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Abstract

This study explores how childbirth differently shapes the career trajectories of men and women within the same couples, with a particular focus on gender disparities in experiencing downward labor transitions following the birth of their first child. Using a unique survey-administrative linked dataset, we track couples' labor market trajectories to analyze transitions from employment to unemployment, full-time to part-time employment, and higher-paid to lower-paid jobs. Additionally, the dataset allows us to link partners, enabling the study of factors influencing differences in the probabilities of downward labor market transitions between partners in the same household. Our findings reveal substantial and persistent penalties for women, lasting up to three years after childbirth, which are mainly related to part-time job arrangements. When examining differences in probabilities within couples, households in which women have tertiary education with respect to their partners and are the primary earners exhibit smaller gender disparities in the likelihood of downward labor transitions with respect to other households.

Keywords: *Labor market; downward transition; gender inequalities; parenthood penalty*
JEL Codes: J13 ; J16 ; E24

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Introduction

Gender gaps arise from complex and multifaceted causes related to the labor market (Goldin, 2014). Regardless of the underlying explanations, previous studies agree that gender disparities tend to widen following childbirth. Caregiving responsibilities associated with childbirth, typically performed within the domestic sphere, often act as a significant barrier to women's labor market integration and career progression, although with heterogeneity along the wage distribution (Budig and Hodges, 2010; Azadikhah Jahromi and Huang, 2024). Depending on the data availability several studies have been focusing specifically on the motherhood penalties (from original works as Waldfogel, 1997 and Budig and England, 2001 to more recent contributions such as Casarico and Lattanzio, 2023) or on the 'parenthood penalty' by comparing mothers and fathers Angelov et al. (2016); Kleven et al. (2019a,b). Despite some cross-country differences, there is broad agreement on the significant and lasting impact of the child penalty on women's careers, particularly in comparison to their male partners. However, less attention has been devoted to women's vulnerability to low wages and in-work poverty. Additionally, while many studies take a long-term perspective, fewer focus on the detailed gendered patterns of downward labor market mobility following childbirth. Couples often navigate opportunities and constraints related to working hours and wages, which are influenced by institutional factors such as availability of part-time contracts.

It is indeed interesting to interact the study on childbirth effect on men's and women's careers with changing labor market structure due to increased flexibility. In this respect, the Italian case study is a perfect example of a country in which the male 'breadwinner' model still dominates while the Italian labor market has been gradually reformed since the late 1990s. Such reforms have aimed to increase labor market 'flexibility' by introducing temporary and para-subordinated contracts while reducing protections for permanent contracts (Cirillo et al., 2017; Daruich et al., 2023). Despite women's increasing participation in the labor market, their working conditions have not improved and the female employment rate is among the lowest in Europe and largely explains the overall gender gap (Andrew et al., 2021). The increase in female employment is linked to low-quality and low-paid jobs (see Bavaro, 2022 as well as Bavaro and Raitano, 2024), among which part-time positions play a crucial role (Depalo and Lattanzio, 2024).[1]

Against this backdrop, this paper explores how the birth of a first child—which significantly increases the household care burden—shapes gender disparities in Italy, a country characterized by an increasingly flexible labor market, low wages, and a growing prevalence of part-time work. Specifically, it aims to analyze the labor market trajectories of couples after the birth of their first child, with a particular focus on transitions into precarious employment conditions, including unemployment, part-

[1] According to data from the Italian Labor Force Survey (ISTAT, 2021), around 74% of part-time work is carried out by women and among these, 64.5% have an involuntary part-time job, the highest share among European countries.

time work, and low-paid jobs. Using the rich AD-SILC dataset—which integrates Italian administrative records on workers' careers with the Italian wave of the Survey on Income and Living Conditions—we assess the gender gap in short- and medium-term downward labor market transitions. Our modeling approach, which differs from the standard event study typically used in the childbirth penalty literature, accounts for multiple individual and household characteristics. We analyze trends over time and examine within-couple characteristics that exacerbate differences between partners. A distinctive feature of this study is its consideration of multiple labor market outcomes to disentangle potential patterns of gender disparities. In particular, we explore the paradoxical role of part-time work, which, while often seen as a tool for balancing work and family life, may also reflect societal norms and power dynamics within households and workplaces (Chung, 2022). Furthermore, to our knowledge, this is the first study to investigate post-childbirth labor market transitions among Italian couples from both an individual and household perspective.

The paper is organized as follows. Section 1 reviews the literature. Section 2 includes the data description and the sample selection procedure. In Section 3 we present the empirical strategy. In Section 4, we show the main results. Finally, Section 5 offers concluding remarks.

