

Closing the gender gap in education: What is the state of gaps in labour force participation for women, wives and mothers?

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***Abstract.** The educational gender gap has closed or reversed in many countries. But what of gendered labour market inequalities? Using micro-level census data for some 40 countries, the authors examine the labour force participation gap between men and women, the “marriage gap” between married and single women’s participation, and the “motherhood gap” between mothers’ and non-mothers’ participation. They find significant heterogeneity among countries in terms of the size of these gaps, the speed at which they are changing, and the relationships between them and the educational gap. But counterfactual regression analysis shows that the labour force participation gap remains largely unexplained by the other gaps.*

Eliminating differences in education between men and women has been a priority of development organizations and the international community for many years. Pursued by institutions like the United Nations and the World Bank, the third Millennium Development Goal (MDG) aims to “eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015”.¹ Equality of educational opportunities between men and women has also been acknowledged in the Universal Declaration of Human Rights of 1948 and in the 1979 United

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¹ For a list of the Millennium Development Goals, see: <http://www.unmillenniumproject.org/goals/gti.htm> [accessed 26 May 2014].

Nations Convention on the Elimination of All Forms of Discrimination against Women.² A key rationale for the above MDG is to contribute to the attainment of other development goals, such as economic growth, world poverty reduction, the eradication of disease and epidemics, and the improvement of other well-being indicators. According to the World Bank (2012), “there is no investment more effective for achieving development goals than educating girls”.

The differences in education between men and women have now disappeared, or even been “reversed” in women’s favour, in almost all developed countries and in many developing countries as well, including among cohorts born over 60 years ago in several countries. The question, then, is whether these countries have also made progress in eliminating other inequalities facing women in the labour market, not only in terms of broader gender equality and women’s empowerment for economic participation, but also between married women and single women, and between mothers’ and non-mothers’ labour force participation.³ Also, how have developed countries fared relative to developing countries in this respect?

Based on micro-level census data from some 40 countries, this article shows how these inequalities or “gaps” have changed over time. First, we document the closing of the gender gap in education and rank countries by the year in which this gap closed or reversed. We then turn to analysis of the gender gap in labour force participation, the “marriage gap” and the “motherhood gap”. These gaps still exist in many countries, although there is significant heterogeneity in terms of their size and the speed at which they are changing. Finally, we investigate the relationships between the gaps. While our cross-country research design does not allow us to identify causality between the gaps or the impact of economic development on them,⁴ it does provide a useful descriptive analysis of how they relate to one another. Despite the international community’s significant focus on reducing the gender gap in education and the remarkable reversal of the gap in so many countries, this is, to the best of our knowledge, the first study to use micro-level data for so many countries to study the state of these gaps and how they have changed over time.

² Article 26 of the Universal Declaration of Human Rights stipulates that: “Everyone has the right to education ... and higher education shall be equally accessible to all on the basis of merit ... Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights.”

³ We acknowledge the importance of other dimensions of women’s empowerment, such as political participation, earnings and property rights protection. Eliminating gender disparity in these areas is clearly necessary on grounds of human rights and, according to a large body of literature, to promote development (Bandiera and Natraj, 2011). In this article, we focus on labour force participation, which has often been regarded by international organizations as a first step towards improving women’s living standards, and as a mechanism for increasing income and economic growth.

⁴ See Bandiera and Natraj (2011) for a summary of existing studies on gender inequality and development, and their limitations. These authors suggest that most of the existing literature does not adequately address issues related to reverse causality and omitted variables.

Research background and rationale

It has been suggested that educating girls and achieving the MDG on gender equality in education will lead to a range of improved economic and social outcomes for developing countries (Schultz, 2002). Evidence from recent empirical work, focusing primarily on developing countries, shows that there are indeed positive economic consequences and social externalities from improving women's education. For example, increases in women's education have been associated with reductions in fertility (e.g. Osili and Long, 2008), decreases in infant mortality and increases in life expectancy (see Dancer, Rammohan and Smith, 2008; Behrman and Deolalikar, 1988). Overall, it appears that educating women has beneficial effects on children's health (see Glewwe, 2000), schooling, and adult productivity (Lam and Duryea, 1999; Strauss and Thomas, 1995). The beneficial effects are greater than those produced by the same level of education for fathers (see Schultz, 2002). Moreover, studies have shown that the benefits gained from expanding female education are far greater than the benefits gained from other public interventions, such as improving family planning service provision or increasing the number of physicians in the population (Kingdon, 2002). Empirical evidence also shows that gender equality in education leads to higher economic growth (e.g. Abu-Ghaida and Klasen, 2004), while low investment in women's education leads to slower economic growth and reduced income levels (Dollar and Gatti, 1999; Klasen, 1999).

Why would increases in women's education produce improvement in other indicators of gender equality and socio-economic development? In an attempt to answer this question, we now discuss the theoretical reasoning behind the potential effect of narrowing the gender gap in education on women's labour force participation generally, on the participation of married versus unmarried women, and on the participation of those with children versus those without children.

Education and labour force participation

The theory of human capital investment relates differences in earnings to differences in schooling, training, and other assets (Mincer, 1974; Becker, 1991). Specifically, it relates expected lifetime labour force participation to one's incentive to acquire education and training. According to this theory, education increases the productivity and, thus, the earnings of individuals. And existing studies have indeed established a strong causal relationship between education and income at the individual level.⁵

Human capital theory explains why women have traditionally had fewer incentives to invest in education and training given their shorter expected labour force participation (Becker, 1992). Many factors have been put forward

⁵ At the macro level, however, the cross-country evidence linking education to growth is inconclusive (Pritchett, 2001 and 2006). The factors that may explain the discrepancy between macro and micro analyses include measurement error in macro regressions and issues related to the quality of education.

to explain why this has changed over time and why the gender gap in education has closed and even reversed in many countries. In the case of the United States, for example, the factors include the technological change that led to the use of mechanical power rather than human energy in workplaces (Galor and Weil, 2000), the rapid expansion of the service sector (Becker, 1992), the alleviation of household chores through the use of piped water, electricity and appliances (Killingsworth and Heckman, 1986; Greenwood, Seshadri and Yorukoglu, 2005; Goldin, 2006), greater ability to control pregnancies through access to birth control technology, and lower “effort costs” of college preparation and attendance for girls than for boys (Goldin, Katz and Kuziemko, 2006). The increase in divorce rates and the decline in family size have also been suggested as correlates and possible determinants of the reversal of the gender gap in education.

Higher educational attainment has allowed women to increase their expected lifetime labour force participation, shifting their time horizon. Accordingly, their expected benefits from an increased investment in education have led them to plan careers instead of “having jobs” and being the “secondary worker” within the household (Goldin, 2006). Indeed, research shows that returns to women’s education are in many countries either equal to or higher than those accruing to men. Consequently, the opportunity cost of staying at home increases with women’s level of educational attainment. It is important to acknowledge the fact that cultural, social and political factors may also affect women’s labour force participation, beyond economic forces. Specifically, social barriers (idem, 1990), cultural factors (e.g. İlkkaracan, 2012; Beblo and Ortlieb, 2012), particular views on the role of women in society (e.g. Folbre, 1994) and within the household (Badgett and Folbre, 1999), or formal restrictions (e.g. Boserup, 1970) may limit women’s labour supply, even in situations where labour market outcomes and returns to education are expected to be high.

Marriage and labour force participation

Married women’s labour force participation has been the subject of much debate in the literature. Mincer’s (1962) model was the first that tried to explain the apparent puzzle of the increase in married women’s labour force participation in spite of steady increases in men’s real earnings in the United States. According to this pioneering work, household income and wages have two effects on female employment status. On the one hand, the income effect suggests that wages are negatively related to labour supply: as wages increase and income goes up individuals may decide to spend less time working in the labour market and devote more time to leisure. On the other hand, the substitution effect suggests that as wages increase, the opportunity cost of not working also increases, thereby prompting individuals to increase their labour supply. Mincer found the positive substitution effect of general wage increases on women’s employment to be greater than the negative income effect through the husband’s wage, with the difference being large enough for increases in women’s wages to explain much of the increase in married women’s labour force participation.

Goldin (1990) shows how changes in income and wage elasticities can affect women's labour force participation, while Blau and Kahn (2007) examine trends in married women's own-wage and cross-wage elasticities. They find that in the United States from 1980 to 2000, married women's own-wage elasticity fell by about half and that their responsiveness to their husbands' wages declined by about 40 per cent. Heim (2007) also examines married women's labour supply elasticities in the United States, over the period 1979–2002, finding that their wage and income elasticities for both participation and hours decreased dramatically in absolute terms over the period.

Juhn and Murphy (1997) examine women's employment and earnings at different points of their husbands' wage distribution from 1959 to 1989 and find an increasingly weak relationship between women's labour force participation and their husbands' earnings. They also confirm a positive relationship between women's wages and labour force participation, casting doubts on the idea that married women's labour force participation increased to compensate for slow growth in their husbands' earnings. In addition to economic factors, Fernandez (2007) shows how changes in culture and social norms, as part of a rational intergenerational learning process, may have contributed to the increase in married women's labour force participation.

Motherhood and labour force participation

In the neoclassical model of the family, women tended to specialize in domestic production, including child rearing and traditional household activities, whereas men were the primary earners and specialized in formal production through labour market activities (Mincer, 1962; Becker, 1981 and 1991). Moreover, even among women in the labour force, the early years of child rearing were associated with a decrease in working experience and wages. However, the neoclassical model was found to be inadequate in explaining the rise in married women's employment, so subsequent models focused on other determinants of mothers' labour force participation (e.g. Bowen and Finegan, 1969; Smith and Ward, 1985).

First, the expansion of education appears to be related to a decline in fertility rates (Caldwell, 1982; Galor and Weil, 1996 and 1999) and postponement of motherhood (see Strauss and Thomas, 1995, for a review of the literature). According to Caldwell (1982), education influences fertility by increasing the cost of children and the perceived importance of investing in children's human capital, leading women's optimal fertility choices toward "higher quality" (Becker and Lewis, 1973; Willis, 1973). Becker, Murphy and Tamura (1990) show how higher levels of human capital lead to an increase in the returns on human capital, as well as fewer children. Galor and Weil (1996) relate increases in women's wages to the decline in fertility, which, in their theoretical framework, is a consequence of the increase in the cost of children more than the increase in household income. Several recent contributions to the literature have tried to establish a causal relationship between education and fertility, addressing issues of reverse

causality and possible omitted variables (e.g. Breierova and Duflo, 2004; McCrary and Royer, 2011; Duflo, Dupas and Kremer, 2010).

