

## Chapter 3

# INEQUALITY AND THE FAMILY

Inequality is not only a personal issue; it is a family issue as well. Just as each individual confronts different opportunities and makes decisions, families also face a variety of circumstances and respond to them. But family decisions are more complex because many are made jointly, whether they involve choices regarding work inside or outside the home, about raising children, or about whether and how much to educate children. Typically, parents save to benefit their children—either through financial instruments or more commonly by dedicating time and resources to their children that give them better education, skills or other assets that will enable them to fend for themselves when they are older. Hence, a fundamental intergenerational transfer of resources takes place within the family.

We have seen that household inequality is strongly related to wage inequality (Chapter 1) and that wage inequality is itself explained in large part by the unequal distribution of schooling (Chapter 2). This chapter asks questions about how these differences in schooling come about and shows how they are strongly influenced by decisions to enter the labor force and by fertility rates and family structure. We discuss how labor supply decisions are affected by available income earning opportunities in the market along with the alternative uses of time in the home.

There are some large variations between the average family at the top and bottom levels of income distribution in Latin America with respect to a few key characteristics.<sup>1</sup> The hourly wage of an individual in the top decile is, on average, almost nine times higher than for an individual in the bottom three deciles. Total household income (all earned and unearned income) of the average family in the top decile differs by a factor of little more than 12 from that of the average family in the bottom three deciles. And when we adjust for the size of households and measure the gap in per capita household income (i.e., income divided by the number of people in the household), the difference is even larger: the family in the top decile has per capita household income that is almost 20 times higher than the lower-income family.

Why are these gaps so large? How much of these gaps is related to characteristics of the family? And why do these differences vary so much across countries?

A large part of the differences have to do with the structure of the economy, culture, ethnicity and many other general social factors. But these differences are also related to the families' own resources—principally the education of the adults (Table 3.1). While the average family in the bottom three deciles has adults with five years of schooling, the adults in the top decile average family have completed about 12 years. The families also differ in terms of their likelihood of working outside the home. The men in each family have about the same probability of being in the paid workforce—approximately 83 percent for lower-income families and 86 percent for higher-income ones. But lower-income women are much less likely to be working outside the home. In fact, the woman in the average top decile family is almost twice as likely to be in the paid workforce as the woman from the lower three deciles—60 percent and 37 percent, respectively.

Table 3.1. Average Family Characteristics by Income

	Top 10%	Bottom 30%
Adult education-male (years)	12.1	5.0
Adult education-female (years)	11.6	4.7
Labor force participation-male (%)	85.8	82.5
Labor force participation-female (%)	60.9	36.7
Number of children	1.4	3.3
Expected educational attainment for children (years)	11.7	6.9
	Income ratio	
Household income	12.3	
Per capita household income	19.9	
<i>Source:</i> IDB calculations based on recent household surveys.		

<sup>1</sup> This chapter relies heavily on household survey data. Box 1.2 and the Appendix in Chapter 1 provide details.

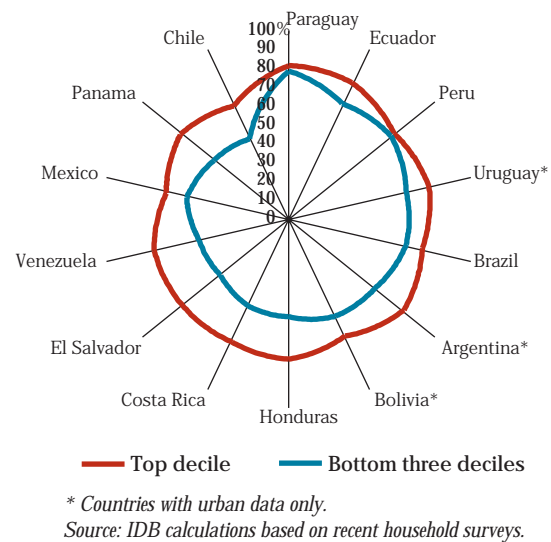
Another difference between families that affects their per capita income is the number of children they have. The average lower-income family has three or more children, while the average upper-income family has only one or two. Finally, the schooling of their children is likely to differ significantly. On their 21st birthdays, children of wealthier families will probably have finished 12 years of school, while children of the average lower-income family are likely to have finished only seven years.<sup>2</sup>

Thus, much of the inequality between lower- and upper-income families is related to differences in their own educational attainment, whether or not women work outside the home, and how many children they have. The differences in educational attainment of their children also have implications for future income inequality, just as the education of the adults was itself strongly affected by their parents' education. Nevertheless, family characteristics do not explain all of the differences. Families with similar characteristics in different countries generate different levels of inequality. This may be partly related to cultural or political factors, but it is also clearly related to such economic factors as prevailing wage rates and the level of informality. The economic context itself appears to alter family behavior in subtle ways that influence labor force participation decisions, the number of children, and children's educational attainment. This chapter will focus on the choices that families make with regard to these characteristics, and how these choices, in turn, affect income distribution. It will begin by looking at the direct impact of each of these factors on income distribution itself, and conclude with a discussion of the interrelationships of these factors and their combined direct and indirect effects on income inequality. This will make it possible to evaluate how much these factors combined contribute to income inequality, and how much remains unexplained in the income disparities experienced by people in different countries in the region.

### LABOR FORCE PARTICIPATION

One household factor that contributes to income inequality is the variation in labor force participation by income level.<sup>3</sup> Individuals from lower-income households are much less likely to participate in the labor force than those in higher-income households. The only exceptions are Paraguay and Peru (Figure 3.1). The difference in participation averages is around 10 percent of the working age population in Ecuador, urban Uruguay, Brazil, urban Bolivia, and Mexico, and about 20 percent in the remaining countries.

Figure 3.1. Labor Force Participation by Country and Income (Ages 15-65)



### Female Labor Force Participation Explains the Difference

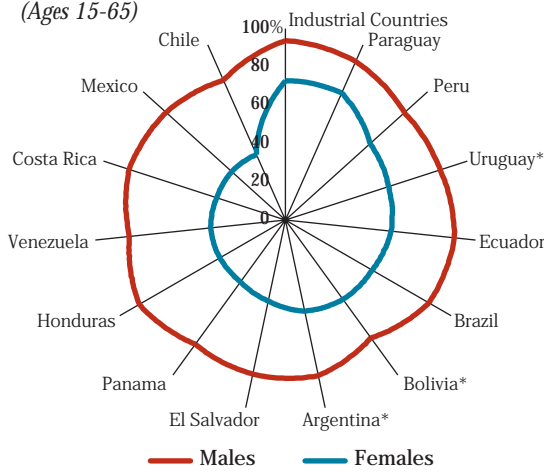
Differences in participation rates between income groups are overwhelmingly explained by levels of female labor force participation, which remain substantially below male rates throughout the region by an average of 37 percent (Figure 3.2). The discrepancy is particularly large in Mexico, Costa Rica, Venezuela and Honduras. But even in countries with less of a difference, such as Paraguay, Peru and urban Bolivia, the gap remains significant. For most countries, this pattern differs markedly from the industrial countries, where the difference between male and female labor force participation is below 20 percent.

Male participation rates are relatively high in all income groups for all countries, averaging about 84 percent. The difference in the participation rates for men in the top decile and in the bottom three deciles is, on average, only 3 percent. However, for women, participation varies strongly with income. While on average more than 60 percent of women in the top decile are in the labor force, among the poorest three deciles this share is only 37 percent. In countries such as Paraguay and Peru, the difference in labor force participation rates apparently

<sup>2</sup> There is also evidence that the quality of schooling is likely to differ significantly by income, with wealthier families having access to better quality education for their children.

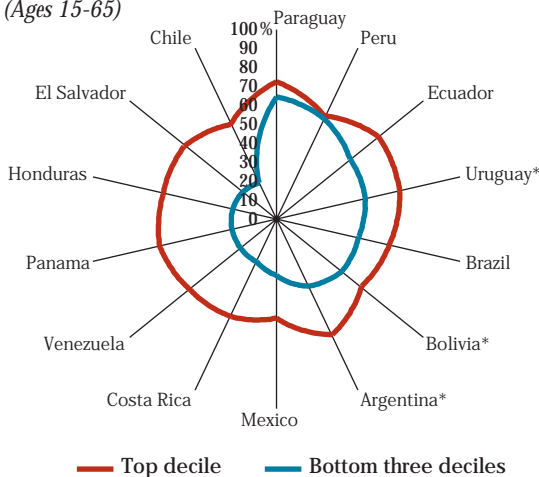
<sup>3</sup> A person is considered to be participating in the labor force if he or she is employed, self-employed, or seeking work. Therefore, unemployed workers who are looking for a job will be included. In most countries for which data is available, the unemployment rate is rather low—generally below 5 percent. The exception is Argentina, where unemployment has ranged above 10 percent.

Figure 3.2. Female and Male Participation Rates by Country (Ages 15-65)



\* Countries with urban data only.  
 Source: IDB calculations based on recent household surveys.  
 Industrial country data from Duryea and Székely (1998).

Figure 3.3. Female Participation Rates by Country and Income (Ages 15-65)

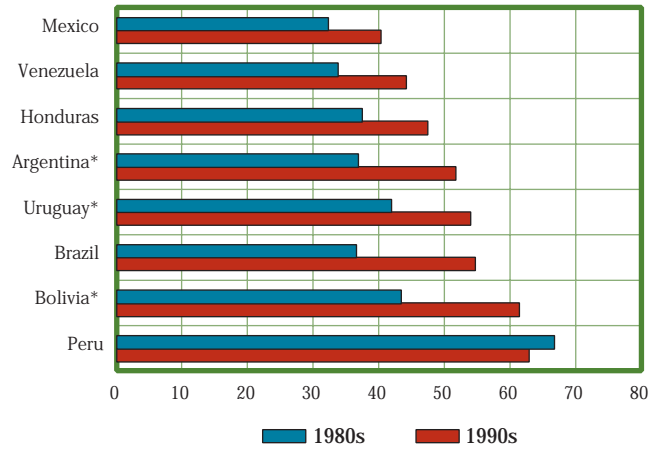


\* Countries with urban data only.  
 Source: IDB calculations based on recent household surveys.

varies little at these extremes of the income distribution, but in countries like El Salvador and Panama, the difference is almost 40 percent. The urban samples—Uruguay, Argentina and Bolivia—are among those with the smallest differences; and the Central American countries are among those with the largest (Figure 3.3).

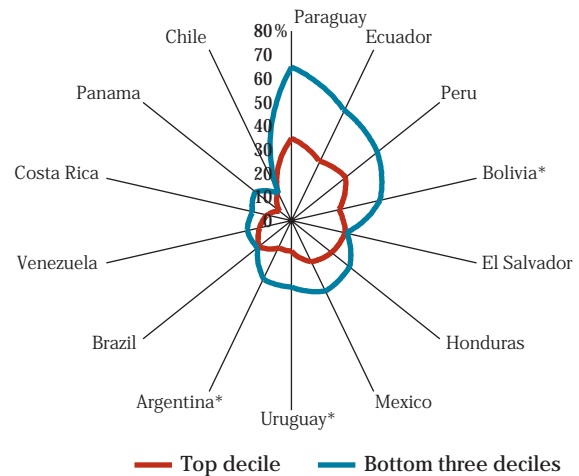
These participation rates are, nevertheless, higher than they were 10 or 20 years ago. Overall labor force participation increased between 1970 and 1995 because of a dramatic rise in female participation rates. In 1970, women represented only 23 percent of the total labor force, but in 1995 they accounted for more than 35 percent. Even over the single decade of the 1980s, rates rose consistently, except in Peru (Figure 3.4). In three of the eight countries in

Figure 3.4. Female Labor Force Participation Rate in the 1980s and 1990s (In percent)



\* Countries with urban data only.  
 Source: IDB calculations based on recent household surveys.

Figure 3.5. Female Participation in the Informal Sector by Country and Income



\* Countries with urban data only.  
 Source: IDB calculations based on recent household surveys.

Figure 3.4—the urban areas of Bolivia, Argentina and Uruguay—the participation of women from the top decile increased more than those from the bottom three deciles. In another four—Brazil, Venezuela, Mexico and Honduras—the relationship was reversed, with larger increases in participation for lower-income women.

**Women Participate Disproportionately in the Informal Sector**

When lower-income women do participate in the labor market, they do so mainly in the informal sector (Figure 3.5). Yet, women from the top 10 percent of the income

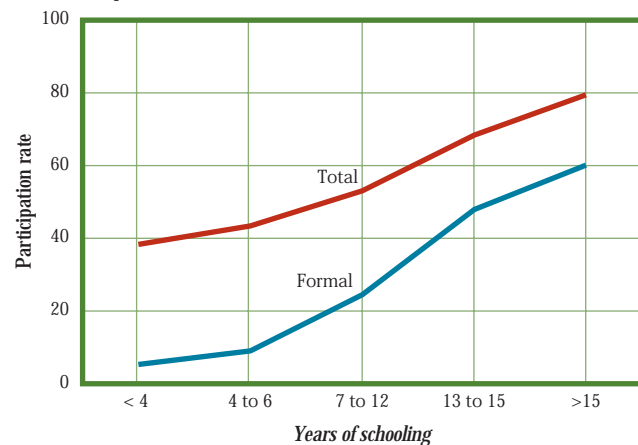
distribution are much less likely to be working in the informal sector. The contrast is strongest in Paraguay, Ecuador, Peru and urban Bolivia, where lower-income women have high participation rates and are conspicuously concentrated in the informal sector. By contrast, women in these countries from the top decile, who have access to formal sector employment, are half as likely to work in the informal sector, even though they have comparable or greater participation in the labor force overall.

The decision to enter the labor force for both men and women is affected by their access to unearned sources of income, their age and physical health, cultural norms, and alternative uses of their time for leisure or work in the home. For adult men in Latin America, being in the workforce is almost automatic. Very few have the means to support themselves without working, and cultural norms encourage men to earn a living in the labor market. Male labor force participation has not changed dramatically over time, and is relatively unaffected by marriage, divorce or number of children.

For adult women in Latin America, the story is more complex and, indeed, changing. As discussed above, women's labor force participation rates vary considerably across countries, income levels and time. There is extensive literature on countries throughout the world that tries to understand these differences, and shows that a woman is more likely to participate in the labor force when she is unmarried, her spouse earns less, her family has more assets, her family has fewer children, she is more educated, or when she has higher income earning opportunities in the labor market.<sup>4</sup> These factors reflect the fact that traditionally women have been expected to assume the responsibilities of rearing children and doing household work.<sup>5</sup> Consequently, when choosing whether or not to enter the labor market, the alternative uses of their time in terms of these very important activities in the home frequently play a role.

Although such models clearly cannot explain any particular individual or family choice about working, they do help us understand social trends in female labor force participation. In general, when male earnings fall, female labor force participation rates are likely to rise, holding all other factors constant. Similarly, developments that raise the productivity of housework, such as access to running water and electricity, will be associated with rising female labor force participation. The number of women who are active in the labor force also increases when women have fewer children. When women are more educated, they can command higher earnings in the workplace, and this also encourages more of them to seek remunerated jobs. And when labor demand makes fewer distinctions between men and women in terms of pay by

Figure 3.6. Female Labor Force Participation by Educational Level  
(In percent)



Note: Average of 14 Latin American countries.