1 Child penalty, households and flexible labor markets

In the last decades the topic of measuring, evaluating and interpreting causes and effects of gender gaps in wages and, more generally, gender inequalities in labor markets has received a huge interest in the academic community (Olivetti and Petrongolo, 2016; Blau and Kahn, 2017; Goldin, 2021).

The works by Kleven and Landais (2017) and Kleven et al. (2019b) explain in great detail how the event of childbirth plays a crucial role in shaping wage inequality, particularly when examining life-cycle trajectories. The literature on motherhood and fatherhood has been unfolding widely in the last years covering many different countries and time span, see for instance the works on the US by Waldfogel (1997) and Bertrand et al. (2010); on Spain by Gutiérrez-Domènech (2005) and Herrarte et al. (2012). The paper by Ejrnæs and Kunze (2013) focuses on labor market dynamics of women after childbirth in Norway, while the more recent work by Kunze (2020) concentrates on male workers to show how their career is relatively unaffected by the childbirth. Another related strand of papers compares the outcomes for males and females partners, for instance Angelov et al. (2016) using Swedish register data show how the within-couple gap unfolds long time after the birth of the first child (persistent negative gap for women both in terms of income and wages). de la Vega (2022) compares German couples disentangling by male and female breadwinner households. The paper by Chung et al. (2017) focus on the gender earnings gap in the US.

Even when focusing exclusively on Italy, a significant number of studies have explored the child

penalty effect on women's labor market employment, wages, and the gender gap. We can divide them among those covering a short-term horizon after childbirth (Pacelli et al., 2013; Fiori and Gessa, 2023) and those which cover the long-run (Picchio et al., 2021). Nonetheless, the most comprehensive work is the one by Casarico and Lattanzio (2023).

While most of the aforementioned articles agree on the extent of the gap between male and female partners, there is not a clear agreement on its origin and interpretation.Taking stock of previous evidence, the existence of labor market penalties for mothers should be understood as a result of the intersection between, on the one hand, a flexible labor market, which facilitates women's detachment from work - already exposed to vertical and horizontal occupational segregation, and, on the other hand, the unequal power dynamics between partners within the household which bind women to roles in social reproduction.

On the first point, the literature on the topic is quite ambiguous. Some contributions highlight that flexible labor markets and the availability of part-time schemes may, in principle, facilitate work-life balance i.e. Johnson and Provan (1995), based on the idea that mothers with greater control over the timing and location of their work would be partially shielded from wage penalties. However, empirical support for this thesis, particularly when focusing on the differences between mothers and non-mothers, has been weak. Conversely, a growing number of contributions have shown that a hyper flexible labor market can contribute to weakening women's participation in the workforce. Focusing on the US labor market, Biasi and Sarsons (2021) provide evidence on the negative relationship between a flexible pay increase and the gender wage gap. On the same line, the paper by Kelle et al. (2017) questions whether part-time employment after childbirth is a stepping stone to full-time or not, and shows how this relationship unfolds in Germany depending on living in the Eastern or Western part of the country (in the latter the duration of part-time is longer). The works by Bardasi and Gornick (2008) and Dex and Bukodi (2012) investigate the differences between part-time and full-time female workers. Bardasi and Gornick (2008) conduct a cross-country analysis within the European Union, while Dex and Bukodi (2012) perform a cohort analysis in the United Kingdom to explain long-term career trajectories.

On the second point, labor market penalties linked to care work and, more specifically childbirth, should be framed in a context of unequal distribution of power within the household (Doepke and Tertilt, 2016) where decisions to provide care can be both intrinsically or extrinsically motivated (England et al., 2012) and are rooted in the social construction of norms and values (Braunstein, 2015). Dissecting the nature of these decisions and motivations is not an easy task given their intersection with specific structures of households and intrinsically related to social norms (Folbre, 2012). Indeed, households can be characterized by more equal or unequal sharing of resources (Corsi et al., 2016). Different studies empirically investigate the degree of intra-household income sharing and usually reject the income-pooling assumption. Therefore, when unequal subdivision of resources within the household goes along with childbirth,

