0.050*** | (0.012) |
| Child is the youngest | −0.082*** | (0.022) | −0.082*** | (0.021) | −0.076*** | (0.012) | −0.078*** | (0.013) |
| Birth not attended by healthcare specialist | 0.091** | (0.037) | 0.069** | (0.035) | 0.086*** | (0.023) | 0.061** | (0.027) |
| ***Characteristics of the household*** | | | | | | | | |
| Head of household is male | −0.002 | (0.015) | −0.005 | (0.015) | −0.000 | (0.008) | −0.002 | (0.009) |
| Age of head of household | 0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) |
| Mother makes financial decisions | 0.009 | (0.020) | 0.006 | (0.018) | 0.013 | (0.011) | 0.008 | (0.011) |
| Household income index (1–5) | −0.054*** | (0.005) | −0.063*** | (0.006) | −0.054*** | (0.004) | −0.063*** | (0.004) |
| No water or electricity | | | | | 0.057*** | (0.020) | 0.019 | (0.018) |
| Number of persons in cluster | | | | | −0.000 | (0.000) | −0.000 | (0.000) |
| Health center is far away | | | | | 0.008 | (0.008) | 0.007 | (0.007) |
| Household owns a car | 0.013 | (0.014) | −0.005 | (0.021) | 0.011 | (0.011) | −0.007 | (0.013) |
| Distance to nearest road (Kms) | 0.002 | (0.004) | 0.001 | (0.003) | −0.002 | (0.003) | −0.002 | (0.003) |
| Altitude (Kms) | 0.042 | (0.047) | 0.007 | (0.035) | 0.064* | (0.038) | 0.036 | (0.037) |
| Rural area | −0.016 | (0.016) | −0.016 | (0.014) | −0.009 | (0.010) | −0.006 | (0.010) |
| Constant | 0.521*** | (0.070) | | | 0.488** | (0.239) | | |
| Observations | 6,217 | | 6,217 | | 6,202 | | 6,202 | |
| R-Squared | 0.221 | | | | 0.266 | | | |
| Department dummy | Yes | | Yes | | No | | No | |
| Municipal dummies | No | | No | | Yes | | Yes | |

*Notes:* The robust standard errors are denoted in parentheses. There are marginal effects for discreet changes in the dummy variables from 0 to 1. The sample was limited to children who have lived in the same household during the last five years (94 percent).

* p < 0.1; ** p < 0.05; *** p < 0.01.

**TABLE A3.3.** Relationship between Different Variables and the Probability of Under-Registration in Peru, 2004–08

*Dependent variable is 1 if the child lacks a birth certificate and 0 if the child possesses one*