Second, advances in household production technology have reduced the time required for domestic production. In addition, advances in medical technology have reduced the time budget associated with childbirth and parenting, while effective birth control allows women to determine the size and timing of their families and to respond rationally to market signals (Barker and Feiner, 2004).

Third, the shift of economic activity towards the service sector, the consequent introduction of scheduled part-time employment, which is more “female friendly”, and the increase in returns to education have led to growth in the labour force participation of married women and mothers (Goldin, 2006; Goldin, Katz and Kuziemko, 2006). This too has increased educated women’s opportunity cost of staying out of the labour force (Attanasio, Low and Sánchez-Marcos, 2009).

Expected relationship between education and labour force participation gaps

Based on the literature reviewed above, we would expect an increase in women’s educational attainment to be associated with increased labour force participation – both among women generally and among wives and mothers⁶ – and with lower fertility rates and smaller wage gaps between men and women. In other words, empowering women with more education should increase their economic participation and give them greater access to economic resources, leading to improvements in many other spheres. Following previous empirical analyses (mainly country-specific studies or studies focusing on a limited number of countries), we expect to observe a U-shaped relationship between women’s participation and development, as documented by Goldin (1994) and Mammen and Paxson (2000). When women have low levels of education, they are employed in low-skilled, often manual activities for which a social stigma exists, but when they are educated, they find employment in more socially acceptable labour market activities.

There has so far been no large cross-country analysis of the reversal of the educational gender gap and the inequalities attaching to women’s labour force participation. Accordingly, the remainder of this article provides evidence on the dynamics of these gaps, relating them to factors such as levels of GDP, urbanization and labour market rigidity.

⁶ We acknowledge that there may be social norms which prevent women from working outside the household, in which case an investment in women’s education could not increase their labour force participation. Moreover, gender inequalities can be multidimensional. For example, Sundaram and Vanneman (2008) find that in Indian districts featuring a higher share of women in employment, girls’ literacy lags further behind boys’. Their suggested explanation is that in this context, where more mothers work outside the household, more girls have to work to help the family. It would also be important to examine women’s participation by sector with a focus on employment status categories. Due to data limitations, we are unable to do this here (for an interesting analysis on India, however, see Huisman and Smits, 2009).

Data

The primary source we used to construct our data set is the International Integrated Public Use Microdata Series, IPUMS-International (Minnesota Population Center, 2009). This is the largest publicly available compilation of individual-level census data, consisting of decennial records of individuals and households. Our analysis is thus based on micro-level data for a selection of 40 countries in Africa, Asia, Europe and Latin America, as available, drawing upon the two most recent waves of the census for each country.⁷ In most cases, the interval between the two waves of the census is ten years. Appendix table A1 lists the countries in our analytical samples and the census years for each country. Our analysis focuses on the cohort of women and men aged 35–44 in order to concentrate on individuals who have finished their studies and made their decisions on marriage, fertility and labour market participation.

Using the census data for each country, we measure several gender gaps, namely:

- the *education gap*, defined as the difference in average years of education between men and women;
- the *labour force participation gap*, defined as the share of men who are in the labour force minus the share of women who are in the labour force – i.e. employed or unemployed and job-seeking – or, where expressly noted for the purposes of our analysis, as the ratio of those shares;⁸
- the *marriage gap*, defined as the difference in employment rates between women who are married (or living in cohabitation) and single women or, where expressly noted for the purposes of our analysis, as the ratio of those rates;
- the *motherhood gap*, defined as the difference in employment rates between women without children and women with three or more children.⁹

⁷ We acknowledge that our sample is biased towards developing countries. However, we were unable to add more developed countries by relying on other data sources because aggregate statistics consistent with the variables and demographic groups we use are not available.

⁸ We use the employment status variable (EMPSTAT) from the IPUMS data set. Although the variable has been harmonized to make work status comparable across countries and over time, some differences remain in regard to terms of classification and reference group. A detailed description for each country and census wave is available at: https://international.ipums.org/international-action/variables/EMPSTAT#comparability_tab [accessed 26 May 2014].

⁹ We also calculate an alternative measure of the motherhood gap defined as the difference in employment between women with children and women without children. Other studies have examined the “family gap” by looking at the difference in earnings between women with children and women without children, but all of them have focused on developed countries, where the average number of children is lower (e.g. Sigle-Rushton and Waldfogel, 2007; Anderson, Binder and Krause, 2002; Waldfogel, 1998; Harkness and Waldfogel, 1999). Our measure based on three or more children is intended to reflect the higher number of children born to mothers in developing countries, which make up the majority of our sample, so that we have a more comparable share of women in each group. However, robustness checks showed that the basic results do not change depending on which definition of the motherhood gap we use in terms of the number of children.

We supplement the measures constructed from the IPUMS census data with country-level variables from the World Development Indicators, including measures of GDP per capita and urbanization rates. We also include measures of labour market rigidity extracted from the World Bank's (2011a) Doing Business data set.

The education gap

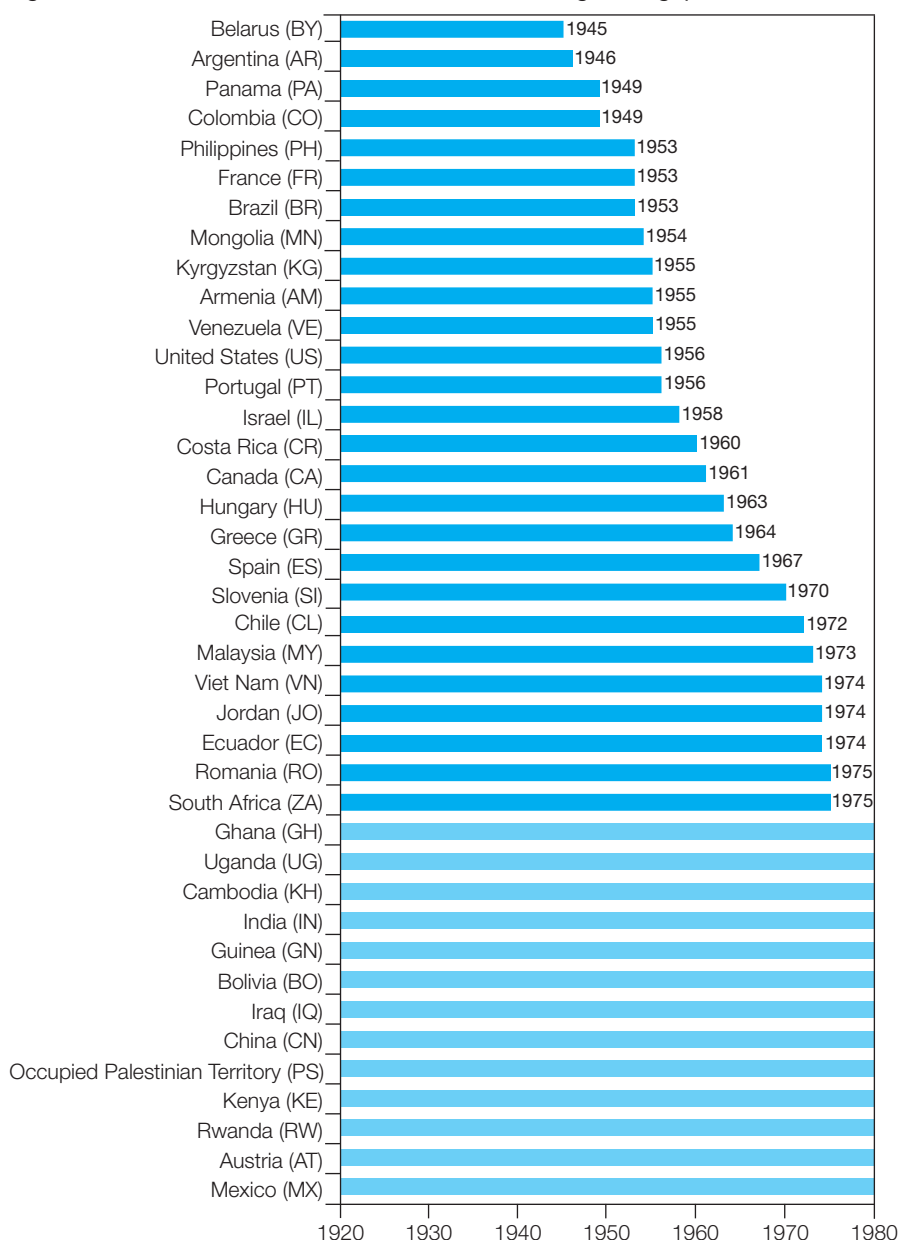
Figure 1 shows the year of birth of the first cohort for which the education gap was closed according to the most recent available wave of the census. In most countries, this wave was administered in the early 2000s (see Appendix table A1). Of the 40 countries in our sample, 27 have closed the gap, while men still averaged more years of schooling than women in the remaining 13 countries at the time of the census. The first country where the gap was closed is Belarus, for the cohort born in 1945, and the last two are South Africa and Romania, for the cohort born in 1975. In the United States, the gap was closed for the cohort born in 1956. Interestingly, ten developing countries closed the gender gap in education earlier than the United States.¹⁰ In countries where the gap was closed in the 1950s, two generations have already experienced gender equality in years of schooling, while in those countries where the gap was closed in the 1970s, only one generation has experienced such equality.

Most developed countries and some developing countries have not only closed the gender gap in education, but also significantly reversed it in favour of women (see Hausmann, Ganguli and Viarengo, 2009). Except for Austria, all of the countries where the gap remains in men's favour are developing countries. As table 1 shows, however, the gap at age 25 is still very wide in 11 of the 13 countries that have yet to close it, ranging from 0.6 to 2.1 years of schooling, but much smaller in Austria and Mexico, at 0.1 years. The gap has closed in Viet Nam, and it has reversed significantly in Mongolia, Portugal, the Bolivarian Republic of Venezuela, Argentina, Brazil and Greece, where 25-year-old women have between 0.8 and 1.2 more years of schooling than men. In Latin America, the gap has been reversed in most countries (eight out of ten). Only Mexico and Bolivia exhibit a persistent gap disfavoursing women, still significant in the case of Bolivia.

