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Rosangela Bando

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Abstract

Men and women are biologically different and may sometimes have different roles, but they should have equal rights. As things stand, however, women work more yet get less formal compensation or benefits in exchange for it. The average woman in Latin America and the Caribbean works 25 hours more per month than the average man. Yet only half of women in the region are paid for or otherwise profit from their work. Work without formal pay leads to weak protection of human rights and limits civic participation. Moreover, gender inequality deters economic development and fosters income inequality. Research shows gender gaps result from the interactions of social norms and biological differences. The challenges to generating effective policies include the difficulty of identifying relevant mechanisms to explain gaps, the cost of collecting and analyzing relevant data, and the complexity associated with determining pertinent features of gender gaps. Collection and analysis of those mechanisms, data, and features are critical to learning how to correct gender gaps going forward.

Keywords: Gender inequality, gender gaps, Latin America and the Caribbean

JEL codes: E24, J01, J16

1. Introduction

Men and women may sometimes have different roles, but they should always have equal rights. However, in Latin America and the Caribbean that is not the case: women work more yet get less formal compensation or benefits in exchange for it. The average woman in the region works 25 hours more per month than the average man (United Nations 2015c), and half the women in the region work for no pay or profit at all (World Bank 2016). A pay gender gap implies limits to individual choice based on sex, thus violating individual human rights. Note that the word "gender" refers to a social construct. Gender denotes a group of behaviors that society considers appropriate for men and women (WHO 2015). Thus, gender gaps refer to differentials between the sexes derived from different treatment by society. The word "sex," on the other hand, denotes the biological and physiological characteristics that separate men and women (WHO 2015).[1]

Governments in the region need policies to promote equal enjoyment by men and women of human rights, including the right to reap economic and social benefits. Despite the current gender gap in Latin America and the Caribbean, there has been significant progress in the region. Women have increased their labor participation since the 1990s more than in any other region in the world. The percentage of employed women 15 years of age and older increased from 38 to 50 percent from 1991 to 2014 in Latin America and the Caribbean, in contrast to a decrease from 49 to 46 percent in the rest of the world (World Bank 2016).[2] However, it is still an open question how much of this labor increase constitutes a substitution for unpaid work and how much of it is actual additional labor. Economists cannot fully explain why women continue to assume unpaid work in society and bear the cost associated with it. Neither is it clear why society continues to bear the social and economic costs associated with gender segregation into occupations.

Economists have studied labor and pay gender gaps since the 1950s. The general argument built to date includes several components. Biology and social norms interact to determine skills. Skills and technology produce goods and services that individuals trade. Institutions regulate trade to reduce transaction costs. Thus, biology, social norms, technology, and institutions influence the pay gender gap. Researchers have found that these factors interact and influence the gender gap at several stages. Therefore, researchers are challenged to find simple solutions. Policymakers and researchers are working together to address the challenge. This paper aims to aid these efforts. It summarizes the progress in research, explains the rationale for the main theories to explain gender gaps, summarizes pay gap studies in the region in the last 10 years, and lists the main challenges to generating evidence-based gender equality policy in Latin America and the Caribbean.

Studying gender gaps is important for two reasons. The first is that gender gaps limit individual choice based on sex. The second article in the Declaration of Human Rights states: "Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as […] sex" (United Nations 1984). However, the observed inequality in pay between men and women is related to limits to freedoms. For instance, Duflo (2012) noted that gender would not influence spending if informal mechanisms enabled individuals to voice their preferences. However, women allocate more resources than men to the education and health of children (Thomas 1990; Duflo 2003; Duflo and Udry 2004). In Mexico, married women's earnings reduce within-household inequality because they share their income with other household members (Campos-Vázquez, Hincapié, and Rojas-Valdés 2012). In the government sphere, the gender of the decision-maker also influences public spending (Yañez-Pagans 2014). Thus, pay gaps reflect gaps in the ability of individuals to voice their preferences.

The second reason why it is important to study gender gaps is that these gaps deter economic growth. Indeed, women tend to invest more than men in human capital for future generations (Duflo, 2003; Duflo and Udry 2004). Gender gaps also undermine collective action. Women are more likely to be out of the labor market or to work in the informal sector (ILO 2013b, 2015b). Thus, tax collection and social coverage is particularly limited for women.[3] In addition, women are less likely to participate in the democratic process as leaders (Zetterberg 2009), and gender segregation into certain occupations also contributes to deterring economic development (World Bank 2012).

The relationship between women's empowerment and economic development is not trivial. Evidence shows that simply endowing women with resources does not always result in economic gains. For example, Udry (1996) found that men's farming plots were more productive than women's plots in Africa. Banerjee, Karlan, and Zinman (2015) found no evidence the gender of the recipient of microcredit loans in Mexico mattered for returns. Overcoming gender gaps can be difficult, and perpetuating gender gaps is likely to deter some paths to economic growth.[4]

This study focuses on the gender gap in pay and how it is related to other important gender issues in the region. There are three features of the scope and limitations of this study. First, the study focuses on economic labor models of individual choice. One concern related to gender issues is that social norms drive gender gaps. Therefore, other studies could consider studying gender gaps from a collective decision-making perspective. Second, this study discusses aggregate evidence that allows for establishing relationships among contributing factors. As a result, it leaves out a rich body of literature on case studies or descriptions of behavior based on small samples. Third, this study will discuss policies related to gender issues in the last 10 years. A historical view demands a broader discussion and is beyond the scope of this work.

2. Gender Gaps in Pay

This section describes the formal pay gap related to gender, highlighting three ways into which gender pay gaps can be split: the pay/no-pay choice, the occupational choice conditional on receiving pay, and the wage gap conditional on an occupation.

First, women disproportionately spend more time in non-remunerated activities. Columns (A) and (B) of Table 1 show the minutes worked per day by sex in developing countries. Women spent 1 hour and 41 minutes on unpaid work for every hour of paid work in 2010 (United Nations 2015 b). The equivalent for men was 13 minutes (United Nations 2015 b). Overall, women work 50 more minutes per day than men both in paid and unpaid work. This difference adds up to 25 hours or about one day of work per month for women. However, women are less likely to get paid than men for all of that work because they spend more time producing goods and services for household or family consumption.[5] For example, women spent 14 hours preparing food and 10 hours cleaning the house per week in 2014 in Mexico (INEG 2015). In contrast, men spent four hours preparing food and four hours cleaning the house per week (INEG 2015).

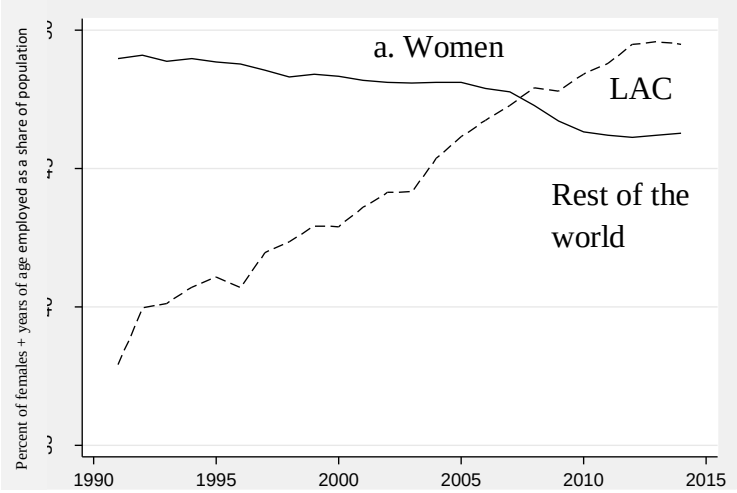
The employment rate for persons ages 15 or older in Latin America and the Caribbean is informative as to the share of men and women working in paid or for-profit activities. The employment rate was 50 percent for women and 75 percent for men in 2014 (Table 1, column (D)) (World Bank 2016).[6] Thus, women spend more time on household and family activities than men and are less likely to hold jobs for pay or profit.

