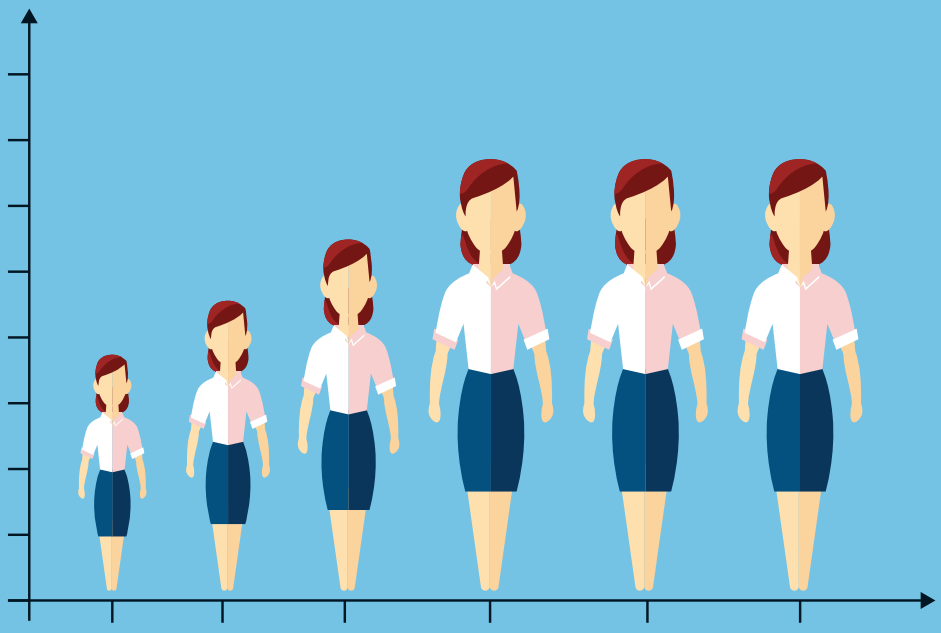

Bridging gender gaps?

The rise and deceleration of female labor force participation in Latin America

Leonardo Gasparini
& Mariana Marchionni
EDITORS

CEDLAS
Center for Distributive, Labor and Social Studies
Facultad de Ciencias Económicas | Universidad Nacional de La Plata

One of the most salient socioeconomic changes over the last half-century has been the strong rise in female labor force participation across the world. Latin America has not been an exception. However, since the early 2000s, there are signs of a widespread and significant deceleration in women's entry into labor markets in Latin America. The slowed increase of women in the workforce has delayed the closing of the gender gap in labor participation, and may also compromise poverty reduction targets.

This book, written at CEDLAS-Universidad Nacional de La Plata, documents the recent deceleration of female labor participation in Latin America, explores its causes, evaluates its implications, and discusses the limitations and challenges facing public policies that aim to empower women and foster gender equality.

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List of acronyms

ALMP	Active labor market policy
CCT	Conditional cash transfer
CEDLAS	Centro de Estudios Distributivos, Laborales y Sociales - Universidad Nacional de La Plata, Argentina
CIEDUR	Centro Interdisciplinario de Estudios sobre el Desarrollo, Uruguay
ECLAC	Economic Commission for Latin America and the Caribbean
GDP	Gross domestic product
IDRC	International Development Research Centre
ILO	International Labor Organization
LABLAC	Labor Database for Latin America and the Caribbean (CEDLAS and the World Bank)
LFP	Labor force participation
MDG	Millennium Development Goals
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing power parity
SEDLAC	Socio-Economic Database for Latin America and the Caribbean (CEDLAS and the World Bank)
TFR	Total fertility rate
WDI	World Development Indicators

"Among the many useful indicators of women's economic status, including women's educational attainment, health, role in politics and legal rights, labor force participation is arguably the most fundamental to the evolution of gender roles."
Olivetti, 2013

"Of the many advances in society and the economy in the last century, the converging roles of men and women are among the grandest."
Goldin, 2014

Chapter 7

Implications of female labor force participation

Leonardo Gasparini and
Mariana Marchionni

1. Introduction

In the previous chapters we have documented and explored the changing patterns of female labor force participation in Latin America. These changes are bound to have profound economic and social consequences. In principle, when a woman finds a paid job, a significant change in household income takes place that may affect the poverty status of the family. In fact, the entry of women into the labor market could be a relevant driver of the whole income distribution.

The implications of increasing female labor participation (and its deceleration over the last several years) go beyond the income dimension. A host of adjustments in family behavior may take place as a consequence of women's transition from inactivity to employment. Women's empowerment, childcare, family violence, education, and fertility are just a few examples of areas in which female labor force participation may have a significant impact.

This chapter is aimed at assessing some of the implications of the increasing pattern in female LFP experienced in Latin America and its recent deceleration. The first sections of the chapter focus on the income dimension. Was the increase in female employment a significant factor for the recent reduction in income poverty and inequality in the region? What are the prospects for the future, given the recent deceleration of this process? Section 2 tackles the first question. By applying microeconometric decompositions, we provide estimates of the implications in terms of income poverty and inequality of the observed changes in female labor force participation over the last two decades. The section concludes that, although not the main factor, increasing female LFP was a significant contributor to the fall in income poverty and inequality in Latin America.

Section 3 looks at the future by projecting rates of female LFP based on the observed patterns in the past, and assessing the impact on income poverty and inequality through microsimulations. If the deceleration in female LFP continues over the next decade, the contribution of this factor to the reduction in poverty and inequality will be meager in most countries. Instead, if the growth rates in female LFP revert to the values of the 1990s, a more sizeable impact is expected. The section provides estimates for income poverty and inequality under these alternative scenarios.

Section 4 discusses other implications of female labor supply with an emphasis on female economic empowerment, control over household resources, investment on children, demand for childcare, and domestic violence.

The chapter closes in section 5 with an examination of the potential distributive impact of fertility changes, a phenomenon closely linked to female labor force participation. After exploring the evidence for Latin America, we conclude that the unbalanced fall in fertility rates across socioeconomic groups had relevant implications on poverty and inequality in the past and are likely to remain relevant in the near future. To be sure, this demographic channel is not among the main explanations of the distributive developments of the last decades, but it is far from being negligible.

2. Distributive implications of changing female employment[1]

The changing role of women in the labor market can have relevant implications in terms of household income, poverty and inequality. If a woman decides to participate in the labor market and finds a job, her household income will rise, reducing the vulnerability to poverty. The increase in female employment is also bound to affect inequality, since these changes are typically not uniform across the income distribution.[2] Assessing the causal impact of changing female employment on poverty and inequality is a very challenging task that requires special circumstances that allow genuine exogenous sources of identification. In

1 This section was written by Leonardo Gasparini, Cecilia Parada and Mariana Marchionni.

2 Notice that in this section we focus on female employment and not labor force participation. The transition from labor inactivity to unemployment does not have any effect in the income distribution, since in both cases earnings are zero. It is the transition from inactivity or unemployment to employment that causes a change in earnings and, hence, an impact on poverty and inequality.

this chapter we take a less ambitious but more practical path, and measure the impact of changing female employment on the income distribution by keeping all else constant. In particular, we take the observed changes in the labor market in each Latin American country as given, and compute the impact on income poverty and inequality that would have occurred after those changes, assuming no other adjustment in behavior takes place. Of course, this is not a very realistic assumption, but it is necessary to have a first approximation of the likely impact of changing female employment on the income distribution.

We apply the decomposition methodology of Bourguignon *et al*. (2004) and Gasparini *et al*. (2004). Specifically, we take data from two years, t_1 and t_2, and carry out two microsimulations. In the first, we pretend that the only change that took place between t_1 and t_2 was the observed change in the female employment situation (employed or not), *i.e*. the *extensive margin* of the labor supply. By computing the change in poverty and inequality in this controlled setting we get a first-order approximation of the distributive impact of changes in female employment. If the only factor that changed between t_1 and t_2 had been the employment situation of women, by how much would poverty and inequality have changed? That is the question that this first microsimulation tries to answer.

Alternatively, in the second microsimulation we assume that the only change that took place between t_1 and t_2 was the observed change in hours of work by employed women. What would have been the impact on poverty and inequality in this artificial setting with changes only in the *intensive margin* of the female labor supply?

The simulations are somewhat more complex than simply copying the employment status (or hours of work) of a woman in time t_1 into the dataset of t_2 (or vice versa), as panel data is not available and, moreover, the characteristics of a woman change over time, altering her probability of becoming employed. Instead, we predict the employment status of a woman in t_2 by considering her observable characteristics at that date and the parameters of a labor market model in t_1. For many women, the prediction is similar to the observed employment outcome in year t_2 so that the simulation is inconsequential. Instead, for some women the simulation implies a change in status. In particular, those women who move from inactivity (or unemployment) to employment in the simulation are assigned a labor income that corresponds to the prediction of a typical Mincerian wage equation. The counterfactual earnings are then use to re-compute household incomes, which are in turn used to simulate poverty and inequality. Appendix 1 and a companion paper (Parada, 2014) provide technical details on this methodology.

The microsimulations have an obvious caveat that originates from the fact that they are not derived from a general equilibrium model. When simulating the impact of changes in employment, we keep all other elements constant in their values for the base year. Naturally, some of these factors may covariate with employment. For instance, the structure of wages may respond to changes in female labor supply. By ignoring this channel we may be biasing our estimate of the distributive impact of the changes in employment. Additionally, changes in female labor force participation and employment may not have been autonomous, but induced for instance by income changes, in which case the microsimulation only captures a round of effects (from female employment to incomes) of a more complicated process.

Unfortunately, it is very hard to compute a credible general equilibrium model capable of tracing all of these effects, and therefore, the microsimulations may be viewed as a second-best methodological option. The results of these techniques provide rigorously-derived estimates of the direct distributional impact of a given change, keeping all other things constant.

The results of the impact of changes in female employment on poverty (measured with the headcount ratio with the US$ 4 line) are shown in Table 7.1.[3] Take the case of Chile to illustrate the interpretation of the figures in the table. Poverty in the urban areas of that country fell 28.3 points between 1990 and 2011. This successful poverty reduction was the result of multiple complex factors that are very difficult to disentangle. The increase in women's employment was surely one of these factors. While 42% of adult women (between 25 and 54 years old) in Chile were employed in 1990, that share climbed to 59% in 2011. Column (ii) in the table tells us that if the only change between those years had been the observed change in the employment state of women (employed or not), keeping all other factors constant, then poverty would have been reduced by 0.5 points. Instead, if employment had remained fixed and only women's hours of work had changed, poverty would have fallen 1 point. The overall female employment effect contributed with 1.5 points to the fall in the poverty headcount ratio in Chile.

Some interesting results emerge from the table. First, all of the estimates are negative: changes in female employment and hours of work contributed to the fall in income poverty in the region. The impact of these factors appears to be rather small, although far from negligible. While the poverty headcount ratio

3 Results are restricted to urban areas, since modeling rural employment is more difficult with the typical available variables.

fell more than 14 points on average in our sample over the two last decades, the estimated contribution of changes in female employment and hours of work was a bit more than 1 point. In some countries, such as Uruguay and El Salvador, the impact was larger in proportionate terms.

Table 7.1: Impact of changes in female employment on poverty
Changes in the poverty headcount ratio (US$ 4 line)

Country	Period	Observed change	Effects		
			Employment Extensive margin	Hours Intensive margin	Total
		(i)	(ii)	(iii)	(iv)
Argentina	1992-2012	-10.9	-0.4	-0.7	-0.8
Brazil	1990-2012	-27.3	-0.1	-0.4	-0.5
Chile	1990-2011	-28.3	-0.5	-1.0	-1.5
El Salvador	1991-2012	-14.3	-1.8	-1.6	-3.6
Mexico	1992-2012	-3.8	-0.1	-0.2	-0.3
Uruguay	1991-2012	-2.5	-0.4	-0.8	-1.0

Source: own calculations based on microdata from national household surveys.
Note: The values of each effect are averages that result from taking alternatively each year in the comparison as the base year. The sample includes only households in urban areas.