Figure 2 relates women's average years of education to the current size of the gender gap in years of education. Interestingly, several of the countries where the gap has reversed are not among those where women have the highest average levels of education (e.g. Argentina and Brazil). In Rwanda and Guinea, where women have the lowest average levels of education, the gender gap is between 1.2 and 2.3 years of schooling. In countries where the

¹⁰ Admittedly, the United States has had a more complicated history in this regard: between 1900 and 1930, women had roughly the same level of education as men (Goldin, Katz and Kuziemko, 2006), then the gap widened and subsequently closed again for the cohorts born in the 1950s. None of the other countries in our sample displays such a reversal over time.

Figure 1. Year of birth of the first cohort to close the gender gap in education



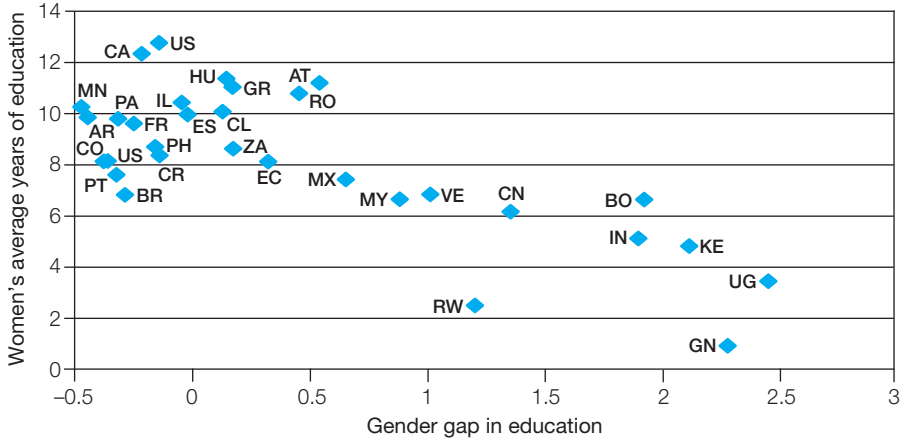
Notes: The gender gap in education is calculated as men's average years of education minus women's average years of education for individuals born in a given year. The year of birth of the first cohort to have closed the education gap in the most recent available wave of the census is indicated for each country. For countries where no year is indicated, the gender gap in education was not yet closed at the time of the latest census for which data are available.

Source: Authors' calculations based on IPUMS-International data.

Table 1. The reversal of the gender gap in education

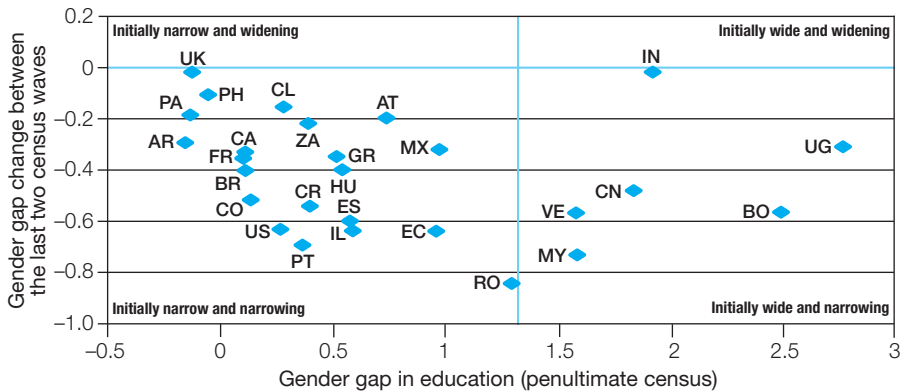
Country	Birth year of cohort in which gap reversed or closed	Gap in years of schooling at age 25
Belarus	1945	-0.4
Argentina	1946	-0.8
Colombia	1949	-0.7
Panama	1949	-0.6
Brazil	1953	-0.8
France	1953	-0.7
Philippines	1953	-0.6
Mongolia	1954	-1.2
Venezuela, Bolivarian Rep. of	1955	-0.9
Armenia	1955	-0.5
Kyrgyzstan	1955	-0.1
Portugal	1956	-1.0
United States	1956	0.0
Israel	1958	-0.1
Costa Rica	1960	-0.4
Canada	1961	-0.5
Hungary	1963	-0.3
Greece	1964	-0.8
Spain	1967	-0.7
Slovenia	1970	-0.6
Chile	1972	-0.1
Malaysia	1973	-0.2
Ecuador	1974	-0.3
Jordan	1974	-0.2
Viet Nam	1974	0.0
South Africa	1975	-0.4
Romania	1975	-0.1
Mexico		0.1
Austria		0.1
Rwanda		0.6
Kenya		0.6
Occupied Palestinian Territory		0.8
China		0.8
Iraq		1.1
Bolivia, Plurinational State of		1.2
Guinea		1.3
India		1.5
Cambodia		1.6
Uganda		1.6
Ghana		2.1

Figure 2. Women’s average years of education and the educational gender gap, most recent census wave



Notes: The gender gap in education is calculated as described in figure 1, and averaged for individuals aged 35–44. The country coding is given in figure 1.
 Source: Authors’ calculations based on IPUMS-International data.

Figure 3. Change in the educational gender gap between the last two census waves



Notes: The education gap is calculated as the difference in average years of schooling between men and women aged 35–44. Two outliers, Guinea and Mongolia, have been excluded. The last two census years for each country are given in Appendix table A1. The country coding is given in figure 1.
 Source: Authors’ calculations based on IPUMS-International data.

gender gap is around two years or more (i.e. Uganda, Kenya, Bolivia and India), women average 4–6 years of education. In some countries, like Bolivia and Mexico, where the gender gap has reversed in urban areas, it persists among the indigenous population and in rural areas (Duryea et al., 2007).

Turning to the dynamics underlying these patterns, figure 3 plots the gender gap in average years of schooling for the age group 35–44 in the penultimate wave of the census against the change in the gap reflected in the most

recent wave of the census. The gap is narrowing in the majority of countries. One exception is India, where the initially wide gap does not appear to be narrowing.¹¹ Elsewhere, the reduction in the gender gap over the course of the decade-long interval between the two waves of the census ranges from close to zero to -0.8 years. Only Mongolia experienced a narrowing of the gap by more than a year; we therefore excluded it from figure 3.

The labour force participation gap

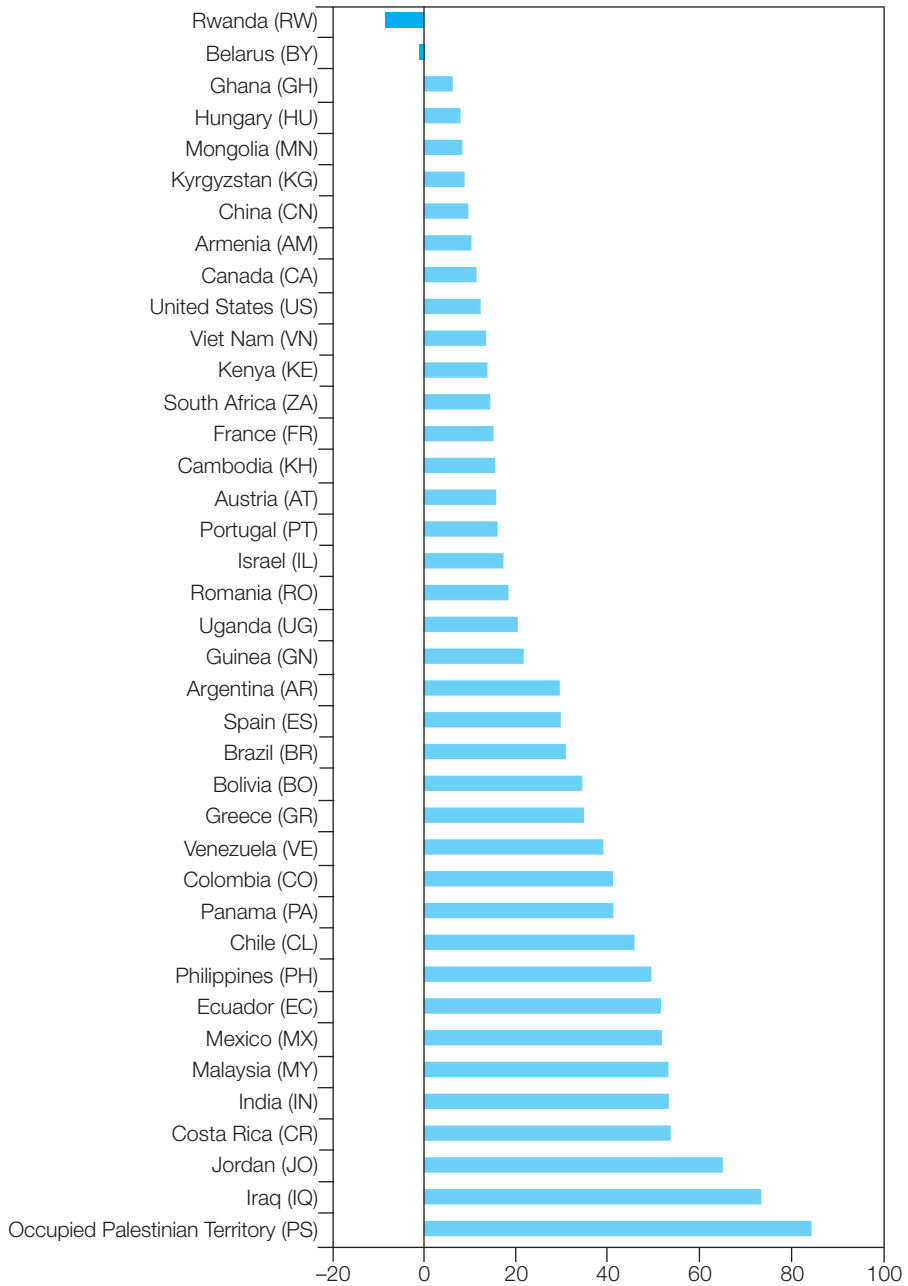
The labour force participation gap is defined as the difference between the proportion of men and the proportion of women in the labour force. When interpreting our results, it should be remembered that this measure is based on the harmonized employment status variable of the IPUMS, which may not accurately take account of the household work, self-employment and informal activities that women are more likely to engage in than men, particularly in developing countries. The resulting bias may thus be more significant for developing countries, and there may be heterogeneity across countries that we cannot quantify. However, this should only affect the static analysis of the labour force participation gap (i.e. for a given wave), but not the dynamic analysis (changes across census waves), since the definition of the employment status variable does not change across waves.