Table 1. The gender gap in paid work, employment, and earnings in developing countries and Latin America and the Caribbean

	Developing countries			Latin America and the Caribbean	
	Minutes worked per day, 2010			Percent of the population age 15+ employed, 2014	Earnings of women relative to men (ratio), 2013
	Paid (A)	Unpaid (B)	Total (C) =(A)+(B)	(D)	(E)
Men	300	80	380	75	1
Women	160	270	430	5	0.87
Gap	140	-190	-50	25	0.13

Source: Author's calculations based on data from United Nations (2015c) for columns (A), (B) and (C); World Bank (2016) for column (D); and ECLAC (2015) for column (E).
Note: Employment is defined as work performed for others in exchange for pay or profit (ILO 2013a).

Employment gaps between men and women are not new, and they used to be larger. Gender gaps in employment closed in Latin America and the Caribbean between 1991 and 2014. Figure 1 shows employment of men and women in the region and in the rest of the world. Appendix 1 lists the countries, economies, and territories included in the calculation and the corresponding data. Employment among women decreased from 49 to 46 percent worldwide but increased from 38 to 50 percent from 1991 to 2014 in Latin America and the Caribbean (World Bank 2016). Employment among men declined slightly from 78 to 75 percent in Latin America and the Caribbean, and from 76 to 72 percent in the rest of the world (World Bank 2016). At this average rate of change in employment among men and women, the gap between them would close by 2056, reaching a global employment rate of 71 percent.



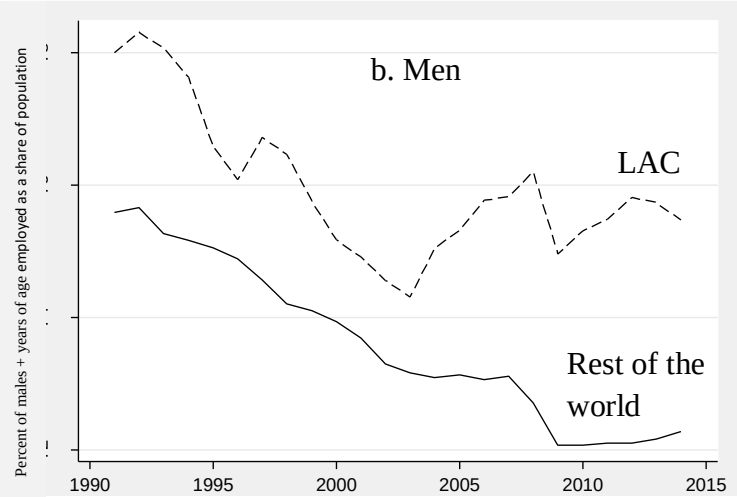


Figure 1. Percentage of men and women employed, Latin America and the Caribbean versus the rest of the world, 1991–2014

Source: Author's calculations based on data from World Bank (2016).
Note: Percentages are computed as a share of the total population. For the countries, economies, and territories included in Latin America and the Caribbean and the rest of the world, see Appendix 1. LAC = Latin America and the Caribbean.

The second way to look at gender pay gaps is by considering that people who work for pay segregate into occupations according to gender. Worldwide, women tend to work in jobs related to education, health, welfare, and the arts and humanities, while men segregate into agriculture, engineering, manufacturing, construction, science, and services (World Bank 2012). Segregation into occupations is related to pay. For example, using data from Bolivia, Chile, Ecuador, Honduras, Nicaragua, El Salvador, Uruguay, and Paraguay from 2007, Ñopo (2012) found that women held only 33 percent of top-paying jobs related to business, law, health, computer science, government, and science. The International Labour Organization (ILO) estimates that 60 percent of chief executive officers in Latin America and the Caribbean are men, while 74 percent of them are men are worldwide (ILO 2015a). Moreover, only 40 percent of firms are owned by women in Latin America and the Caribbean, while 37 percent of firms are owned by women worldwide (ILO 2015a). Thus, women may receive less money for their work because they do not work in the best paid occupations.

Even within specific occupations, women tend to get paid less than men, which constitutes the third way of looking at gender pay gaps. Ñopo (2012) found the top 10 paying jobs in his study paid US$479 to men per month but only US$302 to women, an approximate 30 percent difference. Wage gaps persisted even when considering age, education, number of children, presence of another income earner at home, employment, and number of hours worked per week. Column (E) in Table 1 shows that women earned 87 cents for every $1 that men earned in Latin America and the Caribbean in 2013. The relationship is not exclusively related to wage gaps. For example, Angelucci, Karlan, and Zinman (2015) found that microcredit for women to start a business did not always increase their income in Mexico. The evidence suggests that women tend to get less money for their work relative to men even when both groups are compared within a specific occupation.

In summary, men tend to work in paid occupations, while women tend to work in unpaid ones. When women work for pay, they tend to work in lower-paid occupations relative to men. Within a specific occupation, women are paid less than men, although these gaps have been closing over time.

3. Causes of Gender Gaps in Pay

This section summarizes the main theories to explain gender gaps in pay. Since Ricardo (1821), economists have modeled gaps in individual skills and abilities to explain gaps in labor. In 1965, Becker proposed a model that became standard to analyze occupational choice (Becker 1965). In a basic model, individuals choose between paid and unpaid work by considering the trade-offs – or benefits and costs – associated with the returns derived from each activity. Appendix 2 presents a basic model to clarify these trade-offs. Benefits and costs depend on individual characteristics, social preferences, technology, and institutions.

3.1. Individual characteristics

Economists have specifically explored gender gaps related to education, experience, and preferences since the 1970s (Mincer and Polacheck 1974). Both individual biological features and education influence individual skills and productivity. Gender norms influence education and occupational choice. These conclusions have been widely accepted since debate on the topic started (Becker 1971; World Bank 2012; United Nations 2015b).

3.1.1. The role of nature

Biological predisposition in individuals influences their productivity in certain positions. For example, certain positions in construction may demand lifting heavy objects. The average man can lift heavier objects than the average woman. Another biological difference between the sexes is that of pregnancy, which affects the physiology of women around the time of childbirth. Women experience hormonal changes after giving birth that trigger processes such as milk production. Such processes may induce a transitory change in preferences. For example, women become more sensitive and responsive to infant calls or cry after childbirth (Marlin et al. 2015; Levine et al. 2007; De Pisapia et al. 2013; Noriuchi, Kikuchi, and Senoo 2008). By undergoing such changes, women may face a higher cost than men to forgo the care of infants during a sensitive period. Biology may also play a role in shaping non-transitory preferences. For example, exposure to testosterone before birth influences competition, dominance, and risk preferences in adults (Baron-Cohen 2003; Dreber and Hoffman 2007). Indeed, laboratory experiments find differences across genders in these dimensions (for a review, see Bertrand 2011). Biological processes may induce differences in skills and transitory and non-transitory preferences.

3.1.2. The role of nurture

Education is an important way to acquire skills.[7] As of 2010, 110 girls were completing secondary education in Latin America and the Caribbean for every 100 boys (UNESCO 2016). This ratio for girls was larger than any other region (UNESCO 2016). Currently, women in Latin America and the Caribbean attain more years of education than men (World Bank 2016).