According to Table 7.2 changes in female employment were also inequality-reducing over the whole period under analysis. However, again, the effect was not large: on average about half a Gini point in the last two decades, which represents around 10% of the observed overall reduction in the Gini coefficient.

Table 7.2: Impact of changes in female employment on inequality
Changes in the Gini coefficient

Country	Period	Observed change	Effects		
			Employment Extensive margin	Hours Intensive margin	Total
		(i)	(ii)	(iii)	(iv)
Argentina	1992-2012	-3.3	-0.2	-0.3	-0.4
Brazil	1990-2012	-6.9	0.0	-0.3	-0.3
Chile	1990-2011	-5.1	-0.2	-0.1	-0.4
El Salvador	1991-2012	-8.5	-0.6	-0.4	-1.1
Mexico	1992-2012	-3.6	0.0	-0.5	-0.5
Uruguay	1991-2012	0.1	-0.1	-0.4	-0.5

Source: own calculations based on microdata from national household surveys.
Note: The values of each effect are averages that result from taking alternatively each year in the comparison as the base year. The sample includes only households in urban areas.

In summary, the evidence suggests that changes experienced by Latin American women in terms of employment over the last two decades contributed to the observed fall in income poverty and inequality. The stronger insertion of vulnerable women in the labor market allowed some families to escape income poverty and reduced the income gaps with more affluent households. To be sure, this is not the main reason for the recent decline in poverty and inequality in Latin America, but its contribution to that pattern appears to be non-negligible.[4]

Given the positive distributive implications of the increased female employment, there exists a natural concern regarding the social consequences of the recent deceleration in female labor force participation. The next section explores this issue.

3. Projections[5]

The previous section provided estimates of the impact of the observed changes in female employment on poverty and inequality over the last two decades. In this section, we explore the likely distributive effects of the projected trends in female LFP for the next two decades. Naturally, the exercise is highly speculative, since a complex social phenomenon like labor supply is very difficult to predict. However, although imperfect, the estimates may be useful, as they provide us with some order of magnitude of the likely effect that the changes in female participation could have on poverty and inequality in the near future.

The simulations require forecasts for changes in female labor force participation. We consider two scenarios. In the first one, LFP follows the growth rates observed in the 1990s; in the second one, the growth rates observed in the 2000s continue into the following decade. For most countries, the former represents the high-growth scenario of LFP that prevailed for much of the 20th century, while the latter is a low-growth scenario, like the one prevalent in the last decade. In previous chapters we have identified several factors that account for the fall in the growth rate of female LFP in Latin America in the 2000s, including economic growth and labor and social policies. The likelihood of the low-growth over the

4 Other researchers have found significant poverty-reducing impacts of the increased female labor force participation. For instance, the World Bank (2012) reports that holding all else constant in the labor market, if female income had remained the same during the 2000s, extreme poverty in Latin America and the Caribbean would have been 30 percent higher in 2010. The gains in female income reflect increased labor earnings, expanded access to pensions and increased labor force participation.

5 This section was written by Javier Alejo and Leonardo Gasparini.

high-growth scenario depends on how these and other factors evolve and interact with female LFP, which is difficult to predict.

We carry out the simulations for each country starting in the year 2012, dividing the adult female population into six groups based on education (low, middle and high) and marital status (single, married). For each group we project the level of female LFP for each year in the period 2012-2032, according to the growth rates prevailing between 1992 and 2002 (scenario 1), and alternatively in the period 2002-2012 (scenario 2). These projections imply a given forecasted female LFP rate for each group in each country/year.

We assume that no other change occurs in the economy, apart from changes in labor supply. Therefore, we take the microdata of the 2012 household survey,[6] and simulate the forecasted female LFP by randomly moving inactive women in a given group to the active status. Since we keep all other things constant, including the unemployment rate, some of these women will be unemployed. The change from inactivity to unemployment has no effect on monetary poverty and inequality, since in both cases earnings are zero. Instead, changes from inactivity to employment will have an impact on the income distribution. Women who experience that transition in our simulations are assigned a wage and hours of work according to their observable characteristics, based on the coefficients of a typical Mincer and hours of work equations, and their household per capita incomes are recomputed based on their new earnings, always keeping fixed the rest of the incomes in the household and the family composition. The household per capita income simulated through this process is used to forecast poverty and inequality in each country/year.

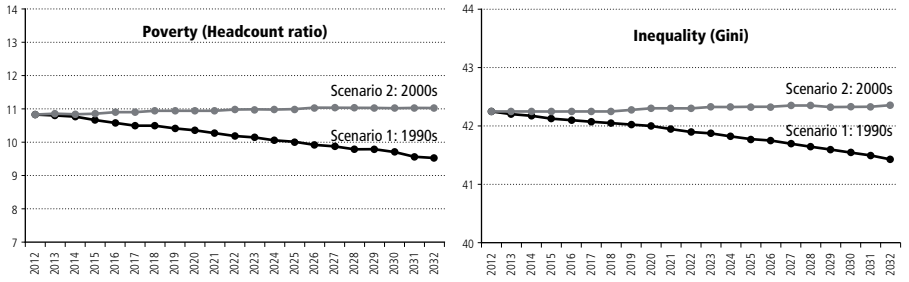
Of course, this is a simple exercise that captures just the first-round impact of the increase in female labor force participation on the income distribution. However, we consider it useful as an approximation, especially as compared to the formidable challenges of the alternative approach of estimating a general equilibrium model.

An illustration of the results is presented in Figure 7.1 for the case of Argentina. The poverty headcount ratio with the line of US$4 was 10.8% in 2012. Under the scenario in which the growth rate of female LFP returns to the high value of the 1990s, the poverty rate would fall to 10.2% in ten years (2022) and to 9.5% in two decades (2032). This reduction in poverty would vanish if the pattern for female LFP in the future were the one experienced in the 2000s in Argentina,

6 We take a year close to 2012, if 2012 is not available.

when the increase in female labor supply came to a halt. In fact, poverty would increase slightly since scenario 2 implies that the small reduction in labor supply for the group of single women with low education that took place in the 2000s would continue in the following decade.

Figure 7.1: Poverty and inequality based on projections of female LFP Argentina, 2012-2032



Source: own calculations based on EPH (INDEC).
Note: poverty is measured with the headcount ratio with a line fixed at USD 4 a day adjusted for PPP; inequality is measured with the Gini coefficient for household per capita income.

The impact on income inequality is similar. In the first scenario the Gini coefficient in Argentina would fall from 42.3 to 41.4 in two decades. Although this is not a substantial fall over a twenty-year period, one Gini point is not a negligible effect coming from a single driving factor.

The inequality-decreasing effect disappears in scenario 2, a fact that is mainly explained by the factor mentioned above and which has been discussed in previous sections: the larger contraction in female labor force participation in the low-education group. However, this effect is insignificant: the Gini would only increase from 42.3 to 42.4 in two decades.

Figures 7.2 and 7.3 (see Appendix 3) show the results for the rest of the Latin American economies, whereas Table 7.3 summarizes the results by showing the projected change in poverty and inequality in each country between 2012 and 2032 under the two scenarios.

For nearly all countries poverty would fall in the next two decades under scenario 1 (the only exception is Peru). The reductions range from 4.9 percentage points in Venezuela to 0.5 percentage points in Brazil and Uruguay. In most

countries poverty would also fall under the low-growth scenario, although in all cases the reduction would be smaller. In fact, as commented above for the case of Argentina, in some countries we project a small increase in poverty driven by a reduction in female labor force participation. On average, while the poverty headcount ratio would fall 1.6 percentage points in scenario 1, it would fall just 0.3 points in scenario 2.

Table 7.3: Changes in poverty and inequality based on projections of female LFP
Latin American countries, 2012-2032

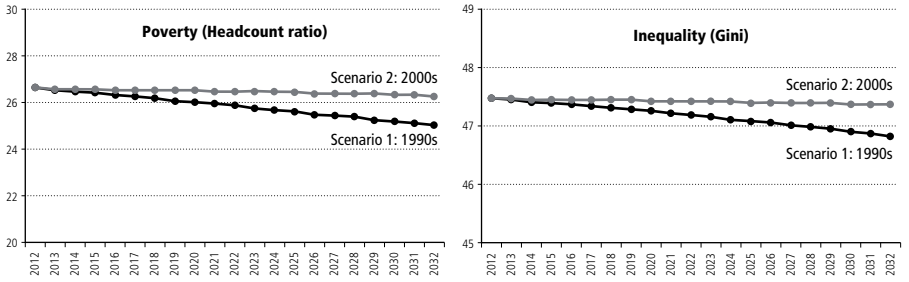
	Change in poverty		Change in inequality	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
ARG	-1.3	0.2	-0.8	0.1
BOL	-2.5	-0.3	-0.8	-0.1
BRA	-0.5	-0.1	-0.2	0.0
CHL	-1.6	-0.4	-0.8	-0.2
CRI	-2.8	-1.1	-1.7	-0.6
ECU	-1.8	-0.6	-0.6	-0.1
HND	-3.5	-0.4	-1.5	-0.3
MEX	-0.6	-0.1	-0.2	-0.1
NIC	-1.1	0.0	-0.2	0.2
PAN	-0.7	-1.2	-0.4	-0.4
PER	0.3	-0.3	0.0	-0.1
PRY	-1.7	0.4	-0.7	0.1
SLV	-1.0	-0.5	-0.3	0.1
URY	-0.5	-0.4	-0.4	-0.4
VEN	-4.9	0.0	-1.1	0.0
Latin America	-1.6	-0.3	-0.6	-0.1

Source: own calculations based on national household surveys.
Note: poverty is measured with the headcount ratio with a line fixed at USD 4 a day adjusted for PPP; inequality is measured with the Gini coefficient for household per capita income. Latin America: unweighted means.

Figure 7.4 shows the projected pattern in poverty for the whole period. Driven by changes in female labor force participation, poverty in Latin America would be cut by 3% in one decade and by 6% in two decades in scenario 1, but remain almost unchanged in scenario 2. In summary, if the observed deceleration of female labor force participation in the 2000s is not a transient phenomenon, and instead it is the beginning of a stage of low or even null growth in female labor

supply, then the contribution of female LFP to poverty reduction in the region would be negligible. This almost null effect contrasts with a significant, although not very large, poverty-reduction effect that would occur if the growth in female LFP observed in the 1990s and in most of the 20th century resumed.

Figure 7.4: Poverty and inequality based on projections of female LFP Latin America, 2012-2032



Source: own calculations based on national household surveys.
Note: poverty is measured with the headcount ratio with a line fixed at USD 4 a day adjusted for PPP; inequality is measured with the Gini coefficient for household per capita income. Unweighted means.

The results are similar for inequality. In most countries the deceleration in labor force participation in the 2000s was greater among women with low education. This implies a deceleration of the inequality-reducing impact of the patterns in female LFP. In almost all Latin American countries, the projected reduction in the Gini is smaller in scenario 2 than in scenario 1; in some countries it even becomes unequalizing. On average for the region, the Gini coefficient falls 0.6 points in scenario 1 and 0.1 in scenario 2.

4. Other implications

Many of the transformations documented in previous chapters—falling fertility rates, rising female education, and labor participation—are associated with a higher degree of women's empowerment. Along with education, female LFP is a primary path to women's empowerment, at least in the economic dimension. Paid work has the potential to transform women's lives, increasing their capacity to exercise choice and control in key areas. In turn, economic empowerment fosters female LFP while facilitating other forms of empowerment.

In this section we discuss implications of higher female participation in the labor market other than the distributive changes analyzed in the first part of this chapter. We review the literature and present evidence relating female LFP to female economic empowerment, control over household resources, investment on children, demand for childcare, and domestic violence.

