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Motherhood and flexible jobs

Evidence from Latin American countries

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Abstract: We study the causal effect of motherhood on labour market outcomes in Latin America by adopting an event study approach around the birth of the first child based on panel data from national household surveys for Chile, Mexico, Peru, and Uruguay. Our main contributions are: (i) providing new and comparable evidence on the effects of motherhood on labour outcomes in developing countries; (ii) exploring the possible mechanisms driving these outcomes; (iii) discussing the potential links between child penalty and the prevailing gender norms and family policies in the region. We find that motherhood reduces women's labour supply in the extensive and intensive margins and influences female occupational structure towards flexible occupations— part-time work, self-employment, and labour informality—needed for family–work balance. Furthermore, countries with more conservative gender norms and less generous family policies are associated with larger differences between mothers' and non-mothers' labour market outcomes.

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1   Introduction

Despite the remarkable convergence of roles of men and women in labour markets over the last century, gaps remain considerable (Goldin 1995, 2006, 2014; Blau and Kahn 2017). Labour supply, income and wages continue to show substantial differences between genders. These gaps are especially large in Latin America, one of the most unequal regions of the world (Alvaredo and Gasparini 2015), where labour force participation of women is 27 percentage points lower than that of men; women earn per hour 17 per cent less than men with similar education and experience and occupy less than 40 per cent of the hierarchical positions (Marchionni et al. 2019).

Motherhood stands out as one of the key factors in explaining the gender gaps in the labour market, since women are still the primary caregivers (Blau and Kahn 2006). In fact, Kleven et al. (2019a) show that while motherhood explained 40 per cent of the gender gap in income and wages in Denmark in 1980, in 2017 almost 80 per cent of this gap can be attributed to the presence of children at home. Several studies have recently assessed the causal effect of the arrival of children on the work trajectories of women in developed countries (e.g., Angelov et al. 2016; Kleven et al. 2019a, 2019b, 2020a; Kuziemko et al. 2018; Berniell et al. 2020), but evidence for developing countries is still scarce. The effects of motherhood in developing countries may be different from those of developed countries for several reasons. In developing countries like those in Latin America labour markets are characterized by high levels of informality—that is, labour markets have a large share of non-registered workers—and, even in the formal sector, labour regulations aimed at balancing work and family are poor and highly unbalanced between genders; also, public provision of childcare services is far from universal and social norms regarding gender roles are more conservative or even sexist.

The aim of this paper is to contribute to the literature and to the policy debate on the factors that affect labour market gender gaps by providing causal evidence on the impact that the birth of the first child has on female labour outcomes in developing countries. We adopt the event study approach around the birth of the first child proposed by Kleven et al. (2019a).

To the best of our knowledge, Berniell et al. (2021) and Aguilar-Gomez et al. (2019) are the first two papers that have studied the effect of the first child on Latin American women's labour outcomes using an event study design. They find strong and negative causal effects of becoming a mother on labour market outcomes for Chile and Mexico, respectively. More importantly, the analysis for Chile shows that the strong and negative motherhood effects persist in the long run, up to 10 years after childbirth. In a related work, Querejeta Rabosto (2020) analyses the impact of motherhood on formal employment indicators in Uruguay. While previous works had already studied the effect of family size or the second and third child on labour market outcomes of Latin American mothers, the effects they find are usually smaller and can only be identified for the short run (Agüero and Marks 2011; Cruces and Galiani 2007; Cáceres-Delpiano 2012). Thus, more research is needed to reconcile the evidence to better assess the impact of motherhood on labour market outcomes in Latin America.

In this paper, we advance in three directions with respect to previous studies. First, we provide new evidence on the effects of motherhood on labour market outcomes in developing countries. We estimate the motherhood effect in four countries in Latin America—Chile, Mexico, Peru, and Uruguay—using the same specification, sample selection criteria, and variable definitions, which allows for direct comparisons both within Latin America and between these countries and the developed countries studied in other papers. Second, we assess the motherhood effect in a variety of labour market outcomes: labour supply—both in the extensive and the intensive margins—and

occupation structure. Specifically, we explore whether motherhood increases the probability of working part-time, holding informal jobs, or being self-employed, which may provide women with the flexibility they need to balance work and family (Berniell et al. 2021). Finally, we discuss the potential links amid the gap between mothers and non-mothers on labour market outcomes and the prevailing gender norms and family policies in the region by providing novel—yet descriptive—evidence on the cross-country correlations for most Latin American countries.

The rest of the paper is organized as follows. Section 2 describes the event study methodology and the data used to estimate the impact of the first childbirth on mothers' and fathers' labour trajectories. Section 3 discusses the main results and explores some heterogeneities and possible mechanisms. Section 4 combines the discussion of causal evidence from previous studies with evidence on the correlations between women's labour outcomes and gender norms and family policies across the region. Section 5 presents our main conclusions and policy implications.

2   Methodology and data

2.1   Event study design

We estimate the effect of children on mothers' and fathers' labour trajectories based on an event study approach around the birth of the first child. Consider a panel of $i = 1, \ldots N$ individuals observed for all or some $t = 1, \ldots T$ calendar periods. For most countries we have monthly data, so calendar periods are months. E_i denotes the calendar period at which individual i's first child is born and $e_{it} = t - E_i$ is the number of calendar periods from the birth of the child. For instance, if calendar time is measured in months and the first child of individual i was born in May 2005, $E_i = \text{May 2005}$ and $e_{i, \text{July 2005}} = 2 \text{ months}$. At this point, it is useful to define the event time index τ to denote periods since the birth of the first child. Event time index $\tau \in [-T, T]$ and $\tau = 0$ denotes the event of having the first child. Continuing with the previous example, if the first child of individual i was born in May 2005 and the first child of individual s was born in April 2007, then $E_i = \text{May 2005}$, $E_s = \text{April 2007}$, and $e_{i, \text{July 2005}} = e_{s, \text{June 2007}} = 2 \text{ months}$; that is, the event time index τ equals 2 both for individual i when calendar time $t = \text{July 2005}$ and for individual s when calendar time $t = \text{June 2007}$. Therefore, the event time index τ allows us to compare individuals with the same exposure to parenthood—2 months in the example—even if their children were born in different calendar periods.

Our baseline model is the same as in Berniell et al. (2021), which in turn is based on the specification proposed by Kleven et al. (2019a).[1] For each country, we model labour market outcome Y for individual i in calendar time t as:

$$Y_{it} = \sum_{\tau \neq -12} \beta_\tau . I(e_{it} = \tau) + \sum_j \gamma_j . I(j = age_{it}) + \delta_t + \varepsilon_{it} \tag{1}$$

The first term in the right-hand side of Equation (1) is a set of event time dummies. The event time coefficients, β_τ, capture for $\tau \geq 0$ the post-child dynamic effects—that is, the effects of parenthood on outcome Y for each event period τ after the birth of the first child.[2] For countries

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[1] Kleven et al. (2019a) show that this approach performs well in identifying both short- and long-run effects of children compared with widely used alternative approaches, such as instrumental variables and differences-in-differences. For a formal discussion about the identifying assumptions in an event study, see Borusyak and Jaravel (2018), Sun and Abraham (2020), and Schmidheiny and Siegloch (2020).

[2] Long-term effects may also include the effects of subsequent children.

with annual data, we set $\tau = -1$ as the base category. When the data has a monthly frequency, we set $\tau = -12$ as the base month; thus, the coefficients measure the impact of children relative to the same month of the year before they are born. The reason for choosing a year before birth as the basis for comparisons is that data usually reflects some partial adjustments that begin around the time of conception.[3]

The following terms include non-parametric controls for age (one dummy variable for each age-in-years cohort) and a set of calendar year fixed effects and a separate set of month fixed effects (denoted just by δ_t to keep the notation simple). The dependent variable Y represents different labour market outcomes: employment status, part-time employment, self-employment, and informal employment. The last three outcomes are conditional on being employed. For each one of the countries, we estimate model (1) for mothers and fathers separately.

To gain comparability with other studies we normalize the event time coefficients' estimates, $\hat{\beta}_\tau$, as in Kleven et al. (2019a). Normalized coefficients measure the percentage effect relative to the counterfactual outcome absent children, and are obtained as $P_\tau = \hat{\beta}_\tau / E[\tilde{Y}_{it} \setminus \tau]$, where $\tilde{Y}$ is the predicted outcome from model (1) at event time τ after subtracting the predicted event time effects.

2.2 Data

For the event study design, we need panel data with information on parents' labour outcomes and children's dates of birth. Such panels are scarce in Latin America, so we focus on the four countries for which the necessary information is available: Chile, Mexico, Peru, and Uruguay.[4] In this section, we discuss the data sources and sample selection criteria used for all four countries.

Our analysis is based on retrospective data from the following national household surveys: the Longitudinal Social Protection Survey for Chile (LSPS-CHL, which includes five rounds: 2004/05, 2006/07, 2008/09, 2012/13, and 2016), the Module of Labour Trajectories of the Employment Survey for Mexico (MOTRAL, applied in 2012 and 2015[5]), the National Household Survey for Peru (ENAHO, applied yearly from 2007 to 2019), and the Longitudinal Social Protection Survey for Uruguay (LSPS-URY, carried out twice, in 2012 and 2016). These surveys include questions about the work trajectories of men and women and information on the dates of birth of their children, so we can follow the trajectories of labour market outcomes of each individual in a window of time that covers some years before and after the birth of the first child. All these surveys

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[3] The literature on motherhood effects using event studies usually finds that the adjustments begin some months before birth, around the time of conception (Kleven et al. 2019a; Kuziemko et al. 2018; Berniell et al. 2021). For instance, Kuziemko et al. (2018) find that women adopt more negative views towards female employment when the child is still in utero. Another example is Byker (2016)—the only related paper based on monthly data that we are aware of—that shows a clear adjustment pattern during the months prior to birth. This suggests that it makes sense to think of the event in a somewhat broader sense, which includes conception and pregnancy in addition to childbirth. When working with yearly data, this adjustment is captured by event time zero.

[4] Although there are other databases with a panel structure in Latin America, the available variables do not always allow for the design of an event study around the birth of the first child. An example of an interesting and unique database in the region is the Longitudinal Social Protection Survey harmonized database, carried out by the Inter-American Development Bank, which contains individual information from Chile, Colombia, El Salvador, Paraguay, and Uruguay (IADB 2016). This harmonized database, however, does not include information on the date of birth of children. Children's date of birth is available only for Chile and Uruguay in the raw data from these surveys, which we use in this paper.

[5] Another option would have been using the Mexican Labour Survey (ENOE for its Spanish acronym), like Aguilar-Gomez et al. (2019), but the ENOE rotating panels follow individuals only during five consecutive quarters, thus only allowing the identification of very short-run effects.

are nationally representative. The evolution of labour variables over time is obtained from information gathered in each wave of the survey through special modules with recall questions that allow to fill the gaps of the employment histories between (and beyond) the years of the waves, except for Peru where individuals are followed yearly for a maximum span of 5 years. Regarding information on the date of birth of the children, the surveys in Chile and Mexico provide the exact month and year, while for Uruguay and Peru the information gathered refers to the year of birth.

For each individual-period observation, our panel has information on employment status, on informal employment, and, for some countries, on the number of hours worked per week, hourly wages, and total labour earnings. Using this information, we construct the following outcome variables for all individual-period observations: (1) employment (it takes the value 1 if the individual is employed, and 0 otherwise), (2) part-time job (it takes the value 1 if working fewer than 30 hours per week) (3) self-employed (it takes the value 1 if own account worker), and (4) informal job (it takes the value 1 when working in a job without social security contributions).