Figure 4 shows the gender gap in labour force participation in the most recent wave of the census. Rwanda is the only country where women's labour force participation is higher than men's, though it is important to note that this cohort lived through the country's 1994 genocide, which has likely affected gender roles in the household and women's labour force participation. Other African States (e.g. Ghana, Kenya and South Africa) have female labour force participation rates as high as those observed in our sample of developed countries. Belarus exhibits equal labour force participation between men and women; and other former or current communist countries also exhibit high female labour force participation rates, with participation gaps below 20 per cent in Cambodia, Romania, Mongolia, Hungary, China and Viet Nam. Latin American countries have wider participation gaps, ranging from 29 per cent in Argentina to 53 per cent in Costa Rica. The Arab countries – Jordan, Iraq and Occupied Palestinian Territory – exhibit very large gaps, above 60 per cent. Among the developed countries, southern European countries (Greece, Spain and Portugal) have comparatively lower levels of women's labour force participation relative to men's.

Figure 5 shows the change in the labour force participation gap between the penultimate and latest waves of the census, plotting the initial gap (horizontal axis) against the change in the gap (vertical axis). The change has been inconsistent across those countries which had wide initial gaps in labour force

¹¹ India's most recent census, conducted in 2011, could present a shift in this pattern as the gap appears to have narrowed in aggregate terms.

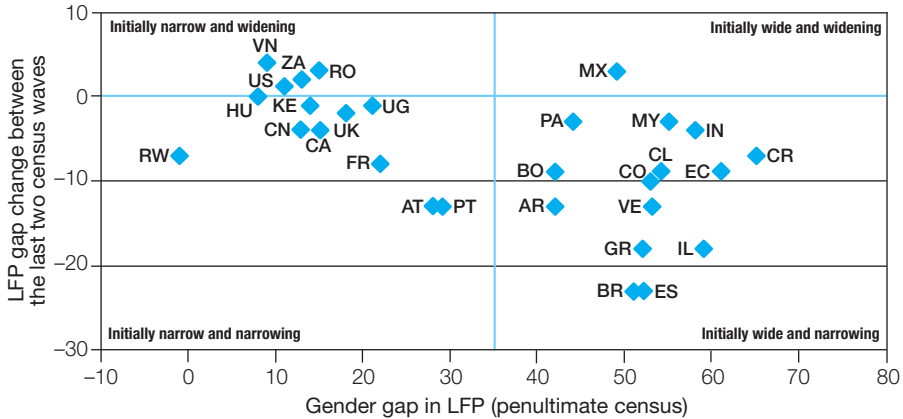
Figure 4. Labour force participation gap



Notes: The labour force participation gap is calculated as the share of men in the labour force (employed or unemployed and job seeking) minus the share of women in the labour force for the age group 35–44.

Source: Authors' calculations based on IPUMS-International data.

Figure 5. Change in the gender labour force participation gap between the last two census waves



Notes: The labour force participation (LFP) gap is calculated as described in figure 4. The last two census years for each country are given in Appendix table A1. The country coding is given in figure 1.

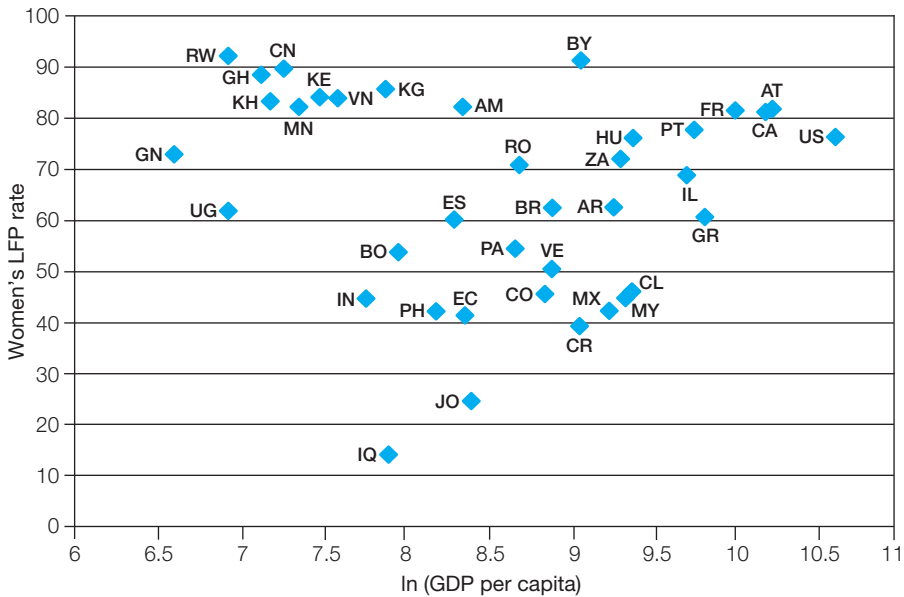
Source: Authors' calculations based on IPUMS-International data.

participation in the 1990s. In Brazil and Spain, the gap narrowed by more than 20 percentage points, displaying the greatest reductions observed across the countries in the sample. Among the other countries with initial participation gaps in excess of 30 per cent, Argentina, Venezuela, Israel and Greece experienced reductions in the gap between 10 and 20 percentage points, whereas Panama, Malaysia, India, Costa Rica, Chile, Ecuador and Colombia witnessed more limited reductions, below 10 percentage points. Mexico, by contrast, experienced a widening of its labour force participation gap. Rwanda, which had already closed its participation gap in the early 1990s, saw further reversal of the gap in favour of women. In Viet Nam, Romania, South Africa and the United States, the gap is widening, while it narrowed by less than 10 percentage points in the remaining countries.

Figure 6 suggests a U-shaped relationship between per capita GDP and female labour force participation: women's labour force participation rates are indeed high (above 70 per cent) in countries like Rwanda, Guinea, Ghana and Cambodia, whose annual GDP per capita is below US\$1,500, but also in countries like Austria, France, the United States and Canada, whose GDP per capita exceeds US\$22,000. Meanwhile, most middle-income countries exhibit female labour force participation rates below 60 per cent. The level of GDP per capita at which women's participation is at its lowest is approximately US\$2,800.¹² Iraq's GDP per capita was close to US\$2,747 in this period and its female labour force participation was the lowest among the countries in our sample, close to 14 per cent.

¹² This observation is supported by the regression analysis results reported in Appendix table A2.

Figure 6. Women’s labour force participation and GDP per capita (PPP)



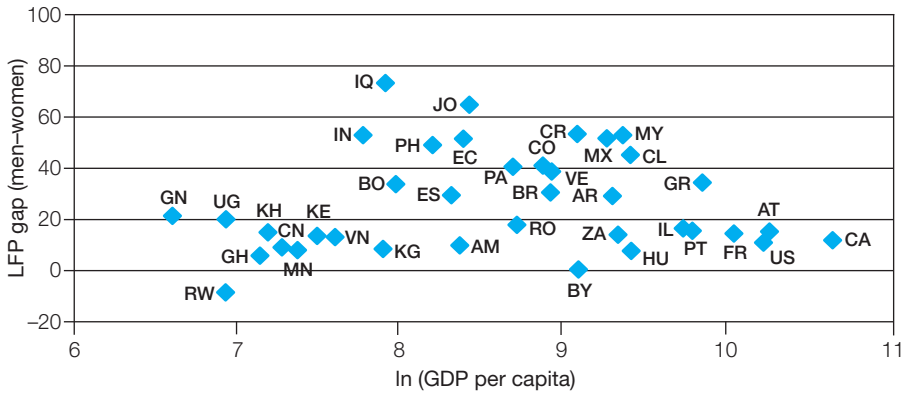
Notes: The labour force participation rate (LFP) is calculated for women aged 35–44. The country coding is given in figure 1.
 Sources: Authors’ calculations based on IPUMS-International data. GDP data are from the World Development Indicators.

Similarly, if we plot GDP per capita against the labour force participation gap, as shown in figure 7, we observe that the gap is smaller at lower and higher levels of GDP per capita. Appendix table A2, however, provides evidence that the relationship between female labour force participation and GDP per capita is weaker after controlling for urbanization. These results are consistent with earlier empirical studies which find that during the early stages of economic development women’s labour force participation declines as a result of the structural change (e.g. Sinha, 1967; Goldin, 1990 and 1994). Specifically, the shift from an agriculture-based economy to expansion of the modern sector leads to a decline in female participation in market-oriented activities.¹³ Nevertheless, low-income countries with high female labour force participation rates (e.g. Ghana, Guinea, Rwanda and Uganda) still exhibit a gender gap in education (figure 1), while developed countries with equally high female labour force participation rates have reversed the gender gap in education and have a greater share of women employed in high-skilled urban occupations (Canada, France and the United States).

We formalize this analysis by means of regressions that explore the relationship between GDP and the labour force participation gap. We also examine

¹³ In this case, labour force participation does not include home-based production of non-marketed services.

Figure 7. The labour force participation gap and GDP per capita (PPP)



Notes: The labour force participation (LFP) gap is calculated as the difference between the percentages of men and women aged 35–44 who are in the labour force. The country coding is given in figure 1.

Sources: Authors' calculations based on IPUMS-International data. GDP data are from the World Development Indicators.

the relationship between the labour force participation gap and the share of the population living in urban areas, and a measure of labour market rigidity. In table 2, column 1 shows that the log of GDP per capita and the log of GDP per capita squared are significantly related to the gender gap in labour force participation, confirming the relationship suggested by figure 7.¹⁴ Column 2 shows the regression results predicting the change in the gap from the previous census. As shown by the descriptive analysis above, the size of the gap in the penultimate census is negatively related to subsequent change in the gap, so that countries with a wider initial gap experience a narrowing of their gender gap, indicating convergence. Change in the labour force participation gap and the log of GDP per capita are positively related, suggesting a U-shaped relationship between these two measures. Surprisingly, the regressions also show that the gender gap in participation is narrowing more rapidly in countries with more rigid labour markets, suggesting that labour market policies may have an impact on the speed at which this gap is changing – albeit not in the direction that might have been expected.¹⁵

Finally, the gender gap in education is decreasing more rapidly in countries where a greater share of the population lives in urban areas (figure 8). This appears to be related to the fact that after an initial decline in female labour force participation, as economies develop further and become urbanized, women's education and the opportunity cost of staying out of the labour force increase. Also, fertility rates decline, as do social barriers to market-based work,

¹⁴ The inclusion of urban-squared in the regression does not change the results.

¹⁵ The mean of the Employment Rigidity Index is 37.9 and the standard deviation is 16.9. An increase in the Employment Rigidity Index of one standard deviation would lead to a reduction in the gap by 0.027 per cent, so the effect is relatively small.