Source: IDB calculations based on recent household surveys.

reducing discrimination or occupational segregation, more women enter the labor market.

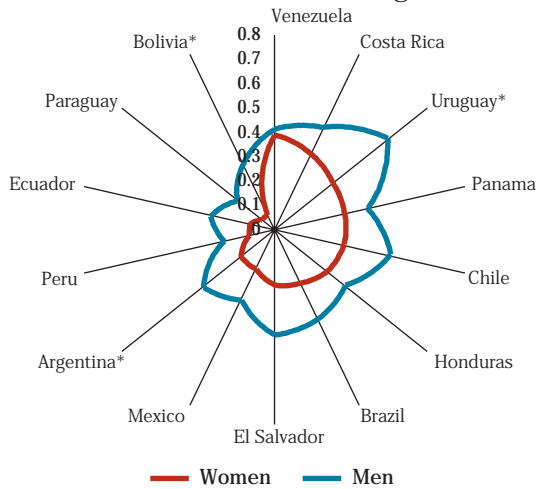
Hence, women's labor force participation in Latin America is likely to be higher whenever their spouses earnings decline, their education levels rise, and the number of children they have declines. These relationships are, in fact, very strongly supported by the available evidence. Policies that contribute to increasing women's labor market opportunities among lower-income groups can, in turn, contribute to reducing income inequality in the region.

First, women who are more educated are more likely to enter the labor market. (Figure 3.6). In fact, the differences are quite sharp. While only some 40 percent of women with four years or less of schooling participate in the labor market, over 78 percent of those with higher education do. The contrast is even sharper with respect to female participation in the formal sector, where a woman with a graduate degree is 11 times more likely to work than her counterpart with a year or two of schooling. This stands in contrast to the experience of men who, even with very little education, are still heavily represented in the formal sector (Figure 3.7).

<sup>4</sup> See Behrman and Wolfe (1984); Hill (1983); and Psacharopoulos and Tzannatos (1992).

<sup>5</sup> This is clearly an oversimplification of historical variations in women's social roles in Latin America, which varies through time, across countries and regions, and across income groups. A full account of these variations and their historical changes is beyond the scope of this study, which aims, instead, to focus on the aggregate changes in female labor force participation in recent years as a consequence of educational, demographic and labor market changes.

Figure 3.7. Share of Formal Sector Participation for Men and Women with Four to Six Years of Schooling



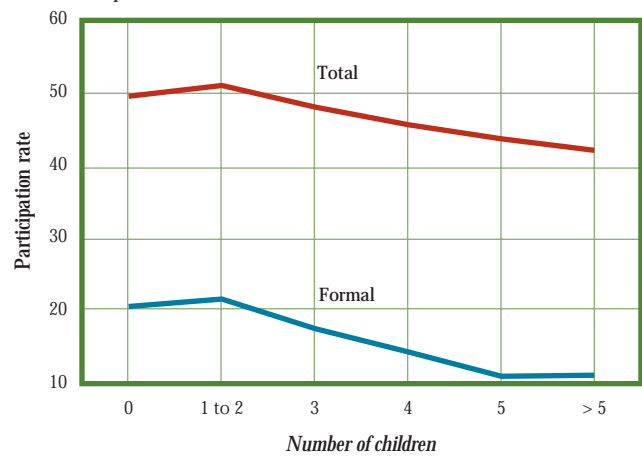
\* Countries with urban data only.  
 Note: The share is calculated as the formal sector labor force participation rate divided by the total labor force participation rate for each sex.  
 Source: IDB calculations based on recent household surveys.

Second, women who have fewer children are more likely to work in the labor market (Figure 3.8). Although this effect is not as dramatic, there is a clear declining relationship between the number of children and a woman's likelihood of participating in the labor force, and the effect is stronger in the formal sector. On average, women with five children participate about 7 percent less than do women with one or two children. In the formal sector, the difference in participation is 10 percent.

In simple tabulations, the relationship between female labor force participation and both education and number of children appears to be fairly strong. Even after controlling for other factors, such as the relative age of the children, the earning potential of the household head, and the presence of other adults and retired persons (over 65), women's education and number of children still have a significant impact on labor force participation decisions. Using an economic model to estimate the probabilities that a woman would be out of the labor force, working in the informal sector, or working in the formal sector, it was possible to show that women's education is by far the most relevant and important factor in explaining labor force participation decisions in almost all of the 14 countries analyzed (see Appendix). In eight countries, the gap in labor force participation between high- and low-income women exceeded 10 percent; and of these eight countries, the difference in educational levels of high- and low-income women explained between 40 and 100 percent of that gap (Figure 3.9).

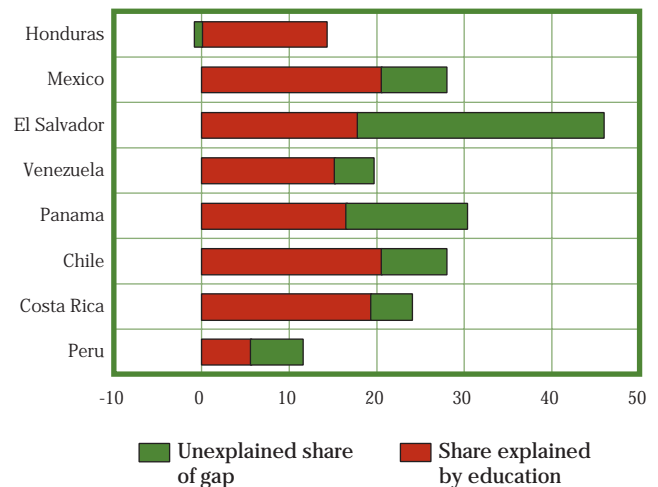
By contrast, the number of children under six years of age is statistically significant but plays a relatively mi-

Figure 3.8. Female Labor Force Participation Rate by Number of Children (In percent)



Note: Average of 14 Latin American countries.  
 Source: IDB calculations based on recent household surveys.

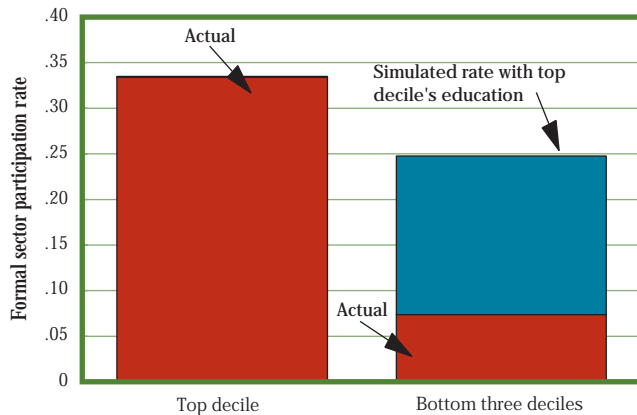
Figure 3.9. Female Labor Force Participation Gap and Education (In percent)



Note: The gap is calculated as the difference between female labor force participation rates in the top 10 percent and bottom 30 percent of income distribution. Only countries with a gap of 10 percent or more are included.  
 Source: IDB simulations based on recent household surveys. See the Appendix for details.

nor role in explaining the participation gap between high- and low-income women. After taking education and other factors into consideration, the number of children explains less than 2 percent of this labor force participation gap. The main explanation appears to be the strongly negative association between women's education and the number of children they have. More educated women tend to have fewer children. On average, each additional child under

Figure 3.10. Education and Women's Formal Sector Participation  
(In percent)



Note: Average for 14 countries.

Source: IDB simulations based on recent household surveys.

six reduces the participation rate by 4.1 percentage points, but the difference in the number of children between high- and low-income women is slightly less than two. By contrast, each additional year of schooling increases participation by 2.1 percent, and the difference in years of schooling between high- and low-income women typically exceeds six years. Consequently, women's education predominates in explaining differences in female labor force participation rates between income groups.

Education greatly affects participation, but it also affects the probability that a woman will work in the formal sector. For the region as a whole, the gap between formal sector participation is wide—33.5 percent and 7.5 percent for higher- and lower-income women, respectively. Using the same labor force participation model, it is possible to explain between 2 and 12 percent of this gap as a consequence of the different education levels of higher- and lower-income women (Figure 3.10). For men, after controlling for other factors, education has a much smaller impact on whether an individual is in the formal or informal sector. This compounded education effect—altering the likelihood that a woman will participate in the labor force and her probability of being in the informal sector—serves to exacerbate income inequality in the region.

The earning potential of the head of household also has an impact on participation, although the effect is much smaller than women's education. If the household head of the bottom three deciles were to have the same education as that of the top decile, women's participation in the formal sector would decrease by an average of 5 percentage points.

Hence, of the factors that we have considered, a woman's education is the most important for explaining

whether she is likely to be working at home, in the informal sector, or in the formal sector. Part of this effect is due to changes in preferences occasioned by schooling, and the accompanying exposure to alternative models of behavior and life choices. But education also plays a critical role in expanding a woman's income earning opportunities. Hence, the cost of staying out of the labor force in terms of what a woman could earn rises along with her educational attainment. It is not surprising, then, to find that in societies with rising educational levels for women, labor force participation rises. Under these conditions, the relative costs and benefits to the family of entering the labor market often shift in favor of working outside the home.

### Why Do Fewer Women Work in the Formal Sector?

We have seen that women participate less in the labor force than men, and that there are several important factors that influence that decision. But the strong differences in the characteristics of jobs in the formal and informal sectors actually make this a three-way decision. Women decide whether or not to participate in the labor force not only by considering the relative benefits and costs of going to work, but by considering the relative benefits and costs of different kinds of jobs. In this context, why are women so much less likely to be in formal sector jobs? There are a variety of possible reasons, including those related to the ways formal sector firms contract and manage personnel and those related to women's own preferences for different kinds of work and working conditions.

If we consider the general characteristics of formal sector jobs and the pattern of female labor force participation, there are several related reasons that contribute to lower formal sector employment for women. First, formal sector firms tend to provide benefits, such as maternity leave, that are not generally provided in the informal sector. Hence, firms may be reluctant to hire younger women who have a significant probability of needing such leave and its attendant benefits (see Chapter 6).<sup>6</sup> Second, firms in the formal sector may be stricter about workers reliably showing up for work and putting in a regular number of hours each day. They are certainly more likely than informal firms to award upward career mobility to workers who have accumulated experience in their occu-

<sup>6</sup> Studies in the United States have demonstrated that even though women interrupt their careers to have children and care for them in their early years, they are, on average, more reliable than men in terms of lower rates of absenteeism. It is unclear how much firms have internalized these relative factors when make hiring decisions.

pation by maintaining a long-term and steady attachment to the firm, or at least to the occupation. By contrast, a large share of women in the informal sector are self-employed—almost 50 percent in both urban and rural areas. This provides greater flexibility in working hours and regularity. Furthermore, many jobs predominantly held by women in such sectors as retail trade and clothing frequently have flexible hours and locations, such as part-time shifts in a kiosk or piece work done at home.<sup>7</sup>

The relative inflexibility of formal sector jobs and their emphasis on steady career experience may make them problematic for many women in Latin America. To the extent that a woman is assuming traditional responsibilities in her home, going to work in the formal sector entails a significant commitment that places strict limits and penalties on dealing with unpredictable events at home. One way to deal with this is to rely on a network of support for fulfilling those traditional responsibilities; another way, for those who can earn enough money, is to contract domestic servants. Maternity leaves can also interrupt the accumulation of job experience, or may be interpreted by employers as indicating a less than complete commitment to a woman's job. Any of these factors can make it more difficult for women to enter and hold jobs in the formal sector than men.

Finally, Latin America, like many other societies, is characterized by significant occupational segregation. Women tend to be concentrated in the clerical, teaching, nursing, seamstressing and retail trades. Women work disproportionately in the service sectors, which have grown steadily as a share of total employment in recent decades. The service sectors are also characterized by jobs ranging from well-paid professional positions in formal sector activities to retail employment that may generate little income. The causes of this concentration of women in particular occupations are not well understood in Latin America, and probably result from the interaction of women's own preferences and their ascribed responsibilities in the home with specific choices by firms in hiring and managing personnel, and with the structure and technology of production.

### Women's Earnings Vary More

Less educated women who enter the labor force tend to be concentrated in informal sector jobs that pay less than formal sector jobs for women with comparable levels of education. Because of the influence of educational attainment on both labor force participation and the probability of being in either the formal or informal sector, the variation in earnings for women is greater than for

men. These large disparities contribute to the overall inequality in income distribution.

As was discussed in Chapter 2, the difference between earnings in the formal and informal sectors for women is quite large, and the gap is larger for women than men. Using the relationships that were statistically analyzed in Chapter 2, it is possible to calculate the wage gaps between these sectors after accounting for other factors that affect income. For example, a 35-year old woman living in an urban area who has completed seven years of school would earn an average of 18.5 percent more in a formal sector job than a similar woman who was self-employed.<sup>8</sup> In 11 of the 14 countries for which data was available, the formal sector pays more to a woman with these characteristics (the exceptions are Argentina, Bolivia and Brazil). (For a summary of earning differentials, see Figure 2.7 in Chapter 2.) In all of the countries for which the gap was significant, the gap for women was much higher than for men. A man with the same personal characteristics living in an urban area and working in the formal sector would earn only 7 percent more than a similar man who was self-employed.

The gap between men and women in the formal sector is lower than in the informal sector. On average, women doing the same job as men earn 10 percent less than men in the formal sector, while the gap in the informal sector is about 25 percent. The smaller gender gap in the formal sector might indicate less gender discrimination, or it might mean that the occupations that women occupy in the formal sector pay closer to the average of their male counterparts. It is difficult to imagine that straightforward gender discrimination by employers could explain such a large gap within the informal sector, since this sector includes self-employment and other activities that are much more fluid. However, it may still be a contributing factor. Occupational segregation is very likely to play a role in the larger gender gap in the informal sector, since women's informal occupations (principally retail trade and domestic service) are significantly less well paid than the informal jobs available to men (including construction and small-scale manufacturing).

The larger gap for women between formal and informal sector activities, then, is likely to have at least two sources. One is that the traditional roles assigned to women in Latin American countries leads them to

<sup>7</sup> A fuller discussion of the impact of labor market patterns on labor force participation, earnings and inequality can be found in Chapter 6.

<sup>8</sup> To calculate these simulations, we first estimate earnings regressions, and use the coefficients to predict each person's income based on their personal characteristics. Secondly, we use the coefficients to evaluate the function at other mean levels, and recompute the predicted income.

seek out jobs that offer flexibility, while formal sector employers are seeking workers who can be predictable and continuously committed to their job. Poor and uneducated women may find it harder to commit to a strict schedule because they do not have the resources to generate the support network that would allow them to allocate their time more predictably. As the woman's educational level increases, so too does her salary, making such a network more affordable. Given the existing tendency in society to assign primary responsibility for household tasks to women, these factors are much less important for men, and hence the premium for men in the formal sector would be correspondingly lower. A second source for this earnings gap is, again, related to occupational segregation. The greater range in earnings for women compared to similar men is affected by the range of available jobs. This range of jobs may be larger for men, since highly educated women are concentrated in particular professional jobs in specific sectors, while poorly educated women are predominantly candidates for domestic service and retail trade occupations. Both of these reasons help explain why women with equal education and experience earn a premium in the formal sector compared to their potential income in the informal sector, and why this premium is larger for women than for men of otherwise equal characteristics. This greater disparity, in turn, contributes to income inequality overall.