Female LFP and women's economic empowerment

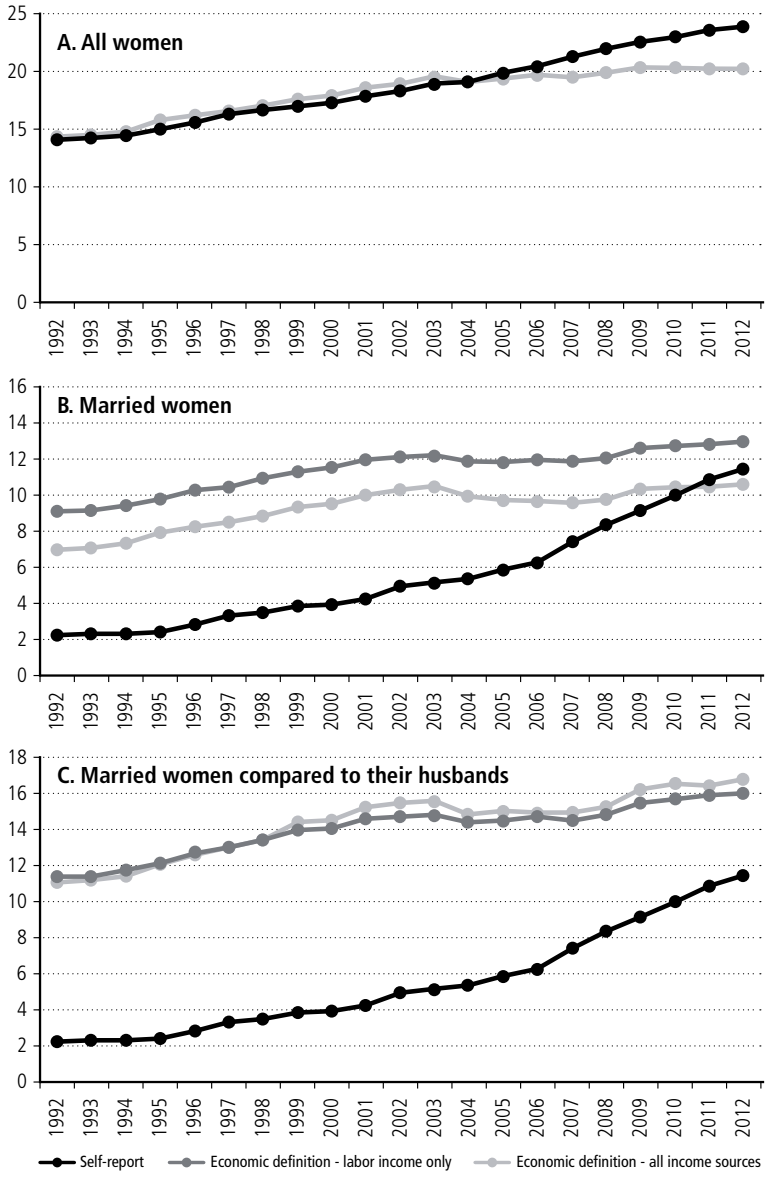
The share of family income earned by women and the share of family resources potentially under women's control have grown over time along with the expansion of female LFP in Latin America. Panel A in Figure 7.5 shows that the share of prime-age women earning more than half of the total family income, *i.e.* the incidence of female economic headship (World Bank, 2012), grew from 14% to 20% over the last two decades in Latin America. The pace of change mimics that of female LFP: rapid growth in the 1990s followed by a deceleration in the 2000s. This pattern is robust to other definitions of economic headship, as we will see later.

The fact that women's contribution to the family budget has increased does not necessarily imply that women now control a larger share of that budget or that they have a greater say in family decisions. Although this is potentially the case, household survey data does not provide enough information to answer this question, at least not in a direct fashion.

However, the self-report assessments on household headship coming from household surveys are likely to capture the perceptions of respondents on the roles and the division of tasks among household members. According to these reports on family roles, the proportion of female-headed households increased in tandem with the expansion of economic female headship (Panel A in Figure 7.5) over the 1990s and early 2000s, suggesting that economic headship is related to some sort of female empowerment process, at least within the family. It is interesting to note that in the 2000s, the share of self-reported female heads continues its rapid growth despite the female economic headship phenomenon decelerates, which could be taken as a sign of female empowerment beyond the economic dimension.

Of course, these results could be driven by many factors that are not strictly related to women's empowerment, such as changes in family structure or even the income measure used to define economic headship. Concerning family structure, and as shown in chapter 2, the period is characterized by a sharp increase in the share of single female household heads, *i.e.* women living with

Figure 7.5: Percentage of female heads of household Latin America, 1992-2012. Women aged 25-54.



Source: own calculations based on microdata from national household surveys.
Note: Self-report: self-report assessments on household headship. Economic definitions of household headship in panels A and B are based on a woman's income compared to her family's income. In panel C, economic definition compares a woman's income to her husband's income. Married women: either in formal or consensual unions. Unweighted means.

no formal spouse or partner. This alone can be the reason why self-reported female headship is increasing. But panel B in Figure 7.5 shows the same patterns when we focus only on married women—either in formal or consensual unions. Female headship was rare in two-parent households in the early 1990s, but it has become increasingly common over time. Based on the self-report assessment, the percentage of prime-age married women who were heads of household grew from 2% in 1992 to 5% in 2002, and then sped up to reach 11% by 2012.

Among married women, self-reported headship is less common than economic headship, but the gap between the two definitions has shrunk markedly over time, and even disappeared over the last years due to the above mentioned acceleration in the rate of increase of the former, together with a deceleration of the latter.

These conclusions are robust to other definitions of economic headship. For instance, we use labor income as an alternative to total family income (panel B in Figure 7.5), and also compare women's income to their husbands' to determine the economic head of household (panel C in Figure 7.5).[7]

Although with different nuances, we find similar trends in most Latin American countries. The rapid increase in self-reported female headship after the mid-2000s is particularly marked in Uruguay, Chile, and Brazil. At the other end of the spectrum is Peru, where the proportion of self-reported female household heads has changed very little since 1992, reaching only 15 percent in 2012, the lowest in the region. Table 7.4 (see Appendix 3) presents the statistics for each country.

In summary, although female labor participation contributes to the empowerment of women, at least in the economic sense, the evidence presented so far suggests a growing trend of female empowerment (as measured by self-assessment of female headship) that manifests even when LFP stagnates. It is likely that this inertial behavior is due to cultural changes that influence empowerment beyond the strictly economic dimensions.

Female economic empowerment, investment in children, and economic development

The evidence that money in the hands of mothers, as opposed to their husbands, increases the share of expenditures on children (clothing, food, education)

7 Economic definitions based on total or labor income differ mostly due to the presence of transfers. Women earn relatively less non-labor income than other household members, especially the elderly, but relatively more than their husbands.

provides a link between women's empowerment and economic development to the extent that increased spending on children contributes to human capital accumulation (Doepke and Tertilt, 2011 and 2014).

In traditional models, families are considered as single decision units, where intra-family behavior is ignored. In such settings, outcomes (consumption, labor participation, fertility, etc.) depend on the global pooling of resources within the household, *i.e.* the income pooling hypothesis (Becker, 1991). However, there is strong evidence against the income pooling hypothesis, as surveyed in Haddad, Hoddinott, and Alderman (1997) and Doepke and Tertilt (2011). Expenditure patterns differ significantly depending on whether the husband or the wife controls family resources. Therefore, the growing importance of women's income that accompanies the expansion of female LFP may result in changes in household decisions, in particular an increase in children's expenditures, such as food and clothing or on a child's outcomes, such as health and education.

Some early studies for Latin American countries found better nutrition outcomes (height for age, weight for age, and weight for height) in families with larger female income shares (Engle 1993 for the case of Guatemala, and Thomas 1990 and 1994 for the case of Brazil). While these results could be driven by unobserved heterogeneity, *i.e.* unobserved factors causing both better nutrition and higher female income shares, more recent studies have managed to isolate the causal effect of female income shares. For instance, the emergence and expansion of conditional cash transfer (CCT) programs in the region since the late 1990s opened the opportunity for evaluating the causal effect of changes in female income shares on child expenditures. In most of these programs, payments are made to a child's mother, following the widespread belief, based on the above mentioned evidence, that mothers make better use of resources (Fiszbein and Schady, 2009).[8]

Data from the Mexican *Oportunidades* program (formerly *PROGRESA*) are the basis for several studies aimed at measuring the effect of paying the transfers to mothers. Hoddinott and Skoufias (2004) and Angelucci and Attanasio (2009) find that households receiving transfers increased their food expenditures and caloric acquisition compared to eligible households not receiving these benefits. Attanasio and Lechene (2002), Rubalcava, Teruel and Thomas (2009), and

8 Identification of the causal effect is based on the random assignment of the program, but since it is always the woman who receives the payments, the results could be driven by an increase in the female budget share or just in total family income. Different strategies are used to deal with this shortcoming, but usually households receiving transfers are compared to other eligible households with similar income or consumption that do not receive transfers.

Bobonis (2009) also find positive effects of Mexico's *Oportunidades* on the expenditure share of children's clothing.

Similar results are found for other Latin American CCT programs targeted to women: Attanasio, Battistin and Mesnard (2012) study Colombia's *Familias en Acción*; Schady and Rosero (2008) analyze Ecuador's *Bono de Desarrollo Humano*; Maluccio (2010), and Gitter and Barham (2008) study Nicaragua's *Red de Protección Social*, and Macours, Schady, and Vakis (2012) focus on *Atención a Crisis*, another Nicaraguan program.

Decision-making within the household is influenced not only by income but also by other variables such as labor participation and education. For instance, Thomas (1994) uses mother's education relative to father's as a proxy for bargaining power. Using data from Brazil, he finds that mother's education has a greater effect on girls' nutritional status while father's education has a bigger effect on boys' nutrition. Another example is Atkin (2009), who, exploiting geographic variation in the opening of new factories in Mexico, finds improvements in child's health (height for age) for mothers who enter the labor market.

Usually, differences in preferences are seen as the key determinants of differences in the observed expenditure patterns. According to this hypothesis, unlike men, women prioritize investments in children's human capital because of their preferences. Croson and Gneezy (2009) review the experimental literature on gender differences on preferences and conclude that even though there are fundamental differences between men and women, it is not possible to tell whether women are more other-regarding than men based on this evidence alone. In particular, it is not clear whether the difference in preferences between men and women affects their behavior towards their children.

Also, as Doepke and Tertilt (2011, 2014) show, the observed expenditure patterns can emerge for reasons other than differences in the preferences of wives and husbands. For example, they present models in which differences in expenditure patterns by gender are endogenous and could disappear if other gender differences such as labor market discrimination were removed. Also, the authors draw attention to the importance of considering other children outputs beyond expenditures. An increase in current spending may come at the expense of other important public goods or may be accompanied by a fall in household savings, reducing future consumption possibilities.

In this sense, there is also evidence of a positive association between female income shares and children's education. World Bank (2012) shows that in Latin America, higher rates of household dependency on female income are associated with higher

rates of school enrollment. This is particularly true at the pre-school and upper secondary levels, since primary and lower secondary education are compulsory in most countries in the region. Children in households highly dependent on female labor income are more likely to be enrolled in preschool and secondary school than children in households more dependent on male labor income or transfers. For instance, estimates of the marginal effects for the case of Brazil are 7 and 14 percent for preschool (3 to 5 year-olds) and secondary school enrolment (16 to 19 year-olds), respectively, after controlling for per capita income, the share of pensions and transfers in household income, household size, and single parenthood.

The link between empowerment and development also goes in the other direction, *i.e.* development can contribute to empowerment. Gender inequality is often greater among the poor, thus, when development reduces poverty levels, the situation of women might improve, both in absolute terms (everybody is better off), and relative to men. Duflo (2012) reviews the evidence on both sides of the empowerment-development link, and concludes that the relationship between the two are probably too weak to be self-sustaining, and that political commitment is required to reach equity between women and men.

In summary, the evidence suggests that female LFP and the consequent female economic empowerment can increase investment in children's human capital. However, it is not clear to what extent these conclusions would hold in other contexts with less gender inequality, nor is it obvious that economic development by itself would lead to more gender equality.

Female LFP, demand for childcare and childcare quality

Care responsibilities that are traditionally assigned to women severely limit their chances of entering the labor market. As discussed earlier in this book, this is particularly the case for young mothers, who find it hard to reconcile the requirements of full-time formal jobs and the demands of caring for their children. Given this reality, many policies aimed at promoting women's work have focused on providing childcare and early education services. In fact, causal evidence for Latin American countries shows that when childcare facilities are available, female participation in the labor market increases (Berlinski and Galiani, 2007; Contreras, Puentes and Bravo, 2012). Chapter 8 elaborates on these policies. In this section, we focus on the reverse channel, *i.e.* the implications of LFP of mothers on the demand for childcare.