Regarding the sample selection criteria, whenever possible we follow similar selection principles in all countries to make the estimates as comparable as possible. Our sample of mothers includes women whose age at first childbirth is between 18 and 50 years. This age range likely covers women's reproductive lives. We also have a sample of fathers whose age at first childbirth is between 18 and 55 years. Notice that our samples include only individuals who become parents at some point over the time window we observe.[6] In Appendix A, we provide further details about each country's data. Appendix Table A1 summarizes the main features of the surveys and the corresponding working sample.

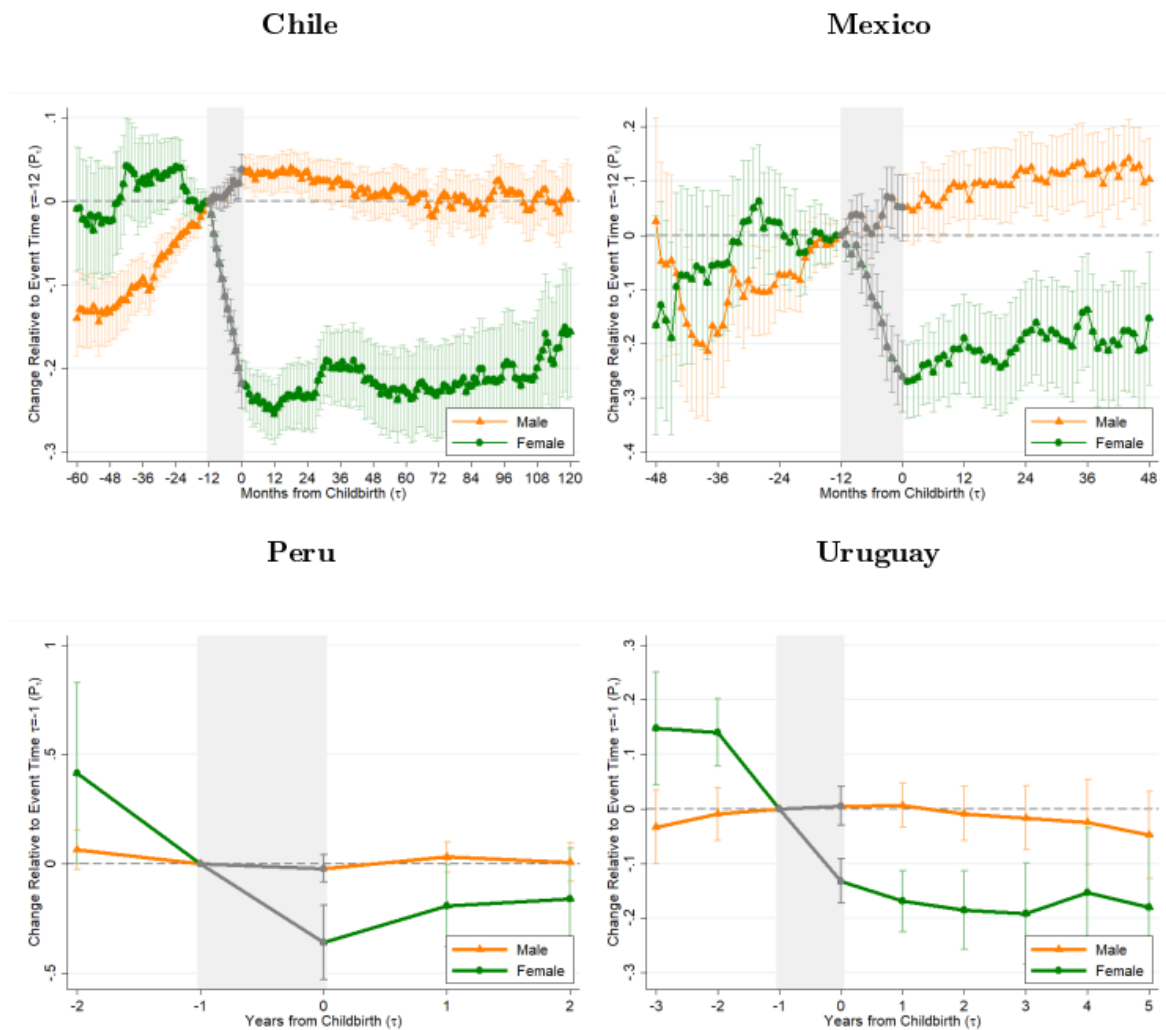## 3   Motherhood effects on labour supply and occupational structure

In this section, we present and discuss the estimated motherhood effects on employment and occupational choices. The figures in this section illustrate the estimated percentage difference in the value of the corresponding outcome between each event time τ and the base event time, which is $\tau = -12$ for Chile and Mexico for which monthly data is available, or $\tau = -1$ for Peru and Uruguay where we use annual data. The shaded areas in the figures indicate the period prior to child birth when we observe some partial adjustments related to conception and pregnancy, as discussed in the previous section.

Figure 1 shows the estimated effect of parenthood on mothers' and fathers' employment rates for all analysed countries.[7] The results confirm that the large negative effects on mothers' employment are pervasive. Women's employment rate drops immediately after the birth of the first child and it does not recover afterwards. In contrast, fathers' employment does not show significant changes and when it does—as in the case of Mexico—it shows a slight increase without a significant break at $\tau = 0$. The birth of the first child, then, generates a gender gap in employment that persists over the years and shows no sign of closing in the medium or long term.

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[6] Since the maximum span panel of Peru is 5 years, with few individuals followed for the whole period, and given that we need to observe individuals at least once before and once after the birth of the first child, we have less observations to estimate the β_τ for $\tau = -2$ and $\tau = 2$ in this country. Therefore, these estimates are less precise than those for $\tau = -1, 0,$ and 1.

[7] The results for Chile are comparable to those from Berniell et al. (2021), in which we use yearly instead of monthly data.

Figure 1: Effect of the birth of the first child on employment

Chile

Mexico

Peru

Uruguay

Note: these figures show the estimated effect of children on employment for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the Longitudinal Social Protection Survey for Chile (LSPS-CHL), the Module of Labour Trajectories of the Employment Survey for Mexico (MOTRAL), the National Household Survey for Peru (ENAHO), and the Longitudinal Social Protection Survey for Uruguay (LSPS-URY).

According to these results, the medium-run motherhood effect on employment (defined as the average decrease in employment from childbirth to 4 years later for Chile, Mexico, and Uruguay, and from childbirth to 2 years later for Peru—see footnote 6) is 19 per cent on average and fairly uniform across countries. The drop in women's employment rate over these first years after motherhood varies between 17 per cent in Uruguay and 20 per cent in Chile, Mexico, and Peru.[8] As for the longer run, we only have evidence for Chile where the long-run motherhood effect on employment—defined as the average decrease in employment from 5 to 10 years after childbirth (i.e. from 60 to 120 months after the event) is 16 per cent. Although the long-run dynamics suggest a slight recovery in female employment, the changes are not statistically significant.

In addition to the negative impact of motherhood on the extensive margin of labour supply, the arrival of the first child also affects hours worked. Figure 2 shows that part-time employment— defined as working fewer than 30 hours per week—increases for working women immediately after their first child is born in Chile, Peru, and Uruguay.[9] The medium-run increase in female part-time employment is 29 per cent in Chile, 43 per cent in Peru, and 16 per cent in Uruguay, although never significant in Uruguay.[10] Moreover, the evidence for Chile suggests that the impact of motherhood on part-time employment persists over the years, with a long-run effect of 43 per cent. This increase in part-time employment could be related to the need of finding a better balance between childcare responsibilities and participation in the labour market, as discussed in Berniell et al. (2021). In Section 4, we provide descriptive evidence for a larger set of Latin American countries that supports this hypothesis.
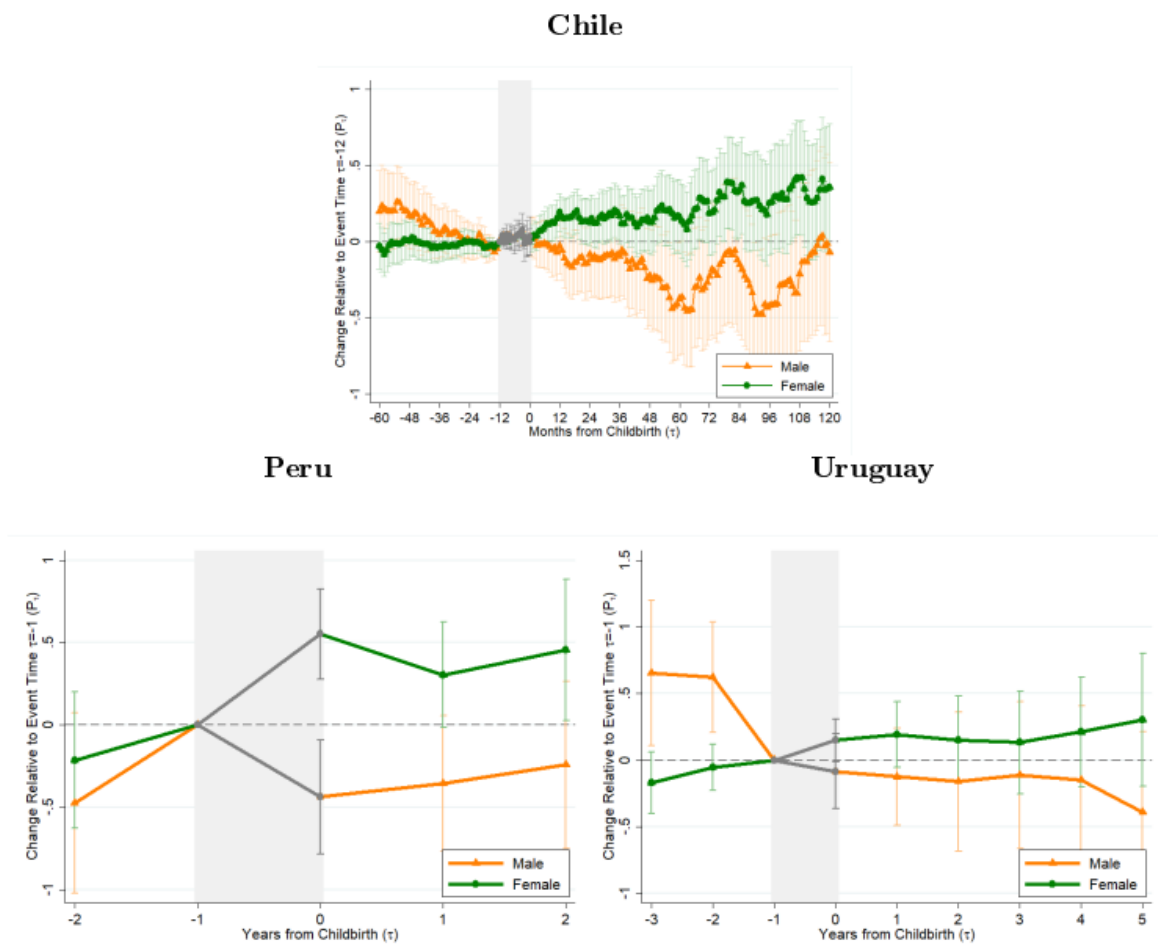
Motherhood affects the type of job women choose upon motherhood, as it triggers an increase in self-employment and informal jobs. Figures 3 and 4 show the trajectories for self-employment and labour informality rates, respectively, for mothers and fathers separately in the four countries we study. Once again, men's and women's trajectories evolve similarly before the first child is born but diverge dramatically after parenthood. The figures in all countries show that the share of working women who are self-employed or non-registered workers increases after the first child is born while fathers' trajectories are virtually unaffected. Despite these similarities, there are some differences. First, the size of the medium-run effects varies across countries. As Figure 3 shows, the medium-run effect of motherhood on self-employment is 42 per cent in Chile and 20 per cent in Mexico, but non-significant in Peru and Uruguay. Regarding the effect on labour informality rates, Figure 4 shows that in the medium run the average effect is about 50 per cent in Mexico and Uruguay, 17 per cent in Peru, and 16 per cent in Chile. The dynamics of the trajectories in this case also differ across countries. While in Chile adjustments are immediate, in Mexico, Peru, and Uruguay there is a gradual adjustment over the first years after childbirth.