### Participation and Income Inequality

As discussed above, women are participating in the labor force in increasing numbers, and this trend is consistent for all ages and educational levels, and across most countries.<sup>9</sup> These trends are consistent with the observed role of women's educational attainment in influencing work choices. As women's educational attainment has risen, so too has their participation in the labor market. Using education and the other factors identified in our participation model allows us to compare how much women's labor force participation would be in the 1990s as a consequence of only the changes in education, income and family size.<sup>10</sup> When this predicted participation rate is compared to the actual rate, it falls well short. These factors explain about 50 percent of the increase in participation rates.<sup>11</sup> Other factors, both economic and social, are also at work (Box 3.1).

Because women's labor force participation is directly related to household income, the differences in participation rates exacerbate income inequality in the region. This direct effect is small but significant. Income

inequality is about 1.5 points higher on average (as measured by the Gini index) than it would be if high- and low-income women had equivalent participation rates (Figure 3.11).<sup>12</sup> In seven countries—Argentina, Ecuador, Honduras, Panama, Paraguay, Uruguay and Venezuela—the direct effect is more than two points. It is interesting to note that in all of the Latin American countries, with the exception of Ecuador, the impact on inequality of differences in female labor force participation rates is smaller than it would be in the United States. Thus, the direct impact of women's labor force participation is significant but relatively modest in explaining income gaps. But labor force participation also influences other decisions that affect income inequality as well.

In sum, the patterns of women's labor force participation have an impact on income inequality in the region. Women participate in the labor force less than men, and when they participate, they are more likely to work in informal sector than in formal sector jobs. Female labor force participation is strongly influenced by women's educational attainment and, to a lesser extent, by the number of children they have. Since lower-income women tend to have less education and more children, they participate less in the labor market than their higher-income counterparts. For those women with less education who enter the labor market, the available earnings opportunities—primarily in the informal sector—also exacerbate income inequality. Women's labor force participation also affects future income inequality through its impact on children's educational attainment; as we will see below, the children of women who have entered the labor market are more likely to be enrolled in school and to complete more years of schooling.

<sup>9</sup> See Duryea and Székely (1998).

<sup>10</sup> The simulations that follow use econometric estimates performed in two stages. First, an earnings regression that uses education, experience and the geographic location of the household is estimated separately for men and women. The coefficients are used to predict the income that each individual would earn, given his or her labor market experience, education and location. In other words, this is an estimate of income generating capacity. The second stage consists of estimating a multinomial logit regression to predict the probability that each person has for not participating in the labor market, participating in the formal sector, or participating in the informal sector. This regression uses the estimated income generating capacity of the individual in question as an independent variable. The simulations consist of using the coefficients from the regressions to evaluate the probabilities by using different mean values for each variable, depending on the experiment in question. The Appendix shows the coefficients of the multinomial regression and provides a more detailed discussion.

<sup>11</sup> This simulation uses the coefficients from the multinomial logit regressions of the previous sections. The experiment consists of using the coefficient estimates for the 1980s, but evaluating the probabilities at the variable means observed for the 1990s. This estimates the proportion of the change due to changes in the quantities of each of the variables in question.

<sup>12</sup> Calculated by comparing the Gini index for the average household income of each earner with the Gini for household income per adult. See Barros, Duryea and Székely (1998) for details.

### Box 3.1. Female Labor Market Participation and Day Care Services in Brazil

Studies of female participation in the labor market agree that child care and labor force participation compete for a mothers' time. Lowering the cost of child care, either by increasing supply or subsidizing child care prices, is shown to increase the usage of "market care" (as opposed to care by the mother or a near relative) and, by lowering the reservation wage of women, also leads to greater female labor force participation. Individual characteristics of the mother, household composition, and supply-side characteristics of the child care market in which the household takes part all influence the type of child care used and labor force participation. In general, studies have found that married women's labor supply is more sensitive to child care costs than that of single women, given married women's access to their husband's income.

Research on the effects of child care on labor force participation and earnings for poor women in the favelas of Rio de Janeiro confirms these general findings. Study results indicate that expanding the supply of low-cost child care in the favelas would increase mothers' labor force participation and their use of publicly financed day care centers. When they work, women who avail themselves of external child care services are also likely to earn more.

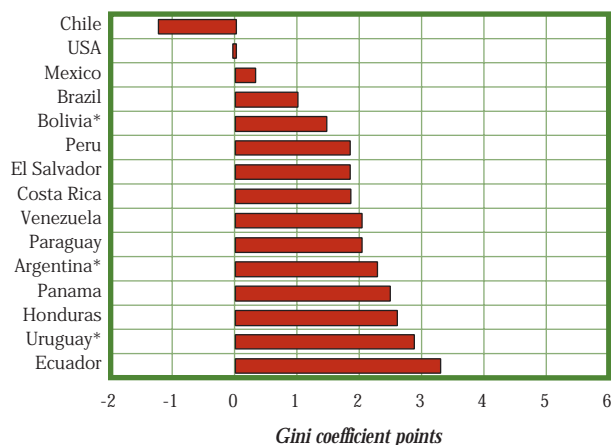
Studies also indicate that women who pay more for child care in the private sector are compensated by greater returns in the labor market. The elasticity of earnings (corrected for selection into the labor force or child care market) with respect to the

use of higher-cost market care ranges from 12 to 29 percent. Private care produces higher returns largely because it offers greater flexibility in operating hours. Limited hours of service in public centers reduces their utility and their net impact on the earnings of women who work longer hours or have long commutes to their places of employment. Greater access to high-quality child care services not only offers developmental benefits for the children receiving care, as has been documented by previous studies, but also expanded economic opportunities for their mothers.

Gelbach (1998) has found that free public schooling impacts positively on labor supply and negatively on the receipt of public assistance by single mothers. Specifically, he finds that for single mothers whose youngest child is five, access to free public schooling raises labor supply by 8 to 18 percent, boosts wage and salary income by 27 percent, and reduces receipt of public assistance by 18 percent.

Child care programs also have important indirect effects such as increased education for older siblings, since alternative child care options free them from these tasks and allow them to continue their schooling. Studies in Brazil, Mexico and Guatemala all indicate that older siblings, particularly females, tend to serve as "mother substitutes," allowing for higher female labor force participation rates, all other things being equal. Similarly, the presence of older siblings within the household reduces the likelihood of using market-based child care services outside the home.

Figure 3.11. Gini Coefficient Differences Due to Participation Rates



\* Countries with urban data only.

Source: Barros, Duryea and Székely (1998).

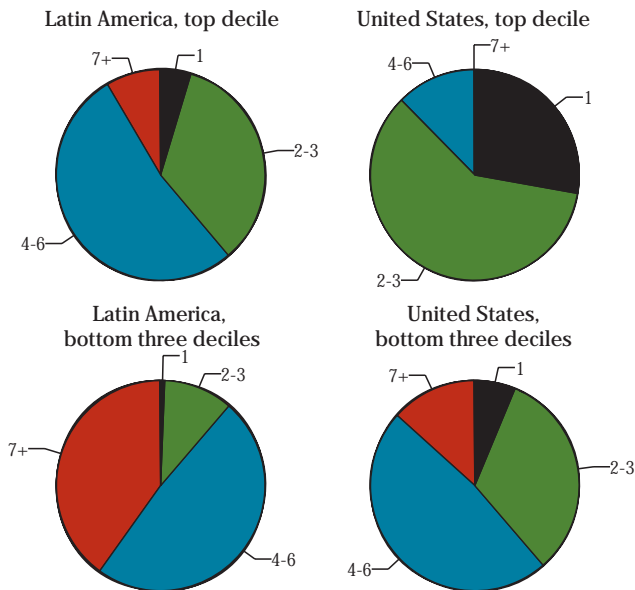
## HOUSEHOLD SIZE AND INEQUALITY

### The Poor Live in Large Households...

Low-income Latin Americans live in larger households than do upper-income people in the region. On average, Latin American families in the top 10 percent of the income distribution have four members, while those in the bottom 30 percent have 6.3 members. The number of Latin Americans who live alone is much higher among the top decile of the population than the bottom three deciles (Figure 3.12), particularly in the urban areas of Argentina and Uruguay, where the proportion is over 10 percent. Even there, however, the share of higher-income people living alone is less than half the rate of the United States, where 28 percent of the highest income group live by themselves. The people in the bottom three deciles, by contrast, rarely live alone in Latin America—fewer than 2 percent in all the countries for which household survey data was available. This contrasts with the United States, where almost 6 percent of the bottom three deciles live alone.

In Latin America, a similar pattern is apparent for three-person households which, throughout the region, encompass between a fifth and a quarter of the rich but

Figure 3.12. Share of Population by Household Size and Income  
(Number of people living in household)



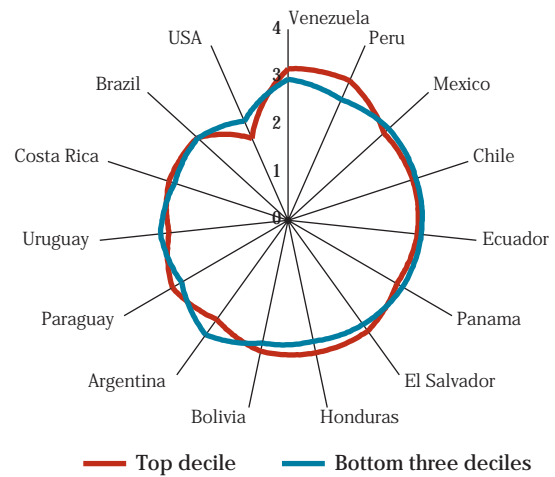
Source: IDB calculations based on recent household surveys.

barely one-tenth of the poor. By contrast, in the United States, all income groups have a similar probability of living in three-person households. Nevertheless, the situation is sharply reversed for households with seven or more members. Barely one-tenth of the top decile live in such large families, while a little more than 40 percent of individuals in the bottom three deciles do, ranging from 22 percent in Chile to about 55 percent in Paraguay.

### ...Because They Have More Children

The larger households in the bottom three deciles are largely the consequence of more children, not more adults. In Latin America, the average household has slightly more than three individuals over 17 years old, and this is consistent across countries and varies little between the top and bottom of the income distribution (Figure 3.13a). By contrast, the number of children per household varies significantly across countries and income levels (Figure 3.13b). Even in countries that have low fertility rates, such as Argentina and Uruguay, there is a difference of about two children between the top 10 percent and the bottom 30 percent of the population. In higher fertility countries and regions such as Central America, the Andean region and Paraguay, the rich have between 1.5 and two children while the poor have between three and four children.

Figure 3.13a. Adults per Household  
(Individuals 18 Years Old and Older)



Source: IDB calculations based on recent household surveys.

Figure 3.13b. Children per Household  
(Individuals 17 Years Old and Younger)



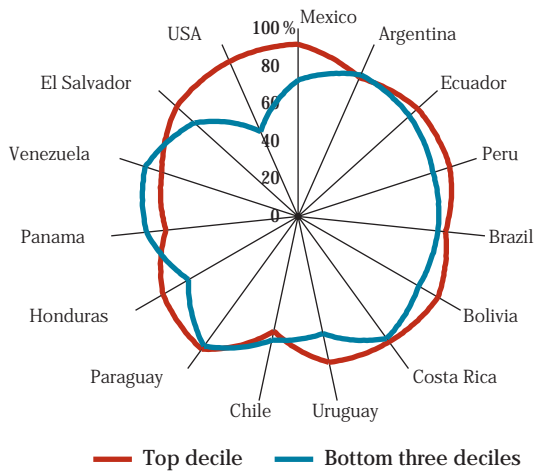
Source: IDB calculations based on recent household surveys.

### "Traditional" Families Still Predominate

Despite the differences in household size across income levels, household structures are strongly similar in all income groups. The traditional family remains the dominant form in Latin America. Most Latin American children live in nuclear or extended families; that is, in households with a parent, a spouse and their children (a nuclear family) or one which also includes other relatives (an extended family).<sup>13</sup> Between 70 and 90 percent of

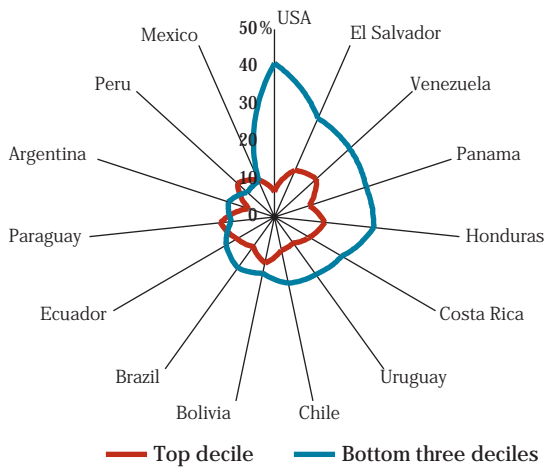
<sup>13</sup> Note that we cannot determine if the spouse is the parent of all children present.

Figure 3.14a. Share of Children Living in Nuclear Households



Source: IDB calculations based on recent household surveys.

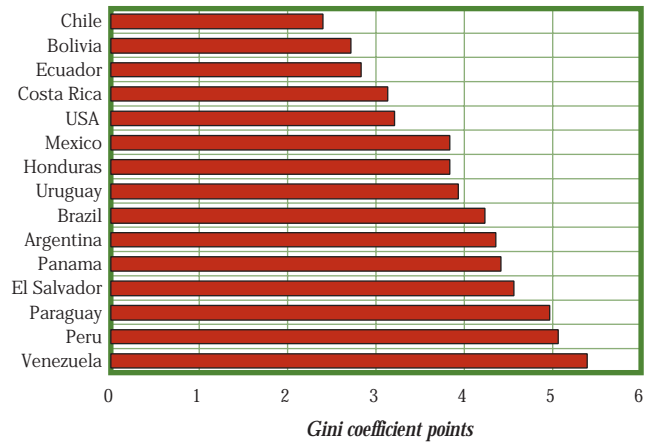
Figure 3.14b. Share of Children Living in Single Parent Households



Source: IDB calculations based on recent household surveys.

children in Latin America live in nuclear or extended families, ranging from as low as 66.3 percent in El Salvador to 83.4 percent in Mexico and 81.8 percent in Paraguay (Figure 3.14a). The number of children living in single-headed households (i.e., households with one adult and no spouse) is rather small. In the typical country, fewer than 20 percent of the children in the bottom three deciles live in single-headed households (Figure 3.14b). El Salvador, Venezuela, Panama and Honduras have the highest shares—close to 30 percent—while Mexico, Peru and Argentina are among the lowest, ranging close to 10 percent. This pattern varies considerably from the United States, where over 40 percent of the children in the bot-

Figure 3.15. Gini Coefficient Differences Due to the Number of Children per Family



Source: Barros, Duryea and Székely (1998).

tom three deciles live in single-parent households and where debates over poverty are concerned with changes in family structure. This kind of debate is less relevant to most Latin American countries, where the share of poor children living in single-parent households is considerably smaller.