Despite achievements in years of education, differences in skills between the sexes remain. Consider the average gaps in certain subjects in the eight Latin American and Caribbean countries that participated in the 2012 Programme for International Student Assessment (PISA).[8]

In math, the average gap was 0.19 standard deviations, favoring boys (OECD 2012). In reading, the average gap favored girls by 0.27 standard deviations (OECD 2012).[9]

Consider a crude estimation of the potential impact of the math gap on earnings in the region. Focus only on men and women who work for pay. Recall that in 2013, women received US$87 while men received US$100 for the same type of work (ECLAC 2015). Hanushek (2011) estimated that a one standard deviation above average can lead to an expected increase in earnings of up to 15 percent. Closing the mathematics gender gap would imply that a woman would earn US$87*[1+(0.19*0.15)] = US$89 for every US$100 a man makes, instead of US$87. Closing the skill gap in math would thus reduce the earnings gap by 15 percent [(89−87)/13]. Closing the reading skill gap would increase the earnings gap.

Gender gaps in skills can result from differential treatment starting early in life (Qian 2008; Barcellos, Carvalho, and Lleras-Muney 2014). The brain is malleable to experiences, especially in the first years of life (Wood et al. 2008; Teasdale and Owen 1984; Wilson 1983). Studies on twins show that even if about 50 percent of the variance in child development is due to genetic factors, a child's genetic expression is influenced by environmental inputs (Teasdale and Owen 1984; Wilson 1983). Bando, López-Bóo, and Li (2016) studied language and socio-emotional skills of young children and found that girls outperformed boys as early as seven months of age in Chile and Nicaragua.[10] This suggests that the gaps in language observed on the PISA tests for 15-year-olds may start as early as infancy. Consistent with the idea that there is a sex predisposition for specific skills, the gender gap in language in PISA is present in all countries despite variation in culture and educational structures (World Bank 2012). However, these differences are small relative to the difference in performance across children from different socioeconomic status.

3.1.3. Identity effects

Later in life, gender norms can affect gender gaps via psychological effects. Akerloff and Kranton (2002) noted that people adapt behavior to follow the ideals of the social category with which they identify. They called this phenomenon "identity effects." In other words, individuals adjust their behavior to comply with the norms of the group to which they perceive themselves as pertaining, regardless of skill. This behavior starts around the age of six (Wetherell 1996). For example, a woman who chooses an occupation to feel feminine or a man who chooses an occupation to feel masculine are displaying identity effects.

Gender roles in Latin America and the Caribbean reflect the Catholic influence in the region. Indeed, the share of people of Catholic descent in Latin America and the Caribbean is larger than that of any other region in the world. In 2014, 84 percent of adults in the region declared they had been raised as a Catholic (Pew Research Center 2014). In the Catholic religion, the ideal of femininity is modeled by the Virgin Mary, the mother of Jesus. *Marianismo* considers women to be nurturing and morally superior to men, and holds that women should be willing to engage in self-sacrifice to benefit society, especially the family. Thus, social norms declare women to be better suited to meet family needs, with special emphasis on the education and rearing of children (Bachrach 1991; Cianelli, Ferrer, and McElmurry 2008). On the other hand, social norms in Latin America and the Caribbean define men to be better suited to defend their self-image as strong and dominant leaders. *Machismo* places expectations on men to take on high-risk behaviors, be aggressive, and show immunity to emotional pain (Lavrin 1987; Cianelli, Ferrer, and McElmurry 2008). These gender norms are likely to impose differential social benefits and costs to promote a fit between sex and gender when an individual chooses an occupation (World Bank 2012; ILO 2016).

3.2. Social preferences

Gender norms can affect occupational choice via demand reflecting social preferences. Indeed, suppose many people were willing to pay a higher price for a good or service when provided by a person of a specific sex. This phenomenon is clear in performance of some forms of arts and sports. If supply is not different between the two groups, then preferences will lead to different wages via demand.

Becker (1971) proposed "taste discrimination" as a cause for gender gaps. Taste discrimination refers to the willingness of society to pay a higher price when a good is made or a service is provided by a person of a specific sex. Taste discrimination implies lower utility to employers when hiring workers for roles which do not match their gender roles, although there is no evidence on how social norms affect employment via demand. However, there is evidence that gender norms influence demand in other markets. Ganguli, Hausmann, and Viarengo (2010) analyzed marriage and skill patterns in Latin America and concluded that men assign a high value to having a stay-at-home wife. They found that skilled women are less likely to marry than unskilled ones. Another piece of evidence is provided by Ñopo (2012), who found that newspapers and commercial magazines in Colombia display individuals in occupations to match gender stereotypes and are tailored to social preferences to maximize sales. In this way, gender norms influence social preferences, which in turn influence demand. Demand for specific attributes in terms of the sex of a person who provides a good or service influences the employment gender gap.

3.3. The role of technology

Technology influences how social norms and biology influence labor outcomes. Economists have long postulated this idea. Hicks (1932) and Roy (1951) explored the role of technology in the relationship between individual skills and occupational choice. There is evidence of a positive association between technology and gender equality. Cubas (2010) found that the price of household appliances and access to infrastructure explains cross-country female employment in Latin America. Another technological advance that influences gender gaps is family planning. Bailey, Hershbein, and Miller (2012) estimated that access to the birth control pill in the 1960s and 1970s allowed young women to earn an 8 percent higher hourly wage premium by age 50 in the United States.[11]

3.4. The role of institutions

Economics has long acknowledged the role of institutions. For example, Coase (1960) highlighted the importance of legal rules to regulate labor. Institutions are especially important to protect individual, property, and labor rights.

3.4.1. Institutions and human rights

Most countries in Latin America and the Caribbean have laws in place to prevent people employed or looking for employment from being discriminated against based on sex (Pagés and Piras 2010). Moreover, most countries have maternity protection, laws on day care services, and laws on leave to take care of sick children (Pagés and Piras 2010). However, only 8 out of 29 countries in Latin America and the Caribbean had laws in place to mandate equal remuneration across genders in 2015 (World Bank 2016).

A challenge in the region is that institutions may have limited reach to enforce laws. Indeed, about half of those employed in Latin America and the Caribbean work in the informal sector (ILO

2015b), and are not covered by the legal framework.[12] Women are overrepresented in the informal sector in Latin America and the Caribbean, except in Bolivia and Venezuela (ILO 2013 b).

3.4.2. Statistical discrimination

Arrow (1973) suggested that discrimination could be a product of information problems. The idea behind statistical discrimination is that employers build beliefs on productivity based on statistics. For example, if employers assume that individuals perform at the same level as their group average, they will be discriminating against those who perform above the average. A woman who applies for a job in a non-traditional female occupation where a few other women have performed poorly may be assumed to be less fit for it. Moreover, if productivity changes, then a lag in data generation will extend statistical discrimination in time. Testing for statistical discrimination is difficult. Standard approaches (such as standard audit studies) confound taste discrimination and statistical discrimination. Thus, there is no evidence on whether statistical discrimination does or does not exist in Latin America and the Caribbean.

The next section discusses evidence on policies implemented in the region to address employment gender gaps. These include policies associated with providing equal opportunities to all persons, relevant technology, and laws to promote gender equality.

4. Proposed solutions to gender gaps in pay

There has been extensive work to identify effective policies to close the gender gap in pay. This section summarizes the empirical work in the last 10 years in the region. The available evidence supports the idea that women disproportionately assume the cost of raising a family. On the other hand, skill gaps or gender discrimination during the hiring process do not seem to play a major role. The implementation of laws results in changes in incentives for society, which affect gender gaps.

Table 2 summarizes the theoretical mechanisms proposed to explain the gender pay gap. The first column summarizes the theoretical causes discussed in the previous section. The second column summarizes interventions in Latin America and the Caribbean to address each theoretical factor. However, interventions can often address many theoretical causes of the gender gap. Thus, linking theory and evidence is not a straightforward exercise. The table associates theoretical causes with interventions that in principle aim to primarily address them. The table lists results on intermediate outcomes if there were no studies on labor outcomes. The evidence presented in the table is discussed in the sections that follow.