Public childcare services for children under 4 years old are far from universal in Latin America. The existing supply is fragmented and heterogeneous, affecting

care arrangements in households differently depending on geographic location, occupational status and socio-economic position. Private, usually expensive, childcare institutions typically satisfy the childcare demands of better-off households. There is also an employment-based supply of childcare services (workplace crèches) available for some formal workers, such as teachers and public employees. Of course, these benefits are beyond the reach of women from less advantaged households or those who work in the informal sector. For these women, families and communities continue to have a dominant role in childcare provision.

Faur (2011) points out that the fragmentation of childcare services in Argentina translates to a high level of privatization for better-off households, and a high level of familiarization for less advantaged households, which widens the gap between women from different socio-economic groups. Moreover, community-based childcare usually means less professionalized and cheaper services, lower staff/child ratios, and fewer facilities and materials, therefore poor children access to lower-quality childcare services than do children from higher-income groups (Razavi, 2012).[9]

There is ample evidence on the effects of early childhood interventions on child development and subsequent success throughout life (Currie and Thomas 2001; Case and Paxson, 2008; Grantham-McGregor et al., 2007). If childcare quality translates into child development, children from low-income households would only gain access to low-quality care services, aggravating the already high levels of inequality of opportunity between children from different socioeconomic groups (Staab and Gerhard, 2010).

In summary, the increase in female LFP generates demands for childcare that are only partially met by the public sector, allowing a heterogeneous supply to bridge the gap. While children from high-income households can access high-quality private institutions, children from poorer households only have access to lower-quality services. This means fewer opportunities for the less advantaged. The situation worsens as labor participation of women from worse-off households (or in more precarious jobs) increases.

Female LFP, private schools and segregation

Extended school hours also help to accommodate mothers' full-time formal job responsibilities with the demands of childcare. Unfortunately, full-day schooling

9 Also, some authors draw attention to the precarious working conditions of those running these community services, usually unpaid or poorly paid women (Staab and Gerhard, 2010; Faur, 2011).

is not common in the public sector, and is more frequently found among private educational institutions. This situation "forces" many couples to choose a full-day private school for their children in order to allow a full-time job for the mother. In turn, earnings from that job can be used to pay for the higher costs of private education.

According to our estimates based on household surveys, the share of children in primary private schools in Latin America (unweighted mean of 10 countries) grew at a similar pace over the last two decades (14.3% in 1990, 17.2% in 2000, and 20.6% in 2010). The rate of growth was also fast in the case of secondary education in the 1990s but much slower in the 2000s (19.6% in 1990, 23.7% in 2000, and 25.1% in 2010), a fact that is consistent with the deceleration in female labor force participation, but that could also be the consequence of various other phenomena.

Gasparini *et al.* (2015) link the growing migration of less economically disadvantaged groups from public to private schools to a sizeable increase in all measures of school segregation in Latin America. For instance, the mean dissimilarity index of segregation between public and private schools between the poor and the non-poor increased from 0.151 in 1992 to 0.162 in 2002 and 0.167 in 2011. This pattern should be of public concern since a more inclusive and integrated education system that encourages the coexistence of students from different socioeconomic and cultural groups in the same classrooms is key to stimulate social cohesion.

In sum, higher female LFP may be associated with greater school segregation if the women who enter the labor market come from better-off households (or if they access better-paid jobs) and possess the means to choose private schools, unlike their poorer counterparts. The situation worsens when the entry into the labor market is weaker in the latter group, which has been the case in the last decade in Latin America, as documented in previous chapters. Even though the previous argument is just speculative and more evidence is needed to better understand the dynamics at play, the implications are sufficiently relevant to be alert on this potential link between female labor force participation and segregation.

Female LFP and domestic violence

Violence against women is increasingly recognized as an important social, health, and human rights problem (WHO, 2005). Domestic violence, *i.e.* violence by an intimate partner, is one of the most common forms of gender-based violence.

Domestic violence is widespread in Latin American societies. Peru is one of the countries with the highest prevalence of domestic violence in the world: 69 percent of Peruvian women between 15 to 49 years old report they have suffered from physical or emotional violence from their male partners (García-Moreno *et al*., 2006). In Colombia, according to the 2005 Demographic and Health Survey (DHS), almost 40 percent of women between 13 and 49 years old report having suffered from physical violence, around 66 percent report that they have been emotionally abused, and 20 percent report that they have experienced both emotional and physical violence (Friedemann-Sánchez and Lovatón, 2012).

While there are many positive implications of increased female LFP, as discussed earlier in this chapter, some theoretical models and empirical evidence suggest that working can increase a woman's risk of suffering from domestic violence.

Some studies in the region find a positive association between women's empowerment and domestic violence. In particular, women with greater say in their households tend to suffer more violence from their partners. Flake and Forste (2006) use data from Demographic and Health Surveys (DHSs) for Colombia, the Dominican Republic, Haiti, Nicaragua, and Peru to explore the link between domestic violence and family characteristics. They find that female-dominant decision-making is positively associated with domestic violence. Friedemann-Sánchez and Lovatón (2012) also find that decision-making dominated by women is associated with a higher probability of intimate partner violence based on 2005 DHS for Colombia. Also, working for pay seems to put women at greater risk (as is the case of Ladina women in Guatemala according to Menjívar, 2011, and Mexican women according to Castro and Casique, 2009).[10]

However, other studies find opposite results. For instance, in Friedemann-Sánchez (2006), employment appears as a protective factor against intimate partner violence among formally employed agro-industrial workers in Colombia. Also, Villarreal (2007) finds that employed women in Mexico are less likely to suffer domestic violence. Despite these results, what all these studies have in common is that they only measure the association between empowerment and domestic violence; they do not determine a causal effect. Female LFP, women's wages, or any other proxy of female empowerment, are endogenous in the sense that they depend on factors that also affect domestic violence.

10 This negative side of empowerment is the typical prediction of socio-cultural models of "male backlash", in which as women's empowerment increases, men feel their traditional gender role threatened, reacting with violence against their female partners (Macmillan and Gartner, 1999).

Causal evidence for Latin American countries is very scarce due to unavailable data and to the difficulty of controlling for endogeneity of woman's wage or labor status.[11] Hidrobo and Fernald (2013) explore how an exogenous increase in a woman's income affects domestic violence by exploiting the randomized rollout of a cash transfer program in Ecuador. They find that the effect depends on a woman's education and on her education relative to her partner's. For women with more than primary education, a cash transfer reduces violence; but for other women, receiving a cash transfer increases violence if their educational level exceeds their male partners'. In a background paper for the case of Peru, Mendoza-Calderón (2014) finds that working women are more likely to suffer domestic violence as compared to non-working women. Clearly, further research is needed to better understand the ways in which women's LFP impacts the risk of suffering from domestic violence, and whether the effect varies with other characteristics, such as education.

5. Distributive implications of fertility changes[12]

Although this book is mainly concerned with female labor force participation, we have also documented other changes that affect women's lives and that may have sizeable implications on their incomes and standards of living. In this final section, we focus on changes in fertility patterns. Fertility rates began their downward trend in Latin America in the mid-1960s, implying a clear convergence towards the levels of the most advanced regions of the world. In particular, as documented in chapter 2, the number of children per household (the proxy for fertility that can be implemented with household survey microdata) has been falling over the last two decades: in 1992, there were 2.3 children under 16 per household (for households with a woman aged 25-45) in a typical Latin American country; that figure fell to 1.8 over the next two decades.

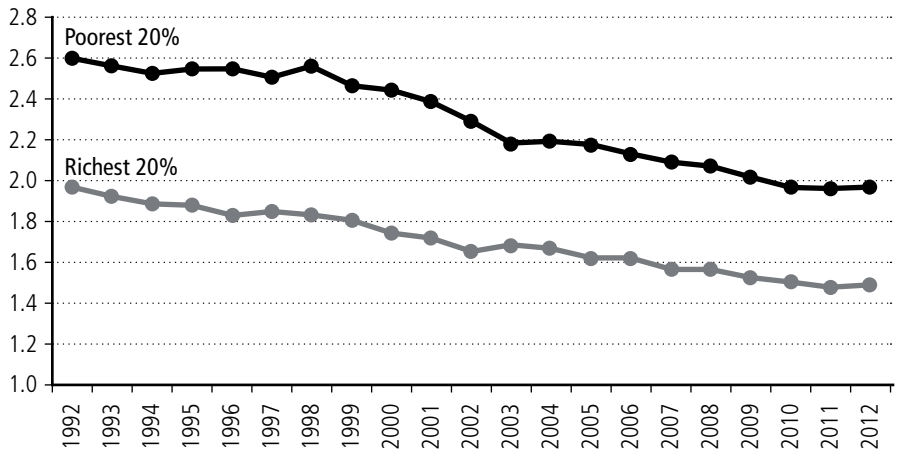
The average number of children decreased in households from all population groups, but the gap between the most and the least vulnerable groups shrank,

11 Aizer (2010) was the first to estimate the negative causal effect of female bargaining power on domestic violence based on data for the United States. She exploited changes in the demand for labor in female-dominated industries relative to male-dominated ones to define an exogenous measure of women's bargaining power. She found a causal negative effect of women's bargaining power on domestic violence. Moreover, the entire decline in domestic violence caused by the decrease of men's wages relative to women's occurs during non-working hours, which rules out explanations based on exposure reduction.

12 The section was written by Nicolás Badaracco, Mariana Marchionni and Leonardo Gasparini.

owing to a sharper decline in the number of children living in poor households. Figure 7.6 takes a sample of seven Latin American countries to show the average number of children under 16 per household in the poorest 20% and richest 20% of the prime-age parents.[13] In both groups, fertility went down over the two decades; the fall is somewhat more pronounced among the poorest couples. The gap in the number of children per household shrank from 0.67 in 1992 to 0.47 in 2012.

Figure 7.6: Number of children under 16 per household Bottom and top quintiles of parental income distribution, 1992-2012.



Source: own calculations based on microdata from national household surveys.
Note: Average of seven Latin American countries: Argentina, Brazil, Chile, El Salvador, Mexico, Peru, and Uruguay. Households with head aged 25-45. Unweighted means.

The distributive impact of these demographic changes could be sizeable. *Ceteris paribus*, a decrease in the number of children in poor households and in those marginally above the poverty line, lowers income poverty. Moreover, differential changes in family size across income strata, as in those mentioned above, could decrease inequality.

In this section we assess the extent to which changes in fertility in Latin America contributed to the observed reduction in income poverty and inequality during the 1990s and 2000s. To this aim, we simulate the household per capita income

13 The sample includes countries in which we implement the microsimulations that follow in this section.

distribution that would emerge if fertility outcomes in a given year would have been determined as in another different year.[14]

Of course, changes in these outcomes are driven by various factors, including some of those affecting female labor force participation. Estimating a general equilibrium model or complex structural equations that take into account all the interactions is not feasible, even less when considering this task for many Latin American economies. Instead, in this section we compute the first-round partial-equilibrium impact on the income distribution of changes in fertility, which could be taken as a useful approximation of the magnitude that these changes may have on poverty and inequality.

We follow the methodology proposed in Marchionni and Gasparini (2007).[15] The main inputs to carry out the microsimulations are the estimates of the parameters that govern fertility decisions/outcomes[16] and the response of labor market participation to changes in family size. We assume that the number of children in a household follows a Poisson process, and that its parameters can be consistently estimated using a Poisson regression model. Hourly wages and hours of work are assumed to be simultaneously determined in an equilibrium model of the labor market.

After estimating the parameters, we carry out the simulations. Poverty and inequality indicators are computed over the counterfactual income distribution that arises in a given base year by assuming that the population in that year takes fertility decisions according to the parameters estimated for a different year. The resulting poverty and inequality measures are compared to those actually observed in the base year. The difference between the simulated value of an indicator of poverty or inequality and its actual value is interpreted as a measure of the direct impact of the change in fertility behavior.