There are several reasons why lower-income households may be larger. There are clearly different attitudes, norms and cultural standards regarding the appropriate age to marry, when and if to have children, divorce and separation, and when and how to combine families in a single household. In addition to cultural reasons and affective ties, economic factors also play a role. Poor families may live in larger households in order to pool economic resources, although the small income-related variation in the number of adults per household indicates that this is not a major factor. However, the number of children living in households headed by someone other than their parent is surprisingly large in some cases. In Venezuela, for example, almost 50 percent of children who are less than 2 years old live in such households, indicating that the choices people make about the structure of their households may be significant. Families may also live in larger households in order to improve income stability, avoid vulnerability and reduce the cost of transferring resources to other members of the family (Boxes 3.2 and 3.3).

Regardless of the reasons, the fact that lower-income individuals live in larger households with more children conspires to worsen per capita income distribution, as income must be shared between more household members. If poorer families had the same number of children as richer families, per capita income inequality, as measured by the Gini index, would be significantly

### Box 3.2. Who Decides in This Family?

Much of the discussion in this chapter focuses on decisions made by families and households regarding the use of time and responsibilities for different tasks, as well as on such intimate family decisions as whether to limit their number of children. The chapter explores the factors associated with labor force participation, fertility and children's educational attainment, and it shows that there are reasonable explanations why families would modify their behavior in response to different economic contexts affecting their own resources and assets. But the chapter does not address how the decisions are made, nor who within the family is making these decisions. Economists have applied their analytical tools to understanding such family decisions in a language that is sometimes jarring, but within which some important insights can be found.

The economic literature models families and households in at least four different ways in order to address a variety of questions. All are simplifications, and each one has its particular insights. The four models can be characterized as monolithic, authoritarian, enlightened authoritarian and bargaining. Studies that characterize families as monolithic do not distinguish between the family members. These studies analyze such factors as how much labor families supply to the labor market and how they assign their incomes in order to maximize the utility of the whole group. For these studies, the differentiation within the family may be less important than the aggregate relationships. Studies that characterize families as authoritarian presume that the head of household makes the decisions, and optimizes her, or more frequently, his utility. The welfare of other family members does affect the head of household's own welfare and so the other family members will eat and be sheltered; however, the resulting welfare of each individual will not necessarily be maximized. An enlightened authoritarian family is similar to the authoritarian family in that a single individual, the head of household, is assumed to make all the decisions. However, in this model, the welfare functions of each member are specified, and the head of household seeks to maximize the

family's joint welfare. Finally, bargaining models treat the family as a grouping of individuals who bring different resources to the family and have differing demands. These models posit a variety of mechanisms through which all the family members come to joint decisions. In some cases the models treat the decision process as "trading," in which members offer certain resources or effort in return for benefits. In other cases, the decision process is modeled with game theory, in which each member pursues different strategies and the combined effects of these strategies have different "payoffs." These kinds of models tend to focus on the internal distribution of resources in the family, and can be quite helpful for studies that are trying to understand household formation.

Bargaining models have been used to understand such questions as why girls receive less education in certain countries, why families support the elderly, and why educational attainment is so highly correlated within couples. Behrman (1998) and Pitt and Rozensweig (1986) use such models to show that the allocation of resources within households appears to depend strongly on the expected future income of each member and its likely contribution to the household. Consequently, very low-income households tend to distribute more resources to their members who have higher earning capacities. Children who are likely to be more economically productive adults also receive greater shares of family resources, which further enhances their income-generating potential. When these children start using these capacities, they tend to transfer resources to the other members of the household. Thus, it appears that the outcomes of household decisions depend not only on cultural norms and affection but also significantly on the economic context within which the unit as a whole behaves as "consumer" and "investor," with strong consequences for family size, household structure, labor supply and income.

*Sources:* Sen (1984); Bourguignon and Chiappori (1992); Haddad and Kanbur (1992); Kapteyn and Kooreman (1992); and Katz (1997).

lower (Figure 3.15).<sup>14</sup> This effect would vary from just over two points in Chile (a 4 percent decline) to over 5 points in Venezuela and Panama, where the Gini indices are 0.47 and 0.56, respectively. Although family size contributes to inequality in all countries, and significantly in some, this factor cannot explain the difference between Latin America and other regions. For example, the potential impact of equalizing family size across income groups in the United States would have an effect comparable to what it would have on many Latin American countries.

In sum, the data indicates that poor families are larger, essentially because they have more children, but not necessarily because they have more adults. Family structure does not vary strongly by income, except with regard to size. The rich live more by themselves and in couples without children. But nuclear and extended fami-

lies are the most common structure for Latin American society for all income groups. The range in family size has a significant impact on the overall distribution of per capita income in society. But what determines family size?

### Fertility and Family Size

Decisions by couples regarding having children are perhaps among the most intimate and important choices that they make. Many people do not even consider this to be a "choice" in the sense that they accept however

<sup>14</sup> The impact of the number of children on the Gini coefficient is computed by comparing the Gini index of total household per capita income with that of total household income per adult. See Barros, Duryea and Székely (1998) for details.

**Box 3.3. Where Do Elderly Latin Americans Live?**

One plausible explanation of why Latin Americans tend to live in extended households is that the household may act as a substitute for social security by grouping people from different generations and facilitating transfers from younger members to their elderly relatives. When adequate social security is not available or is deteriorating, the household can serve as a safety net for the elderly. Figure 1 shows the distribution of the population 65 years of age and older by household type for 15 Latin American countries and the United States. While in the United States most of these individuals live in single person households and as couples without children, a very large proportion of the Latin American elderly live in extended households, with very few living on their own.

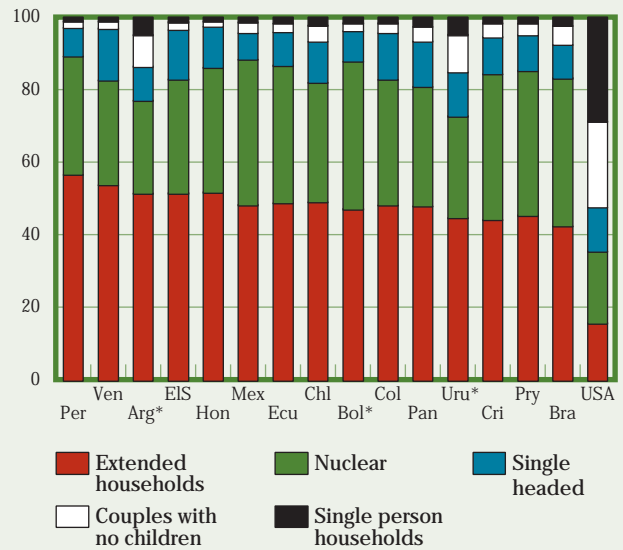
Evidence from Mexico shows that when the oldest person in a household is over 50, households tend to increase their size and change composition toward extended units. In these units, significant transfers across generations take place, and the amount of the transfers increases as the oldest person in the unit grows older. The older the household head, the larger the number of individuals attracted to the unit. This suggests that the family is acting as a mechanism to provide security for the elderly. Strong family ties make it less necessary to rely on social security.

This pattern is also observed in other Latin American countries. According to Figure 1, Honduras, El Salvador, Mexico and Ecuador are the countries where the elderly seem to rely more on other family members, since a majority of them live in extended households and only around 42 percent live alone or in couples without children. Of those that live in extended households, about 40 percent are neither the household head nor the head's spouse.

Interestingly, Uruguay is where the largest proportion of elderly live on their own, perhaps owing to the fact that its social security system is the most advanced in the region. In Uruguay, 68 percent of the elderly live in single person units or as couples with no children, compared to the Latin American average of 48 percent (the proportion in the United States is 85 percent). Around 20 percent of the total reported income of individuals is from pensions and social security payments (the largest in the countries with available data). Looking at the types of income that people receive at different stages of their life, pensions are a key factor in the decisions made by the Uruguayan elderly. Figure 2 shows that after retirement age (60 years for women and 65 for men), the elderly on average obtain an income similar to the amount received by workers 25-30 years of age. This suggests that the average income of retirees does not decline after retirement because the value of pensions is high and more than compensates for the loss of labor income. This may make it less necessary to rely on the family for support and may be behind the large proportion of elderly living as couples without children or in single person households in this country.

Source: Székely (1998).

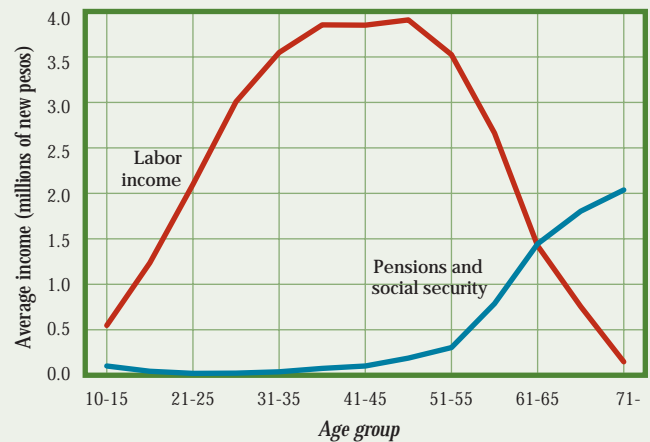
**Figure 1. Where Do Latin Americans Live? (In percent)**



\* Countries with urban data only.

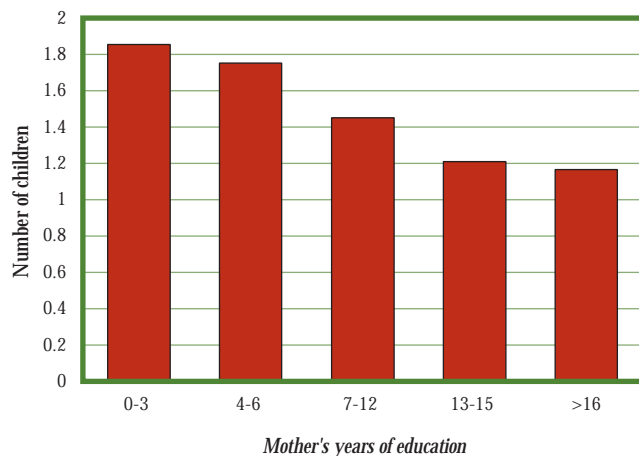
Source: IDB calculations based on recent household surveys.

**Figure 2. Average Labor and Pension Incomes by Age in Uruguay, 1995**



Source: IDB calculations based on recent household surveys.

Figure 3.16. Number of Children per Woman, by Education



Note: Average for 14 Latin American countries.

Source: IDB calculations based on recent household surveys.

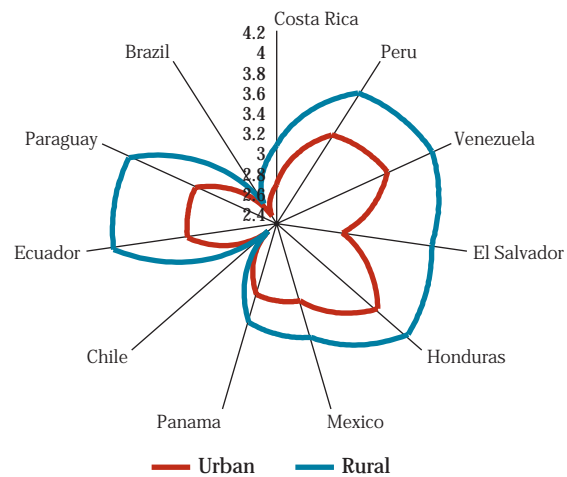
many children they conceive. But many people also choose to influence when they will have their first child, the timing of births, and their total number of children. It is clear from available evidence that enough people make such decisions in response to changing social norms and economic factors that fertility rates are, in the aggregate, strongly influenced by a number of known factors, such as women's education, women's income-earning opportunities, and rural or urban location.

As discussed earlier, the number of children families have varies dramatically by income.<sup>15</sup> Rich households in Latin America have an average of two children less than poorer ones. The differences are widest in Paraguay and El Salvador, where the top 10 percent of households have fewer than two children on average, and the bottom three deciles have more than four. The difference appears to be smallest, although still significant, in Chile, where the top 10 percent of households have slightly more than 1.5 children on average, while the bottom three deciles have an average of around two children per household. This is puzzling in the sense that wealthier families have the resources to have and support more children, not less. Some of the clues to understanding the relationship between income and the number of children can be found by looking at relationships with other factors.

### Educated People Have Fewer Children

As noted earlier, women who are more educated tend to have fewer children.<sup>16</sup> Not surprisingly, parent's schooling and fertility vary negatively, since education

Figure 3.17. Number of Children in Urban and Rural Areas per Woman (30-40 Years Old) with 4-6 Years of Education



Source: IDB calculations based on recent household surveys.

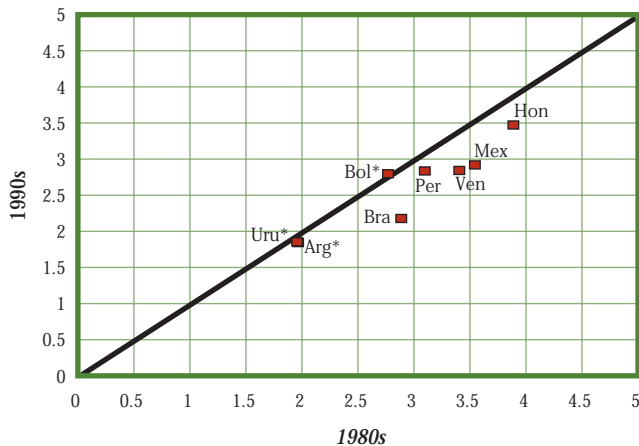
is one of the main determinants of earnings. Figure 3.16 shows the relationship between the number of children and women's educational levels for 14 Latin American countries. The pattern is consistent throughout the region. Women with six years of schooling or less have 0.7 more children on average than those who finished more than 13 years of schooling.

Women's education can influence the number of children they have in at least two ways. First, education may change personal preferences and affect life choices by exposing women to more alternatives. Second, education increases a woman's earning power. This makes entering the workforce more attractive, and means that staying out of the labor force to have and care for children implies foregoing a higher income. Other things constant, men who are more educated or earn higher incomes are also likely to have somewhat fewer children on average, but this effect is smaller than for women.

<sup>15</sup> For the purposes of this study, the number of children per family or woman was estimated using the subsample of children living with mothers aged 30 to 35 years old. This subgroup was chosen because including younger women would bias the estimates downward (younger women have more childbearing years ahead of them and a higher probability that the observation does not accurately measure the total number of children that they will have). On the other hand, including older women would also bias the estimates downward because the household surveys only allow us to count the number of children living with the mother at the time of the survey. For the few household surveys that did not provide detailed information about relationships within the household, fertility rates were estimated by attributing all children in a particular household to women who are household heads or spouses of household heads (see Appendix). The estimates generated in this way are comparable to those measured by CELADE.

<sup>16</sup> Duryea and Lam (forthcoming) is a recent example of the analysis of these relations in a Latin American country.

Figure 3.18. Number of Children per Woman (30-40 Years Old), 1980s vs. 1990s



\* Countries with urban data only.

Source: IDB calculations based on recent household surveys.