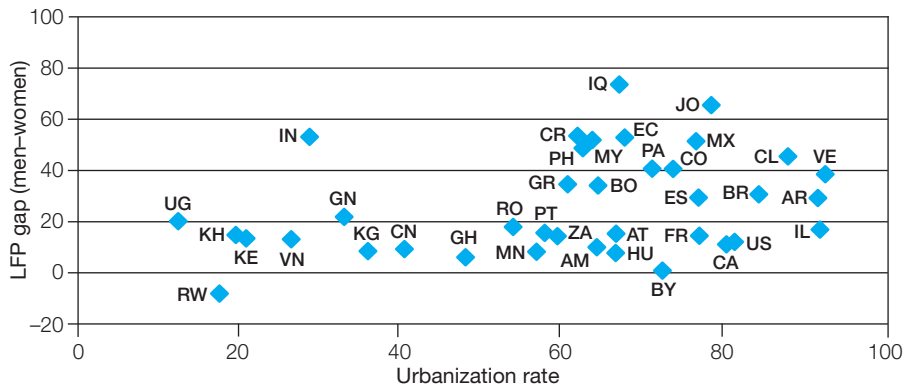
Table 2. Gender gap regressions

	(1) LFP gap	(2) Change in LFP gap	(3) Marriage gap	(4) Motherhood gap
Log GDP	1.146** (0.537)	0.801*** (0.261)	-0.700 (0.710)	-0.228 (0.554)
Log GDP-squared	-0.0685** (0.0305)	-0.0442*** (0.0149)	0.0434 (0.0412)	0.00805 (0.0323)
Rigidity of Employment Index	-0.000105 (0.00185)	-0.00158** (0.000705)	-0.00153 (0.00243)	0.000740 (0.00191)
Share urban	0.287 (0.217)	-0.232** (0.0922)	-0.422 (0.260)	-0.0521 (0.216)
LFP gap, penultimate census		-0.223** (0.0794)		
Women's LFP			0.919*** (0.0974)	0.212 (0.165)
Constant	-4.613** (2.260)	-3.365*** (1.088)	3.907 (2.948)	1.113 (2.329)

Notes: Regressions are based on the gender gap measures described in the data section. Standard errors are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The Rigidity of Employment Index measures the regulation of employment, specifically the hiring and firing of workers and the rigidity of working hours. It is the average of three indexes: a difficulty of hiring index, a rigidity of hours index, and a difficulty of firing index. The results do not change when including "Share of urban-squared".

Sources: Authors' calculations from IPUMS-International data. GDP per capita and level of urbanization are from the World Development Indicators. The Rigidity of Employment Index (0=less rigid, 100=more rigid) is from the World Bank's "Doing Business" data set.

Figure 8. The labour force participation gap and the rate of urbanization



Notes: The labour force participation (LFP) gap is calculated as the difference between the percentages of men and women aged 35–44 who are in the labour force. The country coding is given in figure 1.

Sources: Authors' calculations based on IPUMS-International data. The percentages of the population living in urban areas are from the World Development Indicators.

so women's labour market participation increases (Goldin, 1990 and 1994; Mammen and Paxson, 2000). Importantly, even though this pattern is widely acknowledged in the literature, existing empirical cross-sectional studies are mainly descriptive and cannot identify the causal effect of development and

Figure 9. The marriage gap and the female employment rate



Note: The marriage gap is calculated as the ratio of married to single women's employment rates for the age group 35–44. The country coding is given in figure 1.

Source: Authors' calculations based on IPUMS-International data.

urbanization on women's labour force participation. Besides, countries may follow different development patterns and, accordingly, different trajectories in women's labour force participation.

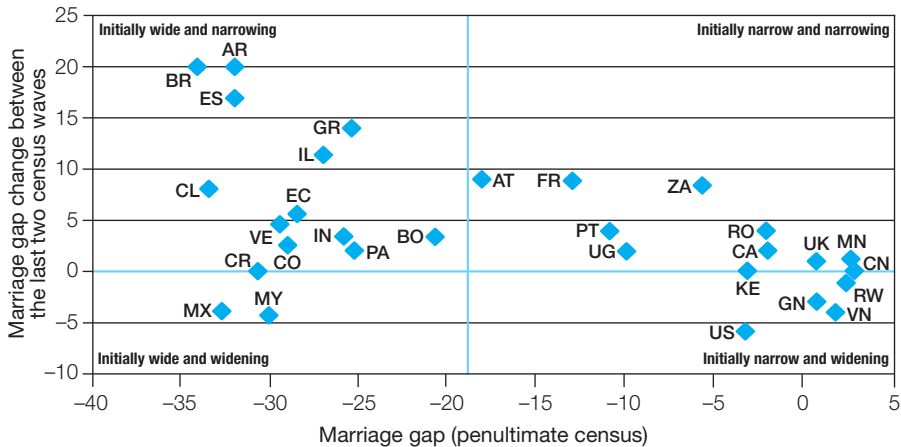
The marriage gap

We now examine the gap in employment rates between married women and single women – the “marriage gap”.¹⁶ By plotting the marriage gap against the female employment rate, figure 9 shows that in countries where women's overall employment rate is low (below 20 per cent), the ratio of married to single women's employment rates is low. In other words, where a smaller proportion of women work, fewer married women work relative to single women. This pattern is clearly reflected in the Arab countries, where the marriage gap is the widest (Occupied Palestinian Territory, Iraq and Jordan). But as the female employment rate rises, the employment differential between married and single women decreases.

There are several countries where female employment rates are high (above 60 per cent) and married women work more than single women (Mongolia, Ghana, China, Slovenia, the United Kingdom, Hungary, Rwanda, Belarus, Canada, and Romania). Interestingly, these countries include both developed

¹⁶ This is based on the IPUMS marital status variable, MARST, for which we use “married/in union”. Our definition of “marriage” thus also includes cohabitation.

Figure 10. Change in the marriage gap over time



Note: The marriage gap is the difference in employment rates between single and married women aged 35–44. The change in the marriage gap is the percentage change in the marriage gap between the last two censuses, for women aged 35–44. The country coding is given in figure 1.

Source: Authors' calculations based on IPUMS-International data.

and developing countries, and communist and former communist countries alike. The results of our regression analysis confirm the relationship between the marriage gap and overall female labour force participation (see table 2, column 3). The results also show that other variables which might play a role in the marriage gap – GDP, urbanization and labour market rigidity – do not significantly explain the size of the marriage gap across countries.

Figure 10 presents the dynamics of the marriage gap by plotting the initial marriage gap (from the penultimate wave of the census) on the horizontal axis and the change in the gap a decade later on the vertical axis. Here, the marriage gap is calculated as the difference in employment rates between single and married women aged 35–44. Countries that started with a small marriage gap witnessed small changes in the gap. But the picture is less clear for countries that had a large initial gap. Some – e.g. Argentina, Brazil and Spain – experienced significant narrowing of the gap. Others, like Chile, Ecuador, Venezuela, India, Colombia and Panama, saw small reductions in the gap. Meanwhile, the marriage gap widened in Costa Rica, Malaysia and Mexico.

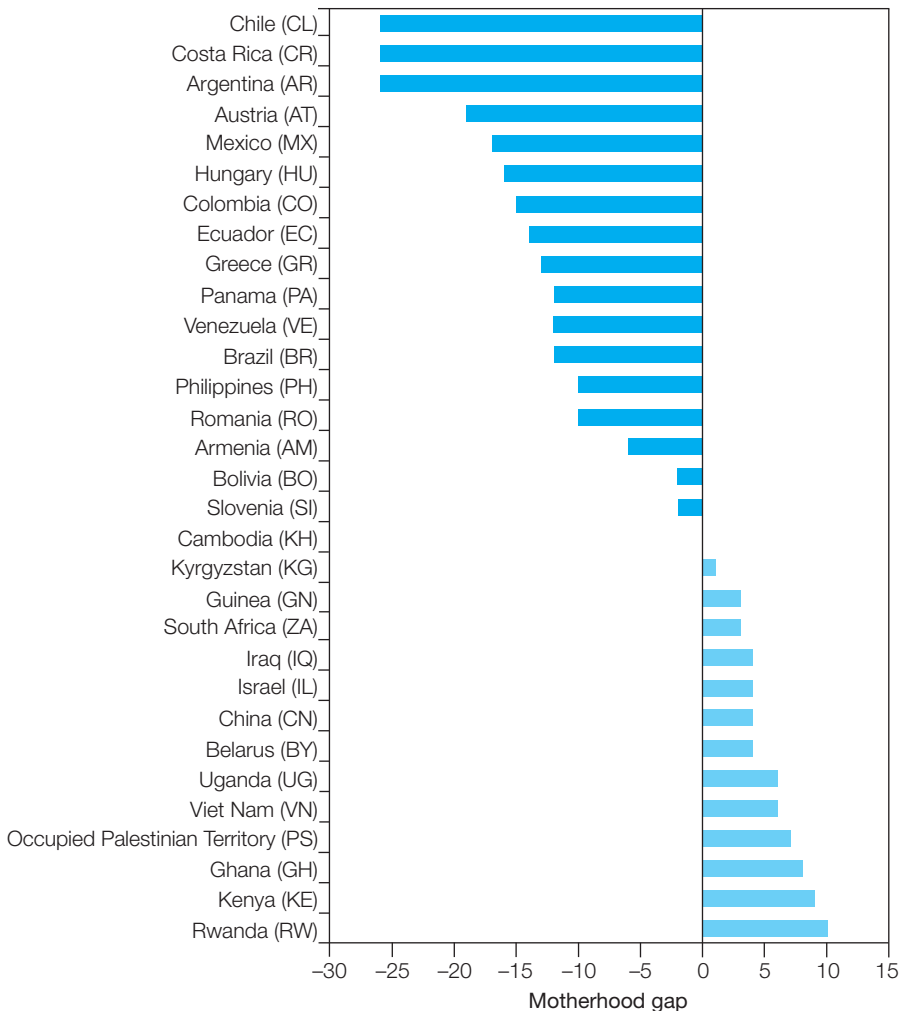
The motherhood gap

We now turn to the gap in employment between women with three or more children and women without children. Earlier studies that have examined the motherhood gap or “family gap” by looking at earnings differentials have been motivated by the fact that, in many countries, women tend to bear primary responsibility for childcare and unpaid household work (Elson, 1999; for

examples of such studies, see note 9 above). Empirical evidence has been mainly limited to developed countries, where findings indicate that there is a persistent family gap, though its size varies across countries (Harkness and Waldfogel, 1999). Women with children are also less likely to work outside of their home; and those who do so, work fewer hours.