Table 2. Individual, societal, technological. and institutional factors that influence women's paid work

Factors	**Empirical evidence on the effectiveness of policies that promote women's paid work in Latin America and the Caribbean**
a. Factors related to individual characteristics	
1. **Nature**. Individual skills and preferences are influenced by fixed biological predispositions such as physical, neurological, and reproductive processes (Welch	• Women may have a biological predisposition to assume a higher cost if children are not taken care of, and therefore may be more strongly motivated than men to take care of children. Childcare services have improved female labor participation in Argentina, Brazil, Colombia, and Ecuador (Attanasio and Vera-

2000; Bertrand 2011; Jayachandran 2015).	Hernandez 2004; Barros et al. 2011; Rosero and Oosterbeek 2001; Berlinski and Galiani 2007; Berlinski, Galiani, and McEwan 2011).
2. **Nurture**. Individual skills results from human capital investment such as education and job experience (Mincer and Polacheck 1974).	• Training for work in Peru, Chile, Argentina, Colombia, and Peru have led to increases in female employment (Valdivia 2015; Kaplan et al. 2015; Aedo and Nuñez 2004; Ñopo, Robles, and Saavedra 2007). • Courses for the unemployed in the region have been successful in increasing female labor participation (Gonzalez-Velosa, Ripani, and Rosas-Schady 2012; Urzúa and Puentes 2010).
3. **Identity effects.** Individuals' preference to comply with their gender social ideals are determined by their identity (Akerloff and Kranton 2002).	• The author could not identify rigorous studies on the effects of policies that aim to change individual depictions of social roles.
b. Factors related to social preferences	
4. **Taste discrimination**. Society pays a higher price when a good is made or a service is provided by a person of a specific sex (Becker 1971).	• There are no studies on the direct effects of taste discrimination on employment. However, Ganguli, Hausmann, and Viarengo (2010) analyzed marriage and skill patterns in the region and found that skilled women in Latin America are less likely to marry than unskilled women. They conclude that men assign a high value to having a stay-at-home wife, while women do not.
c. Factors related to technology	
5. **Technology** changes the relative productivity among gender groups (Hicks 1932; Albanesi and Olivetti 2015).	• There is no evidence of the effect of technology on female employment. However, Cubas (2010) found that the price of household appliances and access to infrastructure explains cross-country female employment in Latin America.
d. Factors related to institutions	
6. **Rights.** Institutions protect labor or individual rights and provide social protection (Coase 1960; Blau and Kahn 1999).	• The implementation of laws for firms to provide maternity leave and unemployment severance in Colombia have resulted in lower employment of female labor (Molinos 2012; Ramirez, Tribin, and Vargas 2015; Pagés and Piras 2010). • Laws that allow firms to hire part-time employees and that promote flexible work schedules in Argentina have promoted female employment (Bosch and Maloney 2010; Pagés and Piras 2010).

7. **Statistical discrimination**. Employers do not have complete information on job applicants. Employers extrapolate productivity based on the sex of the individual (Arrow 1973).	• There are no studies on the effects of policies that aim to address specific types of discrimination. However, Arceo-Gomez and Campos-Vázquez (2014b) found that women have a higher probability of receiving a callback than men after submitting a résumé to apply for employment in Mexico. Married women were less likely to receive a callback than single women. Moreno et al. (2012) found limited evidence of gender discrimination by intermediary employment services in Peru.

Source: Prepared by the author.
Note: Policies usually affect more than one potential source of gender gaps. Thus, evidence is classified according to the main component the policy intends to address.

4.1. Ensure that there are no differences in opportunities across gender groups

Education is likely to play an important role in moderating biological predispositions (Cunha and Heckman 2009). Unfortunately, education is probably not yet addressing inequalities between women and men in Latin America and the Caribbean, other than access. For example, Bassi, Blumber, and Mateo (2016) found that teachers pay less attention to female students in class in Chile. Moreover, Ñopo (2012) found that textbooks depict gender roles in Peru.

Biological predispositions may demand differential job accommodations. For example, consider the birth of a child. Goldin (2014) analyzed U.S. wage patterns and hours of work demanded by occupations from 1970 to 2011 and found that occupations with better pay demanded continuous hours of work. Corporate, legal, and financial jobs particularly penalized job interruptions. Goldin concluded that gender pay gaps could be explained by career interruptions or flexible schedules. Indeed, childbearing tends to reduce the wage of mothers worldwide (Simonsen and Skipper 2012; ILO 2015c). In Latin America and the Caribbean, Piras and Ripani (2005) studied labor patterns in Bolivia, Brazil, Ecuador, and Peru and found that in 1999, mothers with children age 7 or younger were less likely to have a paid job compared to men or women without children.

For women who work, Gamboa and Zuluaga (2013) identified a "motherhood penalty" of 1.8 percent in Colombia. In other words, mothers were paid 1.8 percent less than women not having children. For their part, Atal, Ñopo, and Winder (2009) identified a "family penalty" for both men and women. However, women were more affected because more women tend to drop out of work to raise their families.[13] Indeed, women said work-family balance is the main obstacle to professional development (Thomson Reuters Foundation 2015). A survey by the ILO in 2015 covering more than 1,300 private companies in 39 developing countries ranked family responsibilities as the main barrier to women's leadership (ILO 2015a).

Policies to reduce the cost of motherhood have led to reductions in the gender pay gap. Childcare services and flexible work schedules have increased female employment in Latin America and the Caribbean (Attanasio and Vera-Hernandez 2004; Barros, Olinto, and Carvalho 2011; Rosero and Oosterbeek 2001; Berlinski and Galiani 2007; Berlinski, Galiani, and McEwan 2011; Goldin 2014).

4.2. Use technology to reduce gender gaps

Technology has probably played the most important role in the shift in the gender gap in the last 25 years in Latin America and the Caribbean. Consider the use of contraception to regulate fertility. The average prevalence of using modern contraception among women ages 15 to 49 was 53 percent for 12 countries in Latin America and the Caribbean in 2006, ranging from 67 percent in Mexico to only 25 percent in Haiti (World Bank 2016).[14] Miller (2010) found evidence for Colombia that family planning programs reduced fertility.[15] Figure 2 shows that fertility decreased at a faster rate in the region in the 14 years from 1991 to 2014 than in the rest of the world. The increase in female labor participation in Latin America and the Caribbean in the last 25 years was accompanied by a decrease in fertility. Cruces and Galiani (2007) found that having one more child decreases the probability of the mother working for pay or profit in Argentina and Mexico.[16]

Figure 2. **Average fertility rate in Latin America and the Caribbean versus the rest of the world, 1991–2014**

Source: Author's calculations based on data from World Bank (2016).
Note: LAC = Latin America and the Caribbean.

Evidence in the United States and the United Kingdom suggests that other technologies, including maternal health, infant formula, and home appliance ownership, have increased the participation of women in the labor market (Albanesi and Olivetti 2015; Cohen-Pirani, Leon, and Lugauer 2010; Cavalcanti and Tavares 2008). New technologies may be enabling different schemes for work participation. For example, Internet access is allowing greater flexibility in work schedules and facilitating work from home. It remains a question how technology affects hours of work and whether it affects pay for women and men.

4.3. Strengthen institutions to ensure human, labor, and property rights

This section summarizes the importance of institutions to avoid discrimination, provide social protection, allow for the exercise of human rights, and enhance democratic participation and good government in Latin America and the Caribbean. Appendix 3 provides a summary of the history of international laws aiming to prevent gender discrimination.

4.3.1. Government intervention is key to prevent discrimination

Regulation is important when differences in skills may lead to gender statistical discrimination. Consider official learning validation and certification. UNESCO and UNHCR (2016) find that these are often ignored in the provision of quality education. There are scant standardized tests that enable employers to determine which applicants for a position have the skills they need. The completion rate for secondary education is 41.6 percent in Latin America and the Caribbean (UNESCO 2016). However, it is still an open question whether employers' perceptions of skills result in discrimination.