Economists say that for men the “income effect” (having more resources and therefore being able to care for more children) is larger relative to the “substitution effect” (entering the workforce and spending less time raising children) for men than for women.<sup>17</sup>

### Rural Families Have More Children

Where people live also influences the number of children they have. Families in urban areas have consistently fewer children than their counterparts in rural areas. This is true in all the Latin American countries for which data was available, and is true throughout the world. Much of the difference can be explained by disparities in educational levels, which are lower in most rural areas. But if we consider women of a particular age and educational level, we still see that urban women have fewer children (Figure 3.17). This difference is greatest in Colombia, where rural women between 30 and 40 years of age who finished four to six years of schooling have three children, on average, compared with their urban counterparts who have slightly more than two children. After controlling for education in this way, however, the remaining unexplained differences are almost negligible in Chile and Brazil.

Rural areas differ from urban areas in a number of ways that explain part of the remaining gaps. First, children in rural areas typically can contribute earlier and more productively to their family than children in urban areas. This means that, in addition to cultural or social reasons, a rural family can consider children to be additional contributors to family income at an earlier age.

Second, rural areas have typically lacked social security arrangements that would secure pensions for the elderly. In this kind of situation, families may view having more children as a way of assuring support in old age. Third, as will be discussed below, the foregone earnings of women in rural areas are smaller than in urban areas, and this reduces any incentive to limit family size. Fourth, it has been suggested that high rates of mortality among children encourages families to have more children as a way of assuring that at least some of them reach maturity. Fortunately, as child mortality rates have declined in most of the region, this kind of explanation, if true, is likely to become less important with time.

### Fertility Has Declined More Than Predicted

Fertility has declined steadily in Latin America for decades. Since the early 1980s, the decline has been particularly steep, especially in Brazil, Mexico and Venezuela (Figure 3.18). This decline has been accompanied by an increase in the average schooling of women in most countries. But education alone does not explain the pace of decline. Similarly, demographic models that predicted fertility rates on the basis of income have consistently underestimated the decline in births over the past decades, since fertility rates continued to fall even during the crisis years of the 1980s. With respect to income level, the pattern is less consistent across the region. The decline in fertility has been greater at the bottom than at the top of the income scale in Mexico, and in the urban areas of Argentina and Uruguay, while the opposite has been true for Brazil, Venezuela and Honduras (Figure 3.19).<sup>18</sup>

### The Role of Women's Education

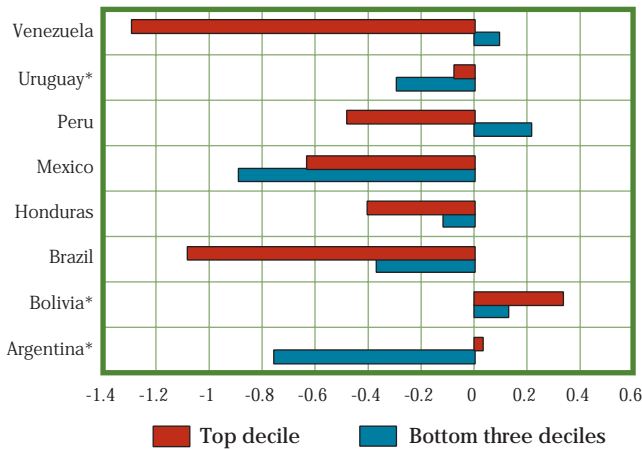
How much of the differences in fertility between high- and low-income women can be explained by the different rates of return they face in the labor market (i.e., the income-earning value of each school year attained) or by the resources they bring to the labor market in terms of their schooling level?

Using a model in which fertility and wages are simultaneously determined (see Appendix), it is possible

<sup>17</sup> See Becker (1964); Galor and Weill (1996); Becker, Murphy and Tamura 1990; and Dahan and Tsiddon (1998).

<sup>18</sup> The figures for the urban Bolivian sample indicate a rise in fertility rates. This is likely to be a consequence of rural-urban migration. The absence of information on migration and on rural areas makes it difficult to determine whether this increasing fertility rate is real or simply an artifact of the sample.

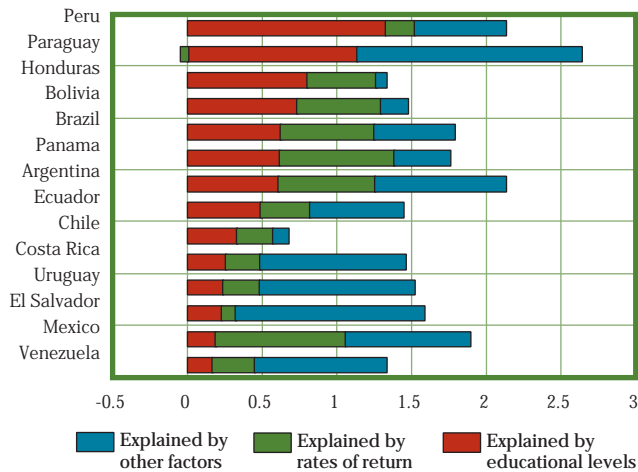
Figure 3.19. Change in the Number of Children per Household by Income, 1980s to mid-1990s



\* Countries with urban data only.

Source: IDB calculations based on recent household surveys.

Figure 3.20. The Fertility Gap Due to Education and Returns



\* Countries with urban data only.

Note: The fertility gap is calculated as the difference in the number of children per household in the top decile to the bottom three deciles.

Source: IDB simulations based on recent household surveys.

to estimate how much of the fertility difference between high- and low-income women can be attributed to either the schooling level or the rate of return.<sup>19</sup> By setting the rate of return to a year of schooling in each country to be equal, we can see how much of a difference this would make to the expected disparity in the number of children. By choosing a relatively low rate of return—6 percent—we also assure that the explanatory power is an underestimate of the true effect of prices on the number of children per family. The analysis shows, in fact, that if all households faced the same prices (returns to education)—that is, if each year of education generated the same re-

turn in all countries and the only remaining differences were educational levels—this would do relatively little to explain why high- and low-income families have different numbers of children (Figure 3.20). The returns to education can explain very little of the variation in El Salvador, urban Uruguay and Costa Rica. However, in Honduras, Peru, urban Bolivia, Chile and Paraguay the returns appear to account for around half of the predicted difference in the number of children in high- and low-income families. As noted above, these are underestimates of the true effect. If a higher rate were used, the explanatory power could be correspondingly larger. In such a case, the foregone earnings for women with more education would rise more than proportionally compared to women with less education, and the gap in the number of children per family would widen. Consequently, policies or economic trends that raise the returns to education may also exacerbate inequality through the effect on fertility decisions, but these effects will be relatively small.

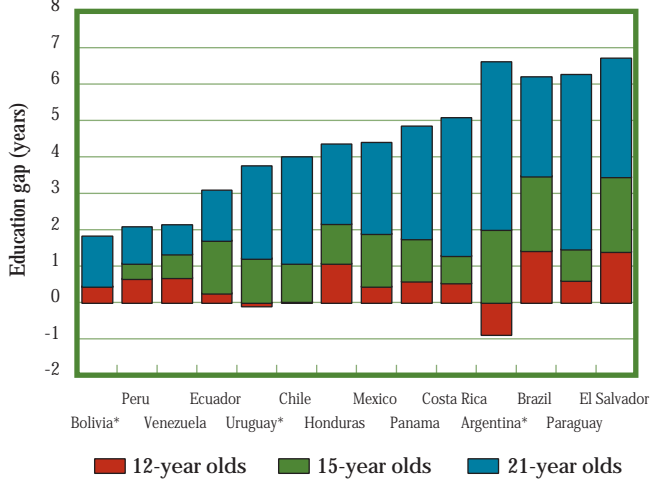
Educational levels have an even larger effect on household fertility decisions throughout the region. After equalizing returns to education, if we also level education so that each woman has completed the same number of years of school, we can account for some 60 percent of the gap between high- and low-income women in terms of the number of children they have. (Figure 3.20). In Honduras, urban Bolivia, Chile, Panama, Peru and Brazil, the introduction of educational levels makes it possible to explain more than 80 percent of the differences between the rich and the poor. This shows that in most countries, the amount of education completed by high- and low-income parents is extremely important. However, variations in the relative prices they face in the labor market, which are shaped by the economic environment, also play some role in their decisions to have children.

## EDUCATIONAL ATTAINMENT OF CHILDREN

While labor force participation and the number of children per household contribute to current income inequality, they also have implications for the education of today's

<sup>19</sup> This exercise is similar to the simulations performed on the participation decision. It is based on two stage regressions. In the first stage, earnings equations are estimated based on experience, education and geographic location. The coefficients from the regression are used to predict each individual's income based on his or her personal characteristics. The predicted incomes are used in a second stage regression where the dependent variable is the number of children in the household, and the independent variables are the estimated income-earnings potential. See the Appendix for the regression results and a discussion of the methodology.

Figure 3.21. Education Gap by Age

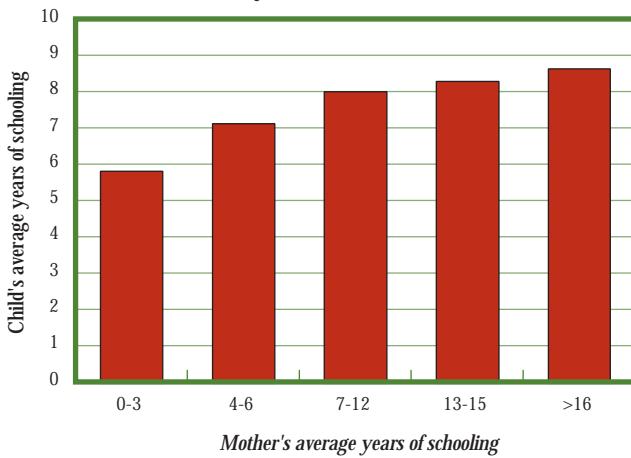


\* Countries with urban data only.

Note: The education gap is calculated as the difference between the average years of schooling completed by children in the top decile and those in the bottom three deciles.

Source: IDB calculations based on recent household surveys.

Figure 3.22. Children's Education by Mother's Education (15-year olds)



Note: Average of 14 countries.

Source: IDB calculations based on recent household surveys.

children, who will be making decisions about work and family in the future. Hence, the seeds of tomorrow's income inequality are being sown today, just as the seeds of yesterday affected income distribution today.

Despite public policies that talk of guaranteeing every child a full and free education, the schooling levels attained by children in Latin America are very different depending on the income of their parents. As discussed in Chapter 2, Latin America has relatively good primary school coverage for all income levels, when compared to other regions. However, there is some evidence that the

quality of this schooling may vary significantly by income. And the data clearly show that as children age, the gap in enrollment widens between children of high- and low-income families.

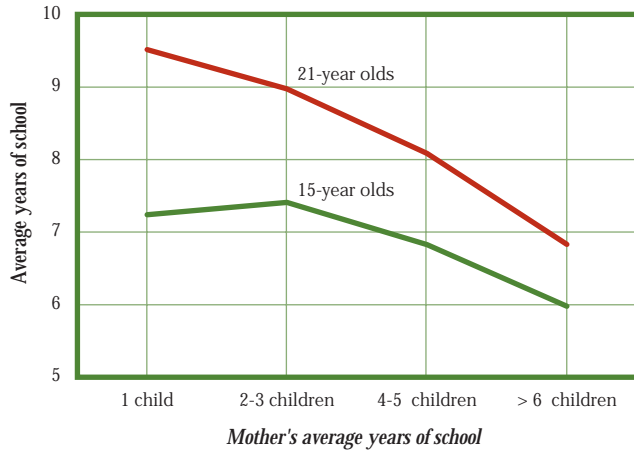
Regional averages for the 14 Latin American sample countries tell the story (Figure 3.21). For the 12-year old age group, the gap is not very evident: in many countries, the differences in attainment from one income group to another are less than half a year. Enrollment rates at this age remain relatively high in most of the region, with almost 90 percent of the bottom 30 percent of the income distribution attending school. However, the average difference of one-half a school year reflects higher rates of repetition among lower-income children. In countries such as Brazil, El Salvador and Honduras, the inefficiency of the schooling process is so bad that children from high-income households have finished a whole additional year of school compared to their lower-income 12-year old counterparts.

The picture worsens by age 15, when most children can be expected to be enrolled in high school. A 15-year old child should have completed between eight and nine years of schooling, a level attained by most children in the top decile. In most countries, lower-income children lag by about a year, but in Honduras, Mexico, Panama and Paraguay the gap is about two years, and in El Salvador and Brazil, almost four years. The larger gaps at this age are related as much to dropout rates as to repetition. By this age, many of the poorer children have already left school and effectively ended their education. Enrollment of 15-year olds in the poorest 30 percent of the population is barely 32 percent in Honduras, 42 percent in Paraguay and 50 percent in El Salvador and Ecuador. Brazil stands out for the impact of repetition, since this age group has attained barely 3.5 years of schooling, yet 68 percent are still enrolled.

By the time young people have reached 21, and most have effectively concluded their formal schooling, there is a wide gap in attainment between the top decile and the bottom 30 percent. In Peru and Venezuela, the difference is only about two years, but in Mexico, Panama, Chile and Costa Rica the gap ranges between four and five years, while in Brazil, Paraguay and El Salvador, the gap has widened to more than six years. At this age, fewer than 20 percent of the bottom three deciles are enrolled in school in all of the region's countries with the exception of Peru, Chile and Venezuela. By contrast, enrollment rates of the top 10 percent exceed 50 percent in Uruguay, Costa Rica, Argentina, El Salvador, Panama and Chile.

Although educational attainment of children varies strongly depending on household income, it is actually the education of parents that most strongly predicts

Figure 3.23. Children's Education by Age and Number of Children of the Mother



Note: Average of 14 countries.

Source: IDB calculations based on recent household surveys.

a child's final level of schooling.<sup>20</sup> Typically, there is a two to three year difference between the educational attainment of 15-year old children whose mothers have less than four years of education and those who have some secondary schooling (Figure 3.22). As in the case of women's labor force participation, education of parents has a variety of potential effects on children. First, education is very strongly related to an adult's long-term earning capacity. Therefore, education may indicate a parent's income—and consequently the resources available at the time the child was in school—better than the current level of income reported in the survey. Second, parents who are more educated may play a pedagogical role, reading to their children, discussing things, and paying more attention to performance on examinations and homework. Third, parents serve as a role model for their children. If children can see that their parents attended and valued schooling, and especially if educational attainment provided payoffs for the parents in the labor market, then these same children may see the advantages and look to follow that example.

By analyzing the performance of children whose mothers are in the labor force, we can infer that the role model or resources explanations are the more likely of these three explanations. Were this a pedagogical story, mothers who do not participate in the labor market would be expected to have more time to improve their children's schooling. However, children of working mothers actually attain higher educational levels than those of mothers who do not work. After controlling for numerous factors—including the number of children in the household, gender of the child, parents' education, household income, urban-rural location, age of the child, and the presence of elderly

members in the household—participation in the labor market by a child's mother increases that child's likelihood of being enrolled in school. In 13 of the 15 Latin American countries for which data was available, this positive effect of a mother's participation in the labor market on a child's educational enrollment is positive and statistically significant (the exceptions are Argentina and Peru; see Table 3.A1 in the Appendix). On average, if a mother participates in the labor market, the probability of her child being enrolled in school increases by around 5 percent.