different scenarios can be detected. In case of income pooling between married or cohabiting parents the motherhood penalty should be buffered by the sharing of resources deriving from the reduction in working hours of the mother. In these cases the literature suggests that while mothers tend to reduce their hours of market work, fathers tend to increase theirs and therefore they also share the costs of forgone earnings. However, the sharing of resources can be influenced by relative bargaining power and indeed lower earnings leave mothers vulnerable to poverty in the event that income pooling comes to an end (Folbre, 2012). Moreover, the literature has also acknowledged an issue of household specialization building on the model of Becker (1985) later enriched by Akerlof and Kranton (2000) highlighting that differences in 'comparative advantages' lead one spouse to focus on developing labor market skills - most often men -, while the other specializes in non-market activities such as childcare and housework. Beyond specialization, what happens within households is likely to be influenced by both cultural norms but also by the resources of each member in the household (Blumberg and Coleman, 1989; Attanasio and Lechene, 2002; Bonke and Browning, 2009). Following this line of reasoning, the prioritization of care provision by women following childbirth can lead to mothers' detachment from labor markets, especially in highly flexible labor markets where the availability of part-time positions is more influenced by firms' staffing strategies than by women's choices regarding time management (Tijdens, 2002).

In the following we provide an empirical exploration based on the Italian case that, building on previous evidence and theories, aims to investigate how childbirth affects labor trajectories for women and men within the same couples. This goes beyond comparing labor market penalties for mothers versus non-mothers, focusing specifically on within-household different labor outcomes in a flexible labor market such as Italy's. Moreover, our data allows us to simultaneously consider several labor outcomes in a more comprehensive way with respect to previous contributions.

2 Data, sample selection and descriptive evidence

The empirical analysis has been developed on a survey-administrative integrated micro dataset known as 'AD-SILC'. The latter is constituted by linking two data sources, a survey source, IT-SILC (2004-17), that is made by the Italian waves of the Survey on Income and Living Conditions produced by Eurostat. The second one is the administrative archive provided by INPS collecting information on working careers and pensions. The merging procedure is conducted through individual tax codes ('*codici fiscali*') that are subsequently anonymised. AD-SILC is an unbalanced panel dataset that in its current version comprises the information contained in all SILC waves from 2004 to 2017 and in the INPS archives (for the linked individuals). AD-SILC allows to follow individuals over time and characterize couples with respect to childbirth over time. In our study, work related information (employment, type of contract, wage etc.) is sourced from the administrative component of the dataset, while the rest of demographic

information (household composition, education, childbirth etc.) stems from IT-SILC.

With regards to the sample selection description, given our research question, we focus on partners who have at least one offspring in the 2004-17 waves of IT-SILC. We build a sample of female-male couples and study the event of first childbirth in a time span between 1995 and 2016.[2] We look at couples' labor market conditions before and after childbirth by exploiting the information on working career provided by AD-SILC. We focus on unemployment, part-time and low-pay states observed in the year before childbirth (reference) and compare them with the same outcomes after childbirth (short, 1 yr, and medium, 3 yrs, transitions). We avoid using information in the year of childbirth because it is influenced by parental leave which may bias the low-pay outcomes (while weeks spent on parental leave are counted as working weeks, there is a difference in the income received in place of individual earnings). Unemployment is defined using administrative data, with the unemployed being those who have worked less than 12 weeks in a year. After having identified the main job (highest wage in case of multiple jobs within a year), we can distinguish between full and part-time jobs. The low pay indicator is built using the national yearly threshold calculated for the universe of Italian workers in Bavaro (2022). Workers whose individual labor earnings are below the threshold are classified as low-paid. In what follows, descriptive evidence from our sample is provided, focusing on the characteristics of couple partners at childbirth. Table 1 presents the summary statistics related to the sample. The number of female-male couples with their first childbirth in the observed time span equals 11,568, accounting for a total of 21,136 individuals. Panel A shows the individual-level characteristics for the male and female partners. There is a consistent discrepancy between the two groups in all observed dimensions except education. Notably, labor market outcomes reveal significant and wide gender gaps, with male partners being less unemployed, more likely to be employed full-time, and more likely to have higher-paid positions. Additionally, male partners tend to be the highest earners in Italian couples. Panel B complements the descriptive statistics with household-level averages, including information on the area of residence (with the North part of the country being more represented) and the year of childbirth.

Descriptive evidence on the change in employment status after childbirth is presented in Tables 2 and 3 which display the unconditional employment transitions through transition matrices. Table 2 documents the labor market transition between three states: unemployment, part-time and full-time work. s_{t-1} corresponds to the employment state the year before childbirth (unemployed, U; part-time, PT or full-time, FT), s_{t+1} and s_{t+3} correspond, respectively, to the state one year and three years after childbirth. The transition one year after childbirth is shown in Panel A, while the transition three years after in Panel B.