Figure 11 ranks countries according to the size and sign of their motherhood gap. In most of the countries in our sample, women with children tend to work less than women without children (hence the negative values of the

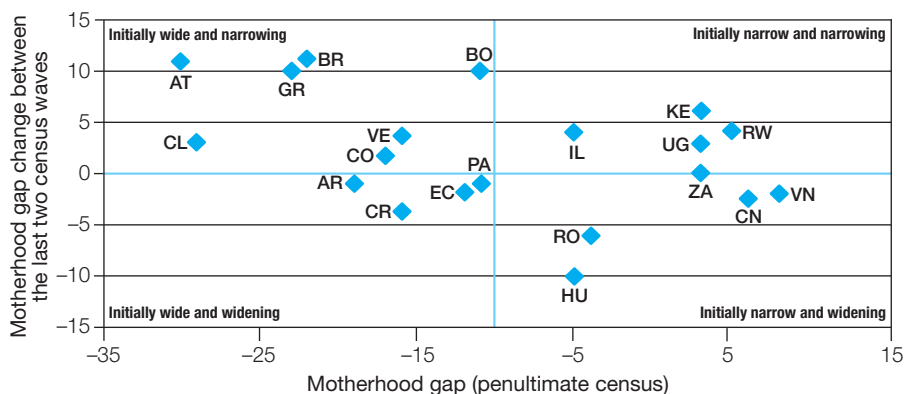
Figure 11. The motherhood gap (most recent census wave)



Notes: The motherhood gap is the difference between the employment rate of women with three children and the employment rate of those with no children, for women aged 35–44.

Source: Authors' calculations based on IPUMS-International data.

Figure 12. Change in the motherhood gap over time



Notes: The motherhood gap is the difference between the employment rate of women with three children and the employment rate of those with no children, for women aged 35–44. The country coding is given in figure 1. Source: Authors' calculations based on IPUMS-International data.

motherhood gap).¹⁷ The gap is widest in Chile, followed by Costa Rica and Argentina. However, there are several countries with a positive motherhood gap, meaning that women with children work more than women without children. In Rwanda, the positive gap is almost 10 per cent. Interestingly, Iraq and Occupied Palestinian Territory, which have the lowest female employment rates, have positive motherhood gaps. Table 2, column 4, shows the regression results for the motherhood gap: there is no significant relationship between the motherhood gap and GDP, urbanization, labour market rigidity, or women's overall labour force participation.

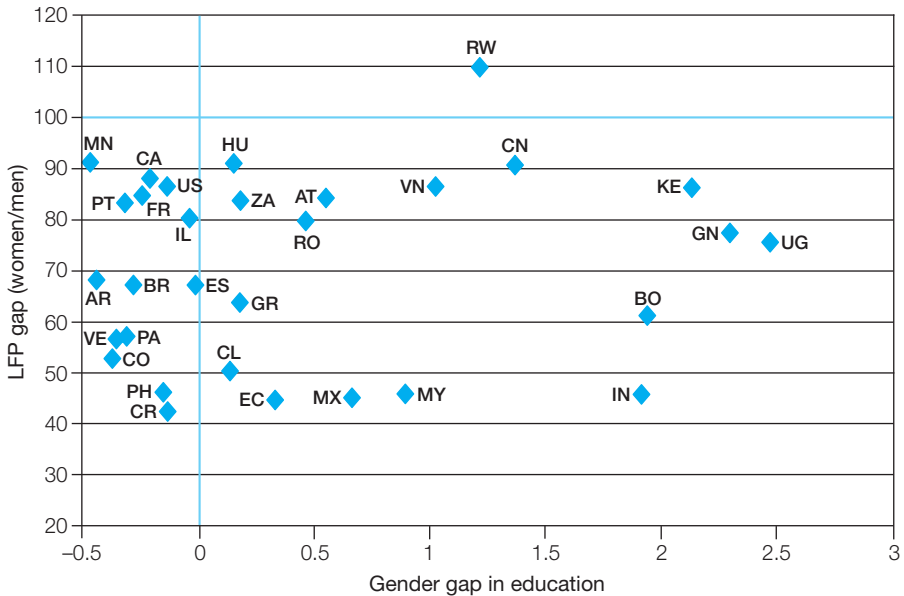
Lastly, figure 12 shows the changes in the motherhood gap across the two census waves. Countries with a larger initial gap saw large changes in the gap (e.g. Austria, Brazil and Greece) while countries with a positive motherhood gap in the penultimate census, like China, Viet Nam and South Africa, witnessed very small changes.

Relationships between the gaps

This section examines the relationships between the gaps we have discussed thus far, namely, the gender gaps in education and labour force participation, and the marriage and motherhood gaps. Figure 13 plots the gender gap in

¹⁷ Appendix figure A1 shows the motherhood gap based on an alternative definition – the difference in employment rates between women with any children and women without children. As noted earlier, we chose our three-child threshold because most of the countries in our sample are developing countries where the average number of children is higher. Also, since the costs of having children increase with the number of children in the household, women with three or more children are a useful group to examine comparatively. Figure A1 shows that a few countries move in the ranking depending on which definition is used, but the original and alternative definitions of the motherhood gap produce very similar results for most countries and, on average, the difference between the measures is zero.

Figure 13. The gender gaps in education and labour force participation



Notes: The gender education gap is the difference between men's and women's years of schooling for those aged 35–44. The labour force participation (LFP) gap is calculated as the proportion of women in the labour force divided by the proportion of men in the labour force for individuals aged 35–44 (expressed as a percentage). The country coding is given in figure 1.

Source: Authors' calculations based on IPUMS-International data.

education on the horizontal axis and the gender gap in labour force participation on the vertical axis. There is no clear relationship between these gaps: although the educational gender gap has reversed in many countries, the labour force participation gap remains. For example, Argentina, Brazil, Colombia, the Philippines, Panama and Venezuela have all reversed their educational gender gap, but all of them still have labour force participation gaps between 40 and 70 per cent. Meanwhile, countries like China, Viet Nam and Kenya have large education gaps, but small labour force participation gaps. Rwanda, where women work more than men, has not reversed its gender gap in education. The country-level regression results reported in column 1 of table 3 confirm that that, after controlling for other factors, the education gap is not significantly related to the labour force participation gap.

As discussed earlier, these patterns may be explained by greater labour force participation among low-skilled women in these countries. As mentioned above, existing studies suggest that women's labour supply follows a U-shaped pattern during economic development (Sinha, 1967; Schultz, 1988; Goldin, 1990 and 1994; Mammen and Paxson, 2000). At very low levels of income, women tend to have low-skilled jobs and long working hours; they are typically the secondary earners in the household; and their work often plays the role of an insurance. There is some disutility and social stigma attached to labour force

Table 3. Regressions showing the relationships between gaps

	(1) LFP gap	(2) Change in LFP gap	(3) Marriage gap	(4) Marriage gap	(5) Motherhood gap	(6) Motherhood gap	(7) Motherhood gap
Log GDP	1.535*** (0.532)	0.386 (0.399)	-0.215 (0.268)	-0.0154 (0.371)	-0.198 (0.540)	-0.00976 (0.501)	-0.0421 (0.495)
Log GDP- squared	-0.0894*** (0.0303)	-0.0202 (0.0222)	0.0125 (0.0156)	0.00239 (0.0214)	0.00617 (0.0314)	-0.00310 (0.0288)	-0.00175 (0.0285)
Rigidity of Employment Index	-0.000632 (0.00174)	-0.000482 (0.000814)	0.000852 (0.000929)	0.000935 (0.00128)	0.00100 (0.00187)	0.000307 (0.00172)	-0.000126 (0.00172)
Share urban	0.287 (0.246)	-0.336*** (0.108)	0.00282 (0.103)	0.0205 (0.168)	-0.0309 (0.208)	0.0408 (0.227)	0.00642 (0.220)
Education gap	0.0739 (0.0566)			0.0459 (0.0441)		0.0539 (0.0595)	0.0322 (0.0593)
Change in education gap		-0.0173 (0.0622)					
LFP gap			-0.985*** (0.0823)	-0.989*** (0.159)	-0.283 (0.166)	-0.500** (0.215)	
Marriage gap							0.444** (0.189)
Constant	-6.422*** (2.238)	-1.668 (1.707)	1.955* (1.112)	0.954 (1.576)	1.187 (2.242)	0.247 (2.124)	-0.0191 (2.149)
Observations	27	22	28	19	28	19	19
R-squared	0.425	0.505	0.907	0.865	0.518	0.751	0.753

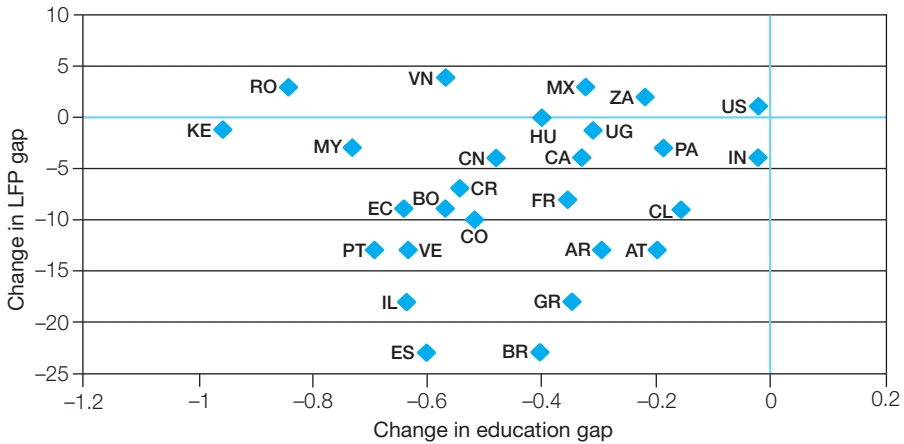
Notes: Standard errors are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Regressions are based on the measures described in the data section. The results do not change when including "Share urban-squared".
Sources: Authors' calculations from IPUMS-International data. GDP per capita and rates of urbanization are from the World Development Indicators. The Rigidity of Employment Index (0=less rigid, 100=more rigid) is from the World Bank's "Doing Business" data set.

participation that helps to understand why women's labour force participation goes down as GDP per capita goes up. At high levels of income per capita, however, women are educated and more likely to have "careers". They are also less likely to be the "second earner" and tend to have more decision power within the household. In this context, women form their identity first, invest in their education and only then make decisions related to marriage and fertility. Descriptive evidence consistent with our results is provided in the World Bank's (2011b) *World Development Report 2012*, which documents women's U-shaped labour force participation curve relative to economic development.