The total number of children in the household is another factor that influences educational attainment. Fifteen-year-old children in households with six or more children have an average of two years less education than children in households with one or even three children (Figure 3.23 and Table 3A.1 in the Appendix). This is a reasonable relationship for a variety of reasons. One possibility is that older children may be drawn out of school to care for younger children.<sup>21</sup> Although this may happen among certain population subgroups, it cannot explain the difference in society as a whole because, as noted earlier, families in which both the mother and the father are working (that is, families with more resources and less time at home) have children who complete more schooling. Another explanation is that having more children makes it more difficult to finance the education of each one. The data strongly supports this explanation; in families with equivalent levels of income, structure and parental education, children in smaller families complete more years of school.<sup>22</sup> Numerous studies have demonstrated that couples try to limit the number of children they will have and simultaneously dedicate more resources to each child they do have. Parents with more education, income earning opportunities and incomes opt for fewer children and dedicate more resources to invest in the education of those offspring. This demonstrates the set of relationships between a mother's education, her income-earning opportunities, the number of children she may have, and her children's educational attainment (Figure 3.24).

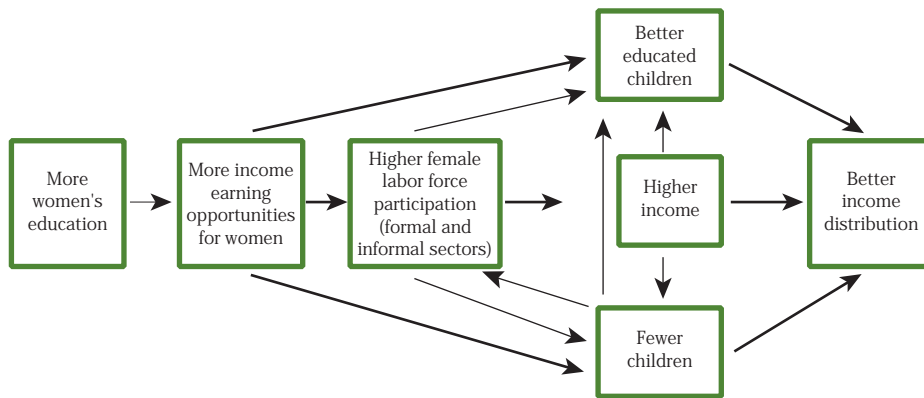
These relationships are quite evident when urban and rural households are compared in terms of participation, fertility and educational attainment. Women living in

<sup>20</sup> See Behrman (1997) and Behrman and Knowles (1997). There is generally a stronger association between a mother's education and school attainment of children than for a father's education.

<sup>21</sup> See Chapter 5 for a lengthier discussion of the impact of children undertaking household activities on their educational attainment.

<sup>22</sup> This finding is consistent with a large economic literature that discusses a "quality and quantity" tradeoff in parental decisions about how many children to have and how much to invest in each one. See Becker (1991) and Cigno (1991).

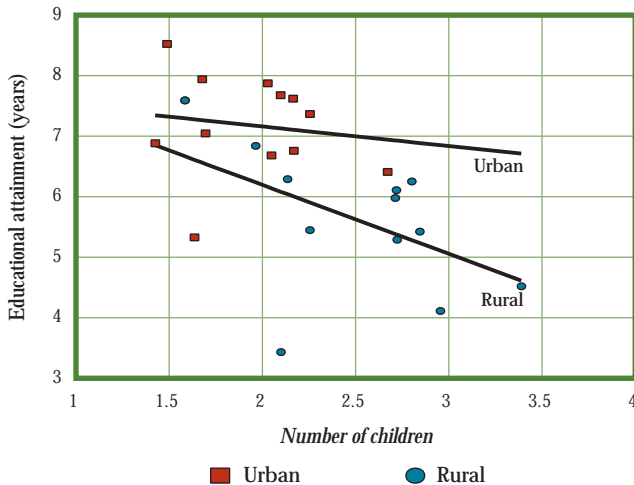
Figure 3.24. Beneficial Effects of Educating Women



rural areas tend to complete fewer years of schooling, and the returns to that schooling are lower than in urban areas. Hence, women in rural areas are less likely to participate in the remunerated labor force, and when they do, they are more likely to work in lower paying informal sector activities. As discussed previously, there are numerous reasons why women in rural areas have more children, but poorer income earning opportunities for women play a part. Rural households have on average 0.6 more children than urban ones, and 15-year-old children in rural households have an average of 1.6 fewer years of education than their urban counterparts (Figure 3.25). This suggests a stronger tradeoff than in urban areas between the number of children in each family and the amount of time and resources dedicated to each one's schooling.

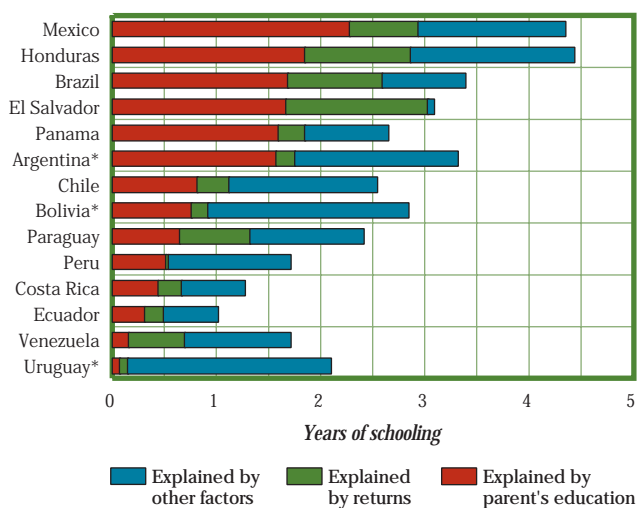
How much of the difference in educational attainment of high- and low-income children is due only to the fact that their parents have different educational levels? Using our model, we estimated that, on average, the variations in the parents' level of education explain about 30 percent of the predicted difference in their children's educational attainment (Figure 3.26). In El Salvador, Honduras, Panama and Mexico, the proportion of the expected difference reaches 50 percent. After accounting for the differences attributable to parental education, economy-wide factors also contribute to the gap in children's educational attainment. One important factor is how much the labor market values an additional year of schooling, i.e., the return to education. Equalizing returns to education between primary and higher education across coun-

Figure 3.25. Number of Children and Schooling in Rural and Urban Areas



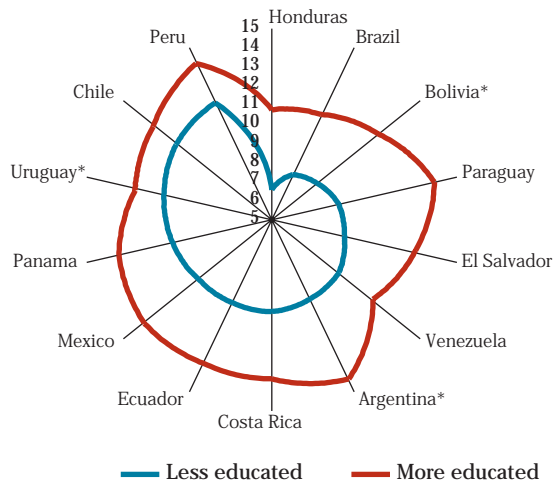
Note: Lines represent relationship between number of children and children's educational attainment after controlling for other factors. See econometric estimations in Appendix.  
Source: IDB calculations based on recent household surveys.

Figure 3.26. Educational Attainment Gap Due to Parent's Education and Returns



\* Countries with urban data only.  
Source: IDB simulations based on recent household surveys. See details of the estimation in the Appendix.

Figure 3.27. Estimated Education Equilibrium for the Two Education Groups



\* Countries with urban data only.

Source: IDB calculations based on recent household surveys.

tries does indeed account for a significant amount of the educational attainment gap. On average, the combination of disparities in returns to education and parental education explains 55 percent of the expected difference in the educational attainment of high- and low-income children. However, in Mexico, Panama, Honduras, El Salvador and Brazil, these factors explain close to 80 percent of the predicted difference. These estimates represent the direct effect of parental education on children's educational attainment; the indirect effects upon other family characteristics will be addressed below.

### INTERGENERATIONAL TRANSMISSION OF INEQUALITY

The education of children depends to a large extent on that of their parents. Just as the attainment of today's adults was affected by their parents' schooling levels, when today's children become parents, their children's education will also depend on theirs, and so on. Are different segments of society gradually moving towards the same levels of education, or will educational levels diverge into two classes—one highly educated and another relatively uneducated? Educational levels will converge whenever children of less educated parents have a continuing and high probability of finishing more school than their parents, and, conversely, when the children of more educated parents have some reasonably significant probability of finishing less schooling than their parents. Education levels will tend to diverge when the opposite situation holds.<sup>23</sup>

In order to find out if the educational levels of Latin American countries are converging or diverging, we estimated the current relationship between mothers' and children's educational attainment for two different groups of women—those who had completed more than nine years of school and those who had completed less.<sup>24</sup> The estimates took other family characteristics into account. The exercise demonstrates that if the current relationship between mothers' and children's education were to continue, all countries in Latin America would move toward a situation in which the less educated today would complete more than primary schooling in a "final" hypothetical equilibrium of the future (Figure 3.27). However, the less educated group would have educational attainment in excess of 10 years of schooling in only five of these countries—Peru, Chile, urban Uruguay, Panama and Mexico. In Honduras, Brazil, urban Bolivia and Paraguay, the less educated group would have 6.6, 7.6, 8.1, and 8.6 years of schooling, respectively. By contrast, the more educated groups are converging toward an average education of more than 13 years, i.e., effectively completing secondary school and with a significant number enrolling in college. The countries for which the more educated groups end up with the highest educational attainment are urban Argentina, Peru, Paraguay, Mexico, Ecuador and Costa Rica. In general, the hypothetical equilibrium level of education for the less educated group is closely related to the projected gap between the two groups. The relationship between these two outcomes is strongly negative: countries with low expected educational attainment for the lower income groups also tend to have a high projected level of educational inequality.

### WEAVING THE STORIES TOGETHER

Thus far, we have shown that participation in the labor market, fertility and the educational attainment of children vary strongly by income. Furthermore, women's potential earning power, as influenced by their own educa-

<sup>23</sup> This assumes that the parent-child education relationship is smooth and with declining marginal educational "returns" to each additional year of parental education. If the relationship varies, with increasing and declining marginal returns at different levels, or if it is discontinuous, it is possible for a variety of equilibria to exist.

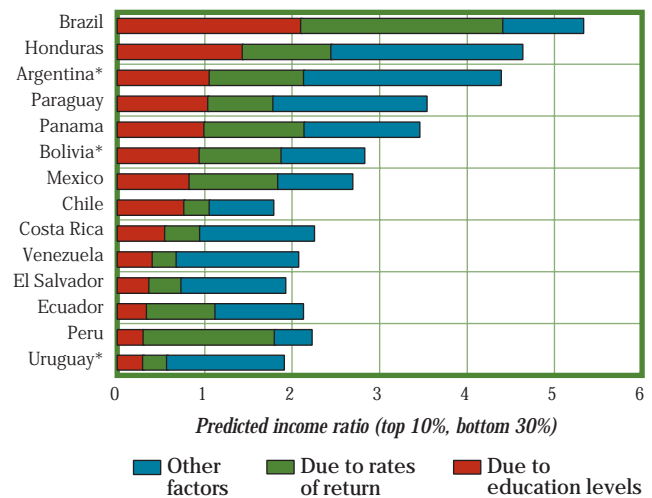
<sup>24</sup> The calculations were done for two separate samples. Using the estimated relationship, it was possible to calculate the final hypothetical equilibria in educational attainment for each of these groups in the future. The exercise is indicative of how educational attainment might move in the future if current relationships between mothers' and children's education remain the same. Also, the estimates of current relationships may understate the true relationships because they are calculated from cross-section, not panel, data.

tional attainment, plays an important role in all these outcomes. Up to this point we have looked only at the direct impact (shown in Figure 3.24 with thick arrows) of education on each of these family characteristics. But we know that these factors are interrelated in ways that introduce indirect effects (thin arrows). For example, as a woman's potential earnings rise, she is both more likely to enter the labor force and have fewer children. But having fewer children also increases her probability of entering the labor force. Hence, there are feedbacks in the complete model that address these indirect effects.

Despite the complexity of the interrelationships, the main relationships are both understandable and can be influenced by appropriate policies. Any policy or social trend that increases women's education will increase their potential earnings in the labor market and lead more women to seek paid work, since the advantages of being in the labor force will have increased relative to engaging primarily in work at home. Similarly, any policies that increase the productivity of household tasks—such as running water, electricity or community services—will also encourage families to allocate more work to the labor market. A more educated woman, with higher potential earnings, also has greater incentives to limit the number of children she has—partly in order to remain in her job longer, but also because it allows her family to focus more resources on fewer children. As a result, more educated women, and those who enter the labor force, have children with greater educational attainment. With greater earnings and fewer children per family among lower-income families, the overall distribution of income would tend to improve. And the higher educational attainment of children would, concomitantly, lead to lower income inequality in the future.

However, women's earning potential depends not only on their educational attainment but also on the returns to that education generated by the economy as a whole. Women's opportunities in the labor market will vary with the degree of occupational segregation, gender discrimination, and the formal versus informal jobs that are available. Rural opportunities, in particular, are significantly more limited than those in urban areas. Choices about fertility, labor market participation and schooling involve additional factors such as those related to the productivity of household work (e.g., availability of water, electricity and urban transport), the availability and total cost of child care, and the quality of education.<sup>25</sup> These elements vary across countries and across localities of the same country, and are difficult to measure directly. However, they enter into the explanation of why some countries are more unequal than others.

Figure 3.28. Income Gap Due to Education and Returns



\* Countries with urban data only.

Source: IDB simulations based on recent household surveys.

See the Appendix for details.

Following our earlier approach, in which we demonstrated how much of the income gap could be attributed to the direct effects of education and income opportunities upon family characteristics, we can now look at estimates of the total impact of these particular relationships.<sup>26</sup> Both personal characteristics and features of the economy influence the resulting levels of income inequality, so we estimate how the income gap between high- and low-income households is affected by the gap in educational levels between lower- and higher-income parents and by the fact that the returns to a year of primary education are much lower than the returns to a year of higher schooling (Figure 3.28).<sup>27</sup> On average, if the only difference between low- and high-income households were the amount of education the parents receive (in this case the return of each year is set equal across countries and educational levels), then 26 percent of the predicted

<sup>25</sup> Policies related to these factors are discussed in greater depth in Chapter 5.

<sup>26</sup> The method for the simulations is similar to the one already employed to estimate participation and the number of children in the household. The difference is that in this case, there are three kinds of decisions (rather than one) that are taken simultaneously. The simulation method is as follows: at a first stage earnings equations are estimated based on experience, education and geographic location. The coefficients from the regressions are used to predict each person's income earnings potential, based on personal characteristics. The estimated income feeds into three simultaneous equations that determine the number of children per household, the probability of participating formally and informally in the labor market, and children's educational attainment. By using the coefficients from the regressions and evaluating each equation at certain mean values, the estimated per capita income of the members of the household can be obtained. See the Appendix for more details.