Some equations may clarify the methodology. The non-technical reader can skip them and go directly to the results. We measure poverty and inequality over the distribution of household per capita income, defined as

14 The term *fertility* is used as a shortcut for the number of children in the household, which in most cases changes as the consequence of fertility decisions.

15 The explanation of the methodology is taken from Marchionni and Gasparini (2007) and Badaracco (2014). See Appendix 2 for more details.

16 For simplicity we refer to fertility *decisions*, although fertility outcomes could be the result of free conscious choices, but also the consequence of various other circumstances.

(1) $$y_{ht} = \frac{Y^L_{ht} + Y^{NL}_{ht}}{N_{ht}} \quad \forall i \in h \text{ at time } t$$

where i indexes individuals, h households and t time periods (years). Y^L_{ht} denotes total labor income of household h at time t, Y^{NL}_{ht} labels non-labor income, and N_{ht} is the family size, which is the sum of the number of children H_{ht} and the rest of the household members R_{ht}.

(2) $$N_{ht} = H_{ht} + R_{ht}$$

Labor incomes are determined in a model similar to the one discussed in Appendix 1. Non-labor incomes are determined by

(3) $$Y^{NL}_{ht} = m_{ht} + g(H_{ht})$$

where m_{ht} is exogenous and $g(H_{ht})$ represents the part of non-labor incomes that depends on the number of children. Typically, the cash transfer in poverty-alleviation programs vary with the number of children in the family.

We label the parameters of the fertility decisions at time t as η_t, and those at time t' as $\eta_{t'}$. A key step in the methodology is to estimate the counterfactual number of children in a given year t if fertility outcomes were determined as in an alternative year t'. Once this term, labeled as $H_{ht}(\eta_{t'})$, is estimated, three microsimulation exercises are carried out by replacing this estimate in the household per capita income equation.

The first exercise implies replacing the simulated number of children into the denominator of the equation for household per capita income (1).

(4) $$Y^D_{ht} = \frac{Y^L_{ht} + Y^{NL}_{ht}}{N_{ht}(\eta_{t'})}$$

where $N_{ht}(\eta_{t'}) = R_{ht} + H_{ht}(\eta_{t'})$. The change in the income distribution resulting as a consequence of this exercise is labeled as the *direct-size effect*. It is interpreted as the contribution of the change in fertility parameters η to the actual change in the income distribution through the direct channel – *i. e.* a change in the number of household members among whom total household income should be distributed.

The second exercise involves using the simulated number of children $H_{ht}(\eta_{t'})$ to re-compute the individual hours of work using equation (1).

$$Y_{ht}^{H} = \frac{Y_{ht}^{L}(\eta_{t'}) + Y_{ht}^{NL}}{N_{ht}} \quad (5)$$

With a different number of children in the household, some individuals may decide to work more or less hours, and that, in turn, will alter individual labor incomes, and thus total household income. The change in the income distribution as a consequence of this second exercise is named the *hours-size effect*. It is interpreted as the contribution of the change in fertility parameters η to the actual change in the income distribution through the indirect channel of affecting the hours of work decisions.

We carry out a third exercise by simulating the counterfactual distribution arising from a change in non-labor income driven by changes in fertility decisions.

$$Y_{ht}^{NL} = \frac{Y_{ht}^{L} + Y_{ht}^{NL}(\eta_{t'})}{N_{ht}} \quad (6)$$

The distributional impact of changes through this channel is labeled as the *non-labor income effect*.

The total effect adds the impact of changes in the fertility parameters through the three channels

$$Y_{ht}^{T} = \frac{Y_{ht}^{L}(\eta_{t'}) + Y_{ht}^{NL}(\eta_{t'})}{N_{ht}(\eta_{t'})} \quad (7)$$

So far, we have assumed that year t is the base year from which we "import" the parameters of another year t'. Of course, we could instead have taken t' as the base year and "imported" year t parameters. As is well established in the microsimulation literature, the decompositions are path-dependent: the results are not exactly the same when taking alternatively year t or year t' as the base year. We perform both exercises and report the average value for each of the effects discussed above.

The methodology requires keeping all other things constant when simulating the impact of changes in fertility decisions. Naturally, as was stressed in previous sections, some of these factors may covariate with fertility. For instance, the structure of wages may respond to changes in the labor supply triggered by a change in fertility. Additionally, changes in reproductive behavior may have been

induced by income changes, in which case the microsimulation only captures a single round of effects, from fertility to incomes, of a more complicated process.

If we observe that family size declines for the poor more than for the rich, it is rather obvious that poverty and inequality measured over the distribution of household current income per capita will also decline. This section makes two contributions to this intuition. First, it provides estimates of the magnitude of the direct distributive impact of the changes in fertility; that is the extent to which the actual declines in poverty and inequality can be accounted for by only the change in the reproductive behavior. Second, the methodology allows tracing and measuring some not-so-obvious effects. The fall in the number of children in the bottom strata of the distribution may induce some low-income women to enter the labor market or to work more hours. In that case, the decline in poverty and inequality might be larger than expected if one only considers the direct impact of the decline in family size.

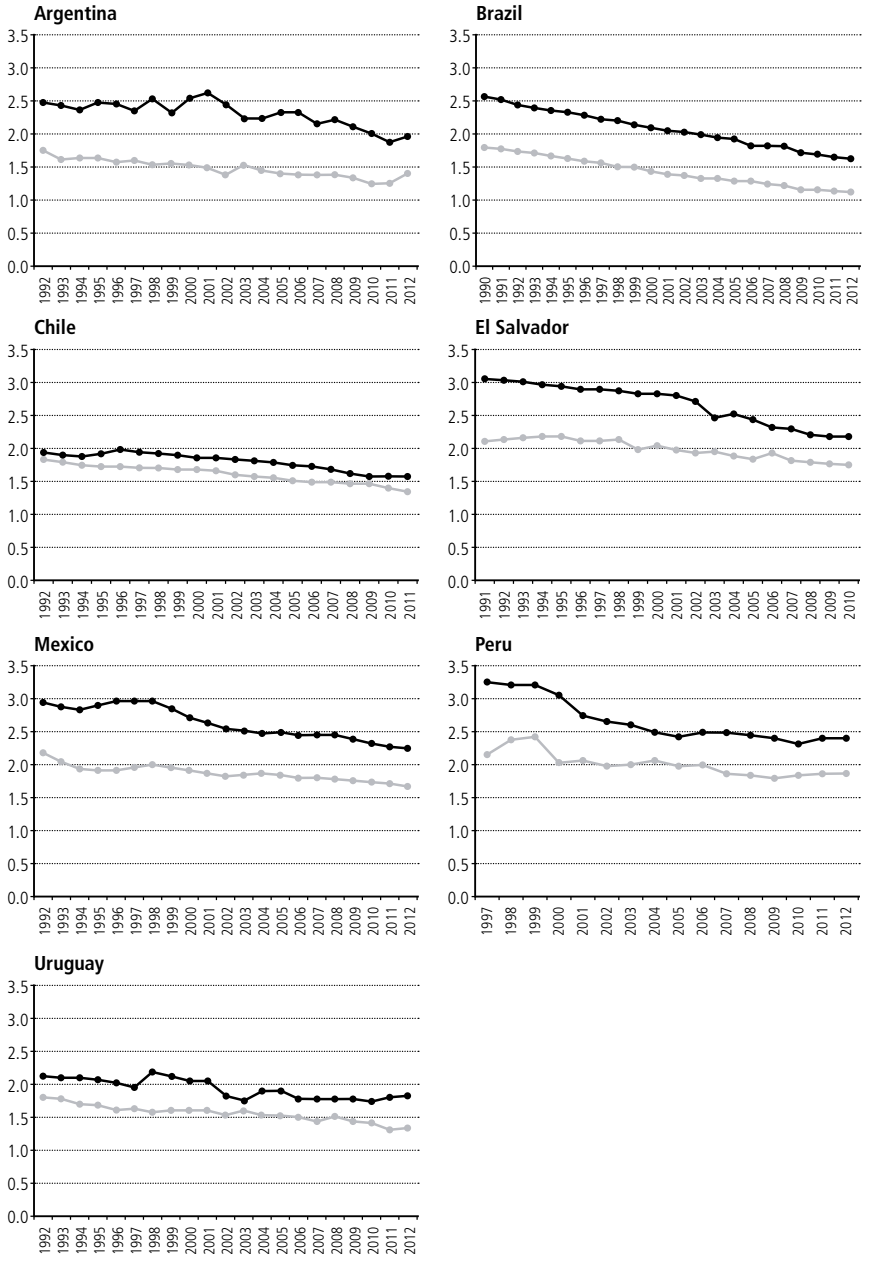
Results

The estimations of the fertility equations are carried out for a sample of households in which the family head is between 25 and 45 years old. Figure 7.7 illustrates the number of children under 16 years old per household for the bottom and top quintiles of the parental income distribution in seven Latin American countries. In all cases, the number of children falls over time for both income groups. In Argentina, Brazil, El Salvador, Mexico, and Peru, the reduction is more marked for the bottom quintile, implying a shrinking fertility gap with the top quintile. In Chile, by contrast, the gap remains rather constant, while there are some signs of a widening gap in Uruguay.

The results of the microsimulations regarding poverty are presented in Table 7.5. Column (i) displays the observed change in the headcount ratio, while the rest of the columns present the impact of the changes in fertility. Column (v) shows the sum of all effects explored (equation (7)). In order to better understand the information in the table, take the case of Brazil. Column (i) informs that between 1990 and 2012 the poverty headcount ratio in that country (using the line of US$ 4 a day) fell 25 points.[17] The value in the last column has the following interpretation: if fertility had been the only factor that changed during that period, then the poverty headcount ratio in Brazil would have fallen 3.92 points.

17 The values in this column do not coincide with the corresponding ones in Table 7.1, since here we are restricting the sample to households in which the head is between 25 and 45 years old. In addition, the analysis in Table 7.1 is limited to urban areas.

Figure 7.7: Number of children under 16 per household Bottom and top quintiles of parental income distribution.



Source: own calculations based on microdata from national household surveys.
Note: Households with mother aged 25-45. Black line: bottom income quintile (poorest 20%). Grey line: top income quintile (richest 20%).

This change is statistically significant, although not very big compared to the actual fall in poverty in that period. The overall effect is the result of a significant *direct* effect (-3.74), and two smaller effects that go in different directions. On the one hand, the differential reduction in fertility implied a greater increase in hours of work among more disadvantaged households, which in turn contributed, although very slightly, to a further reduction in income poverty. On the other hand, the falling patterns in fertility among the poor ameliorated the poverty-decreasing impact of the conditional cash transfer programs that are mainly targeted to families with children (mainly the *Bolsa Familia* in the 2000s). However, this effect was quantitatively almost insignificant.

Changes in fertility patterns over the last two decades in Latin America have implied a reduction in income poverty. The impact is statistically significant and in some cases economically large. For instance, the estimated poverty-reduction effect was more than 4 points in Mexico and El Salvador. Most of the effect comes through the *direct* effect: a reduction in fertility rates among the most disadvantaged groups reduced family size and increased per capita income. The *hours-of-work* effect is in most cases poverty reducing and the *non-labor-income* effect is poverty increasing, but in both cases the estimated sizes are small.

Table 7.5: Impact of fertility changes on poverty
Changes in the poverty headcount ratio (US$ 4 line)

Country	Period	Observed change	Effects			
			Direct	Hours	NLI	Total
		(i)	(ii)	(iii)	(iv)	(v)
Argentina	1992-2012	-11.22	-1.39	0.04	0.39	-0.80
		(0.08)	(0.02)	(0.01)	(0.01)	(0.02)
Brazil	1990-2012	-25.16	-3.74	-0.17	0.14	-3.92
		(0.03)	(0.01)	(0.00)	(0.00)	(0.01)
Chile	1990-2011	-33.24	-1.56	0.18	-	-1.43
		(0.05)	(0.01)	(0.00)	-	(0.01)
El Salvador	1991-2010	-14.12	-4.98	-0.34	-	-5.31
		(0.06)	(0.04)	(0.01)	-	(0.05)
Mexico	1992-2012	-3.50	-4.35	-0.30	0.25	-4.43
		(0.10)	(0.04)	(0.02)	(0.01)	(0.04)
Peru	1997-2012	-23.20	-3.83	-0.19	-	-3.94
		(0.09)	(0.03)	(0.01)	-	(0.03)
Uruguay	1995-2012	-1.56	-0.08	0.00	0.02	-0.05
		(0.03)	(0.02)	(0.00)	(0.00)	(0.02)

Source: own calculations based on microdata from national household surveys.
Note: All effects are significant at the 1% level. The standard errors were calculated using bootstrap with 200 replications. The values of each effect are averages that result from taking alternatively each year in the comparison as the base year. The sample includes only households in which the head is between 25 and 45 years old. NLI=non-labor income.