4.3.2. Government intervention is key to ensure social protection

Social protection is linked to formal work. For example, pension contribution rates in Chile are 96 percent among men but only 75 percent among women, while in El Salvador pension contribution rates are 85 percent among men but only 55 percent among women (Bosch, Melguizo, and Pagés 2013). In the region, the gap closes at the time pensions are received, when 65 percent of men

and 61 percent of women 65 years or older receive a pension (Bosch, Melguizo, and Pagés 2013). Therefore, women are more likely to demand social assistance rather than to become entitled to pensions. Thus, policies to reduce informality are likely to disproportionately benefit women.

4.3.3. Government intervention is necessary to ensure human rights

Latin America and the Caribbean has the dubious distinction of being the most violent region in the world. The homicide rate was 29.3 among men and 3.7 among women per 100,000 population in 2012 (UNODC 2013). While violence disproportionately affects men, the shape of that violence is different across the sexes. Most women are killed by people expected to care for them, while men are killed by people they may not know (UNODC 2013). Half of female homicide victims are killed by an intimate partner; in contrast, 6 percent of male homicide victims are killed by an intimate partner (UNODC 2013). Many countries have adapted their regulatory framework to address human rights across sex groups. For example, 18 of 29 countries in Latin America and the Caribbean have explicitly criminalized marital rape (World Bank 2016). However, there is still work to be done in the rest of the countries. In addition, enforcement of the law may not be ideal. Ensuring individual rights for women may be costlier than ensuring those rights for men, given that ensuring rights for women requires regulation within the household. More research is needed in this area.

4.3.4. Government intervention is necessary to enhance good government

The democratic process demands inclusive citizen participation. However, gender gaps in occupations extend to participation in the political process. Consider the participation of women in political positions at the national level. By 2015, all Latin American countries except Guatemala and Venezuela had laws to promote female participation (Freidenberg and Lajas 2015). In 2015, women occupied 27 percent of national parliamentary seats in the region (ECLAC 2015), far short of their share of the population.

One frequent approach to promoting female political participation is to set gender quotas. Zetterberg (2009) finds that gender quotas have a limited impact on political trust, knowledge, or interest among women. He concludes that women do not perceive quotas as empowering in Latin America, and he argues that informal nomination procedures favor women with close ties to particular leaders. Thus, the process sends the message that procedures are unfair and that they discourage qualified women.[17]

Table 3 summarizes the goals and evidence of related gaps discussed in this section and lists related articles in the Declaration of Human Rights. The solution to the gender gap is a combination of policies to enhance equality of opportunities, guarantee equal access to salaried positions, promote the use of technology, and strengthen institutions. Taken together, these policies are directed to enhancing the exercise of human rights.

Table 3. Proposed solutions to gender gaps, related gaps, and human rights

Area	Goal	Evidence of related gaps	Related articles in the Declaration of Human Rights (United Nations 1948)
1. Ensure that there are no differences in opportunities across gender groups			
Nurture	Men and women have the same opportunities to access remunerated occupations.	• Programme for International Student Assessment (PISA) scores for 15-year olds show that boys have an advantage of 0.19 standard deviations in math, while girls have an advantage of 0.27 standard deviations in language (OECD 2012).	• Article 23. (1) Everyone has the right to work, to free choice of employment, to just and favorable conditions of work and to protection against unemployment. (2) Everyone, without any discrimination, has the right to equal pay for equal work.
Nature	Men and women share the opportunity cost of raising a family.	• Women with children age 7 or younger are less likely to have a paid job (Piras and Ripani 2005). Mothers face a wage penalty of about 1.8 percent compared to women without children (Gamboa and Zuluaga 2013).	• Article 16. (1) Men and women of full age, without any limitation due to race, nationality, or religion, have the right to marry and to fund a family. They are entitled to equal rights as to marriage, during marriage, and at its dissolution. • Article 25. (2) Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection.
2. Use technology			
Men and women have the right to decide on reproduction.		• The average use of modern contraceptive methods among women ages 15 to 49 was 53 percent for 12 countries in LAC in 2006.	• Article 16. (1) Men and women of full age, without any limitation due to race, nationality, or religion, have the right to marry and to fund a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution. • Article 25. (1) Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood,

			old age or other lack of livelihood in circumstances beyond his control.
3. Strengthen institutions			
Collective action	Men and women contribute to public expenditures and are able to access public goods and services.	• Contribution rates for pensions in Chile are 96 percent among men but 75 percent among women (Bosch, Melguizo, and Pagés 2013).	• Article 22. Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality. • Article 29. (1) Everyone has duties to the community in which the free and full development of his personality is possible.
Human rights	Men and women should have the right to be free from violence.	• The homicide rate in LAC in 2012 per 100,000 population was 29.3 among men and 3.7 among women (UNODC 2013). • The share of homicide victims killed by an intimate partner is 50 percent for women and 6 percent for men (UNODC 2013).	• Article 7. All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination.
Representation	Men and women should voice their preferences for government decisions.	• In 2015, women occupied 27 percent of the national parliamentary seats in LAC (ECLAC 2015).	• Article 21. (1) Everyone has the right to take part in the government of his country, directly or through freely chosen representatives. (2) Everyone has the right to equal access to public service in his country.

Source: Prepared by the author.
Note: The same opportunities refer to the same productivity potential. Access implies no social or psychological cost or discrimination. LAC: Latin America and the Caribbean.

To sum up, formal institutions are important to ensure that citizens can exercise their human rights and be free of discrimination. Formal institutions play a central role in facilitating coordinated and collective action and providing social protection. Participation in the democratic process provides incentives for shaping and maintaining good government. The main challenge is to enforce regulations for individuals trading within the household or in informal markets. Another challenge

is how to promote participation by women in the democratic process. Policies to address these issues are likely to promote gender equality. Addressing these issues would benefit not only to women but also men in similar circumstances. The next section discusses why identifying more specific policies may be challenging.

5. Challenges to identifying evidence-based gender equality policies

Promoting gender equality based on evidence is not easy. There are important areas where better evidence is needed to design policy. This section lists the main challenges to identifying evidence-based policies to promote gender equality.

The first policy challenge is to better understand *individual choices* on occupations. There is a need to understand the role of nature versus nurture in this choice, as well as the mechanisms through which society influences these choices. The second challenge is to better understand *how to use technology responsibly*. Indeed, technology may bring controversial results, such as facilitating abortion or increasing the double burden on individuals (i.e., the workload of people who have jobs and are also responsible for unpaid domestic labor). There is a need to better understand the effects of programs that provide family planning, as well as technological advances such as Internet access that facilitate working from home. The third challenge is to better understand *how to strengthen institutions and make them more inclusive* while respecting privacy. Indeed, transactions within the household limit the ability of the government to act.

A better understanding of individual choices, the use of technology, and the reach of institutions would aid international efforts to identify effective evidence-based policy. However, research related to gender gaps faces many challenges. The first is to identify specific mechanisms relevant for policymaking. For example, consider vouchers to subsidize wages. Vouchers have resulted in a higher probability of employment among women in Argentina (Gallasso, Ravallion, and Salvia 2004). However, it is difficult to determine a long-term solution using vouchers. The subsidy could address several contributing factors to gender inequality, including shortcomings in productivity, compensation for discrimination, or higher regulatory costs. But it is difficult to tell if such subsidies contribute to close the gender gap over the long term or are just a temporary fix.

Two mechanisms especially difficult to separate are those related to individual and social behavior. Individuals adapt their behavior according to what others do. For example, married men in the Philippines changed their expenditure choices when their wives knew they received money (Ashraf 2009). Gender interventions are prone to triggering broad social effects. In these cases, the researcher will not be able to separate the group effect from the sum of aggregated individual effects. This problem is known as the reflection problem, and it was first proposed by Manski (2000).