The bottom-left triangle of the matrices is particularly relevant, since it captures the probability of

[2]We are aware of the possible selection into parenthood that may depend on the instability of women's work status (Modena and Sabatini, 2012).

Table 1: Descriptive statistics

Panel A: Individual level	Male		Female		Difference	
	mean	s.e.	mean	s.e.		t
State before childbirth: Unemployed	0.175	0.380	0.373	0.484	-0.197***	(-34.52)
State before childbirth: Part-time	0.019	0.138	0.088	0.284	-0.069***	(-23.46)
State before childbirth: Full-time	0.805	0.396	0.539	0.498	0.266***	(-44.98)
State before childbirth: Low-paid	0.063	0.242	0.096	0.294	-0.033***	(-9.32)
State before childbirth: High-paid	0.762	0.426	0.532	0.499	0.230***	(-37.79)
Age at childbirth	32.271	4.670	29.408	4.785	2.863***	(46.063)
Education: Low-secondary	0.363	0.481	0.300	0.458	0.063***	(-10.16)
Education: High-secondary	0.479	0.500	0.507	0.500	-0.028***	(-4.26)
Education: Tertiary	0.158	0.365	0.193	0.395	-0.035***	(-6.96)
Private employee	0.627	0.484	0.706	0.456	-0.078***	(-10.73)
Public employee	0.107	0.309	0.141	0.348	-0.035***	(-6.75)
Self-employed	0.266	0.442	0.153	0.360	0.113***	(-18.27)
Highest earner in the couple	0.598	0.490	0.273	0.445	0.325***	(-52.73)
Panel B: Household level	mean	s.e.				
Area of living : North	0.486	0.499				
Area of living : Centre	0.233	0.422				
Area of living : South	0.282	0.450				
Year of childbirth: 1995-1999	0.313	0.464				
Year of childbirth: 2000-2003	0.281	0.449				
Year of childbirth: 2004-2007	0.216	0.411				
Year of childbirth: 2008-2011	0.125	0.331				
Year of childbirth: 2012-2016	0.065	0.246				

Notes: No. of observations equals to 11,568 couples and 23,136 individual values.
Source: own elaborations based on AD-SILC.

moving, respectively, from part-time at time $t-1$ to unemployment $t+1$, from full-time to part-time and from full-time to unemployment. The probabilities in the bottom-left triangle are higher for the female partner with respect to the male partner and this holds true both one year and three after childbirth, when the gap becomes even wider. This indicates that the already disadvantaged conditions highlighted in Table 1 are exacerbated by the childbirth event. Moreover, the main diagonal indicates the proportion of women and men who remain in the same status. The unemployment condition for women shows significant persistence, with almost 90% of unemployed women remaining unemployed after childbirth.

In Table 3, we analyze transitions among three states: unemployment, low-paid employment, and high-paid employment. Panel A depicts transitions one year after childbirth, while Panel B corresponds to transitions three years afterward. Nonetheless, there remains a significant disparity between female and male partners in terms of the likelihood of experiencing worsened labor market conditions. This discrepancy is evident both one and three years post-childbirth, showing a troubling trend towards increased disparity over time.

These figures illustrate the magnitude of the issue in both the Italian labor market and the distribution of household work, which is likely to be further exacerbated by childbirth. However, at this stage, we are presenting descriptive evidence; for example, we do not yet evaluate the potential impact of a second child on explaining the decline in women's conditions three years after the first childbirth. Therefore, in the remainder of this paper, we adopt a more sophisticated analytical approach, which is first outlined in the next section.

Table 2: Labor market status transition matrix

Panel A	Female			Male		
	s_{t+1}			s_{t+1}		
s_{t-1}	*U*	*PT*	*FT*	*U*	*PT*	*FT*
U	87.82	2.41	9.76	65.91	2.47	31.62
PT	20.51	67.71	11.78	8.89	45.78	45.33
FT	13.82	11.19	74.99	4.43	0.82	94.75
Panel B						
	s_{t+3}			s_{t+3}		
s_{t-1}	*U*	*PT*	*FT*	*U*	*PT*	*FT*
U	80.82	4.62	14.56	52.52	3.75	43.73
PT	27.58	55.74	16.68	9.33	33.78	56.89
FT	18.25	19.5	62.26	5.01	1.14	93.85

Notes: No. of observations equals to 11,568 couples and 23,136 individual values. Figures are expressed in percentage points. Each row of the transition matrix sum up to 100 pp. *U* stands for unemployed status; *PT* stands for part-time worker; *FT* stands for full-time worker. s_{t-1} denotes the status the year before childbirth, s_{t+1} denotes the status one year after childbirth, s_{t+3} denotes the status three years after childbirth.
Source: own elaborations based on AD-SILC.