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[8] The trajectory of labour force participation around the birth of the first child is similar to that of employment. See Appendix Figure B1.

[9] As mentioned in Section 2, data for Mexico comes from the MOTRAL module, which unfortunately does not have information on working hours. For more details about the data, see Appendix A.

[10] Appendix Figure B2 shows the effect of motherhood on the total hours worked.

Figure 2: Effect of the birth of the first child on part-time employment

Note: these figures show the estimated effect of children on part-time employment (conditional on working) for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A. Working hours is not available for Mexico.

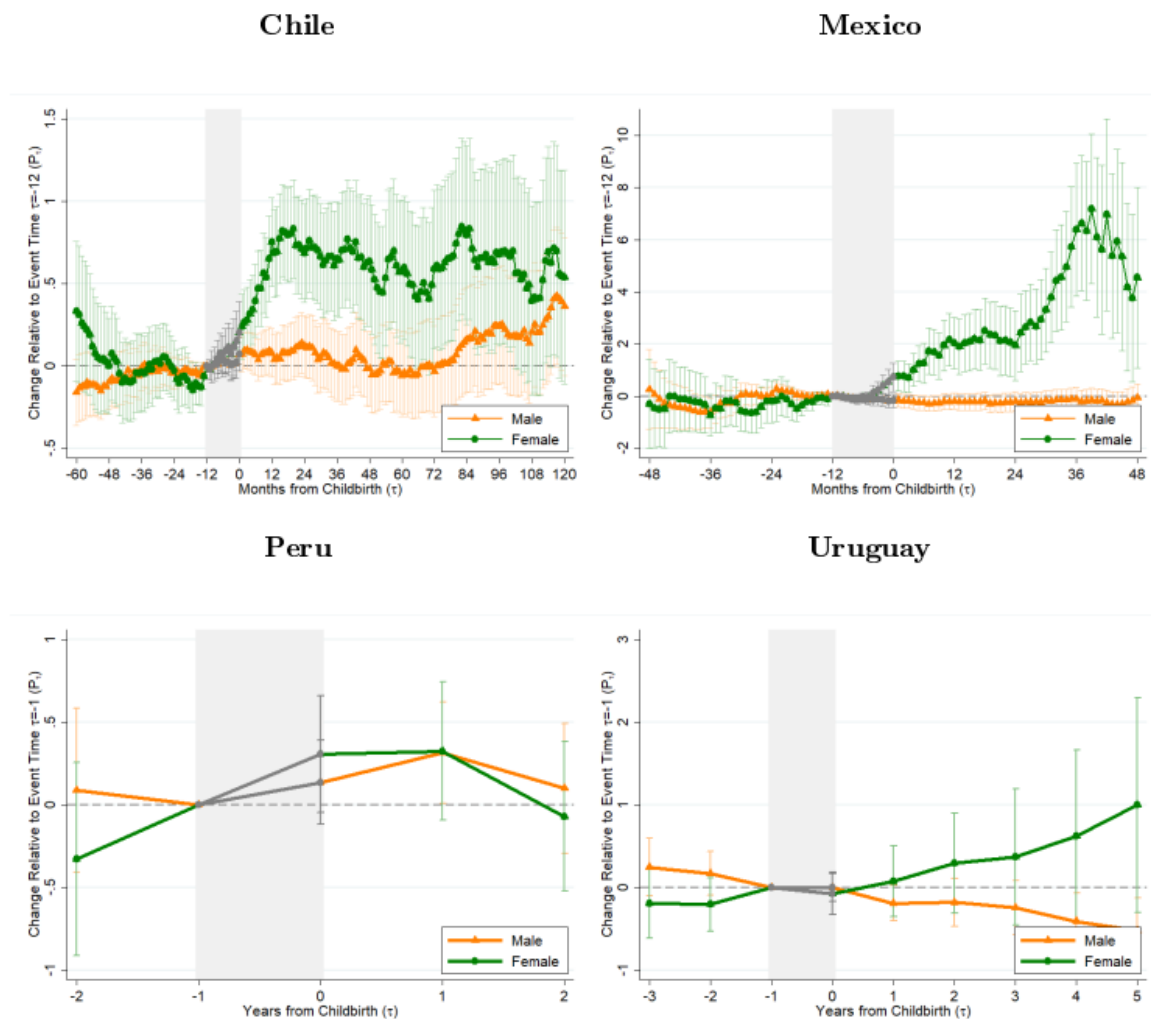Source: authors' calculations based on the LSPS-CHL, LSPS-URY, and ENAHO.

Figure 3: Effect of the birth of the first child on self-employment

Note: these figures show the estimated effect of children on self-employment (conditional on working) for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

Figure 4: Effect of the birth of the first child on labour informality

Note: these figures show the estimated effect of children on labour informality (conditional on working) for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

We also analyse the heterogeneous impacts of motherhood for women with low or high educational levels. Of course, by splitting the samples into these two groups, our estimates loose precision, which reflects in noisier trajectories and wider confidence intervals than in the previous figures. Nevertheless, we still find a recurring pattern: in general, low-educated women experience larger motherhood penalties than high-educated women. This conclusion is consistent with the hypothesis of opportunity costs in the occupational choices upon motherhood: more educated women remain more attached to the labour market since their potential loss of wages may be considerably larger. In Appendix C, we describe these results for each one of the four countries.

4   Explaining the link between motherhood and flexible jobs: gender norms and family policies

Our analysis in the previous section shows that motherhood has a large and significant impact on women's labour supply and employment choices. While differing in magnitude, all countries included in this study show that after the birth of the first child a substantial number of women abandon the labour market. Furthermore, a large fraction of those who decide to remain in the workforce face important changes in terms of occupations: in all countries we find a significant increase of part-time work, self-employment, and informality rates after the birth of the first child. Conversely, men do not seem to experience changes in terms of either their labour supply or occupational structure when becoming fathers.

These occupational choices—whether voluntary or not—usually come at a high cost for mothers. On the one hand, leaving the labour market implies giving up economic independence as well as social security benefits. On the other hand, switching to part-time work, self-employment or informal jobs also implies lower hourly wages, reduced or null access to occupational and social insurance benefits, lack of job security, as well as lower or inexistent pension income in old age (Williams 2000; Budig 2006; Bardasi and Gornick 2007; Temkin 2009; Caceres and Caceres 2017). Furthermore, taking these types of jobs may have long-term consequences associated with lower accumulation of human capital (Gasparini and Tornarolli 2009; O'Reilly and Bothfeld 2002; Miller 1997).

Dropping out of the labour force or shifting to these alternative occupations, however, also offers a substantial benefit: more time flexibility. Indeed, several studies have linked part-time jobs to flexible work arrangements (Bertrand et al. 2010; Goldin 2014; Goldin and Katz 2011a, 2011b; Berniell et al. 2020a). Self-employment and informal jobs also offer a route to flexibility (Giménez-Nadal et al. 2012; Georgellis and Wall 2006; Berniell et al. 2020, 2021; Chioda 2016).

Why are women willing to trade present and future benefits of employment for flexibility? Two different yet related issues may be driving these decisions: gender norms and family policies. Gender norms may impose severe restrictions on women's supply of labour by moulding the expectations regarding mothers' and fathers' involvement in child rearing. Given that mothers are still the primary caregivers, family policies may further shape the ways in which women are inserted in the labour market by smoothing (or hampering) the difficult balance between work and family. Specifically, we focus on two family policies: childcare and parental leave. While both policies relax constraints on families' time, the former focuses on providing support to caregiving activities for all parents whereas the latter is tied to formal labour market participation and may promote—depending on their design—co-responsibility (Gasparini and Marchionni 2015).

The question of how gender norms and family policies determine motherhood effects is as relevant as it is difficult to answer because of various informational and methodological limitations. First,

the endogeneity of gender norms and policies requires that the study of their impacts be restricted to specific contexts in which their causal effects on labour outcomes can be identified. Second, because of the data restrictions in Latin American countries discussed earlier, we cannot estimate the causal effect of motherhood for most of the countries in the region—we have only been able to do so for a small subset of countries in the previous section.

Faced with these limitations, our approach combines the discussion of causal evidence from previous studies with novel—yet descriptive—evidence that highlights the potential link between the severity of the motherhood penalty and both gender norms and family policies. To this end, we resort to the gap between mothers and non-mothers in labour market outcomes for the 18 Latin American countries. This analysis resembles that of Olivetti and Petrongolo (2017), although they link family policies to gender gaps in labour market outcomes whereas we focus on the gap between different groups of women depending on whether they have had children or not.[11] Specifically, we look at the gap between mothers and non-mothers in the four labour market outcomes analysed in the previous section: employment, part-time work, self-employment, and labour informality. The gaps are defined as the difference in each labour market outcome between mothers with young children—up to 5 years of age—and non-mothers, measured as a percentage of the results of childless women.[12]

Data on labour market variables come from the Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020) for the following countries: Argentina, Brazil, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. Part-time work is defined as the fraction of employed women working fewer than 30 hours a week; self-employment is defined among employed women, and labour informality is the fraction of salaried women who are not entitled to retirement benefits linked to their jobs. We focus on women aged 25–54 years and consider two groups: mothers (with at least one child under the age of 5 years) and childless women. On average, the gap in the employment rate is −17 per cent; that is, mothers are 17 per cent less likely to be employed than non-mothers. This gap is of the same order of magnitude as the causal effects of motherhood estimated in Section 3, which ranged from 17 per cent in Uruguay to 20 per cent in Chile, Mexico, and Peru. This gives us confidence in using the labour market outcome gaps between mothers and non-mothers as an approximation of the motherhood effects. While acknowledging that it only represents descriptive evidence, focusing on these gaps allows us to cover all the Latin American region rather than only four countries.

Regarding the other labour market outcomes considered, the mothers to non-mothers gaps in the three occupations under analysis (part-time work, self-employment, and labour informality) are positive, meaning that mothers tend to resort to these alternative work arrangements more frequently than childless women. On average, mothers engage in part-time work 38 per cent more than childless women, and their rates of self-employment and labour informality are 6 per cent and 12 per cent higher, respectively. Descriptive statistics for each country may be found in Appendix D.

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[11] Other papers have been able to carry out a cross-country analysis of the correlations between causal estimates of the motherhood effects and family policies or gender norms. Kleven et al. (2019b) discuss the potential role of family policies (parental leave and childcare provision) in explaining the observed differences in child penalties in earnings in six developed countries: Denmark, Sweden, Germany, Austria, United Kingdom, and the United States. Berniell et al. (2020) go further, by showing that across 29 European countries the size of labour market responses to motherhood are larger in societies with more conservative social norms or with weaker policies regarding work–life balance.

[12] Results hold for mothers of older children but, as expected, they tend to be milder.

In what follows, we present the evidence of the link between these gaps and each of the proposed explanations driving mothers' labour choices, namely, gender norms and family policies. These pieces of evidence compose a novel yet descriptive collage that helps illuminate the discussion about the role of policies and norms in explaining women's labour outcomes and persistence of labour gender gaps in Latin American countries.

4.1 Gender norms

There exists a vast body of literature relating norms and culture to economic outcomes.[13] Specifically, norms related to gender may shape women's labour market behaviour. A well-known channel through which norms may mould mothers' labour market outcomes concerns the beliefs regarding the role of women within the family. More conservative views could impose a larger burden on women in terms of balancing work and family life. This, in turn, may result in a large number of mothers either opting out of the labour market or demanding higher levels of flexibility in case they carry on working. This flexibility can be found, as stated before, in part-time work, self-employment, and informal jobs.