A second challenge is the difficulty of obtaining relevant data. For example, current public data do not allow for ascertaining how much of the increase in women's labor is a substitution for unpaid work. Many organizations are currently working to collect these data through time-use and employment surveys. For example, the Organization for Economic Co-operation and Development (OECD), United Nations, and World Bank are starting to put together data collected across countries.[18]

Another data-related challenge is that men and women differ in dimensions other than sex, including developmental history.[19] In addition, gender gaps are related, in part, to behavior that takes place within the household and to labor not traded in the labor market. In addition, observers may induce unconscious bias in research. Thus, measurement may be costly and prone to bias.

The third challenge is that factors that influence the gender gap may not be detected with a single statistic. Consider the distribution of skills across the sexes. Assume that both men and women have a standard normal distribution with a common mean. However, suppose the variance is different among groups. Heckman (1998) notes this case will result in different shares across a common threshold value other than the mean. Thus, using a common rule for both groups may result in gaps.[20]

Despite these limitations, there are opportunities to generate evidence. Various policies already in place lack a formal evaluation. For instance, gender firm certification programs aim to ensure equal treatment across genders in several dimensions, including recruiting, professional development, pay, work-life balance, and sexual harassment. Programs currently operate in Argentina, Brazil, Chile, Costa Rica, Mexico, and Uruguay (IDB 2015), yet they have not been evaluated. Programs with the goal of changing social norms also need more evaluation. For example, the Somos Diferentes, Somos Iguales Program in Nicaragua, and Program H and Program M in El Salvador and Brazil are only recently being evaluated (IDB 2015; Promundo 2016; United Nations 2011; Bando, Hidalgo, and Land 2018). Programs that provide multiple services in a single geographical point also need to be studied. For instance, Ciudad Mujer in El Salvador provides labor intermediation, health, psychology, legal, and childcare services. Researchers are currently studying this program (IDB 2015).

Another opportunity to generate evidence is to consider gender in broader development research. Evaluating sex-specific delivery of goods and services should aid learning and improve understanding of how to promote inclusive development. Better data and a better understanding of those data promote innovation. For example, in Latin America electricity is more expensive for residential use than commercial use. Women are more likely to own a small home business. Thus, considering other inputs for production as equal, women face a higher price for production (Komives et al. 2005). This finding indicates that a flat rate for electricity affects opportunities for one group more than the other.

Including gender in policies to promote development may also prevent unexpected adverse effects. Policies that ignore gender could result in unequal access, violate human rights, or increase violence. However, flexible works schedules may result in women working more hours to meet expectations. Another example is that of conditional cash transfers in Mexico, where transfers to women resulted in short-term increases in domestic violence (Bobonis, Gonzalez-Brenes, and Castro 2013).

In summary, there are important areas to explore: the acquisition of skills and occupational choice, the use of technology, and the strengthening of institutions. Future work to identify policies to close gender gaps based on evidence will face challenges. First, research must pay attention to the many mechanisms through which an intervention affects gender gaps. Second, men and women differ in dimensions other than sex. Third, men and women may differ in statistics other than the mean. Despite these challenges, research in development could inform knowledge on how to address gender gaps and help avoid potential adverse gender effects.

6. Conclusion

The percentage of women employed has increased faster in Latin America and the Caribbean than in any other region in the world in the last 25 years. However, many women do not see the benefits of their work. Women work more hours than men, but half of women in Latin America and the Caribbean do not get pay or profit. The high share of women without pay leaves them with limited entitlement to benefits. Most women work at home or in the informal sector. Thus,

they are less likely to benefit from legal protection. On average, women face more obstacles to benefiting from certain human and labor rights and rights as citizens.

Gender gaps result from biological predispositions and expectations by society as to what occupation persons of a given sex should choose and how much they should be paid. In Latin America and the Caribbean, gender roles have it that women are better suited than men to pursue activities that directly benefit the household or the family. Gender roles influence occupational choice and skills. Other factors such as discrimination, regulations, and technology also influence this choice.

Policies to reduce gender gaps can be grouped into three categories: policies that aim to ensure equality of opportunity across genders; policies directed toward the use technology; and policies to ensure individual rights.

Policy design and determining whether policies should be tailored across sexes demands clear answers to some outstanding questions. There is a need to understand the dynamics and long-term effects of human capital accumulation across sexes and how it affects individual choices. Thus, studies over long periods of time would be insightful. There is a need to learn how to protect labor and human rights within the household and in informal markets; to find ways to make social services more inclusive; to find ways to promote participation by all in the democratic process; and to understand how social norms modulate the use of technology to reduce gender gaps. In summary, given that men and women are not the same, there is a need to understand how both can enjoy equal opportunities and equal rights, and to find ways to spread the cost of unpaid labor more equally.

Research in this area faces several challenges. First, policies affect behavior through several pathways, so one needs to understand the roles of those pathways and how they interact in order to design effective policies. Second, researchers may face challenges in finding men and women with similar characteristics to construct a proper sample. Indeed**,** men and women are raised differently. Thus, long-term research may be necessary to understand a specific intervention net of current differences. Third, gender differences are likely to matter for policy design in distributional features other than the mean. Thus, detailed analysis is necessary to inform policy.

Interventions for development can further understanding about gender even when gender is not the central issue. Indeed**,** many current development studies provide key information about gender gaps. Consider studies on pensions, informality, and democratic participation. These development issues relate to the gender gap, so they represent an opportunity to generate evidence. Therefore, when possible, such development studies should include a careful gender analysis. These exercises would likely bring Latin America and the Caribbean closer to finding the answer to when and how to address gender gaps.

Appendix 1. Statistics on employment, fertility, and growth in Latin America and the Caribbean and the rest of the world

Table A1.1 presents statistics on employment, fertility, and growth. Columns (1) to (5) display statistics for Latin America and the Caribbean. Columns (6) to (7) display statistics for all the countries listed except those in Latin America and the Caribbean. All averages were estimated weighting country averages by the country population. All data were provided by the World Bank Database on Gender Statistics, available at http://data.worldbank.org/data-catalog/gender-statistics (accessed on 24 October 2016). Data for GDP growth and GDP per capita are missing

for about 10 percent of countries before 1995, but less than 5 percent after. Missing data for fertility constitute at most 1 percent. No data are missing for employment.

The Latin American and Caribbean countries included are Argentina, The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela.

The rest of the world is comprised of the following countries, economies, and territories: Afghanistan, Albania, Algeria, Angola, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Chad, China, Comoros, Democratic Republic of Congo, Republic of Congo, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, The Gambia, Georgia, Germany, Ghana, Greece, Guinea, Guinea-Bissau, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Islamic Republic of Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Democratic People's Republic of Korea, Republic of Korea, Kuwait, Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macao SAR, Macedonia, FYR, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, the Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Papua New Guinea, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, Russian Federation, Rwanda, Saudi Arabia, Senegal, Serbia, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uzbekistan, Vietnam, West Bank and Gaza, Yemen, Republic, Zambia, and Zimbabwe.