3 Empirical strategy

The empirical strategy focuses on estimating gender disparities in experiencing labor market downward transition after childbirth. In detail, we estimate the probability of experiencing a downward labor transition for both men and women within a couple, one and three years after the birth of their first child at time t. We define labor market downward transition across three distinct pathways: firstly, the transition from employment (both full-time and part-time) to unemployment; secondly, the transition from full-time employment to either part-time work or unemployment; and lastly, the movement from high-pay employment to low-pay employment or unemployment. Since each of these transitions is available, respectively, for individuals who were employed at time $t-1$; for individuals who were employed full-time at time $t-1$; and for individuals who were in high-pay employment at time $t-1$, we face a selection problem. To address this issue we apply a probit model with sample selection (Heckman, 1979; Van de Ven and Van Praag, 1981). Therefore, for the first transition, from employment to unemployment, we estimate the following system of equations:

$$\begin{cases} \mathrm{E}_{i,t-1} = Z_i'\gamma + u_i \\ \mathrm{DM}^{\mathrm{UN}}_{i,t+1} = X_i'\beta_{t+j} + \varepsilon_{i,t+j} \end{cases} \tag{1}$$

Where $\mathrm{E}_{i,t-1}$ is a dummy variable equal to one if the individual was employed at time $t-1$, the year

Table 3: Low-pay status transition matrix

	Female			Male		
Panel A		s_{t+1}			s_{t+1}	
s_{t-1}	U	LP	HP	U	LP	HP
U	87.82	5.77	6.4	65.91	8.25	25.84
LP	37.67	32.7	29.63	14.78	38.4	46.82
HP	10.64	9.69	79.67	3.7	2.34	93.97
Panel B		s_{t+3}			s_{t+3}	
s_{t-1}	U	LP	HP	U	LP	HP
U	80.82	7.72	11.46	52.52	10.38	37.1
LP	39.39	24.48	36.13	14.5	28.04	57.46
HP	15.99	10.52	73.49	4.34	3.85	91.8

Notes: No. of observations equals to 11,568 couples and 23,136 individual values. Figures are expressed in percentage points. Each row of the transition matrix sum up to 100 pp. U stands for unemployed status; LP stands for part-time worker; HP stands for full-time worker. s_{t-1} denotes the status the year before childbirth, s_{t+1} denotes the status one year after childbirth, s_{t+3} denotes the status three years after childbirth.
Source: own elaborations based on AD-SILC.

of birth of the first child; $\mathrm{DM}^{\mathrm{UN}}_{i,t+j}$ is a dummy equal to one if the individual moved from employment to unemployment at $t+j$ (DM stands for downward mobility); Z_i' contains the observable determinants of the latent propensity of being found in employment at time t; X_i' contains the observable determinants of the dependent variables in the main equation. Moreover, Z_i' should allow identification by an exclusion restriction. In our setting, we impose exclusion restrictions by assuming that achieving the highest education level later than expected solely impacts the selection probability without influencing the transition probabilities. Thus, the set of covariates in the first stage is: gender, education, geographical area, age of the parent when the first child was born, year of birth of the first child, a dummy equal to one if the spouse has the highest earnings within the couple, and a dummy variable capturing whether individuals achieved education later than expected. On the other side, the covariates in the second stage are: gender, education, age of the parent when the first child was born, year of birth of the first child, a dummy equal to one if the spouse has the highest earnings within the couple, and a dummy capturing if another child was born one year after the first.

Then, for the second transition, from full-time employment to either part-time work or unemployment, we estimate the following other system of equations:

$$\begin{cases} \mathrm{FT}_{i,t-1} = Z_i'\gamma + u_i \\ \mathrm{DM}^{\mathrm{PT}}_{i,t+j} = X_i'\beta_{t+j} + \varepsilon_{i,t+j} \end{cases} \tag{2}$$

Where $\mathrm{FT}_{i,t-1}$ is a dummy variable equal to one if the individual was in full-time employment at time $t-1$; $\mathrm{DM}^{\mathrm{PT}}_{i,t+j}$ is a dummy equal to one if the individual shifted from full-time employment to either part-time employment or unemployment at $t+j$; Z_i' contains the observable determinants of the latent propensity of being found in full-time employment at time t.