A close association between gender norms and women's involvement in the labour market may be traced out over the past century. Fernández (2013) points out that at the onset of the twentieth century social stigma was associated with working women and their husbands, since this fact signalled that the latter was unable to provide for his family. Later on, beliefs moved on to stress how women's involvement in the labour market may jeopardize families' general stability, as well as the suitability of certain types of work and specific careers (Goldin 1995). Furthermore, Goldin and Olivetti (2013) show that the rise of female labour force participation in the United States and Europe during the Second World War was related to the fact that working became acceptable for women whose husbands were enrolled.[14] Evidence on more recent periods suggests that norms are still important in shaping women's labour market outcomes. Drawing on data from the World Values Surveys during the 1990s, Fortin (2005) shows that anti-egalitarian views are associated with lower employment rates and larger gender pay gaps in 25 OECD countries. Furthermore, Bursztyn et al. (2017) show how gender norms affect single women's willingness to reveal their career ambitions in a group of Master of Business Administration students in the United States. Bertrand et al. (2015) highlight the role of norms within the households: they show that in households in which a woman's educational level predicts a higher salary than her husband's it is less likely that women participate in the labour market and that if they do so, they earn less than their husbands and devote more time to housework, which is interpreted as compensation.

Data from the World Values Survey for Latin American countries show that while proxies of social acceptance of the role of women in the labour market and leading public roles have greatly improved in the last decades in the region, views about traditional intra-household division of labour have remained fairly still (Chioda 2016). Despite this general pattern, Latin American countries present large heterogeneities. In this section, we explore one gender norm in particular: the level of disagreement with the statement that 'a woman should work only if her partner does not earn enough'. We draw the gender norm variable from *Latinobarómetro* (2015), an annual public

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[13] Resorting to different strategies to overcome endogeneity issues, this literature shows a causal impact of social preferences and beliefs in a variety of economic outcomes. Among the different strategies, we find natural experiments (Botticini and Eckstein 2005), instrumental variables (Tabellini 2010), and epidemiological approaches (Fernández 2010).

[14] Moreover, social norms not only affect current but also future female labour force participation. In fact, a large strand of literature has attempted to identify the intergenerational transmission of labour market behaviour within the same family (Olivetti et al. 2013; Kleven et al. 2019a; Farré and Vella 2013; Fernández et al. 2004).

opinion study carried out using a common questionnaire in 18 countries in Latin America and representing over 400 million individuals. The survey enquires on opinions regarding the state of democracy and the economy, as well as behaviours and values. On average, 40 per cent of respondents disagree with the statement. However, the differences across countries are large: while Brazil and Uruguay show the largest shares of disagreement (54 and 48 per cent, respectively), in Guatemala and Venezuela less than 30 per cent of the respondents disagree with the statement.

These differences in gender norms may help explain differences in labour market outcomes between mothers and non-mothers. To that end, Figure 5 shows the cross-country relationship between women's employment and occupational structure and the level of disagreement with the conservative statement described before (i.e. 'a woman should only work if her partner does not earn enough'). The figure plots the fraction of the population in each country that disagrees with this statement against the existing gap between mothers and non-mothers regarding employment and occupational structure—part-time work, self-employment, and labour informality. The patterns found are very strong: countries that hold more conservative views regarding women's role show larger gaps between mothers and non-mothers for all outcomes. That is, in countries that disagree with this statement to a larger extent mothers make similar choices to those made by childless women.[15] This evidence—though descriptive—is consistent with a substantial role of gender norms in labour market outcomes of mothers. Importantly, gender norms seem to be related not only to participation in the labour market but also to the way mothers choose to do so when they carry on working.

Figure 5: Gender norms and the mothers to non-mothers' gap in labour market outcomes across Latin American countries

(a) Employment

b) Part-time work

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[15] We also find the expected patterns when we correlate labour market outcomes with gender norms separately for each group of women. For instance, mothers show increasing levels of employment (and decreasing levels of part-time work, self-employment, and labour informality) in countries with more egalitarian views. Results are available upon request.

(c) Self-employment

(d) Labour informality

Note: these figures plot the gap in labour market outcomes between mothers and non-mothers, measured as a percentage of the results of childless women against the fraction of respondents in the corresponding countries that disagree with the statement: 'a woman should work only if her partner does not earn enough'. Part-time work is defined as the fraction of employed women working fewer than 30 hours a week; self-employment is defined among employed women and informality rates are measured based on the fraction of salaried women that are not entitled to retirement benefits linked to their jobs. All gaps are measured among women aged 25–54 years. Gaps are calculated for 2015, except for Mexico, Nicaragua, and Guatemala (2014), and Venezuela (2006).

Source: labour market gaps are calculated based on Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020); the fraction of agreement with 'a woman should work only if her partner does not earn enough' is constructed based on *Latinobarómetro* (2015).

4.2 Family policies

Family policies are important to relax parents' time constraints and to foster gender equality, by promoting and consolidating cultural changes. Given that gender norms still place the lion's share of childcare on women, suitable family policies that allow for balancing work and family life may go a long way in providing the flexibility women are currently demanding and for which they are paying large costs, as discussed in Section 3. In this section, we focus on two family policies that have been extensively studied in the literature because of their links with labour market gender gaps: childcare provision and parental leave. On the one hand, external sources of childcare that are easily accessible and compatible with women's working schedule may temper their demand for flexibility. On the other hand, family policies tied to the formal labour market such as parental leave schemes may soften transitions when children are born, relax families' time constraints, and promote co-responsibility between parents as long as they incorporate gender-neutral benefits.

Availability—and suitability—of childcare services

The literature has shown that childcare and female labour force participation are closely related. Mateo Díaz and Rodríguez-Chamussy (2013) provide a review of international and Latin American evidence showing that access to formal childcare has positive effects on female labour supply—both in the extensive and in the intensive margins. The survey reviews several studies based on randomized experiments and quasi-experimental data that show that increased access to childcare has a positive effect on female labour participation, employment, and working hours. For Latin America, the evidence is provided by the evaluation of different programmes, many of which were not intended to alter female labour outcomes in the first place. For instance, Attanasio and Vera-Hernandez (2004) evaluate the 'community nursery programme' in Colombia and find that day care increased 31 per cent the average probability of employment as well as the average number of hours worked. In the case of Argentina, Berlinski and Galiani (2007) follow a differences-in-differences strategy and find a positive impact of a large preschool infrastructure expansion on maternal employment rates. Furthermore, Berlinski et al. (2011) adopt a regression discontinuity

design using enrolment cut-off dates and birth dates of children and find that preschool attendance increases mothers' labour force participation whereas no effects are found for enrolled children who are not the youngest in the family.[16] Mateo Díaz and Rodríguez-Chamussy (2016) point out that in the (relatively few) cases in which childcare programmes have not affected female labour force participation this was because they had not been properly tailored to the needs of (potentially) working mothers.

Even though the provision of formal childcare services in the region has expanded significantly during the last years (Araujo and López Boo 2015), coverage is far from universal. According to the Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020), on average, around 70 per cent of children between 3 and 5 years of age were enrolled in preschool circa 2018. The picture for children below 3 years of age is much less encouraging: no country in the region reaches even 30 per cent of coverage. Low enrolment rates in childcare in Latin America are due not only to a shortage in supply but also—and maybe more importantly— to an inadequate design of programmes in terms of providing support for balancing work and family (convenience of location, compatibility with work schedules).[17]

Furthermore, enrolment rates for childcare services vary greatly across the countries of the region. For instance, when focusing on children aged between 3 and 5 years, some countries such as Argentina and Brazil show almost universal coverage whereas others like Bolivia and El Salvador cover slightly over half of that age group. Guatemala presents an extreme case: only 14 per cent of children aged between 3 and 5 years are enrolled in preschool.

These differences in preschool attendance for young children are likely related to mothers' labour market outcomes. Figure 6 provides evidence in this regard by linking the gap in labour market outcomes between mothers and childless women to the enrolment rates of children aged between 3 and 5 years in the region. The figure shows that enrolment rates of young children are negatively correlated with labour market gaps between mothers and non-mothers across Latin American countries. In other words, the higher the enrolment rates, the more similar the labour choices of mothers and childless women. This is true not only for employment, but also for occupational choices such as part-time work, self-employment, and informal jobs.[18] Although descriptive, this evidence is consistent with the causal evidence outlined before: stronger childcare systems seem
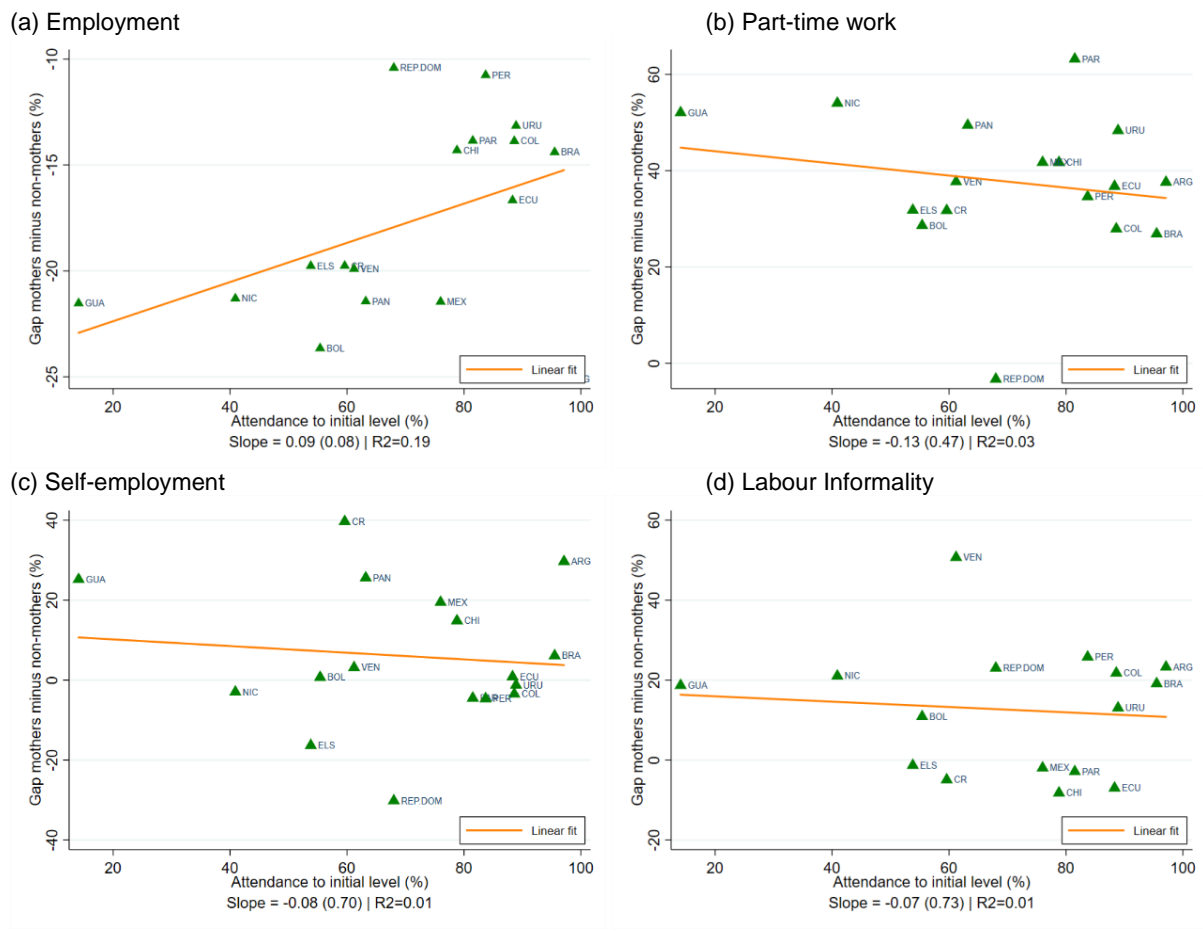
[16] Evaluations of programmes implemented in other countries show qualitatively similar results. Martínez and Perticará (2017) analyse a randomized experiment in Chile aimed at offering afterschool care for children aged between 6 and 13 years. They find that programme participation increases female employment by 5 per cent and female labour force participation by 7 per cent. In Mexico, Angeles et al. (2014) find that a day-care programme increased female employment in 18 per cent, short term job tenure in 15 per cent and hours worked per month (24 more hours). In Brazil, Paes de Barros et al. (2011) identify a causal link between access to childcare and maternal labour market outcomes, raising participation rates by 8 per cent and mothers' employment by 27 per cent. In Ecuador, Rosero and Oosterbeek (2011) evaluate an early childhood intervention that included day care and find that it is associated with an increase in labour participation of mothers. For Guatemala, Hallman et al. (2005) find that reducing prices of formal childcare has no effect on the extensive margin but has a large positive effect on labour hours.