Table A1.1. Employment, fertility, and growth in Latin America and the Caribbean and the rest of the world

Year	Latin America and the Caribbean					Rest of the world				
	Percent of employment in the population ages 15 and over		Fertility (births per woman)	GDP growth (percent)	GDP per capita (in U.S. dollars)	Percent of employment in the population ages 15 and over		Fertility (births per woman)	GDP growth (percent)	GDP per capita (in U.S. dollars)
	Women	Men				Women	Men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1991	37.91	78.00	3.17	3.56	3,107	48.97	75.59	3.28	3.11	4,714
1992	39.97	78.31	3.09	2.91	2,868	49.11	75.66	3.19	5.09	4,953
1993	40.14	78.07	3.02	3.87	3,255	48.89	75.27	3.10	5.13	4,866
1994	40.73	77.63	2.96	4.95	3,681	48.98	75.17	3.03	5.38	5,118
1995	41.09	76.59	2.90	2.15	3,859	48.87	75.06	2.95	6.02	5,593
1996	40.70	76.09	2.85	3.57	4,087	48.79	74.89	2.90	6.33	5,614

1997	41.97	76.72	2.80	5.09	4,405	48.57	74.57	2.84	5.04	5,481
1998	42.36	76.47	2.75	2.13	4,357	48.32	74.21	2.80	3.82	5,388
1999	42.93	75.76	2.71	0.34	3,856	48.41	74.10	2.76	5.41	5,569
2000	42.91	75.18	2.66	3.70	4,201	48.34	73.94	2.74	5.38	5,643
2001	43.60	74.92	2.61	0.89	4,018	48.20	73.70	2.71	4.80	5,535
2002	44.14	74.56	2.56	0.85	3,531	48.11	73.30	2.70	4.86	5,734
2003	44.17	74.32	2.51	2.08	3,587	48.11	73.17	2.68	6.30	6,397
2004	45.37	75.05	2.45	5.89	4,130	48.12	73.10	2.67	7.92	7,080
2005	46.15	75.32	2.40	4.68	4,960	48.13	73.14	2.65	7.30	7,519
2006	46.75	75.77	2.36	5.58	5,769	47.91	73.06	2.64	7.87	8,005
2007	47.30	75.83	2.31	5.82	6,757	47.79	73.12	2.63	8.31	8,887
2008	47.93	76.20	2.27	4.05	7,771	47.30	72.72	2.62	5.03	9,610
2009	47.81	74.97	2.24	-0.93	7,201	46.73	72.08	2.60	4.19	9,006
2010	48.43	75.32	2.21	5.70	8,839	46.32	72.07	2.58	7.29	9,661
2011	48.81	75.48	2.19	4.78	9,918	46.21	72.11	2.56	5.66	10,555
2012	49.49	75.82	2.17	3.24	9,935	46.14	72.11	2.55	4.96	10,599
2013	49.58	75.74	2.14	3.23	9,958	46.21	72.17	2.53	5.21	10,752
2014	49.50	75.47	2.12	1.58	9,765	46.29	72.28	2.52	5.21	10,926

Source: Author's calculations based on data from the World Bank at http://data.worldbank.org (accessed 24 October 2016).

Appendix 2. A basic labor model for paid labor

This section aims to provide a simplified model for the trade-offs between labor participation outside the home and household production within the home. Indeed, this is a crucial problem many adult women face. In this basic model, individuals divide labor among paid and unpaid work to maximize utility or welfare. Individuals will allocate time where the last unit of labor makes the same contribution to overall utility. Employment contributes to utility through the acquisition of goods and services paid by the earned wage. Unpaid work contributes to utility through the direct production of goods and services.

The model has two goals. The first is to list the main factors that influence the choice of the within-home versus outside-home labor supply. The factors considered are those with the largest gaps across the sexes. The second goal is to understand the basic trade-offs between the outside-home and within-home labor supply. The model should allow for understanding how changes to contributing factors affect labor choices.

For simplicity, consider an individual one-stage static model. This model has important limitations. First, it does not explore intertemporal choices, and thus cannot distinguish between transitory or

permanent changes to factors. Second, it does not allow for analyzing the effects to changes in individual skills. Third, it assumes that wages and preferences are exogenous. This latter limitation is important. Models with endogenous wages and preferences have led to a different conclusion that childbearing does not affect education and other investment for outside-home work.

The model follows the rationale and principles postulated by Becker (1965). First, assume an individual can use time for one of two activities. The first leads to utility derived from household production. Assume that this activity leads to goods or services that cannot be traded in the market. Time spent on these activities is grouped under the "within-home" label. The second activity leads to utility derived from production of goods or services that can be traded in the market. Time spent on these activities are grouped under the "outside-home" label. Assume the within-home and outside-home activities are mutually exclusive. Let an individual be endowed with one unit of time. Let *L* denote the time allocated to the outside-home activity and 1-*L* the time allocated to the within-home activity.

Assume that individuals face household and market production functions *F* and *G*. These goods and services could be imputed a dollar amount. Assume decreasing returns to time, so *F'(.)>0, F''(.)<0, G(.)'>0* , and *G''<0*. Assume that an individual allocates time to maximize utility from goods and services derived from both activities and faces the following maximization problem:

$$Max_{\{L\}}\ U(F(L, \boldsymbol{x}, R, \boldsymbol{T}), G(1-L, W, D, R, \boldsymbol{x}), \bar{L}), \qquad \text{(A2.1)}$$

subject to $F(L) \geq \underline{F}$ and $G(L) \geq \underline{G}$. The values $\underline{F}$ and $\underline{G}$ reflect restrictions the individual faces for the family to survive. Thus, a single woman with small children will face a higher restriction $\underline{G}$ to within-home production than a single woman with no children. Let *D* denote discrimination and *R* denote regulations. It is a vector of parameters that capture the role of labor rights (formal institutions) and social norms (informal institutions) on *F* and *G*. Let ***x*** denote a vector of individual characteristics that pertain to productivity and that may include biological characteristics. Let ***T*** denote a vector of parameters that influence the technology available that influences the relative marginal returns of *F* relative to *G*. Let $\bar{L}$ denote the average time allocation of individuals with the sex of the decision-maker. This parameter aims to model the cost of deviating from social prescriptions.

Consider an internal solution. The first order condition is:

$$U_F F_L = U_G G_{L.} \qquad \text{(A2.2)}$$

Thus, the individual will allocate time in each activity up to the point where the marginal contribution of time to utility is equal. The choice to stay at home or work will be influenced by the relative productivity of the individual in each activity to produce goods or services. It will also depend on the relative contribution of marketable to nonmarketable goods or services to individual utility. To the extent that factor ***x*** consistently affects the sexes differentially, it may lead to sex segregation into occupations.

This model relates market features and individual preferences. It does so in a fashion similar to models of endogenous fertility choice. Assume the number of children is a monotonic function $N = N(1-L)$. Thus, the number of children will depend on relative marginal productivity and utility. Indeed, decisions will be driven by the benefits and opportunity cost of raising children.

The description of the model proposes factors listed in Table 2 in the main text. The factors can be categorized into two groups. The first category covers market attributes. Thus, this group includes market prices *P* and *W*, discrimination *D*, rules and regulations *R*, and technology *T*. The second category covers factors that vary across individuals in a market. These include attributes associated with preferences $\bar{L}$ and productivity ***x***. Note that although $\bar{L}$ is a group-wide characteristic, it may affect individuals differently.

The model has two implications. First, the allocation of time across activities will depend on the marginal productivity and the marginal utility that an individual derives from them. Second, these factors will be influenced by prices, discrimination, rules and regulations, characteristics in terms of sex, and technology.

Appendix 3. A brief history of international laws against gender discrimination

Policies that aim to incorporate institutional changes vary by region. However, one of the first modern formal institutional changes took place in 1947, when the United Nations created the Commission on the Status of Women (CSW). The CSW is currently one of the main global intergovernmental bodies dedicated to promoting gender equality. In 1951, the countries agreed on the Convention on Equal Remuneration for Men and Women Workers for Work of Equal Value.

In 1953, the CSW held the Convention on the Nationality of Married Women. In 1962, it added rules to marriage including consent, minimum age, and registration. By 1967, the United Nations had promulgated the Convention on the Elimination of All Forms of Discrimination against Women. In 1993, violence came into the public light with the Declaration on the Elimination of Violence against Women. In 1999, the convention added the right to ask for victims of gender discrimination to petition the government for assistance without fear of retaliation. This convention was denominated as a Protocol to the Convention.