| | (1) OLS | | (2) PROBIT | | (3) OLS | | (4) PROBIT | |
|---|---|---|---|---|---|---|---|---|
| Distance to nearest civil registry office (Kms) | 0.001 | (0.001) | 0.0004 | (0.000) | 0.00005 | (0.000) | 0.00009 | (0.0002) |
| ***Characteristics of the parents*** | | | | | | | | |
| Mother without identity document | −0.001 | (0.006) | 0.002 | (0.004) | 0.002 | (0.006) | 0.005 | (0.010) |
| Quechua-speaking | −0.001 | (0.006) | 0.002 | (0.004) | 0.002 | (0.006) | 0.005 | (0.010) |
| Aymara-speaking | −0.027 | (0.027) | −0.007 | (0.005) | −0.038 | (0.029) | −0.012 | (0.020) |
| Speakers of other indigenous language | 0.086*** | (0.017) | 0.042*** | (0.011) | 0.088*** | (0.017) | 0.067 | (0.075) |
| Adolescent mother | −0.016 | (0.023) | −0.003 | (0.005) | −0.015 | (0.023) | −0.005 | (0.010) |
| Mother lives with her partner | −0.015 | (0.010) | −0.008 | (0.006) | −0.016 | (0.010) | −0.013 | (0.018) |
| Mother has completed primary education | 0.008 | (0.008) | 0.006 | (0.006) | 0.007 | (0.009) | 0.009 | (0.016) |
| Mother has completed secondary education | 0.003 | (0.010) | 0.002 | (0.007) | −0.000 | (0.011) | 0.001 | (0.011) |
| Mother has completed tertiary education | −0.006 | (0.011) | −0.005 | (0.006) | −0.007 | (0.012) | −0.008 | (0.015) |
| ***Characteristics of the child*** | | | | | | | | |
| Child is a girl | 0.020** | (0.009) | 0.014** | (0.007) | 0.022** | (0.009) | 0.022** | (0.009) |
| Child's age | −0.006*** | (0.002) | −0.004*** | (0.001) | −0.005*** | (0.002) | −0.005 | (0.007) |
| First-born child | −0.010 | (0.011) | −0.005 | (0.004) | −0.008 | (0.011) | −0.006 | (0.010) |
| Child is the youngest | −0.018** | (0.009) | −0.014** | (0.006) | −0.016* | (0.009) | −0.015 | (0.021) |
| Birth not attended by healthcare specialist | 0.006 | (0.005) | 0.004 | (0.003) | 0.004 | (0.005) | 0.004 | (0.008) |
| ***Characteristics of the household*** | | | | | | | | |
| Head of household is male | −0.000 | (0.000) | −0.000 | (0.000) | −0.000 | (0.000) | −0.000 | (0.000) |
| Age of head of household | 0.000 | (0.000) | | | 0.000 | (0.000) | 0.018 | (0.025) |
| Household income index (1–5) | −0.011*** | (0.003) | −0.007*** | (0.002) | −0.010*** | (0.004) | −0.010 | (0.013) |
| No water or electricity | | | | | 0.015 | (0.018) | 0.004 | (0.012) |
| Number of persons in cluster | | | | | 0.000 | (0.000) | 0.000 | (0.000) |
| Health center is far away | | | | | −0.003 | (0.005) | −0.004 | (0.007) |
| Household owns a car | 0.001 | (0.006) | −0.006 | (0.006) | −0.003 | (0.006) | −0.013 | (0.018) |
| Distance to nearest road (Kms) | 0.001*** | (0.000) | 0.0009** | (0.000) | 0.001*** | (0.000) | 0.0002** | (0.000) |
| Altitude (Kms) | −0.007** | (0.003) | −0.005*** | (0.002) | −0.002 | (0.004) | −0.008 | (0.011) |
| Rural area | −0.019*** | (0.007) | −0.012*** | (0.004) | −0.027*** | (0.007) | −0.022 | (0.030) |
| Year | 0.001 | (0.002) | 0.000 | (0.001) | −0.000 | (0.002) | −0.000 | (0.001) |
| Constant | −1.751 | (3.755) | | | 0.574 | (3.971) | | |
| Observations | 9,104 | | 9,104 | | 9.,104 | | 6,182 | |
| R-Squared | 0.075 | | – | | 0.101 | | – | |
| Regional dummies | Yes | | Yes | | No | | No | |
| Municipal dummies | No | | No | | Yes | | Yes | |

*Notes:* The robust standard errors are denoted in parentheses. There are marginal effects for discreet changes in the dummy variables from 0 to 1. The sample was limited to include only those who have lived in the same place in which the child was born (95 percent).

* p < 0.1; ** p < 0.05; *** p < 0.01.

"This publication presents novel information on children without birth registration in Latin America and the Caribbean. The contributions include not only the identification but also the quantification of the potential causes and consequences of under-registration of births in the region. Unregistered children are clearly behind in terms of education and wellbeing, emphasizing the urgency to assure legal identity, social inclusion, and development in our countries."

Santiago Levy
Vice President
Inter-American Development Bank

"Without birth registration, people move through life like invisible citizens, without the capacity to exercise their social, civil, and political rights, and with limited access to public and private services. On the other hand, governments with poor or nonexistent civil registration systems face, among other problems, difficulties in designing appropriate policies and controlling social spending (by not having the accurate information on the beneficiaries of the services they offer). Within this context, this publication is recommended reading for both public and private actors committed to reducing under-registration of births in order to improve the basic indicators of health and education in Latin America and the Caribbean."

Iván Arcos Axt
Former Metropolitan Director
Civil Registry and Identification Service, Chile

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