[17] Based on a description of public and private childcare provision in Latin America, Mateo Díaz and Rodríguez-Chamussy (2016) identify large gaps between supply and demand, emphasizing the absence of features that render the existing programmes a feasible and convenient alternative for working parents: adequate age requirements of children, compatible schedules, appropriate coverage and location, reasonable prices and fees, as well as how they connect with parental leaves and compulsory education.

[18] Furthermore, we find that mothers show higher employment rates—and lower participation in part-time work, self-employment, and labour informality—in countries with higher enrolment rates of young children. Results are available upon request.

to help women balance work and family life and lower the need for mothers to either opt out of the labour market or choose more flexible—yet costly—work arrangements.[19]

Figure 6: Childcare and the mothers to non-mothers' gap in labour market outcomes across Latin American countries

(a) Employment

(b) Part-time work

(c) Self-employment

(d) Labour Informality

Note: these figures plot the gap in labour market outcomes between mothers and non-mothers, measured as a percentage of the results of childless women against the gross enrolment rate of children aged 3–5 years in each country. Part-time work is defined as the fraction of employed women working fewer than 30 hours a week; self-employment is defined among employed women and informality rates are measured based on the fraction of salaried women that are not entitled to retirement benefits linked to their jobs. All gaps are measured among women aged 25–54 years. Gaps are calculated for 2015, except for Mexico, Nicaragua, and Guatemala (2014), and Venezuela (2006).

Source: labour market gaps and enrolment rates are calculated based on Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020).

Parental leave

Family policies tied to employment are important to achieve gender equality in the labour market, promoting as well as consolidating changes in social norms regarding gender roles. A typical example is parental leave. Olivetti and Petrongolo (2013) show cross-country evidence of a positive, strong, and robust correlation between the number of weeks of job-protected leave for

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[19] We find similar results when relating women labour outcomes to other variables such as minimum child age for starting preschool and primary school.

mothers and the gender gap in employment in OECD countries, although the effect seems to be limited to short or intermediate leave durations and to apply only to less-educated women.

The causal evidence is less conclusive. While some studies find support on the positive effect of maternity leave on female labour market outcomes (Kluve and Tamm 2013; Baker and Millingan 2008), others find no effect at all (Lalive and Zweimüller 2009; Dahl et al. 2016; Kleven et al. 2020b). Differences in design may account for these mixed results.[20] Depending in part on the design, paid leave for mothers can become a long-term obstacle to women's careers due to loss of work experience and higher costs for employers hiring women of childbearing age.[21] Regarding paternal leave, the evidence is very scarce and mixed: while Huerta et al. (2013) and Ñopo (2011) find that men who take paternal leave are more involved when raising their children later on. Research based on more careful identification strategies does not show positive effects on women's labour market outcomes or in father's involvement in childcare later on (Ekberg et al. 2013).

Mateo Díaz and Rodríguez-Chamussy (2016) provide a detailed review of parental leave schemes in Latin America. Even though all countries provide maternity leave and most offer paid leave during pregnancy, only 11 countries have paternity leave. On average, Latin American countries offer between 12 and 13 weeks of paid leave after birth for mothers (IPC-IG and UNICEF 2020). But the length of paid entitlement shows strong variation across countries: from 6 weeks in Honduras to half a year in Brazil. In contrast, paternal leave only covers a few days, ranging between 2 and 14 days in the region.
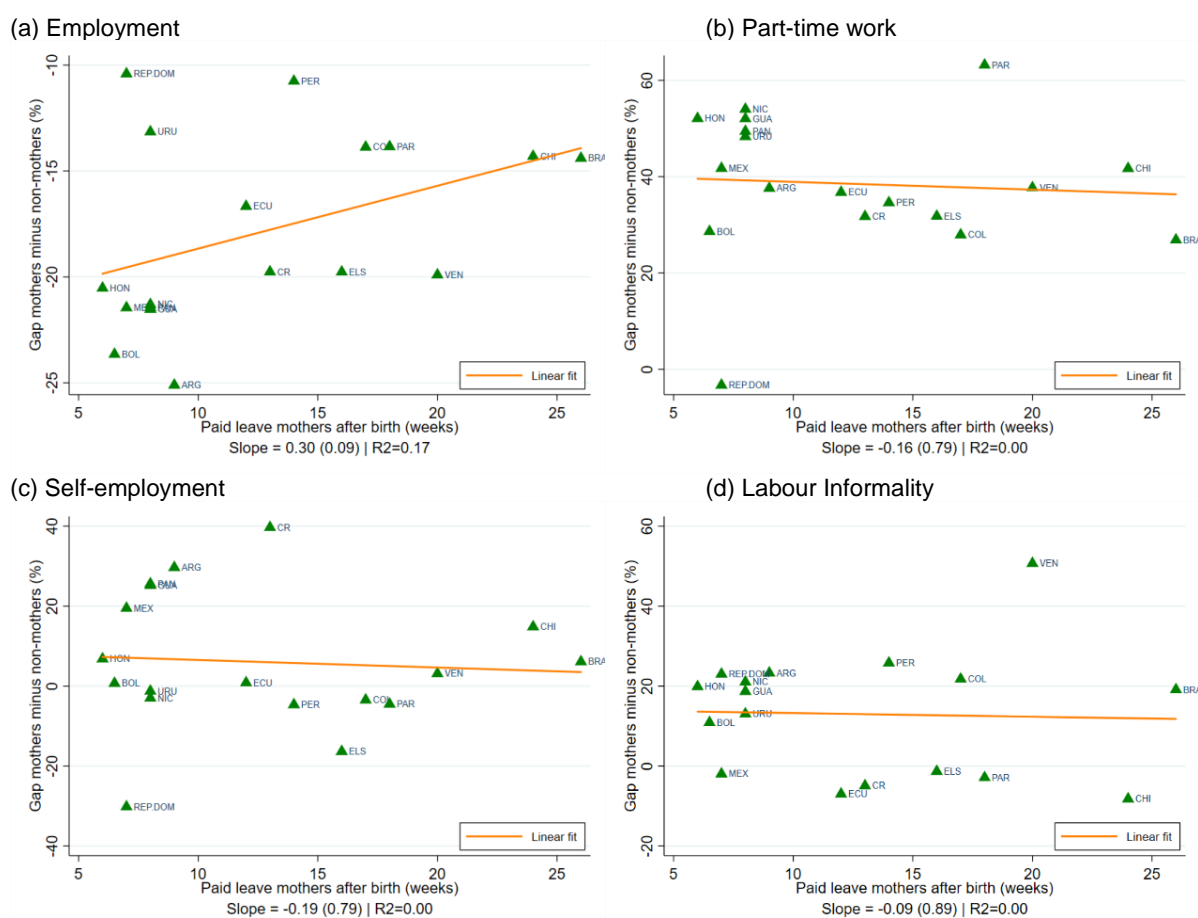
In Figure 7, we show the correlation between the maximum number of weeks of job-protected leave available to mothers and the gap in labour market outcomes between mothers and childless women across Latin American countries. Countries with longer periods of paid maternity leave show smaller gaps between mothers and non-mothers. In other words, it seems that the longer the job-protected leave for mothers, the milder the effects of children on women's labour market outcomes.[22] This suggests that mothers who enjoy longer maternity leave make job choices more similar to childless women than mothers who enjoy shorter periods of paid leave, not only in terms of labour supply—both in the extensive and in the intensive margins—but also in terms of occupation—self-employment and informal jobs. Again, this descriptive evidence is consistent with the causal results referred before and points to the relevant role that family policies may have in shaping mothers' labour outcomes.

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[20] For instance, if maternity leave is financed by the private sector rather than provided publicly, further barriers to female labour force participation may arise (Mateo Díaz and Rodríguez-Chamussy 2016). Furthermore, if parental leave is restricted to (or only taken up by) mothers, they may reinforce traditional gender roles (Marchionni et al. 2019; Antecol et al. 2018).

[21] Although important, flexibility is not only needed around the child's birth; during the first years, parents will probably demand it in large quantities. Flexible work arrangements, however, are scarce even in high-income countries: according to Olivetti and Petrongolo (2017) only 56 per cent of firms in the European Union allow employees to distribute days according to their needs (by accumulating days off and switching start and end of daily work), and to our knowledge no evidence is available regarding the impact of such arrangements on female labour market outcomes.

[22] When we correlate labour market outcomes with the length of maternal paid leave for each group of women, we find higher employment rates—and lower participation in part-time work, self-employment, and labour informality—for mothers in countries with longer periods of paid entitlement. Furthermore, we find similar results when relating women's labour outcomes to the length of paid leave available to fathers. Results are available upon request.

Figure 7: Maternal leave and the mothers to non-mothers' gap in labour market outcomes across Latin American countries

(a) Employment

(b) Part-time work

(c) Self-employment

(d) Labour Informality

Note: these figures plot the gap in labour market outcomes between mothers and non-mothers, measured as a percentage of the results of childless women against the number of weeks of maternity leaves after birth guaranteed in each country. Part-time work is defined as the fraction of employed women working fewer than 30 hours a week; self-employment is defined among employed women and informality rates are measured based on the fraction of salaried women that are not entitled to retirement benefits linked to their jobs. All gaps are measured among women aged 25–54 years. Gaps are calculated for 2015, except for Mexico, Nicaragua, and Guatemala (2014) and Venezuela (2006).

Source: labour market gaps are calculated based on Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020); information on maternity leave duration is based on IPC-IG and UNICEF (2020).

5   Final discussion

We show that motherhood has a negative impact in Latin American women's labour market outcomes: motherhood lowers female labour supply and favours occupational choices towards more flexible jobs, such as part-time jobs, self-employment, and informal work arrangements. Importantly, these effects occur right after childbirth and do not fade in the medium or long term. Since fathers' labour outcomes remain unaffected, motherhood opens gender gaps in the labour market that persist over time.

For the four countries studied—Chile, Mexico, Peru, and Uruguay—employment rates of women drop between 17 and 20 per cent after the first child is born. Evidence for Chile suggests that the long-run effect is 16 per cent 10 years after childbirth. In addition to the negative impact of motherhood on the extensive margin of labour supply, the arrival of the first child also affects

working hours, thus increasing part-time employment by 16–29 per cent in the medium run and 43 per cent in the long run. Motherhood also triggers an increase in self-employment and labour informality among working women. The medium-run effect of motherhood on self-employment ranges between 17 and 42 per cent, and the effect on informality is between 16 and 50 per cent.