Table 7.6 shows the results of the simulations on income inequality, measured by the Gini coefficient. Inequality in Brazil, as measured by the Gini coefficient, fell 7.18 points between 1990 and 2012. If fertility had been the only factor that changed in that period, then the Gini coefficient would have fallen 1.32 points (column v). This change is statistically significant, representing around 18% of the actual reduction in inequality during that period. The differential reduction in fertility across socioeconomic groups in Brazil contributed to the observed decline in inequality in the last two decades, although it was not a decisive factor. The overall effect of -1.32 points in column (v) is the result of a significant *direct* effect (-1.30), and two smaller effects going in different directions.

Some interesting general results emerge from Table 7.6. First, changes in fertility have implied a decline in income inequality. The differential pattern in fertility across groups experienced in most Latin American countries over the last decades translated into an equalizing impact on the income distribution. Second, this effect is small, although not negligible. To be sure, demographic changes are not the central reason behind changes in income inequality but they are not irrelevant. In principle, most of them are statistically significant. On average, fertility changes account for a fall of around a point in the Gini coefficient. In Peru the impact was almost two Gini points.

Third, most of the effect comes from the *direct* effect. The differential fall in fertility rates among socioeconomic groups had a larger impact on the family size of poorer families, implying a proportionally larger increasing effect on their per capita incomes.

Fourth, the effect of fertility changes on hours of work and, in turn, on incomes, is smaller and has different signs across countries. It is important to notice that a more intense reduction in fertility among the poor may be consistent with a positive sign (inequality-increasing) for this effect. This could happen if the elasticity of hours of work with respect to the number of children is higher among the non-poor, and if the extra-hours worked triggered by the fall in fertility imply a household income increase proportionally larger for the non-poor. Anyway, with one exception the hours-of-work effect has a negative sign, implying that the asymmetric reduction in fertility contributed to a reduction in income inequality by fostering a higher participation in the labor market among the more disadvantaged parents (mostly mothers).

Finally, the effect through non-labor incomes is always inequality-increasing but small. The fall in fertility among the poor implied a lower inequality-reducing impact of the conditional cash transfer programs that spread in the region, mainly during the 2000s. The effect, however, is in most cases very small.

Table 7.6: Impact of fertility changes on inequality
Changes in the Gini coefficient

Country	Period	Observed change	Effects			
			Direct	Hours	NLI	Total
		(i)	(ii)	(iii)	(iv)	(v)
Argentina	1992-2012	-5.44	-1.04	-0.01	0.13	-0.95
		(0.10)	(0.01)	(0.00)	(0.00)	(0.02)
Brazil	1990-2012	-7.18	-1.30	-0.06	0.06	-1.32
		(0.04)	(0.00)	(0.00)	(0.00)	(0.00)
Chile	1990-2011	-1.78	-0.75	0.04	-	-0.73
		(0.08)	(0.01)	(0.00)	-	(0.01)
El Salvador	1991-2010	-7.68	-1.30	-0.07	-	-1.40
		(0.06)	(0.02)	(0.00)	-	(0.02)
Mexico	1992-2012	-0.86	-1.68	-0.11	0.12	-1.69
		(0.19)	(0.02)	(0.00)	(0.00)	(0.02)
Peru	1997-2012	-7.32	-1.92	-0.06	-	-1.99
		(0.13)	(0.01)	(0.00)	-	(0.01)
Uruguay	1995-2012	-2.03	-0.12	-0.01	0.02	-0.13
		(0.04)	(0.01)	(0.00)	(0.00)	(0.01)

Source: own calculations based on microdata from national household surveys.
Note: All effects are significant at the 1% level. The standard errors were calculated using bootstrap with 200 replications. The values of each effect are averages that result from taking alternatively each year in the comparison as the base year. The sample includes only households in which the head is between 25 and 45 years old. NLI=non-labor income.

In summary, we find that the changes in fertility decisions that took place over the last decades contributed to reductions in income inequality and poverty in all countries. The fall in fertility among the income-deprived contributed to the reduction in poverty, and as it was larger than the decline among the non-poor, it contributed to the fall in inequality, as well. The main channel was simple: lower fertility rates implied smaller families and, thus, larger per capita incomes that reduced the probability of falling into income poverty. Lower fertility also fostered labor force participation, especially among women, which contributed to a reduction of poverty in several countries and a reduction in inequality in most economies, although the size of this effect was generally small.

Given the magnitude of the effects found, we conclude that demographic changes in general, and fertility outcomes in particular, do not seem to be trivial determinants of the income distribution, and deserve careful consideration. This section has focused on some simple yet central channels, and ignored some factors that could also be relevant. For instance, a reduction in the number of children per family could imply higher inheritances and higher family spending on education and health per child, and hence, better income perspectives. Also,

smaller families may be better positioned to take advantage of labor market opportunities, for instance, through migration. Moreover, lower fertility rates may be associated with a reduction in the relative supply of unskilled labor and hence, an increase in its relative wage.

Although in the short and medium-run, lower fertility in more disadvantaged households may contribute to reducing poverty and inequality, in the long run the implications are more nuanced. When children become adults they may contribute to their parents' incomes:[18] a fall in fertility may reduce incomes for the elderly, especially in countries where the pension system is weak, and ultimately contribute to higher poverty through that intertemporal channel.

18 The contribution to household income may start earlier in life. Child labor is still an issue in most Latin American countries.

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Appendix 1

In this appendix we describe the microeconometric decomposition methodology outlined in section 2 and discuss the estimation strategy. Total household income (Y_{ht}) is the sum of individual labor incomes (Y_{jt}^{L}) and non-labor incomes (Y_{jt}^{NL}) over all household members.

(A1.1) $$Y_{ht} = \sum_{\forall j \in h} (Y_{jt}^{L} + Y_{jt}^{NL})$$

It is assumed that non-labor incomes are exogenously determined. Individual i's labor income is the product of the hourly wage rate (w_{it}) and the number of hours of work (L_{it}).

(A1.2) $$Y_{it}^{L} = w_{it} L_{it}$$

We follow Gasparini, Marchionni and Sosa Escudero (2004) in assuming that both wages and hours are determined in a reduced-form model of the labor market equilibrium:

(A1.3) $$\ln w_{it}^{*} = X'_{1it} \beta_{t} + \varepsilon_{it}^{W}$$

(A1.4) $$L_{it}^{*} = X'_{2it} \gamma_{t} + \varepsilon_{it}^{L}$$

$$\text{with } w_{it} = w_{it}^{*} \text{ and } L_{it} = L_{it}^{*} \text{ if } L_{it}^{*} > 0$$

$$w_{it} = 0 \text{ and } L_{it} = 0 \text{ if } L_{it}^{*} \leq 0$$

$$(\varepsilon_{it}^{W}, \varepsilon_{it}^{L}) \sim N(\mathbf{0}, \mathbf{0}, \sigma_{Wt}^{2}, \sigma_{Lt}^{2}, \rho_{t})$$

where w_{it}^{*} and L_{it}^{*} are latent variables, unobservable by the analyst. The column vectors X_{1it} and X_{2it} include all observable factors affecting hourly wages and hours of work, respectively. β_t and γ_t (vectors), are the parameters to be estimated in the model, along with $\sigma_{Wt}^2, \sigma_{Lt}^2$ and ρ_t.

The specification of equations (A1.3) and (A1.4) corresponds to the *Tobit Type III* model in Amemiya's (1985) classification. It is possible to consistently estimate the parameters of this model by:[19] (i) estimating equation (A1.3) by Heckman's maximum likelihood method, using a censored version of (A1.4) as a selection equation, where instead of hours of work a binary indicator that captures whether the individual works or not is used, and (ii) estimating equation (A1.4) using a Tobit model. We estimate this model for three groups: household heads, spouses, and others.

In the framework of this model we carry out two simulations that arise from changing the parameter γ. In the first simulation, we consider only women that change their employment status and assign them a wage according to equation (A1.3), and an error term drawn from the bivariate distribution implicit in the model. In the second simulation, we consider only changes in hours of work among those women who were employed before the simulation.

19 This estimation strategy is consistent though not fully efficient. Gasparini *et al*. (2004) argue that (i) this alternative has certain computational advantages over a full information procedure, and that (ii) the efficiency loss is not necessarily significant for a given sample size.

Appendix 2

The methodology for the microsimulations of section 4 is similar to that described in Appendix 1. Instead of simulating changes in female labor force participation, in this section we simulate changes in fertility outcomes. This appendix reports some of the methodological issues regarding this point.[20]

According to economic theory, fertility outcomes are the result of a process affected by characteristics of each spouse and on household characteristics, among other factors. Fertility decisions can be represented by the following equation:

(A2.1) $$H_{ht} = H(Z_{ht}, e_{ht}; \eta_t)$$

where H_{ht} is the number of children in household h at time t, Z_{ht} is a column vector of household observable characteristics and e_{ht} includes all unobservable characteristics that influence family reproductive behavior. For the estimation of this model, it is assumed that the number of children follows a Poisson process with parameter μ_{ht}. Formally,

(A2.2) $$H_{ht} \sim Poisson(\mu_{ht}) \quad \text{with} \quad \mu_{ht} = E(H_{ht}|Z_{ht}) = exp(Z'_{ht}\eta_t)$$

Then,

(A2.3) $$Prob(H_{ht} = H_o) = \frac{\exp(-\mu_{ht})(\mu_{ht})^{H0}}{H_0!} \text{ with } H_o = 0, 1, 2, \ldots$$

This is the Poisson regression model, from which it is possible to consistently estimate parameters η_t by the maximum likelihood procedure. It can be shown

20 The section is taken from Marchionni and Gasparini (2007) and Badaracco (2014).

that consistency holds for the maximum likelihood estimators of η_t as long as the real distribution is any of the linear exponential family (to which the Poisson distribution belongs), provided that the conditional mean in (A2.2) is correctly specified. The estimators of η (which for simplicity are also denoted by η) are used to perform the microsimulations.

The simulated number of children in household h at year t, using the estimated fertility parameters for year t', is given by:

$$H_{ht}(\eta_t) = F^{-1}_{\eta_{t'}|Z_{ht}} \text{ o } F_{\eta_t|Z_{ht}}(H_{ht}) \tag{A2.4}$$

where $F_{\eta_t|Z_{ht}}(.)$ is the function that gives the relative ranking of its argument in year t distribution conditional to the observable characteristics Z_{ht}. In this particular case, $F_{\eta_t|Z_{ht}}(.)$ is the cumulative probability function of a random variable that follows a Poisson distribution with $exp(Z'_{ht}\eta_t)$ parameter.

The advantage of simulating the number of children through equation (A2.4) instead of predicting the expected number of children from the estimated model becomes evident when unobservable factors affecting fertility decisions are taken into account. Two households with the same observable characteristics Z_{ht} but a different number of children clearly differ in their unobservable characteristics e_{ht}, although the prediction of the expected number of children for both households would be the same and equal to $exp(Z'_{ht}\eta_t)$. Since the objective is to simulate changes in the number of children as a consequence of changes only in the parameters η, it is necessary to keep unobservable factors fixed. Therefore, each household is characterized by the quantile it occupies in the distribution of children of year t. Let q_{ht} be the quantile for household h at time t, that is, $F_{\eta_t|Z_{ht}}(H_{ht})=q_{ht}$. The simulated number of children in household h will be the one that places it in the q_{ht} quantile of the distribution of children with the relevant parameters of time t' ($\eta_{t'}$) conditional to the observable characteristics Z_{ht}.