Figure 14 plots the relationship between changes in the education and labour force participation gaps. In no country have both gaps increased. In India, the gender gap in education has not changed while the gender gap in labour force participation has narrowed by around 4 percentage points.¹⁸ In Romania, Viet Nam, Mexico, South Africa and the United States, by contrast, the gap

¹⁸ As mentioned in note 11 above, the latest wave of the Indian Census (2011) could show a different pattern.

Figure 14. Changes in the education gap and in the labour force participation gap

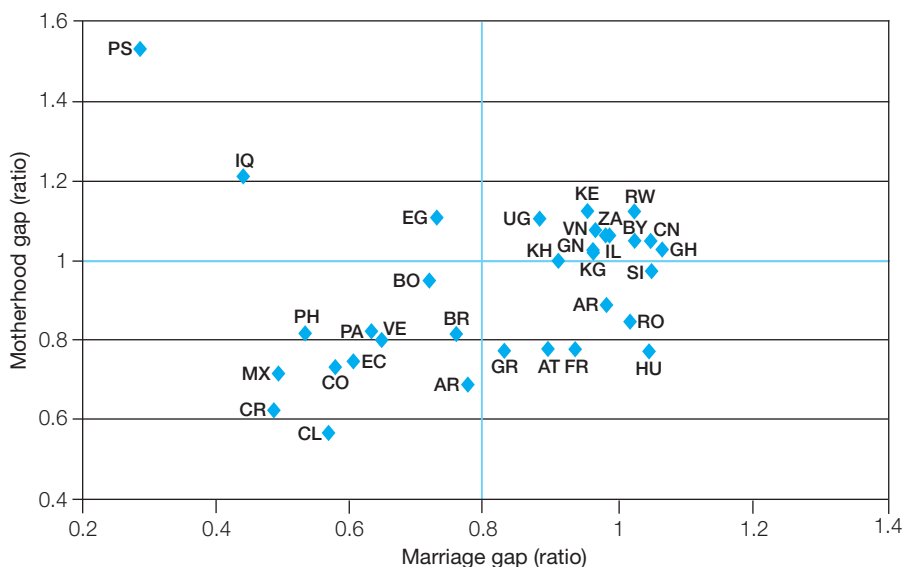


Notes: The gender education gap is the difference between men's and women's years of schooling for those aged 35–44. The labour force participation (LFP) gap is calculated as the male participation rate minus the female participation rate for individuals aged 35–44. This graph is presented for those countries for which we have information on both the education and the labour force participation gaps. The country coding is given in figure 1. Source: Authors' calculations based on IPUMS-International data.

in labour force participation is widening, while the gap in education is either shrinking or unchanged. In the majority of countries, however, both gaps narrowed between the two census waves. The most significant reductions in the labour force participation gap occurred in Brazil and Spain, while the greatest decreases in the education gender gap occurred in Kenya, Romania and Malaysia. There is heterogeneity across the remaining countries. Our regression analysis shows no significant relationship between change in the labour force participation gap and change in the education gap (table 3, column 2).

Columns 4 and 6 of table 3 show that the labour force participation gap is significantly associated with both the motherhood gap and the marriage gap. However, reduction of the educational gender gap has not generally been associated with narrowing of the marriage and motherhood gaps. These gaps have responded instead to other factors that have affected the overall gender gap in labour force participation. Except in Iraq and Occupied Palestinian Territory, there appears to be a positive relationship between these gaps: the smaller the employment rate differential between married and single women, the smaller the differential between women with children and women without (figure 15). We imagine that many of the factors making marriage more compatible with work also tend to make motherhood more compatible with work. A better understanding of the interactions between household and market production and intra-household decision-making and bargaining power can shed more light on the labour supply decisions of wives and mothers (Benería and Sen, 1986 and 1982; Folbre, 1986). Column 7 of table 3 confirms the positive relationship between the marriage and motherhood gaps after controlling for other factors.

Figure 15. The motherhood gap and the marriage gap



Notes: The motherhood gap is the ratio of working women with three children to working women with no children, for women aged 35–44. The marriage gap is the ratio of married to single women's employment rates, for women aged 35–44. The country coding is given in figure 1.

Source: Authors' calculations based on IPUMS-International data.

How much of the labour force participation gap can be accounted for?

Finally, we consider how much of the gender gap in labour force participation can be explained by size of the education, marriage and motherhood gaps. In the spirit of an Oaxaca-Blinder decomposition, we present a descriptive analysis of what women's labour force participation would be if the different groups we are studying all had the same level of education. Following Blinder (1973) and Oaxaca (1973), this approach has typically been used to study mean outcome differences between groups (e.g. wage gaps by sex or race). Specifically, it decomposes a differential between two groups into a part that is "explained" by group differences in observable characteristics, such as education or work experience, and a residual part that cannot be accounted for by observable differences. In this approach, a counterfactual wage equation is created in which, say, women are given the characteristics of men. The "unexplained" part is then often used as a measure of discrimination, though it also includes the effect of differences between the groups in unobserved characteristics. Most applications of this decomposition approach can be found in the labour market and discrimination literature (for meta-studies, see, for example, Stanley and Jarrell, 1998; Weichselbaumer and Winter-Ebmer, 2005); and more recent studies

have developed alternative approaches for creating counterfactuals (e.g. Fortin, Lemieux and Firpo, 2010; Machado and Mata, 2005).

Here, we seek to calculate how much of the labour force participation gap between men and women is explained by the other gaps we have analysed thus far (education, marriage and motherhood) and how much of the labour force participation gap is left unexplained. To do this, we create counterfactual labour force participation gaps by running regressions of women's labour force participation as a function of years of education, age, and dummies for married women and those having three or more children. Accordingly, we run the following regression for women only (aged 35–44) for each country separately, using the full individual-level census sample:

$$\text{FemaleLFP}_i = \alpha + \beta_1 \text{education}_i + \beta_2 \text{age}_i + \beta_3 \text{married}_i + \beta_4 \text{children}_i + \varepsilon_i$$

Still following the Oaxaca-Blinder approach, we then create counterfactual levels of women's labour force participation by “predicting” their participation using the estimated regression coefficients above if (1) if they had men's average level of education, all other variables being equal; (2) if they did not display a “marriage gap”, all other variables being equal (i.e. omitting the coefficient on marriage); and (3) if they did not display a “motherhood gap”, all other variables being equal (i.e. omitting the coefficients on having children). We then use these counterfactual levels of women's labour force participation to create counterfactual labour force participation gaps by calculating the difference between men's actual labour force participation and the counterfactual participation rate for women. Lastly, we subtract the counterfactuals based on hypothetical scenarios (1), (2) and (3) from the actual labour force participation gap. This leaves us with the portion of the participation gap that is unexplained by the education, marriage and motherhood gaps, showing how much of the actual gap in labour force participation between men and women is reduced in each hypothetical case.

Table 4 reports the results of this analysis. Column 1 gives the actual size of the labour force participation gap for each country. Column 2 shows how much women's labour force participation would change if women had men's average level of education for those countries where the gender gap has not reversed. Assigning male levels of education to women leads to reductions of the labour force participation gap by several percentage points in some African and Arab countries including Guinea, Iraq, Kenya, Occupied Palestinian Territory and Uganda. For other countries, the reduction is modest. India is a unique case: here, the labour force participation gap increases because of this country's negative relationship between education and labour force participation.¹⁹

Column 3 of table 4 shows how the labour force participation gap would change if the marriage gap were eliminated. For many countries, the reduction is large, particularly in Bolivia, Cambodia, Chile, Kenya, Kyrgyzstan, Malaysia, Panama, Spain and Venezuela. In China, Ghana, Mongolia and Slovenia, the

¹⁹ As previously mentioned, however, this negative relationship may no longer hold in the light of the results of the 2011 wave of the census.

Table 4. Counterfactual analysis of the labour force participation gap

Country (census wave)	(1) Actual LFP gap	(2) Gap w/o education gap	(3) Gap w/o marriage gap	(4) Gap w/o motherhood gap	(5) Residual percentage of actual gap
Argentina (2001)	29.17	–	19.61	25.95	56
Armenia (2001)	9.88	–	6.94	–	70
Belarus (1999)	0.28	–	–	–	
Bolivia, Plurinational State of (2001)	34.12	33.61	20.51	–	59
Brazil (2000)	29.96	–	19.04	–	64
Cambodia (1998)	14.23	14.93	5.54	–	44
Canada (2001)	10.85	–	9.62	–	89
Chile (2002)	45.48	45.04	26.36	38.33	41
China (1990)	9.27	8.81	–	–	95
Colombia (2005)	30.81	–	25.15	–	82
Costa Rica (2000)	53.38	–	31.34	52.37	57
Ecuador (2001)	51.25	50.26	34.79	–	66
Ghana (2000)	5.74	5.58	–	–	97
Greece (2001)	34.5	33.8	23.55	34.28	66
Guinea (1996)	21.37	18.7	16.43	–	64
Hungary (2001)	7.55	7.09	7.17	3.99	42
India (1999)	52.89	–	34.57	–	65
Iraq (1997)	73.21	62.91	65.62	67.55	68
Israel (1995)	16.94	16.8	12.96	–	76
Jordan (2004)	64.87	62.54	41.22	–	60
Kenya (1999)	13.38	11.07	7.31	–	37
Kyrgyzstan (1999)	8.39	–	3.34	–	40
Malaysia (2000)	52.91	51.45	19.8	–	35
Mongolia (2000)	7.89	–	–	–	
Occupied Palestinian Territory (1997)	84.15	79.11	70.86	74.53	67
Panama (2000)	40.96	–	24.04	39.85	56
Portugal (2001)	15.63	–	12.13	–	78
Romania (2002)	18.02	16.22	17.04	16.17	74
Rwanda (2002)	–	–	–	–	
Slovenia (2002)	3.44	3.26	–	–	95
Spain (2001)	29.38	–	16.73	–	57
Uganda (2002)	20.02	17.25	13.75	–	55
United States (2005)	15.74	–	9.48	–	60
Venezuela, Bolivarian Rep. of (2001)	38.66	–	21.98	37.75	55
Viet Nam (1999)	13.58	13.82	7.47	–	57

Notes: (1) is the labour force participation gap calculated as the proportion of men in the labour force minus the proportion of women in the labour force for individuals aged 35–44. For (2)–(4), a counterfactual gap is calculated based on a regression of women's labour force participation as a function of years of education, age, dummy for married and dummies for children (0–6+). Women's labour force participation is then predicted as if they had men's level of education, all other variables being equal, in (2); as if they if they did not display a "marriage gap", all other variables being equal (omitted coefficient on marriage), in (3); as if they did not exhibit a "motherhood gap", all other variables being equal (omitted coefficients for children 3+), in (4). (5) is the share of the actual gap left after subtracting (2)–(4) from the actual gap. If a cell is blank, the relevant gap has reversed or is 0, or increases the LFP gap, as noted in the text. In some cases, a cell is blank because variables are missing, namely: the number of children ever born for Canada, India, Jordan, Mongolia, Portugal, Spain, Uganda and the United States; and labour force participation for Mexico.