These types of jobs—part-time jobs, self-employment, and informal jobs—are characterized by lower wages, lack of social security, larger job instability, and poor career development prospects, yet women are paying this high price in return for the time flexibility these job types offer. We analyse two potential drivers of women's demand of flexibility in the labour market: gender norms and family policies. When looking at the gap in labour market outcomes between mothers and childless women for 18 Latin American countries, we find that in countries with more egalitarian views and stronger family policies such as childcare and maternal leave both groups of women make more similar choices. This novel—yet descriptive—evidence highlights the substantial role of norms and family policies in shaping women's involvement in the labour market. Fostering policies that promote co-responsibility at home as well as free up time for families may go a long way in promoting mothers' involvement in the labour market as well as in improving the quality of female employment. In Latin America, there is still much room to advance in this direction.

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Appendix A: Data sources and working sample

This appendix presents in detail the data sources and sample selection criteria used for all three countries, as summarized in Appendix Table A1.

Table A1: Surveys and working samples

Country	Data source	Acronym	Survey dates	Representativeness	Working panel						
					Time unit	Calendar periods covered	First child was born in range	Periods relative to first child's birth	Sample of mothers	Sample of fathers	Dependent variables available
Chile	Longitudinal Social Protection Survey	LSPS-CHL	5 rounds between 2004 and 2016	National; rural and urban population aged 18 years or more	Month	Jan 2001–Aug 2016	Feb 2002–Jul 2016	[−60, 120]	Age at first birth between 18 and 50 years; observations: 3,228	Age at first birth between 18 and 60 years; observations: 2,740	Labour participation, employment, hours, wages, earnings, public employment, informal employment, self-employment
Mexico	Module of Labour Trajectories of the Employment Survey	MOTRAL	2 rounds, in 2012 and 2015	National; urban population aged 18–54 years, with work experience	Month	Jan 2007–Jun 2015	Jan 2007–Feb 2015	[−57, 62]	Age at first birth between 18 and 47 years; observations: 403	Age at first birth between 18 and 48 years; observations: 279	Labour participation, employment, nominal and real monthly income, informal employment, self-employment, activity sector, task
Peru	National Household Survey	ENAHO	6 rounds (2007–11, 2011–15, 2012–16, 2013–17, 2014–18, and 2015–19)	National; urban and rural; regional	Year	2007–19	2008–18	[−2, 2]	Age at first birth between 18 and 50 years; observations: 655	Age at first birth between 18 and 55 years; observations: 541	Employment, unemployment, Labor participation, hours, informal employment, self-employment
Uruguay	Longitudinal Social Protection Survey	LSPS-URY	2 rounds, in 2012/13 and 2015/16.	National; rural and urban population aged 14 years or more	Year	2009–16	2009–16	[−6, 6]	Age at first birth between 18 and 44 years; observations: 472	Age at first birth between 18 and 50 years; observations: 366	Labour participation, employment, hours, nominal and real monthly income, wage, self-employment, public employment, task, activity sector, small firm, informal employment

Source: authors' own elaboration.

A1 Chile

We use data from the Longitudinal Social Protection Survey for Chile (LSPS-CHL), carried out by the Ministry of Labour and Social Protection in Chile. Our analysis is based on five waves gathered between 2004 and 2016 (2004/05, 2006/07, 2008/09, 2012/13, and 2016), following around 16,000 individuals in each wave.[*] The survey includes demographic and socioeconomic information at the individual and household level. More importantly for our purposes, the survey recovers labour market trajectories.

Date of birth of the first child

The LSPS-CHL includes information on the exact date of birth of children. Our working panel includes individuals who become parents between February 2002 and July 2016.

Labour history

The LSPS-CHL asks information about all the jobs an individual had in the 3 years before the interview. In the wave of 2016 it also asks, to the new individuals entering the panel, about the work history since 2001. Thus, when we combine the five rounds, we end up with labour information from 2001 to 2016. The time window in which we can observe the labour trajectories varies across individuals.

For each job listed in the labour history module, there is information regarding the start and end date of the job, sector and occupation, whether it was a permanent or temporary job, the number of hours worked, monthly wage, and whether the worker had contributed to the social security while working there, among others.

A2 Mexico

For Mexico, we use data from the Module of Labour Trajectories of the Employment Survey (MOTRAL, for its acronym in Spanish) conducted in 2012 and 2015, along with the National Survey of Occupation and Employment (ENOE). MOTRAL represents a joint effort of the National Commission of the Retirement Savings System and the National Institute of Statistics and Geography. The MOTRAL module was addressed to a single individual per household, aged between 18 and 54 years and with some previous work experience. MOTRAL has national statistical representativeness for the urban population.

For each job performed during the last 5 years, the module contains information about sector of activity, occupational category, wage, formality condition, reason of job ending, and activities during unemployment. By matching MOTRAL with ENOE, it is possible to obtain a socio-demographic characterization of households, in particular the date of birth of the respondent's first child. MOTRAL provides information on 5,264 labour trajectories in 2012 and 5,802 in 2015, representing a total of 14,647.

The MOTRAL module asks about work history in the last 5 years. When we pool the data from the 2012 and 2015 rounds, we end up with information on labour trajectories from January 2007 to June 2015. To be more precise, our pooled data contains two sub-panels: one containing information between January 2007 and June 2012 for individuals interviewed in the 2012 round,

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[*] The LSPS-CHL has an additional wave of data (collected in 2002/03) that we do not use because that sample is not representative of the Chilean population as it only includes affiliates to the pension system.

and the other including information between January 2010 and June 2015 for individuals interviewed in the 2015 round. Thus, for each sub-panel we can follow labour trajectories during a time window of 5 years and 5 months.

Date of birth of the first child

The information related to the date of birth of children is obtained from ENOE. However, there is no specific question about the date of birth of the first child, so we build a proxy. Even though ENOE provides information about the date of birth of all members in the household, it is not always possible to identify mother–child or father–child relationships. What we do know from ENOE is the number of children born alive to each woman ('In total, how many daughters and sons born alive have you had?') and the relationship between each member of the family and the head of the household. When the respondent of the MOTRAL module is the household head, who is also the mother or father of the oldest child in the household, we can be almost certain in identifying the date of birth of the first child.[†] But there are other cases in which the identification of the mother–child or father–child relationship is less obvious, and therefore we must make some assumptions in order to identify sons and daughters in households in which another household member has answered the MOTRAL. Given that we know the relationship a child has with the head of the household, cases vary with the relationship that the member who answered the MOTRAL has with the head of the household. These cases do not cover all households, but they represent a conservative approach to assign children to potential parents. Once we assign children to their parents, we can identify the first child. It is important to note that our sample only includes mothers for whom the number of children we identify within the household matches their self-reported number of children born alive. If the person answering the module is a man, we use his spouse's children as a proxy of his children.

Labour history

For each job performed during the last 5 years, the MOTRAL module contains information on the start and end date of each activity, sector of activity, occupational category, wage, formality condition, and reason of job ending, among others. Monetary variables are expressed in Mexican pesos as of June 2015.

A3   Peru

The National Household Survey for Peru (ENAHO, for its acronym in Spanish) is carried out by the National Institute of Statistics of Peru. The survey includes a panel component since 1998. In 2007, there was a large change in the whole structure of the survey, including the design of the panel. We use information from the new survey ('ENAHO *metodología actualizada*') which has information from 2007 to 2019. The panel size varies from year to year and has a maximum span of 5 years. In this analysis, we use information from those parents with panel data before and after the birth of the first child.

In addition to employment, income, and expenditure data, main topics often covered by the ENAHO include agricultural activities, health status and health care use, housing, and demographics.

[†] We only know for sure whose first child it is if the person responding to the MOTRAL is a woman, since the question about the number of children she has had is only applied to women. If the interviewed person is a man, we use his spouse's children to proxy his children.

Date of birth of the first child

We construct a variable with the birth date of the first child using information from the variable indicating the relationship with the head of the household and family nucleus (i.e. whether the person is a child of the head of the household). We make two assumptions to build this variable: first, that the oldest child in each nucleus is the first-born child, and, second, that their parents are the nucleus head and their significant other. Another point to consider is that the survey does not distinguish between children and stepchildren.

Labour history

The ENAHO allows the construction of the socio-demographic and labour variables of interest at the moment of the interview. It includes information on labour participation, employment, unemployment, self-employment, part employment, working hours, and hourly wage, among others.

A4   Uruguay

We use the Longitudinal Social Protection Survey for Uruguay (LSPS-URY) carried out by the Social Security Bank of Uruguay. So far there have been two rounds of LSPS-URY: October 2012/May 2013 and September 2015/June 2016. In the first round, all household members 14 years of age or older were interviewed, and 14,647 of the 18,428 individuals included in the original sample were interviewed again in the second round. LSPS-URY is nationally representative, covering both rural and urban areas.

LSPS-URY collects labour information of the 3 years prior to the interview, so that the two combined rounds allow us to follow the labour trajectories from October 2009 to June 2016 (i.e. a time window of almost 7 years). Because of the limited information on the exact date of birth of the first child, the event study is carried out using annual data.
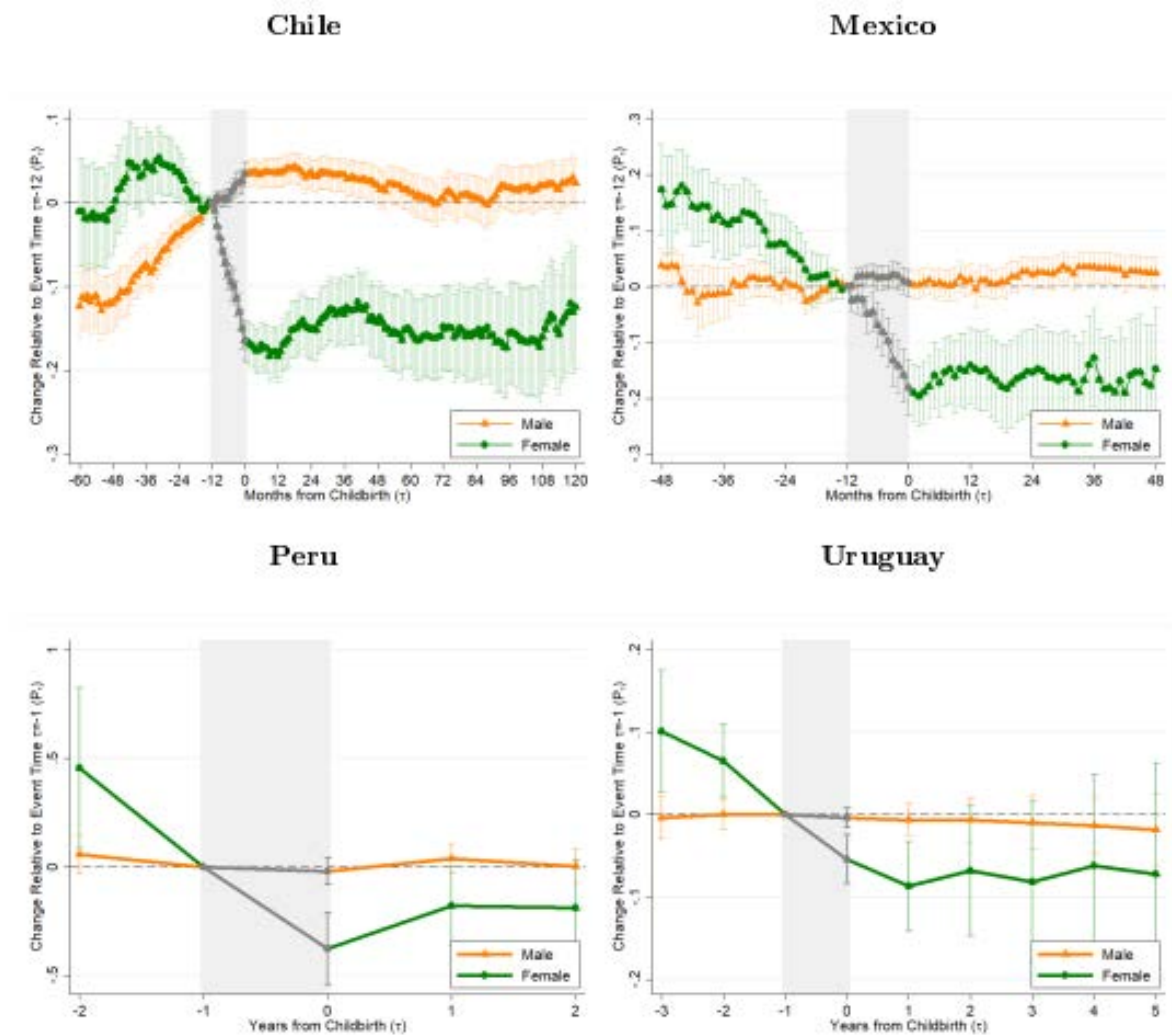
Date of birth of the first child

LSPS-URY has information on the year of birth of the first child. The fact of not knowing the exact month of birth forces us to carry out the event study for Uruguay based on annual data.