Lastly, we estimate the following system of equations:

$$\begin{cases} \mathrm{HP}_{i,t-1} = Z_i'\gamma + u_{1i} \\ \mathrm{DM}^{\mathrm{LP}}_{i,t+j} = X_i'\beta_{t+j} + \varepsilon_{i,t+j} \end{cases} \tag{3}$$

Where $\mathrm{HP}_{i,t-1}$ is a dummy variable equal to one if the individual was employed in a higher-pay occupation at time $t-1$; $\mathrm{DM}^{\mathrm{LP}}_{i,t+j}$ is a dummy equal to one if the individual moved from a higher-pay occupation to either a low-pay status or unemployment at $t+j$; Z_i' contains the observable determinants of the latent propensity of being found in full-time employment at time t.

For the last two systems of equations, we employ the same set of covariates in both the first stage and second stage as we do for the first system. Therefore, the exclusion restriction is maintained by including a dummy variable in the first stage that equals one if the individual achieved education later than expected.

4 Main results

The results section is organized in two parts, in the first we provide evidence on the gender gap in downward transition after childbirth, with an analysis conducted at the individual level, although always looking at a selected sample of partners. Additionally, we examine childbirth cohort variation. In the second part, which builds on the first, we shift to a household-level analysis, where we present findings on the determinants of women's worsening labor market outcomes within couples.

4.1 Comparing partners: measuring gender gap in downward transition after childbirth

Starting from the individual level, the scope is to estimate gender differences in the probability of labor market downward transition between partners after childbirth. To achieve this, the transition to a 'worse' employment status has been modeled with three different specifications: i) from employment at $t-1$ to unemployment at $t+1$ ($\mathrm{DM}^{\mathrm{UN}}_{i,t+1}$); ii) from full-time employment at $t-1$ to either part-time employment and unemployment at $t+1$ ($\mathrm{DM}^{\mathrm{PT}}_{i,t+1}$); iii) from high-pay employment at $t-1$ to low-pay

employment or unemployment at $t+1$ ($DM^{LP}_{i,t+1}$).[3] Each of these transitions are estimated one and three years after childbirth, using a probit model with sample selection. For each of the three specifications the sample selection is different: for model i) we correct for the probability of being employed, for model ii) we correct for the probability of being full-time employed, for model iii) we correct for the probability of being in high-paid job. In the transition equation, we control for gender (our key variable), educational achievement, area of living, age at childbirth, a dummy for higher within-couple earnings, a dummy for self-employment, and a dummy for having a second child. In the selection equation, we control for gender, educational achievement, area of living, and a dummy that equals one for individuals with late educational achievement, which is used as an instrument.

The results are shown in Table 4, in Column (1) for $DM^{UN}_{i,t+1}$, Column (2) for $DM^{PT}_{i,t+1}$ and Column (3) for $DM^{LP}_{i,t+1}$. In the top panel, we display the marginal effects from the probit models, while in the bottom panel, we display the marginal effects from the selection equations.

Regarding our sample selection correction strategy, the variable on late educational achievement is significant across all regressions, and we observe a statistically significant selection effect (Rho) in all models except for the first specification presented in Column (1a). This indicates that, in this specific case, a standard probit model would not suffer from selection bias.

The probability of transitioning from employment to unemployment is provided in Columns (1a) and (1b) respectively for one and three years after childbirth. Female partners have a greater probability of transitioning to unemployment compared to male partners, a probability that intensifies when moving from short (1yr) to medium (3yr) time after childbirth (from 7.3 to 10.4 percentage points). In analyzing the probability of transitioning from full-time employment to either part-time work or unemployment, displayed in Columns (2a) and (2b), the previously observed disadvantage for female partners is confirmed: one year after childbirth, the probability of downward mobility for women is 21.2 percentage points higher, which escalates to a higher probability of 36.7 percentage points three years later. Finally, in Columns (3a) and (3b), when considering low-pay as a defining factor in downward transition, women display 9.5 percentage points higher probability of transitioning from high-pay employment to either low-pay employment or unemployment one year after childbirth, increasing to a 12.8 percentage points higher probability three years later.

Regarding the other covariates, one interesting finding is that significance, sign and size of the marginal effects are coherent across the three specifications. Residing in the South or the Center increases the probability of experiencing downward transition. On the other hand, being the partner with the highest remuneration in the couple and having had the first child at an older age decreases the probability of downward transition. The only slight difference across models is centered around

[3]Keep in mind that the time t in this notation corresponds to the year of childbirth, while $t-1$ and $t+1$ correspond, respectively, to one year before and after childbirth.

self-employment (whose marginal effect has negative sign in model i) and ii) but it is not significant in model iii)) and, partially, around having a second child.