Appendix 3

Figure 7.2: Poverty based on projections of female LFP Latin American countries, 2012-2032.

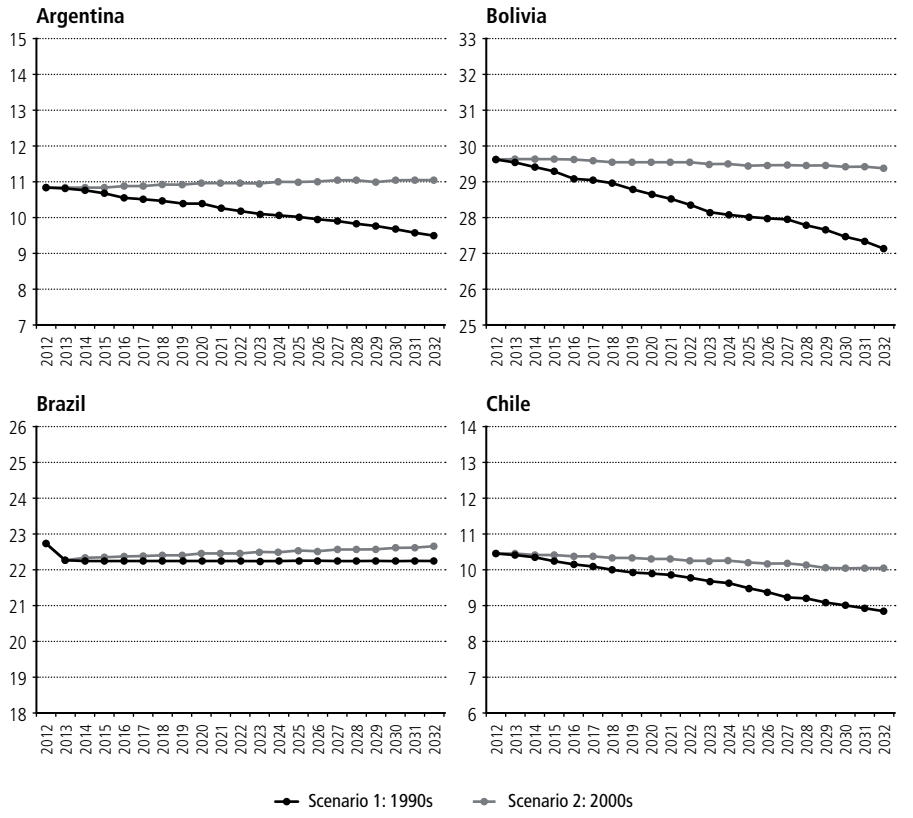


Figure 7.2: Poverty based on projections of female LFP (cont.)

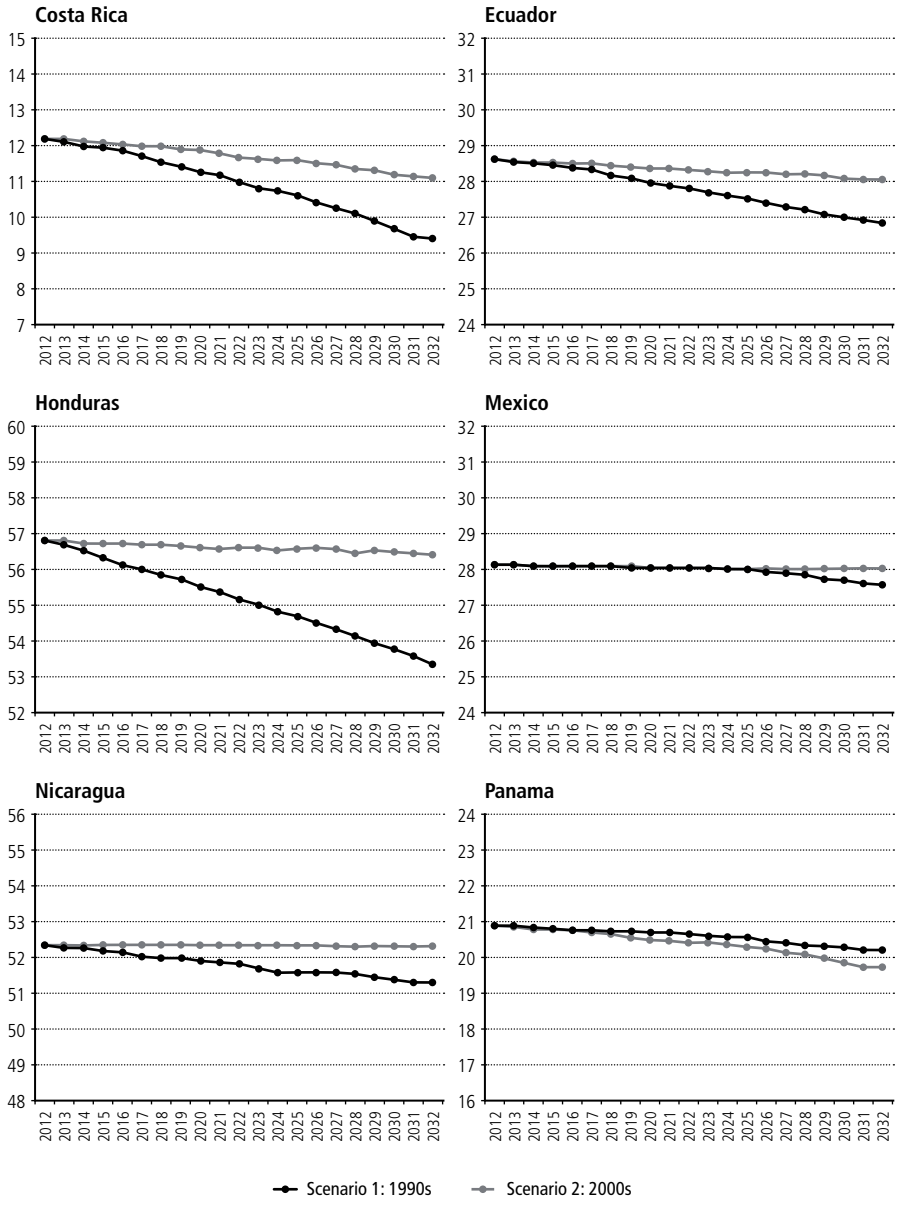
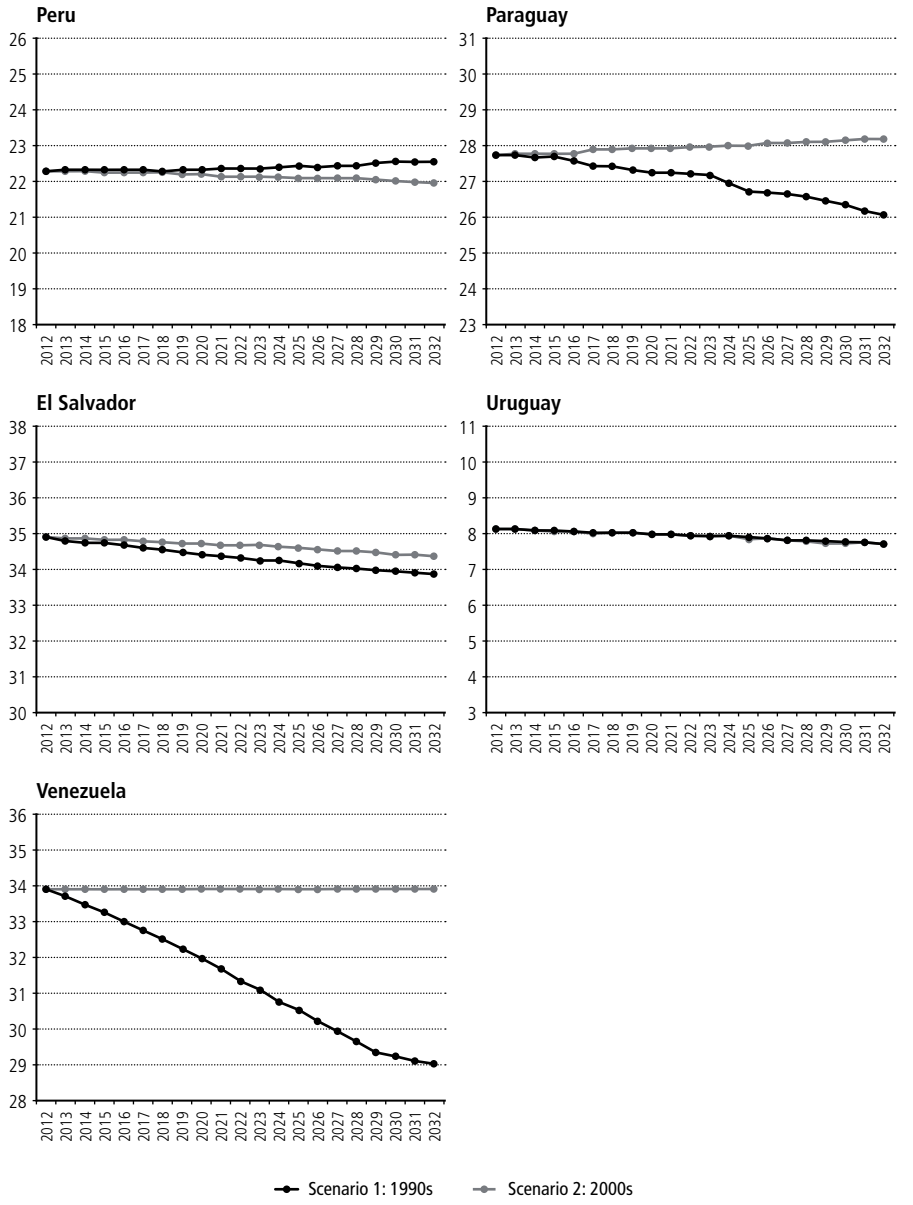


Figure 7.2: Poverty based on projections of female LFP (cont.)



Source: own calculations based on national household surveys.
Note: poverty is measured with the headcount ratio with a line fixed at USD 4 a day adjusted for PPP.

Figure 7.3: Inequality based on projections of female LFP Latin American countries, 2012-2032

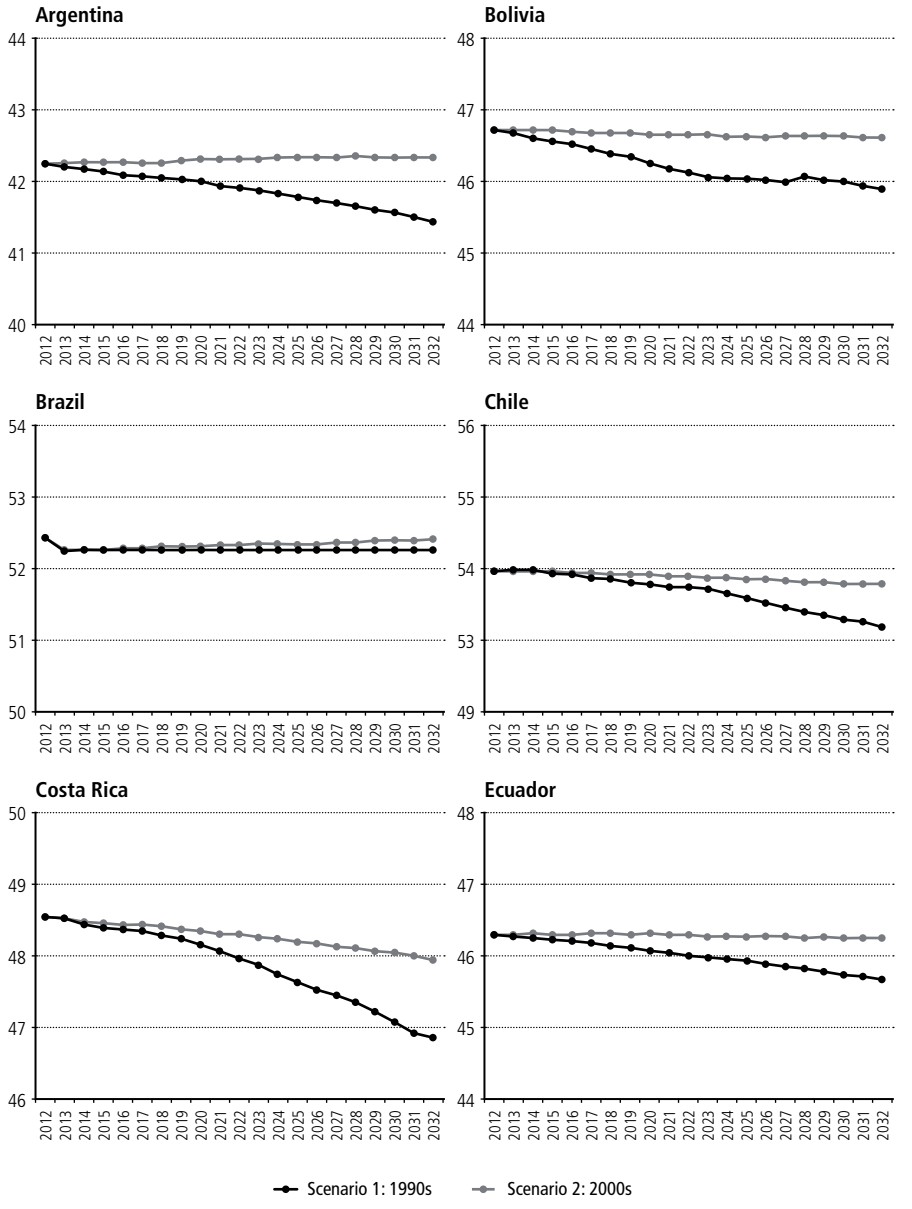


Figure 7.3: Inequality based on projections of female LFP (cont.)