Labour history

In each round the LSPS-URY asks about current main and secondary jobs, and first job. Wave 1 enquires additionally on other jobs those interviewed had during the last 3 years. Depending on the type of job, the survey contains information on month and year of beginning and finishing, labour relationship, task, hours worked per week, firm's sector, firm's size, formality, and net monthly income. Because of the nature of current jobs, there is no information about the exact moment these jobs end (considering the survey's temporal window for example for Wave 1, it could be either 2012 or 2013). We would like to assign to this date the time the interview was made. Unfortunately, we do not have this information, so we assume the interview was made in 2013 for interviewees in Wave 1 and 2016 for those in Wave 2. As we mentioned before, the lack of information about the month of birth of the first child forces us to work with annual data, so assuming a certain month is irrelevant. Finally, if for a particular year a worker has more than one job, we summarize hours and incomes across jobs, but we keep the main job's other characteristics (task, sector, etc.).
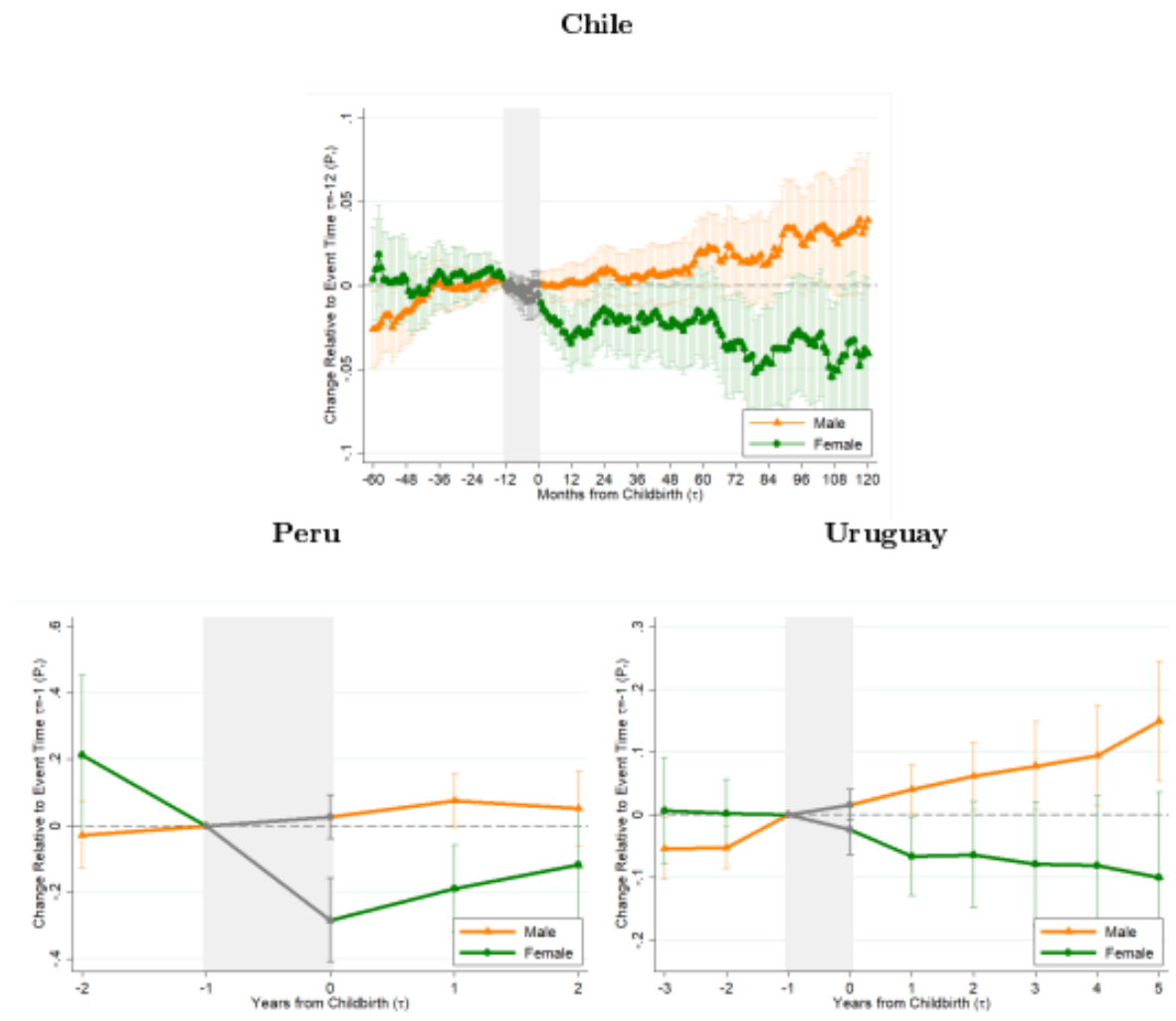
Appendix B: Figures

Figure B1: Effect of the birth of the first child on labour force participation

Note: these figures show the estimated effect of children on labour force participation for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the Longitudinal Social Protection Survey for Chile (LSPS-CHL), the Module of Labour Trajectories of the Employment Survey for Mexico (MOTRAL), the National Household Survey for Peru (ENAHO), and the Longitudinal Social Protection Survey for Uruguay (LSPS-URY).

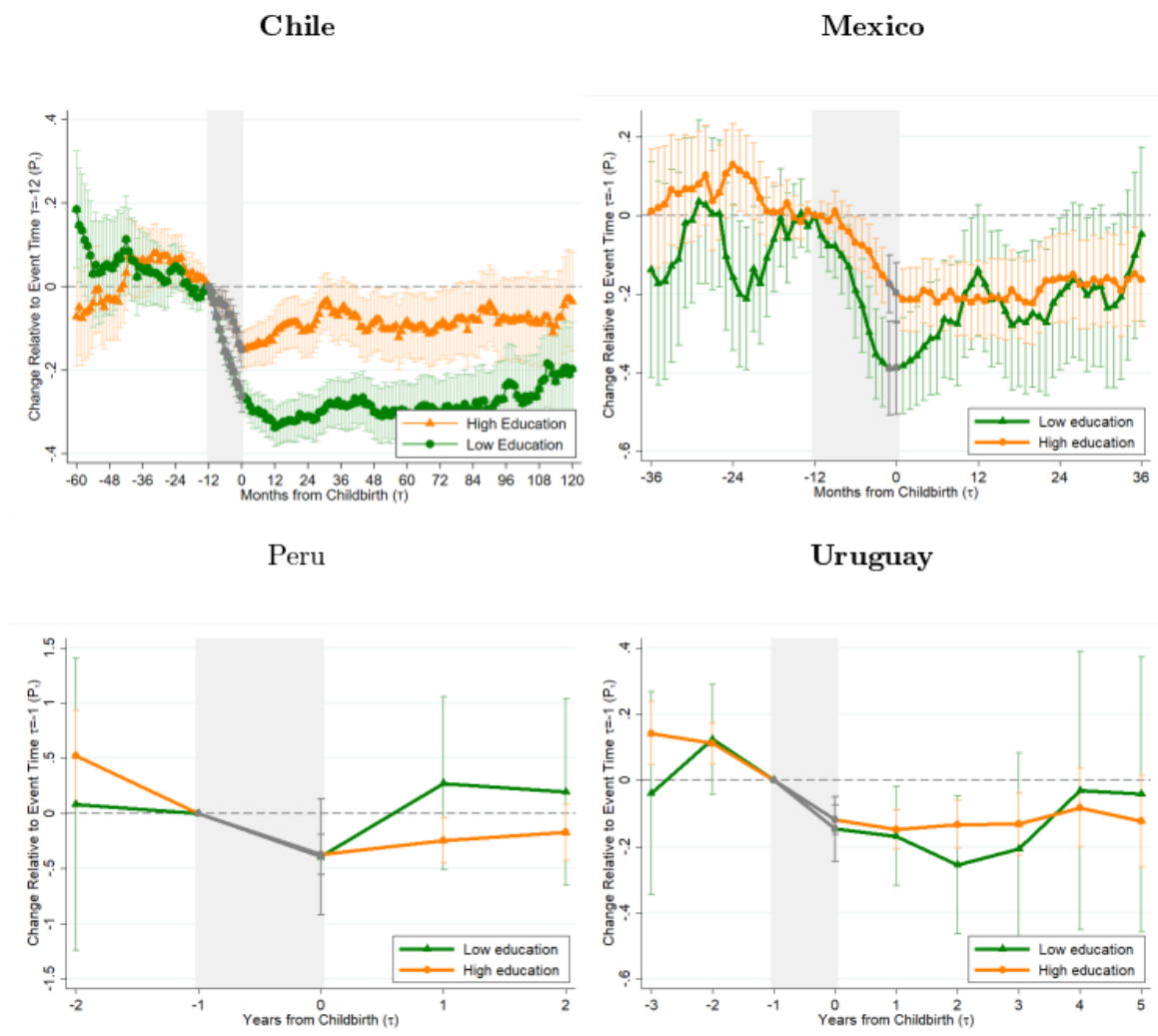Figure B2: Effect of the birth of the first child on hours worked per week

Chile

Peru

Uruguay

Note: these figures show the estimated effect of children on hours worked per week for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years and fathers whose age at first childbirth is between 18 and 55 years. We use monthly data for Chile and yearly data for Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL and LSPS-URY. Retrospective information on working hours is not available in MOTRAL.

Appendix C: Heterogeneous effects across education groups

In this appendix, we explore whether the effects of children on mothers' labour outcomes vary with education. Appendix Figures C1–C4 show the estimated motherhood effects on the different labour outcomes for women with high and low education, separately.[‡] Of course, our estimates lose precision, which reflects in noisier trajectories and wider confidence intervals than in the previous figures. Nevertheless, we can still find a recurring pattern in the different countries. First, low-educated women experience larger motherhood penalties than high-educated women. Second, although the effects are smaller for the most educated women, they also experience a negative impact of motherhood on labour outcomes. Even though it is not always possible to statistically distinguish between the two groups, the figures show that motherhood effects are usually larger among women with low education.