<sup>27</sup> For the technical presentation of the economic model that was used, see the Appendix.

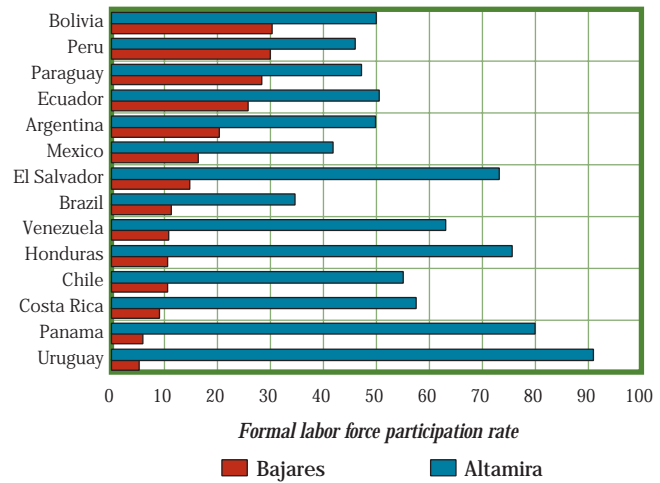
per capita income differentials could be explained. However, the wages paid for different types of education are not the same. When the wage variations are factored in, around 60 percent of the expected differences between the rich and poor can be explained using this model. In the case of Brazil, Peru, Mexico and urban Bolivia, the differences in relative wages and quantities of education for parents actually explain around 80 percent of the expected disparities in per capita income between the rich and the poor. Thus, the combined impact of direct and indirect effects on income inequality is significant in most countries. However, while personal differences matter, the model still only predicts a portion of the actual income gap. The magnitude of the income differential is also strongly determined by the economic environment in which people live.

## TWO COUPLES TRAVELING THROUGH LATIN AMERICA

To understand better how the economic environment affects families' decisions and directly and indirectly affects income inequality in the region, we use our model to simulate the impact of different levels of educational attainment on labor force participation, fertility, children's educational attainment, and income inequality throughout the region. For the exercise, we can imagine two couples who always decide to live in urban areas, and who differ only in their educational attainment. The Altamira couple (Family A) is composed of two 35-year old adults each with about 11 years of schooling—the average educational attainment of Latin American adults from the top income decile. The Bajares couple (Family B) are also both 35 years old, but each has only about four years of schooling—the average for the bottom three income deciles. We will use these two fictional families to answer the following questions. How unequal would their incomes be if they lived in different countries of the region? How different would their choices be about labor market participation? How many children would they decide to have? And how much education would their children receive?

In this experiment, the people remain constant; only the environment changes. If the outcomes vary greatly from one country to another or they experience vastly different inequality, the blame cannot be placed on the educational gap, per se, which is going to remain the same. Rather, the inequality must be coming from the context, either directly through such factors as returns to education, indirectly through its influence upon the couples' decisions regarding labor force participation and how many children they have, or from other country-specific factors.

Figure 3.29a. The Altamira and Bajares Families: Women's Formal Labor Force Participation (In percent)

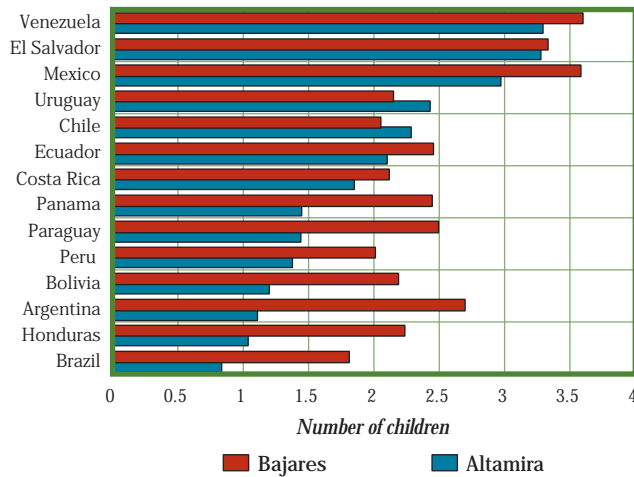


Source: IDB simulations based on recent household surveys. See the Appendix for details.

## Labor Force Participation

As noted earlier, men's labor force participation is generally high regardless of income level, so both Mr. Altamira and Mr. Bajares are more than 80 percent likely to be in the labor force. Interestingly, Ms. Altamira and Ms. Bajares are also equally likely to be in the labor force; the average difference by country is about 3 percent, with the largest projected gaps in urban Bolivia and Peru. Nevertheless, Ms. Altamira is much more likely to be working in the formal sector than Ms. Bajares (Figure 3.29a). In fact, for the region as a whole, Ms. Altamira is about 40 percent more likely to have a formal sector job than Ms. Bajares, with the largest predicted gaps in Panama and Uruguay, and the lowest in urban Bolivia and Peru. This demonstrates a key socioeconomic difference between different countries and their impact on family behavior. For example, with only four years of education in Uruguay, Ms. Bajares is at a substantial disadvantage relative to a population with a much higher average level of educational attainment. Her options are strongly restricted to informal activities, in contrast with Ms. Altamira. Also, the relatively small size of the formal sector in countries like Peru and Ecuador means that even Ms. Altamira has a somewhat low probability of getting one of these better kinds of jobs. The implications of being in different sectors are important because of the wide gap between formal and informal wages—more than 20 percent on average. The widely differing experiences simulated by the model are remarkable, given that the only difference between the two women is their education.

Figure 3.29b. The Altamira and Bajares Families: Number of Children



Source: IDB simulations based on recent household surveys. See the Appendix for details.

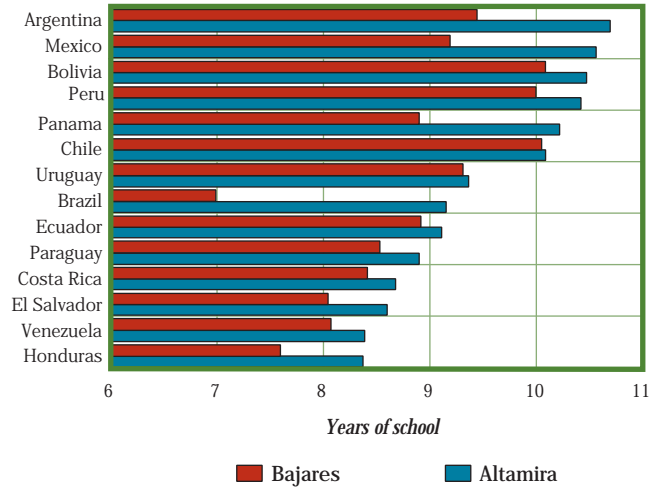
**Number of Children**

The number of children these couples are expected to have varies significantly depending on which country they are in (Figure 3.29b). Almost everywhere, the Bajares would be likely to have more children. In the countries with the largest expected families—Venezuela, El Salvador and Mexico—each couple would be expected to have three or four children, while in Brazil and Honduras, they would be expected to have one or two. However, the largest gaps between the two families can be found in the urban samples of Argentina and Bolivia (1.6 and 1.0, respectively), along with Honduras (1.2), Panama (1.0), Paraguay (1.1), and Brazil (1.0). These gaps in the number of children, which are purely a consequence of the expected effects of differing educational levels, contribute to income inequality across households.

**Children’s Attainment**

The difference between the couples in terms of levels of education also generates very different patterns in their children’s educational attainment (Figure 3.29c). On average, the children in a family like the Altamiras would complete 9.8 years of schooling, while the Bajares’ children would complete only nine. The highest attainment for children of more educated parents would be found in urban Argentina, Mexico, Panama and Brazil; the lowest in Venezuela and Honduras. For the Bajares’ children, educational attainment would be highest in the urban

Figure 3.29c. The Altamira and Bajares Families: Children’s Educational Attainment



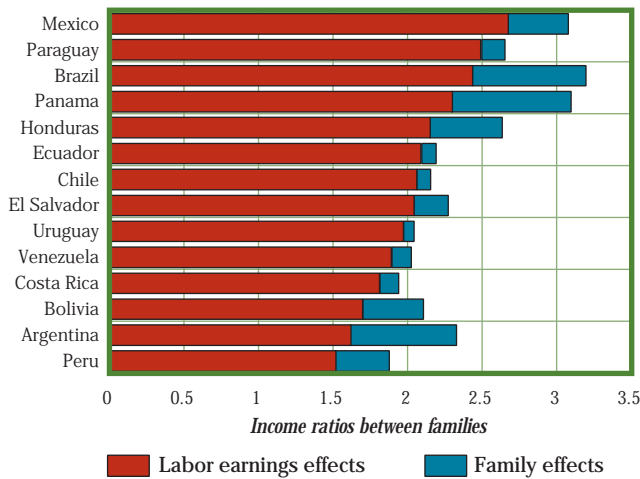
Source: IDB simulations based on recent household surveys. See the Appendix for details.

samples of Bolivia and Argentina, Mexico and Peru, while it would be lowest in Honduras, El Salvador and Venezuela. The gap between the educational attainment of the Bajares’ and Altamira’s children would be lowest in Chile and urban Uruguay. This same gap would be greatest in Mexico, Panama, Argentina and Brazil—the same countries where the Altamira’s children would have the highest expected attainment. The combined effects of parents’ education, labor force participation and number of children upon educational attainment of children varies across countries, but in almost all cases it generates gaps that can be expected to perpetuate income inequality in the future.

**The Income Gap: Direct and Indirect Effects of Education Gaps**

The resulting income gaps between the two families, solely generated by their different educational levels, are generally large and vary significantly across countries. We can now distinguish two different steps in the chain of effects caused by differing educational levels. The first step, discussed in Chapter 2, is the impact of education on individual labor earnings and, consequently, upon the distribution of income across individuals. This is shown in Figure 3.30 as a labor earnings effect. If the Altamiras and Bajares went to Peru, both worked, and had no children, the income of the Altamiras would be 50 percent higher than that of the Bajares; with the same experience in Mexico, the gap would be over 150 percent.

Figure 3.30. The Altamira and Bajares Families: The Income Gap



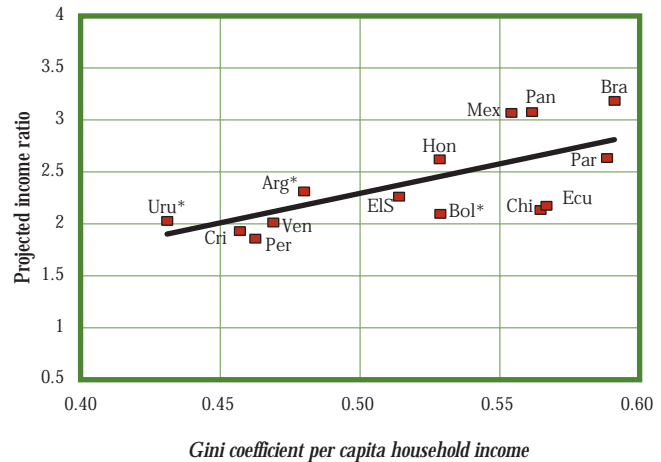
Note: Income ratio is based on the expected per capita household income for each family.

Source: IDB simulations based on recent household surveys. See the Appendix for details.

The second step estimates the expected impact of education on income through family effects. That is, using the analysis developed in this chapter, we can calculate the effect on household income that would result from the differences in the expected decisions by the Altamiras and Bajares with respect to seeking jobs and having children. This family effect is also shown in Figure 3.30. It is much smaller than the direct impact of education upon income gaps that results from returns to education in the workforce. Nevertheless, it does exacerbate the expected income gap between the two families in all countries. In some cases, the family effect is rather small, such as in Ecuador, Chile, and Uruguay. In others, the effects are quite large, notably in Argentina, Brazil and Panama. In all cases, the combined results are quite remarkable considering that the Altamira and Bajares families differ only with respect to their education, and therefore can account for some of the income inequality in each country to differing degrees.

The income gaps between the Altamiras and the Bajares—which differ so markedly from country to country despite the fact that their personal education and age is the same—are strongly correlated with the actual levels of income inequality (Figure 3.31). These differences in per capita family income reflect the different wages families earn, their choices regarding participation in the labor market, and the number of children they decide to have. The simulation captures 25 percent of the variation in the Gini index. This is quite an achievement, considering that the results are abstracted from other factors that

Figure 3.31. The Altamira and Bajares Families: Income Ratio and Income Distribution



\* Countries with urban data only.

Source: IDB simulations based on recent household surveys. See the Appendix for details.

affect income inequality in the various countries, including the distribution of earnings associated with individual educational attainment (see Chapter 2), rural and urban differences, and the distribution of assets. Hence, the travels of the Altamiras and the Bajares show us both the relevance and limitations of education and family effects on income inequality.

## CONCLUSIONS

This chapter has examined the interrelated nature of critical choices that vary systematically with income distribution: labor force participation, fertility and educational attainment. It highlighted the critical role played by education for women, and along with it the opportunity cost for women of participating in the market. A high return for women in the labor force contributes to high participation, fewer children, and higher educational attainment by those children. That is the virtuous circle. However, this process depends not only on the educational attainment of the mother, but also on other factors that vary dramatically across the region. These variations were illustrated by simulating how the income gap between two hypothetical families would vary even though the characteristics of the family themselves remained constant. Different countries generate very different levels of inequality for these families. Hence, their education, age and location, as such, cannot fully explain the varying degrees of inequality across Latin America. Other factors in the

structure of the economy are making wage gaps larger in some countries and smaller in others. Other factors are encouraging otherwise similar women to work at home, or seek out jobs in the informal or formal sectors. Even such personal choices as the number of children to have and how much resources to put into their education appear to be influenced, in the aggregate, by some important factors that go beyond individual characteristics and encompass factors in the broader market and society.

What broader factors could explain the differences that remain after accounting for the personal characteristics of the household? Part of the answer lies in the wages commanded by different levels of education, i.e., returns to schooling, which reflect the structure of supply and demand for people with different levels of education. High returns reflect, in part, a relative abundance of people with very low educational attainment, and a relative scarcity of highly educated individuals. However, these low levels of educational attainment are themselves partly a consequence of earlier educational outcomes that influenced fertility and educational attainment in previ-

ous generations. Part of the answer lies also in the demand for labor and the effectiveness of labor markets, which are themselves functions of technologies, productivity, organization of firms, and public economic policies. And the answer also has to do with the sensitivity of family decisions regarding labor force participation, fertility or educational attainment to relative “prices” such as wages for the skilled and unskilled, for formal and informal jobs, and for men and women.

Hence, by traveling this microeconomic road we have hit upon a macroeconomic and societal boundary. Forces larger than the characteristics of the families are driving a large part of income inequality; factors that lead otherwise similar people in different countries to make different choices. As this complex web of factors generates unequal incomes, it also feeds back into different choices regarding participation, fertility and attainment, so that over time households may become even more unequal in their family characteristics. The next chapter seeks to uncover what these larger economy-wide forces, including public policies, might be.