Indeed, the evidence from the downward transition may be summarized as follows. The gender gaps measured in terms of a greater probability of downward mobility for female partners are striking for all three 'worse' employment specifications. Downward mobility tends to rise moving from short to medium term after childbirth for all three 'worse' employment specifications. The part-time downward mobility gender penalty is more pronounced than the ones linked to employment and low-pay.

To wrap up the section, we examine the evolution of labor market penalties by childbirth cohort. Figure 1 reports the probability of experiencing labor market downward transition for female partners compared to male partners in five childbirth cohorts (1995-99, 2000-03; 2004-07; 2008-2011; 2012-2016) and jointly considering the downward mobility in terms of employment ($DM^{UN}_{i,t+1}$), time ($DM^{PT}_{i,t+1}$) and pay ($DM^{LP}_{i,t+1}$). On the left-hand side of the figure we show the mobility one year after childbirth, while on the right-hand side of the figure we show the mobility three years after childbirth.

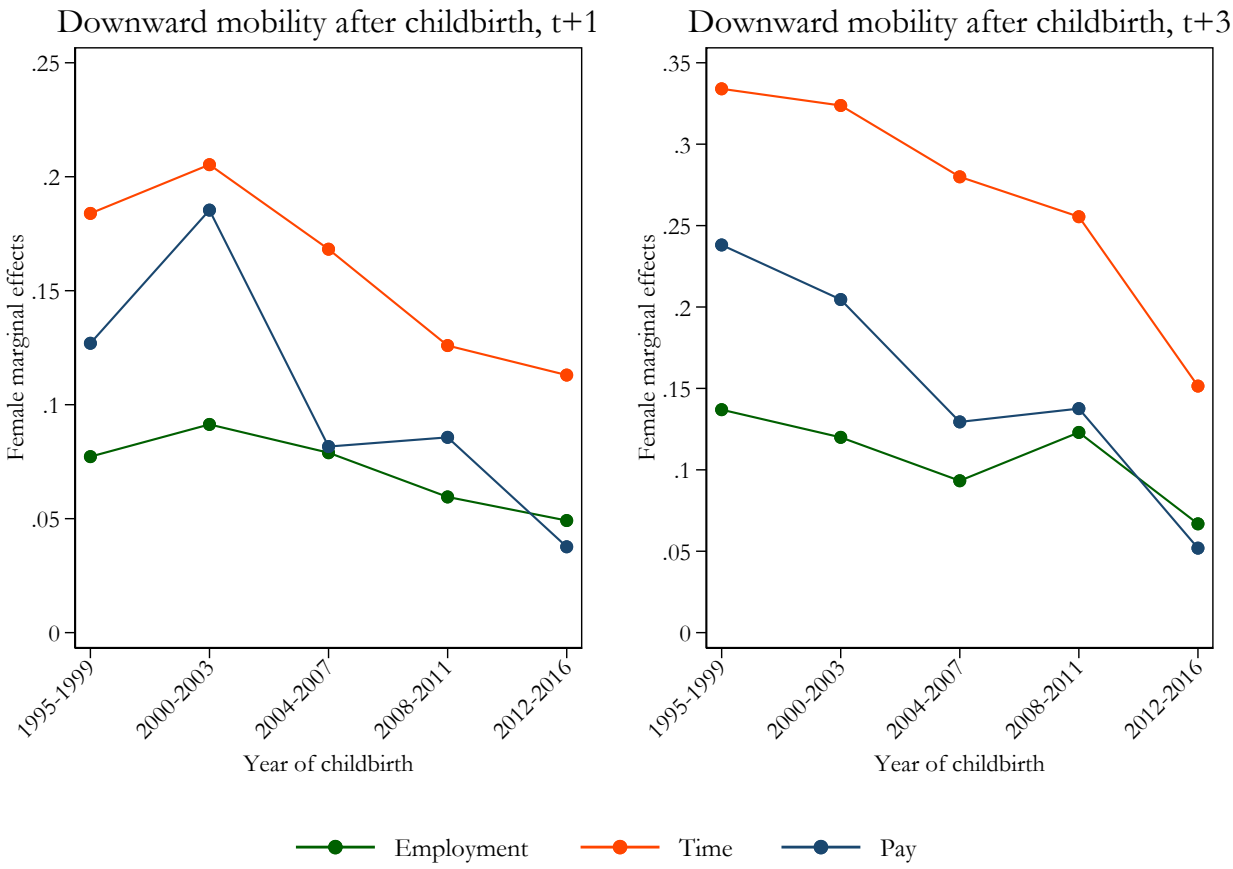
The first result of this cohort-level analysis confirms the dominance of downward mobility in terms of time compared to the other two outcomes. The size of the gender marginal effects is greater for mobility from full-time employment to part-time employment or unemployment (orange line) than for mobility from employment to unemployment (green line) and for mobility from high-pay employment to low-pay employment or unemployment (blue line). This result holds true throughout the cohorts and both in the short and medium term. The second piece of evidence, which once again confirms what was found in previous empirical analysis, is that the gender gap in downward mobility is generally higher for medium rather than for short term transitions. Overall we observe a reduction in the size of the marginal effects across cohorts, which is consistent across the three measures of downward transition. However, in the most recent cohort, those who lived first childbirth born between 2012 and 2016, there remains a significant gender gap in downward mobility over time, with marginal effects exceeding 10 percentage points in both short-term and medium-term transitions. This result is particularly relevant given the specific characteristics of the Italian labor market, where part-time positions are more prevalent among women and, in most cases, do not represent a voluntary choice.