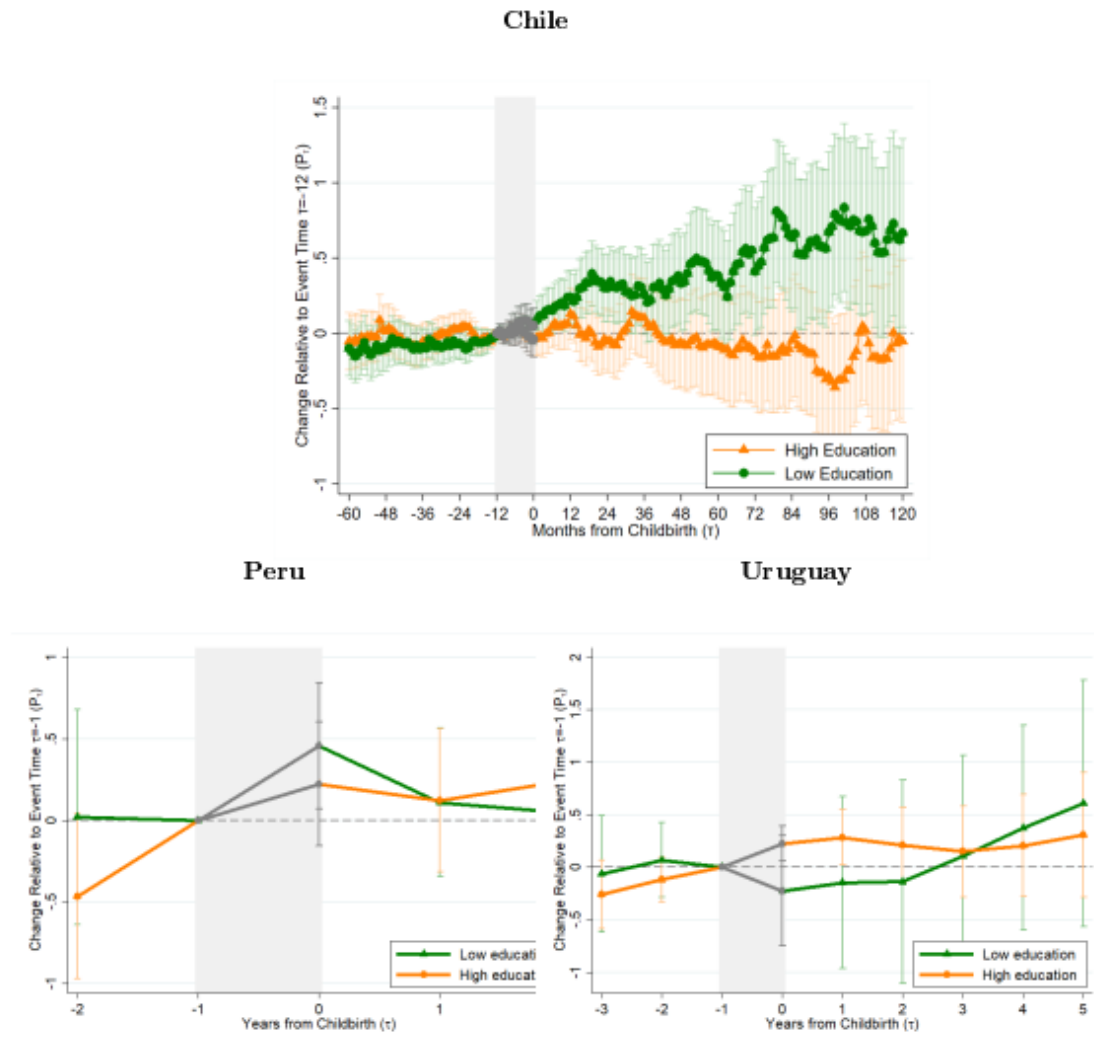Figure C1: Motherhood effect on employment by education

Note: these figures show the estimated effect of children on employment for women with high and low educational level, separately, for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated

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[‡] In the case of Mexico and Uruguay, we define as highly educated those who completed high school; for Chile and Peru, highly educated women are those with at least some college education.

percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

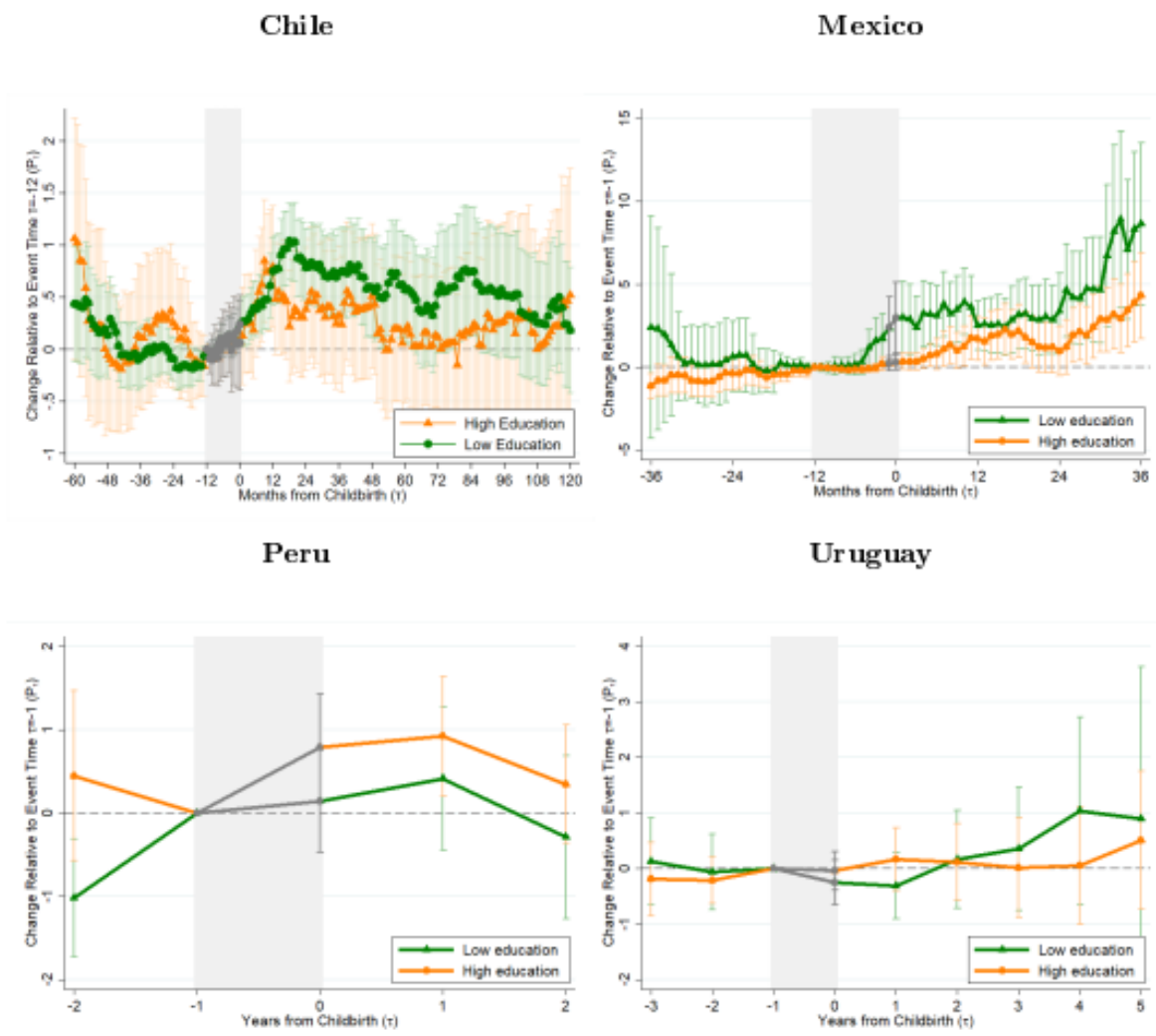Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

Figure C2: Motherhood effect on part-time employment by education

Note: these figures show the estimated effect of children on part-time employment for working women with high and low educational level, separately, for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

Figure C3: Motherhood effect on self-employment by education

Note: these figures show the estimated effect of children on self-employment for working women with high and low educational level, separately, for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

Figure C4: Motherhood effect on labour informality by education

Note: these figures show the estimated effect of children on labour informality for working women with high and low educational level, separately, for each event time τ compared with the year prior to childbirth (the omitted category); that is, event time $\tau = -12$ in Chile and Mexico and $\tau = -1$ in Peru and Uruguay. The effects are computed using the normalized coefficients described in Section 2. Thus, the figures report the estimated percentage difference in the outcome variable between each event time τ and the year prior to the birth of the first child. The regressions include year, month, and age-in-years fixed effects. The 90 per cent confidence intervals are constructed based on standard errors clustered at the individual level. Samples include mothers whose age at first childbirth is between 18 and 50 years. We use monthly data for Chile and Mexico and yearly data for Peru and Uruguay. For more details on the composition of each country's sample see Section 2 and Appendix A.

Source: authors' calculations based on the LSPS-CHL, MOTRAL, ENAHO, and LSPS-URY.

Appendix D

Table D1: Labour market outcomes of mothers and non-mothers (%) by country

Country	Employment			Part-time			Self-employment			Informality		
	Mothers	Non-mothers	Gap	Mothers	Non-mothers	Gap	Mothers	Non-mothers	Gap	Mothers	Non-mothers	Gap
Argentina	53.4	71.3	−25.1	44.9	32.7	37.6	17.8	13.7	29.6	29.7	24.1	23.3
Bolivia	55.2	72.3	−23.7	25.1	19.5	28.6	44.0	43.7	0.7	54.1	48.8	10.9
Brazil	55.3	64.6	−14.4	23.1	18.2	26.9	19.7	18.6	6.1	19.3	16.2	19.1
Chile	56.3	65.7	−14.3	19.5	13.7	41.7	19.6	17.1	14.8	12.6	13.8	−8.2
Colombia	59.6	69.2	−13.9	26.5	20.7	27.9	40.7	42.1	−3.5	34.5	28.4	21.8
Costa Rica	47.1	58.7	−19.8	32.2	24.4	31.7	21.2	15.2	39.6	30.5	32.1	−4.9
Dominican Republic	54.2	60.5	−10.4	16.5	17.1	−3.3	21.1	30.3	−30.2	13.4	10.9	23.0
Ecuador	55.0	66.0	−16.7	28.5	20.8	36.8	35.2	34.9	0.8	29.4	31.7	−7.0
El Salvador	48.3	60.2	−19.8	25.8	19.6	31.8	39.3	46.9	−16.3	42.4	42.9	−1.3
Guatemala	40.1	51.1	−21.5	37.0	24.3	52.0	45.4	36.3	25.2	59.6	50.3	18.7
Honduras	45.3	57.0	−20.5	47.8	31.4	52.1	49.9	46.7	6.8	41.8	34.9	19.9
Mexico	45.4	57.8	−21.5	35.8	25.3	41.7	21.5	18.0	19.5	53.6	54.7	−2.0
Nicaragua	49.5	62.9	−21.3	36.5	23.7	54.0	43.5	44.8	−3.0	43.7	36.1	21.0
Panama	55.7	70.9	−21.4	25.6	17.1	49.4	24.0	19.1	25.6	n.a.	n.a.	n.a.
Paraguay	59.7	69.3	−13.9	31.8	19.5	63.2	32.5	34.0	−4.5	49.8	51.3	−2.9
Peru	70.5	79.0	−10.8	38.7	28.8	34.6	39.0	40.9	−4.6	57.7	45.9	25.8
Uruguay	70.0	80.6	−13.2	28.1	18.9	48.3	18.1	18.4	−1.3	8.6	7.6	13.0
Venezuela	50.3	62.8	−19.9	22.7	16.5	37.7	38.8	37.6	3.1	35.3	23.4	50.7

Note: part-time work is defined as the fraction of employed women working fewer than 30 hours a week; self-employment is defined among employed women and informality rates are measured based on the fraction of salaried women that are not entitled to retirement benefits linked to their jobs. Gaps are computed as the difference between mothers and non-mothers in each labour market outcome, measured as a percentage of the results of childless women (mothers are restricted to women with children aged 5 years or below). All labour market outcomes are measured among women aged 25–54 years. Data are for 2015, except for Mexico, Nicaragua, and Guatemala (2014) and Venezuela (2006).

Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank 2020).