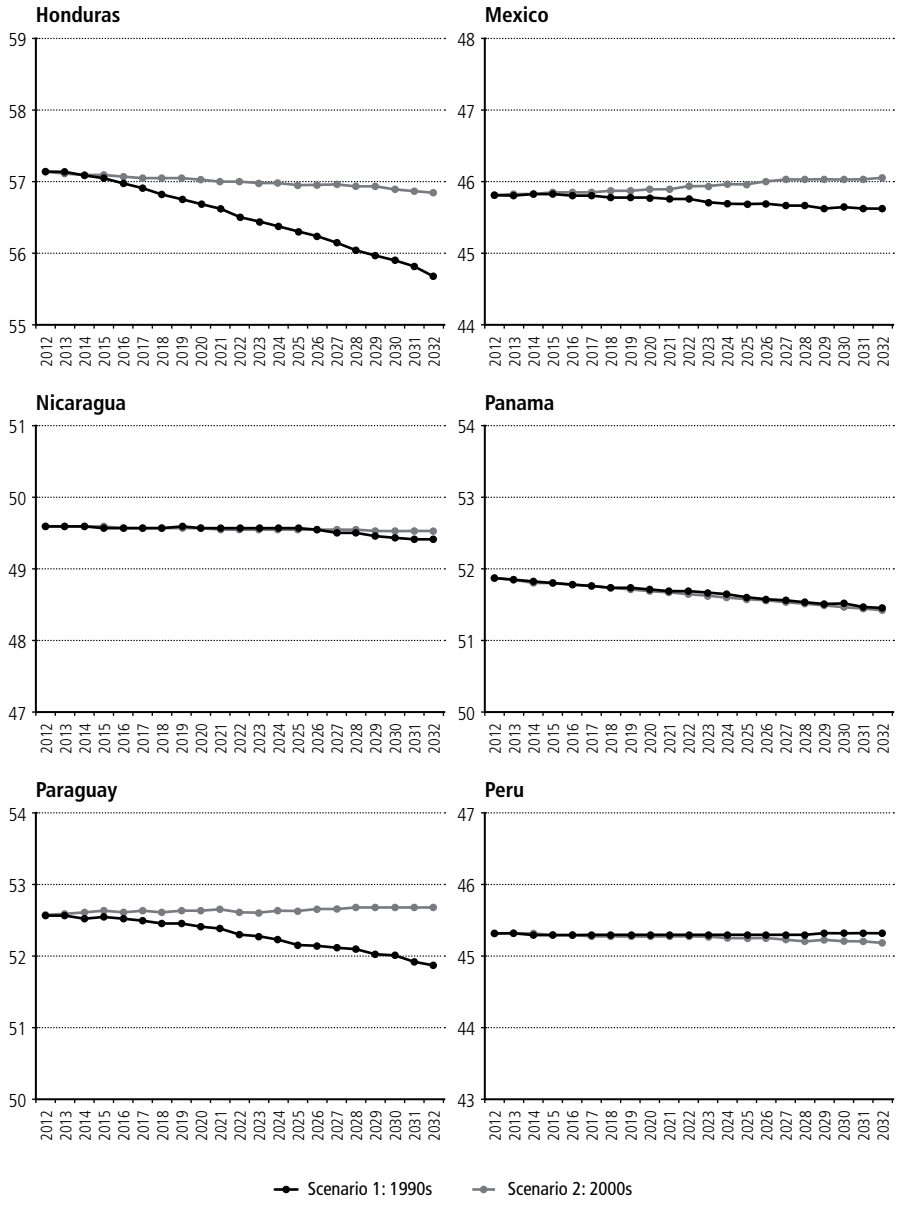
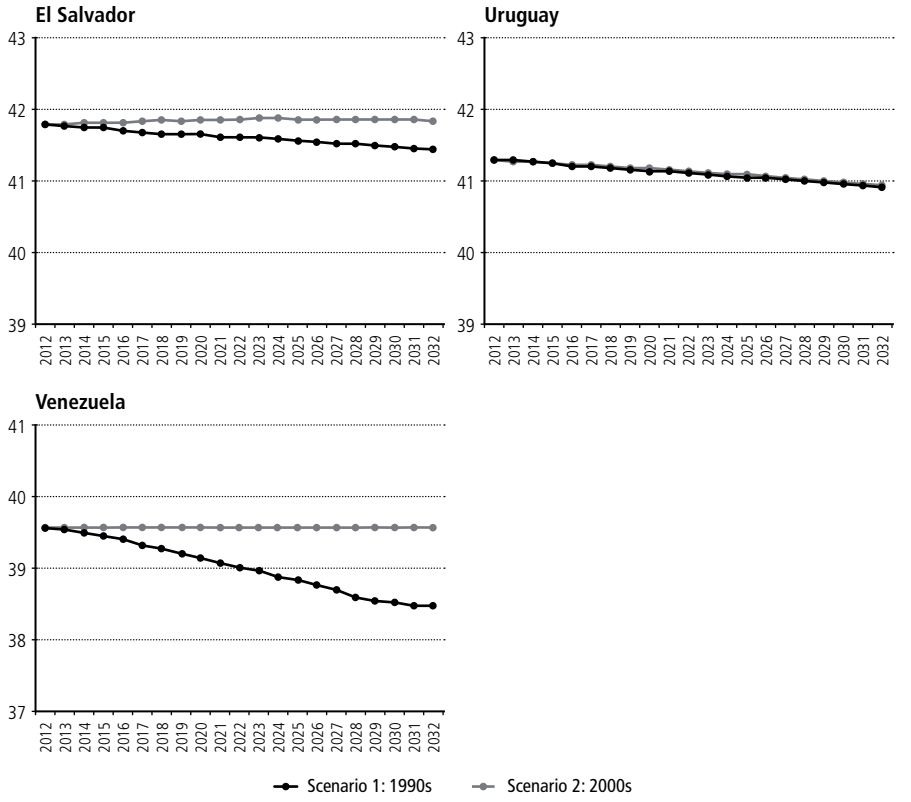


Figure 7.3: Inequality based on projections of female LFP (cont.)



Source: own calculations based on national household surveys.

Note: Inequality is measured with the Gini coefficient for household per capita income.

Table 7.4: Percentage of female heads of household Latin American countries, 1992-2012. Women aged 25-54.

A. All women

	Share of female household heads based on self-report assesment				Gap between self-report and economic definitions of female household headship*		
	1992 (in %)	change 2002-1992	change 2012-2002	change 2012-1992	1992	2002	2012
Argentina	12.7	5.3	7.4	12.7	-4.2	-6.5	2.7
Bolivia	9.5	4.8	4.7	9.5	-2.1	-3.6	-0.9
Brazil	15.7	6.1	9.6	15.7	-1.0	0.8	8.9
Chile	16.8	4.2	12.6	16.8	0.0	0.0	5.7
Costa Rica	12.1	5.8	6.3	12.1	0.1	3.0	6.9
Ecuador	4.9	3.5	1.4	4.9	1.5	-2.4	-3.5
Honduras	3.9	1.2	2.7	3.9	2.9	0.4	2.5
Mexico	7.7	3.9	3.8	7.7	-0.7	-1.7	0.4
Nicaragua	2.7	-1.3	4.0	2.7	1.1	2.0	3.7
Panama	7.4	1.3	6.1	7.4	0.4	1.8	7.1
Peru	2.9	0.8	2.2	2.9	-1.9	-2.5	-0.1
Paraguay	11.1	8.1	3.0	11.1	-2.2	1.7	6.4
El Salvador	6.1	4.9	1.3	6.1	-0.4	-2.5	-0.8
Uruguay	22.3	7.8	14.5	22.3	0.6	-0.8	8.7
Venezuela	10.4	7.1	3.3	10.4	1.6	0.9	6.4
Latin America	9.8	4.2	5.5	9.8	-0.3	-0.6	3.6

B. Married women

	Share of female household heads based on self-report assesment				Gap between self-report and economic definition of female household headship**					
					Total income			Labor income		
	1992 (in %)	change 2002-1992	change 2012-2002	change 2012-1992	1992	2002	2012	1992	2002	2012
Argentina	2.3	1.9	9.8	11.7	-10.6	-18.0	-5.4	-12.7	-10.8	-3.3
Bolivia	0.5	1.2	3.5	4.7	-7.5	-11.1	-7.5	-7.9	-10.7	-7.6
Brazil	1.2	3.8	14.8	18.6	-9.3	-8.6	1.3	-9.7	-8.0	5.1
Chile	1.1	4.3	10.9	15.3	-6.3	-6.6	1.5	-6.4	-5.8	2.3
Costa Rica	1.5	2.8	7.5	10.3	-7.9	-7.6	-4.3	-7.7	-7.5	-3.6
Ecuador	2.5	0.3	0.3	0.6	-6.8	-12.1	-12.0	-6.3	-8.8	-9.7
Honduras	3.9	-0.7	6.1	5.4	-6.7	-8.7	-7.5	-6.7	-9.5	-4.9
Mexico	0.4	1.1	3.1	4.2	-5.4	-10.0	-12.1	-5.8	-8.8	-9.5
Nicaragua	7.4	-1.0	6.0	5.0	-9.5	-8.4	-7.1	-9.7	-10.4	-7.6
Panama	3.1	1.9	4.6	6.5	-11.2	-11.9	-6.2	-10.8	-10.8	-5.7
Peru	1.4	0.4	2.6	3.0	-11.5	-11.2	-6.6	-13.6	-13.9	-11.6
Paraguay	1.3	7.0	5.6	12.6	-7.9	-8.1	-1.7	-8.2	-7.4	-1.1
El Salvador	2.0	6.0	1.2	7.3	-11.0	-15.3	-12.2	-11.0	-13.1	-11.5
Uruguay	4.5	3.1	14.4	17.5	-10.3	-11.6	1.6	-10.1	-11.3	1.9
Venezuela	0.2	7.6	7.1	14.8	-9.6	-10.0	-1.7	-9.6	-9.7	-1.7
Latin America	2.2	2.6	6.5	9.2	-8.8	-10.6	-5.3	-9.1	-9.8	-4.6

Source: own calculations based on national household surveys.

Note: *Economic definition based on total family income: share of prime age women earning more than half of total family income. **Economic definition based on both a woman and her husband's income: share of prime age married women earning more than her husband. Married women: either in formal or consensual unions. Latin America: unweighted means.