## APPENDIX

### Female Labor Market Participation Decisions

Female participation decisions have been studied extensively. A problem with econometric estimates is data availability; specifically, it is difficult to obtain a good measure of the opportunity cost that a woman faces when she decides to participate actively in the labor market or not. One way of tackling the issue is to produce a variable that approximates the income that a person would obtain in the labor market if he or she were to participate, and then use this to see if the decision to participate is statistically associated with this measure. This approach is followed here.

The exercise requires a two-stage process. In the first stage, we estimate wage regressions in the following form:

$$\ln(y_i) = c + \beta_1 e_i + \beta_2 \text{exp}_i + \beta_3 \text{exp}_i^2 + \beta_4 \text{urb}_i + u_i$$

where the dependent variable is the logarithm of the income of each earner,  $e$  represents the number of years of education of person  $i$ ,  $\text{exp}$  denotes experience (measured as the age minus six, minus the years of education),<sup>1</sup>  $\text{exp}^2$  is its squared value, and  $\text{urb}$  is a dummy variable for urban areas. The regression is performed separately for men and women, correcting for sample selection bias.<sup>2</sup>

We use the estimated coefficients to predict the income (denoted  $y^*$ ) that each person would obtain if he or she participated in the labor market by using his or her education, experience and location. Then we use  $y^*$  as an independent variable in a multinomial logit equation in the following form:

$$\ln(p_i) = c + \gamma_1 \text{nkids}_i + \gamma_2 y_f^* + \gamma_3 y_m^* + \gamma_4 \text{urb}_i + \gamma_5 \text{age}_i + u_i$$

where  $\text{nkids}$  is the number of children each female has,  $y_f^*$  is the predicted income of the female in question,  $y_m^*$  is the predicted income of the male spouse or male household head, and  $\text{age}$  is a dummy variable for age. The variable  $p_i$  is a variable that takes the value of 0 if woman  $i$  is not participating in the labor market, 1 if she participates in the informal sector, and 2 if she participates in the formal sector of the economy.

The coefficients from the multinomial logit estimation are presented in Table 3A.2.

With these two equations we performed several simulations. For example, given the coefficients and the mean value of the wage regression, one can estimate the income of a prototype person by simply multiplying the

coefficients by the assumed education, experience and location. With this information we predict  $y_m^*$  and  $y_f^*$ , respectively, and if we had the number of children that each woman has, her age and her rural-urban location, we could multiply them by the coefficients of the multinomial logit regression to obtain the predicted probabilities of being types 0, 1 or 2.<sup>3</sup> With this method, one can vary the education of the woman, the education or income of the male head or male spouse, the number of children and the age to assess the impact on the probabilities of participating in the labor market.

Obviously, this kind of exercise is subject to econometric problems such as endogeneity. This is the case especially with variables such as the number of children in the household. Unfortunately, it is difficult to get around this problem with the information from household surveys because it is almost impossible to construct good instrumental variables. Several robustness tests were performed to the estimates presented in Table 3A.2 to check whether the conclusions changed when attempting to substitute the variable  $\text{nkids}$  with constructed instruments. The conclusions derived from the results did not vary from any of these estimates.

### Fertility Decisions

One limitation of household survey data is that it typically does not contain retrospective fertility histories of household members. Typically, we are able to count the number of children living in a household and identify their mother, but we do not know if the woman has other children living elsewhere. Therefore, rather than strictly looking at fertility, the focus is on the number of children in the household, and whether this number is significantly correlated with other variables.

To perform the simulations on fertility discussed in the main text, we performed an exercise similar to the one described in the previous section. We also took a two-stage approach, where first we estimated earnings equations to predict  $y_m^*$  and  $y_f^*$  and then we used these predicted income-earning potentials in a regression where the dependent variable is the number of children in the household, and the independent variables are  $y_m^*$  and  $y_f^*$

<sup>1</sup> To measure experience, the number of children each woman has is taken into consideration. The assumption is that a woman loses one year of labor market experience per child.

<sup>2</sup> For Argentina, Bolivia and Uruguay only urban data are available, so the dummy variable is not included.

<sup>3</sup> To assess the probabilities, we make the corresponding transformations to the coefficients so that they yield the predicted probabilities.

and the urban-rural location dummy.<sup>4</sup> With these two equations we can simulate the number of children that a prototype person would have, and test for the sensibility of that result to the education of the mother, the education and income of the male spouse or male household head, etc. by multiplying the regression coefficients by the mean values of the variables in question.

### Binding the Stories Together

To put together the family's decisionmaking process regarding participation, fertility and children's education, a recursive model was estimated of earnings, participation, number of children and educational attainment of those children and estimated for 14 Latin American countries. Since all these are interrelated decisions, we estimate a simultaneous equation system following these steps:

First, we run an earnings regression of the following:

$$\ln(y_i) = c + \beta_1 e_i + \beta_2 \exp_i + \beta_3 \exp_i^2 + \beta_4 \text{urb}_i + u_i$$

with which we predict  $y_m^*$  and  $y_f^*$  as in the exercises previously described.

The predicted variables  $y_m^*$  and  $y_f^*$ , which represent the income generating potential of a person with a certain degree of education, experience and location, feed into the following regression:

$$\text{nkids}^* = c + \alpha_1 y_f^* + \alpha_2 y_m^* + \alpha_3 \text{urb}_i + \gamma_5 \text{age}_i + u_i$$

where the idea is that the coefficients of this regression can be used to predict the variable  $\text{nkids}$  for each household, based only on the opportunity cost (proxied by the earnings potential variables) and location. We denote  $\text{nkids}^*$  the number of children in each household predicted by  $y_m^*$  and  $y_f^*$  and  $\text{urb}$ . From this perspective, the only reason why two couples in the urban sector would choose to have a different number of children is because they have different educational levels, and because the returns to their education (the opportunity cost) differ.

Thirdly, we reestimate the multinomial logit described at the beginning of this Appendix by running the following regression:

$$\ln(p_i) = c + \gamma_1 \text{nkids}_i^* + \gamma_2 y_f^* + \gamma_3 y_m^* + \gamma_4 \text{urb}_i + \gamma_5 \text{age}_i + u_i$$

where  $\text{nkids}$  has been substituted for  $\text{nkids}^*$ . With the coefficients from this regression and the average values for  $y_m^*$ ,  $y_f^*$ ,  $\text{nkids}^*$ ,  $\text{urb}$ , and the age of each female, we can predict the probability of being out of the labor force, or participating in the informal or formal sector, which

we label  $p_1^*$  and  $p_2^*$  respectively.

Fourthly, we estimate earnings equations of the same form as in the first stage regression above, but we run them separately for men and for women in the formal and informal sectors, respectively. The coefficients allow us to predict the following income-earnings potentials

$$\begin{aligned} y_{m,f}^* &= \text{income of males in the formal sector} \\ y_{m,i}^* &= \text{income of males in the informal sector} \\ y_{f,f}^* &= \text{income of females in the formal sector} \\ y_{f,i}^* &= \text{income of females in the informal sector} \end{aligned}$$

We estimate the income per capita of each family through the following formula:

$$\text{ypc}_i = \{y_m^* + [p_1 y_{f,1}^* + p_2 y_{f,2}^*]\} / (\text{nkids}^* + 2)$$

The formula says that the estimated income per capita ( $\text{ypc}^*$ ) of family  $i$  is calculated by adding up the predicted income of a male with a certain education, experience and geographic location, with the income of the female computed as the estimated probability ( $p_1^*$ ) of being in the informal sector times the informal sector predicted income (the income is also predicted based on education, experience and rural-urban location), plus the estimated probability of being in the formal sector ( $p_2^*$ ) times the formal sector predicted income. All this is divided by the number of children expected of a couple with a certain education, experience and rural-urban location, plus two adults to account for total family size.

Finally, we estimated the educational attainment of each family with the following regression:

$$\text{educkids}_i^* = c + \eta_1 y_m^* + \eta_2 [p_1^* y_{f,1}^* + p_2^* y_{f,2}^*] + \eta_3 \text{nkids}^* + \eta_4 \text{sex}_i + u_i$$

where  $\text{educkids}^*$  represents the predicted educational attainment of the child, and  $\text{sex}$  is a dummy variable for the gender of the child.

Therefore, the system of equations uses the number of years of education, experience and geographic location as exogenous variables, and with this information it predicts the income earning potential in the formal and informal sectors, the probability for females of being out of the labor force or in the formal or informal sectors, the number of children that a couple with the above characteristics would have, and their attainment. The main advantage is that, as explained in the text, the methodology allows simulations of several scenarios by making an explicit distinction between the effects of the number of years of schooling (the quantity effect), and the returns to education (the price effect).

<sup>4</sup> This second-stage regression was only estimated for the sample of 35-40 year old females.

**Table 3A.1. Dependent Variable:  
Probability of 15-18 Year Olds Being Enrolled in School**

<b>Independent Variable</b>	<b>Argentina</b>	<b>Bolivia</b>	<b>Brazil</b>	<b>Chile</b>	<b>Costa Rica</b>	<b>Ecuador</b>	<b>El Salvador</b>	<b>Honduras</b>	<b>Mexico</b>	<b>Panama</b>	<b>Paraguay</b>	<b>Peru</b>	<b>Uruguay</b>	<b>Venezuela</b>
Age	-0.0891**	-0.0292**	-0.0811**	-0.0382**	-0.0911**	-0.0643**	-0.0963**	-0.1466**	-0.1446**	-0.0571**	-0.1070**	-0.0691**	-0.0818**	-0.0937**
Gender	-0.0186	0.0026	-0.0329**	-0.0224**	-0.0693**	-0.0110	-0.0024	-0.1104**	0.0705**	-0.0350**	0.0463*	0.0087	-0.0912**	-0.0955**
Father's education	0.0131**	0.0071**	0.0119**	0.0043**	0.0174**	0.0225**	0.0126**	0.0217**	0.0201**	0.0052**	0.0171**	0.0102**	0.0144**	0.0086**
Mother's education	0.0242**	0.0051**	0.0210**	0.0177**	0.0326**	0.0335**	0.0271**	0.0287**	0.0303**	0.0140**	0.0269**	0.0071**	0.0214**	0.0253**
Log of household pc income	0.0841**	-0.0056	0.0299**	0.0092*	-0.0033	0.0013	0.0118	0.0277*	-0.0036	0.0314**	0.0119	-0.0166**	0.0538**	-0.0213**
Urban-rural			0.0970**	0.0730**	0.1618**	0.1943**	0.2472**	0.1881**	0.1263**	0.1394**	0.2141**	0.1438**		0.1196**
No. of other children in household	-0.0482**	-0.0050**	-0.0079**	-0.0209**	-0.0347**	-0.0279**	-0.0045	-0.0096*	-0.0363**	-0.0187**	-0.0173**	-0.0185**	-0.0279**	-0.0146**
Mother participates	-0.0579	0.0258**	0.0432**	0.0050	0.0561**	0.0416*	0.0593**	0.0605**	0.0442**	0.0208	0.1302**	-0.0105	0.0334**	0.0054
No. elderly members of household	-0.0481	0.0478**	0.0259**	0.0437**	0.0740**	0.1074**	0.0593**	0.0546**	0.0643**	-0.0218	0.0779**	-0.0019	0.0618**	0.0782**

\*Statistically significant at the 95 percent level.

\*\*Statistically significant at the 99 percent level.

Table 3A.2. Coefficients from Multinomial Logit Regression														
Dependent Variable, Female Labor Market Participation (Baseline, p = 0)														
p = 1	Argentina	Bolivia	Brazil	Chile	Costa Rica	Ecuador	El Salvador	Honduras	Mexico	Panama	Paraguay	Peru	Uruguay	Venezuela
Number of children	-0.11	-0.00	-0.03	-0.14	-0.05	-0.06	-0.04	-0.06	-0.01	-0.04	0.01	-0.09	-0.06	-0.07
Women, income	-1.28	-2.23	-0.10	-0.61	0.19	-0.75	-0.39	0.12	-0.11	-0.44	-0.37	-2.46	-0.72	-0.59
Men, income	-0.45	-0.24	-0.19	-0.14	-0.19	-0.13	-0.21	-0.34	-0.36	-0.39	-0.01	-0.21	-0.06	-0.14
Urban-rural			0.57	1.07	0.16	0.28	0.97	0.46	0.10	0.27	-0.74	0.04		0.57
Age 20-25	0.19	0.63	0.17	0.25	0.15	0.28	0.38	0.47	0.52	0.30	0.22	0.19	0.18	0.29
Age 25-30	0.53	0.74	0.24	0.49	0.05	0.27	0.75	0.45	0.43	0.77	0.55	0.29	0.30	0.52
Age 30-35	0.47	0.92	0.19	0.62	0.24	0.33	0.43	0.46	0.26	0.61	0.46	0.41	0.38	0.42
Age 35-40	0.25	0.78	0.14	0.36	-0.13	0.28	0.37	0.16	0.26	0.43	0.41	-0.02	0.22	0.13
Age 40-45	0.00	0.38	-0.01	0.11	-0.52	-0.34	0.08	-0.03	-0.05	0.31	0.32	-0.24	-0.04	-0.39
Age 45-50	-0.64	-0.39	-0.37	-0.35	-0.99	-0.43	-0.28	-0.07	-0.38	-0.47	0.21	-0.58	-0.78	-0.66
Constant	3.49	5.69	-1.65	2.94	-1.39	7.34	0.38	-0.24	0.09	-0.38	3.60	5.92	7.68	2.91
<b>p = 2</b>														
Number of children	-0.19	0.02	-0.17	-0.17	-0.11	-0.03	-0.05	-0.06	-0.18	-0.11	-0.03	0.05	-0.17	-0.04
Women, income	2.37	3.07	1.05	2.07	2.04	1.94	2.21	2.54	1.92	2.54	1.97	2.76	1.59	2.11
Men, income	-0.45	-0.23	-0.26	-0.13	-0.24	-0.12	-0.27	-0.43	-0.38	-0.33	-0.07	-0.20	-0.06	-0.15
Urban-rural			1.27	0.19	0.28	-1.33	0.32	0.38	-0.29	0.21	-0.68	-2.23		-0.05
Age 20-25	-0.12	0.08	-0.13	-0.13	-0.28	0.05	0.13	-0.25	0.20	0.09	-0.28	-0.12	-0.01	0.22
Age 25-30	-0.11	-0.17	-0.27	-0.23	-0.34	0.18	0.29	-0.09	-0.09	0.53	-0.26	-0.22	0.00	0.42
Age 30-35	-0.26	-0.41	-0.51	-0.37	-0.61	0.10	-0.60	-0.76	-0.40	0.00	-0.18	-0.26	-0.12	0.24
Age 35-40	-0.79	-0.87	-0.98	-0.95	-0.84	-0.65	-0.80	-0.67	-0.84	-0.22	-1.07	-0.49	-0.64	0.05
Age 40-45	-0.91	-1.62	-1.47	-1.21	-1.66	-0.51	-1.31	-1.41	-0.99	-1.05	-0.90	-1.07	-0.99	-0.58
Age 45-50	-1.72	-2.36	-1.98	-1.89	-2.71	-1.18	-2.23	-1.60	-2.33	-2.95	-0.58	-1.74	-1.92	-1.52
Constant	-5.36	-8.89	-3.84	-15.03	-13.20	-16.21	-7.26	-7.51	-5.31	-4.96	-18.02	-4.75	-16.56	-13.80

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