Source: Authors' calculations from IPUMS-International data.

labour force participation gap increases in the hypothetical scenario, indicating that marriage is associated with greater labour force participation among women in these countries.

Column 4 shows what happens to the labour force participation gap when we assign to each mother with three or more children the labour force participation of a woman without children. For many of the countries with a motherhood gap, the cells are blank because the gap actually increases in this counterfactual. In Argentina, Chile, Iraq, Occupied Palestinian Territory and Hungary, the labour force participation gap narrows significantly when mothers are assigned the labour force participation of non-mothers.

Finally, in column 5, we report the residual, i.e. the share of the actual labour force participation gap that is not explained by the counterfactuals based on eliminating the education, marriage and motherhood gaps. For most countries, a large share of the labour force participation gap remains unexplained after we eliminate these other gaps. For a few countries, notably Cambodia, Chile, Hungary, Kenya and Malaysia, less than half of the gap is left unexplained after the other gaps have been eliminated, suggesting that in these countries, reducing the education, marriage, and motherhood gaps will contribute significantly to reducing the overall labour force participation gap. However, in line with our previous analysis at the country level, other factors besides the education, marriage and motherhood gaps appear to explain the largest share of the overall gender gap in labour force participation for most countries.

Conclusion and discussion

Signed by the leaders of 189 countries, the Millennium Development Goals have prioritized the beneficial effects of educating girls and achieving gender equity in education. Our analysis has shown that this goal has now been attained in many countries. All the countries in our sample where the gender gap in education has not closed are developing countries. Yet, while the education gap has thus closed or even reversed in a majority of countries, other gaps affecting women's employment remain, particularly the differences between married and single women, and between mothers and non-mothers.

We have documented significant heterogeneity in terms of the size of these gaps, the speed at which they are closing, and how they are inter-related. In contrast to the many country studies that have been carried out on this topic, primarily on developed countries, we have provided cross-country comparisons of these gaps in a large number of developing countries. Our main conclusion is that there is no systematic pattern to how these gaps have changed over time and that further study is needed to explain the divergent paths countries have taken. So while the closing of the educational gender gap would seem to promise further reductions in the gender gap in labour force participation, it does not appear to be significantly related to the employment gaps between married and single women, and between women with and without children.

In 22 of the 35 countries in our counterfactual analysis, the gap in labour force participation between men and women was found to exceed 15 per cent in the latest census wave we considered. Our counterfactual analysis shows that closing the gender gap in education would narrow the labour force participation gap to less than 15 per cent for ten of those 22 countries. Eliminating the marriage gap would do so for only four of the 22 countries, and eliminating the motherhood gap would do so for seven of them. Thus, even after “closing” all of the gaps we examined in our counterfactual analysis, a large share of the labour force participation gap remains unexplained – over 60 per cent on average across the countries in our sample. This suggests that other factors – beyond education, marriage and motherhood – are playing a significant role in determining the size of the labour force participation gap in most countries.

The differences we observe among these countries in the size of the marriage and motherhood gaps are likely related to how compatible work is with marriage and children. We show that reductions in these gaps would reduce the overall gap in labour force participation significantly in several countries, but this would not be the case in many others.

Much of the development policy aimed at achieving the Millennium Development Goals on gender equity has focused on reducing gender gaps in schooling through policies that change the costs or benefits of education (see, for example, Glick, 2008). In the light of our findings, however, we argue that focusing on education alone is not enough. The focus should be broadened to include other policies as well, notably initiatives aimed at making work more compatible with marriage and motherhood. In fact, such changes might also encourage further educational investments by women. Cultural attitudes, the availability of day care or in-home help, urban transport and other factors may indeed play a role in whether women with children work, and more analysis of this impact is needed. However, it is clear that even after eliminating labour force participation gaps associated with marriage and motherhood, female labour force participation remains low in many countries for other reasons that require further study.

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Appendix

Table A1. Analytical sample

	Sample 1 Latest wave of the census	Sample 2 Penultimate and latest waves of the census
Argentina	2001	1991, 2001
Armenia	2001	
Austria	2001	1991, 2001
Belarus	1999	
Bolivia, Plurinational State of	2001	1992, 2001
Brazil	2000	1991, 2000
Cambodia	1998	
Canada	2001	1991, 2001
Chile	2002	1992, 2002
China	1990	1982, 1990
Colombia	2005	1993, 2005
Costa Rica	2000	1984, 2000
Ecuador	2001	1990, 2001
France	1999	1990, 1999
Ghana	2000	
Greece	2001	1991, 2001
Guinea	1996	
Hungary	2001	1990, 2001
India	1999	1987, 1999
Iraq	1997	
Israel	1995	1972, 1995
Jordan	2004	
Kenya	1999	1989, 1999
Kyrgyzstan	1999	
Malaysia	2000	1991, 2000
Mexico	2005	1995, 2005
Mongolia	2000	
Occupied Palestinian Territory	1997	
Panama	2000	1990, 2000
Philippines	2000	
Portugal	2001	1991, 2001
Romania	2002	1992, 2002
Rwanda	2002	1991, 2002
Slovenia	2002	
South Africa	2007	2001, 2007
Spain	2001	1991, 2001
Uganda	2002	1991, 2002
United Kingdom	2001	1991, 2001
United States	2005	2000, 2005
Venezuela, Bolivarian Rep. of	2001	1990, 2001
Viet Nam	1999	1989, 1999

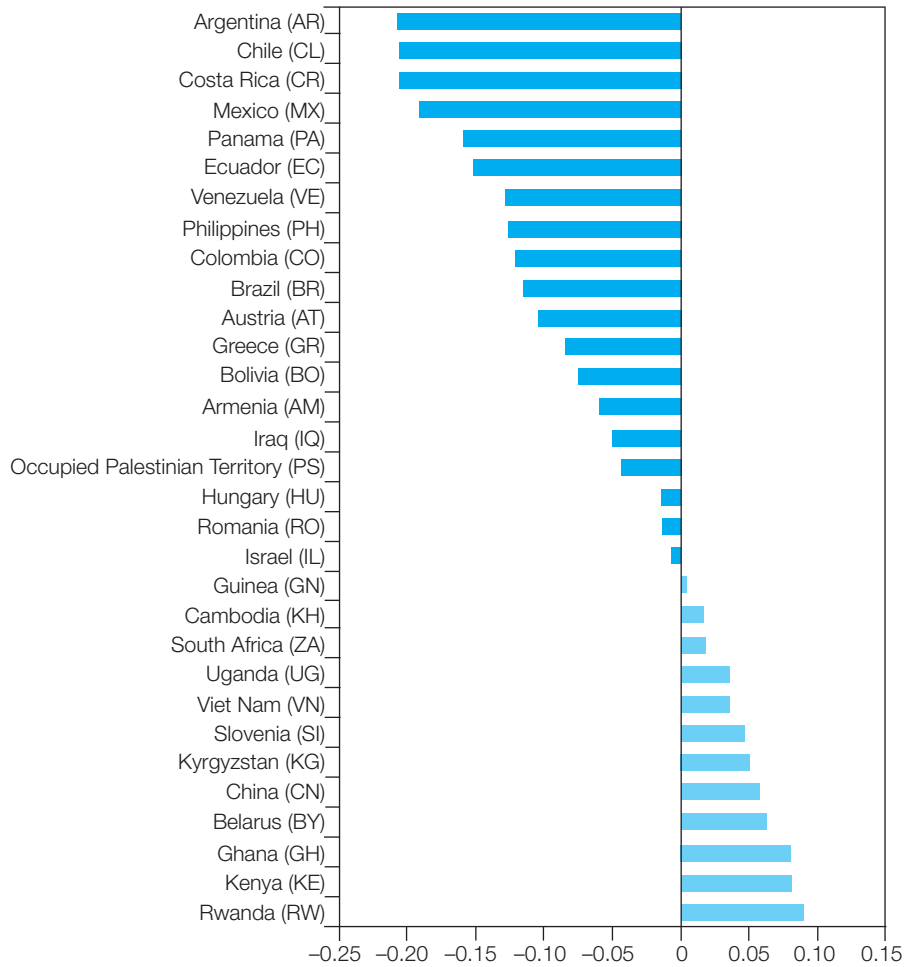
Table A2. Women's labour force participation regressions

	(1) Women's LFP	(2) Women's LFP	(3) Women's LFP	(4) Women's LFP
Log GDP	-1.506*** (0.444)	-1.070** (0.500)	-1.096** (0.526)	-1.127* (0.559)
Log GDP-squared	0.0868*** (0.0258)	0.0647** (0.0282)	0.0661** (0.0296)	0.0680** (0.0316)
Share urban		-0.368* (0.213)	-0.241 (0.712)	-0.247 (0.723)
Share urban-squared			-0.112 (0.600)	-0.106 (0.610)
Rigidity of Employment Index				0.000353 (0.00187)
Constant	7.086*** (1.884)	5.216** (2.130)	5.301** (2.208)	5.416** (2.324)
Observations	38	38	38	38
R-squared	0.251	0.311	0.312	0.313

Notes: Standard errors are given in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sources: Authors' calculations from IPUMS-International data. Regressions are based on the gender gap measures described in the data section. GDP per capita and level of urbanization are from the World Development Indicators. The Rigidity of Employment Index (0=less rigid, 100=more rigid) is from the World Bank's Doing Business data set.

Figure A1. Alternative definition of the motherhood gap (latest census wave)



Notes: For this definition of the motherhood gap, we calculate the difference between the employment rate of women with any children and the employment rate of those with no children, for women aged 35–44.
 Source: Authors' calculations from IPUMS-International data.