The International Convention on the Elimination of All Forms of Discrimination against Women is one of nine core human rights treaties. Thus, the right to live without discrimination is universal, inalienable, legally binding, and based on the inherent dignity and worth of all human beings (United Nations 2015a). States are obligated to respect, protect, and fulfill the right of women to live free of discrimination.

In 2000, 189 world leaders signed a pledge to pursue the achievement of a set of eight goals for development collectively called the Millennium Development Goals (MDGs). The third goal refers to the promotion of gender equality and the empowerment of women. The fourth aims to improve maternal health. Unlike treaties, the MDGs are not legally binding obligations upon states. Rather, they are high-level political commitments. Countries agreed to quantify their progress and report on it. Indeed, the United Nations has published annual progress reports since 2005. Legislation on quotas for posts assigned by national elections started in the 1990s. Table A3.1 summarizes selected international laws that address gender equality.

Table A3.1. Summary of selected international laws that address gender equality

Year	Initiative
1947	The first intergovernmental body dedicated to promoting gender equality is created by the United Nations (the Commission on the Status of Women).
1951	The first international convention to adopt the principle of **equal pay for equal work** is adopted (Equal Remuneration Convention).
1953	The first international law to protect the **political rights** of women is passed (Convention on the Political Rights of Women).
1957	The first international agreement on women's **rights in marriage** is approved (Convention on the Nationality of Married Women).
1962	An agreement to incorporate **consent to marriage**, a minimum age of marriage, and registration of marriages is adopted (Convention on Consent to Marriage, Minimum Age for Marriage and Registration of Marriages).
1967	The Convention on the Elimination of All Forms of **Discrimination** against Women is approved.
1993	The Declaration on the Elimination of **Violence** against Women is adopted.
1999	The right of petition for victims of discrimination is introduced (Optional Protocol to the Convention). This right gives the victims the ability to seek government assistance without fear of reprisals.

Source: Author's summary based on the United Nations Women webpage available at www.unwomen.org/en/csw/brief-history (accessed 5 June 2016).

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Endnotes

[1] "Male" and "female" are sex categories. "Masculine" and "feminine" are gender categories.
[2] Employment is defined as work performed for others in exchange for pay or profit (ILO 2013a).
[3] For evidence on pensions, see Bosch, Melguizo, and Pagés (2013).
[4] For an excellent discussion on the relationship between economic empowerment and economic development, see Duflo (2012).
[5] Productive activities that involve within-household transactions are difficult to value because the market often does not correctly price them. Moreover, measuring activities that produce goods and services for household consumption is conceptually difficult. For example, a person reading a book to his or her child may be doing so as a service to the household, for their own pleasure, or both. Persons working on own-use household or family production are not considered employed. Persons working on own-use consumption are considered out of the labor force and not part of the economically active population (the labor force). The services produced for own-use consumption are not included in the system of national accounts (ILO 2013a).
[6] Worldwide, these figures were 46 percent for women and 72 percent for men.
[7] An important set of policies since the 1960s has focused on guaranteeing equal access to education. Indeed, member countries of the United Nations signed the Convention against Discrimination in Education in 1960 (UNESCO 2016). Six countries in Latin America and the Caribbean ratified the convention in the same decade. By 2015, 19 countries had ratified it.
[8] The PISA, an OECD initiative to evaluate educational systems, measures what 15-year old students can do with what they know.
[9] The average gap was 0.07 and 0.40 standard deviations in math and reading, respectively, in countries outside the region (OECD 2012).
[10] The author did not find evidence that household characteristics, parental care practices, or health were related to gender gaps in infants.
[11] The birth control pill was first approved for use in 1960 in the United States. World historians credit it as a key technology in transferring reproductive rights from men to women (Roberts 2013). Today, three forms of birth control are on the World Health Organization's list of important medications needed in a basic health system (WHO 2015).
[12] The informal sector is broadly characterized as consisting of units engaged in the production of goods or services with the primary objective of generating employment and income for the persons concerned. These units typically operate at a low level of organization, with little or no division between labor and capital as factors of production and on a small scale. Labor relations – where they exist – are based mostly on casual employment, kinship, or personal and social relations rather than contractual arrangements with formal guarantees (ILO 1993).
[13] Consistent with social gender roles, the mother is usually the main caregiver of the child. For example, consider single-parent households in Brazil and Mexico. As many as 88 percent of these households were constituted by single mothers in 2010 (United Nations 2015c). The share of single-parent households overall in Brazil and Mexico was 11.1 percent and 7.4 percent, respectively (United Nations 2015c). In addition to single-parent families, the share of informal unions outside of marriage is increasing in the region. Indeed, around 48 percent of women between 25 and 29 years old lived in consensual union in the Dominican Republic and Panama in 2010 (United Nations 2015c). This share is above 30 percent in Argentina, Colombia, Ecuador, Guyana, and Uruguay (United Nations 2015c).
[14] In general, the average fertility rate decreased in Latin America and the Caribbean from 3.16 to 2.12 children per family between 1991 and 2014 (World Bank 2016).
[15] The 12 countries were Belize, Brazil, Chile, Cuba, Dominican Republic, Honduras, Haiti, St. Kitts and Nevis, Mexico, Peru, Trinidad and Tobago, and St. Vincent and the Grenadines.
[16] Technology alone is far from enough to offset gender gaps. For example, the teen pregnancy rate in Latin America and the Caribbean is the second highest across regions in the world, despite the availability of contraception. The rate was 79 births per 1,000 15-19-year-old women in 2010 (ECLAC 2013). Teenage pregnancy limits educational achievement and causes poverty (Arceo-Gomez and Campos-Vázquez 2014a; Hoffman and Maynard, 2008). Despite this, a study in 2010 found that only 4 out of 10 teenagers in a relationship who do not wish to get pregnant use birth control (Guttmacher Institute 2010). The lack of use was not an information problem because 9 out of 10 teenagers

knew about contraceptive methods (Guttmacher Institute 2010). La Ferrara, Chong, and Duryea (2012) found that soap operas in Brazil showing the benefits of lower fertility led to smaller families in areas with low socioeconomic status. For a discussion on fertility see Guianne (2011).

[17] Corporate quotas in the region have not been evaluated. However, evidence from Norway shows that the participation of women on boards led to changes in management practices that reduced short-term profits (Pande and Ford 2014). Cross-country comparisons show that political and corporate entities tend to avoid the intended impact of quotas (Pande and Ford 2014).

[18] Other examples of data limitation are the lack of information on time allocation by gender for the region. There is not enough information to explore how occupational segregation conditional on paid work has changed in the region, or how pay gender gaps conditional on a given occupation have evolved. For OECD data collection efforts, see https://www.oecd.org/gender/data/ (Chile and Mexico). For the United Nations, see http://unstats.un.org/unsd/gender/default.html. For the World Bank, see http://data.worldbank.org/topic/gender. For a description on the number of countries with data available, see http://unstats.un.org/unsd/gender/dataWW2015.html. All sites accessed on 21 December 2016.

[19] Researchers are likely to face challenges in finding comparable individuals to construct a proper sample. In an extreme, the researcher may not be able to observe one sex at all. Indeed, sorting of men and women into occupational tracks starts early in life. Research focusing on long periods of time may ameliorate this challenge and improve understanding of the dynamics of gender gaps.

[20] For example, suppose that both groups have the same average math scores, but men have more variation. Suppose that the passing score is above the mean. In this case, more men will pass the test. Thus, a researcher comparing the percentage that passes the test across the sexes will find a sex gap. Without knowing the threshold and the distribution, a researcher cannot tell if there was any discrimination. Therefore, researchers must remember that distributional differences may influence results. As a result, deriving lessons learned across studies becomes increasingly challenging.