Table 4: Probability of labor market downward transition after childbirth

	$DM^{UN}_{i,t+1}$ – (1)			$DM^{PT}_{i,t+1}$ – (2)			$DM^{LP}_{i,t+1}$ – (3)		
Transition	1 Yr – (1a)	3 Yrs – (1b)		1 Yr – (2a)	3 Yrs – (2b)		1 Yr – (3a)	3 Yrs – (3b)	
Female	0.073***	(-10.45)	0.104***	(-13.71)	0.212***	(-7.78)	0.367***	(-13.65)	0.095***	(-9.93)	0.128***	(-10.87)
Up Sec	-0.035***	(-5.85)	-0.040***	(-6.45)	-0.043***	(-4.40)	-0.045***	(-4.77)	-0.029***	(-4.57)	-0.034***	(-4.62)
Tertiary	-0.053***	(-7.53)	-0.079***	(-10.35)	-0.081***	(-6.48)	-0.125***	(-10.51)	-0.046***	(-6.18)	-0.072***	(-8.11)
Center	0.023***	(-4.52)	0.025***	(-4.52)	0.027**	(-3.29)	0.029**	(-3.22)	0.019***	(-3.32)	0.021***	(-3.30)
South	0.051***	(-5.91)	0.054***	(-6.00)	0.078***	(-4.29)	0.094***	(-5.30)	0.046***	(-4.29)	0.052***	(-4.26)
Age	-0.003***	(-4.34)	-0.002***	(-3.30)	-0.006***	(-3.84)	-0.009***	(-5.12)	-0.002**	(-2.77)	-0.002*	(-2.42)
High Retr.	-0.019***	(-4.36)	-0.021***	(-4.66)	-0.017**	(-2.62)	-0.027***	(-3.86)	-0.013**	(-2.64)	-0.008	(-1.59)
Self-empl.	-0.008	(-1.56)	-0.012*	(-2.23)	-0.048***	(-5.90)	-0.077***	(-8.93)	0.004	(-0.61)	-0.001	(-0.14)
2nd Child	0.000	(-0.03)	0.027**	(-2.61)	-0.02	(-1.15)	0.018	(-1.06)	0.039***	(-3.67)	0.029*	(-2.52)
Selection	1 Yr		3 Yrs		1 Yr		3 Yrs		1 Yr		3 Yrs	
Female	-0.140***	(-25.98)	-0.140***	(-26.19)	-0.216***	(-37.12)	-0.216***	(-37.22)	-0.172***	(-29.90)	-0.173***	(-30.07)
Up Sec	0.067***	(-10.67)	0.067***	(-10.70)	0.067***	(-10.10)	0.067***	(-10.12)	0.086***	(-12.98)	0.086***	(-12.86)
Tertiary	0.047***	(-5.16)	0.048***	(-5.25)	0.064***	(-6.95)	0.064***	(-6.90)	0.047***	(-4.88)	0.046***	(-4.82)
Center	-0.052***	(-7.21)	-0.052***	(-7.22)	-0.047***	(-6.25)	-0.047***	(-6.28)	-0.076***	(-9.89)	-0.075***	(-9.81)
South	-0.214***	(-29.73)	-0.214***	(-29.66)	-0.198***	(-26.77)	-0.198***	(-26.87)	-0.250***	(-33.39)	-0.250***	(-33.32)
Late educ	-0.068***	(-7.78)	-0.067***	(-7.71)	-0.070***	(-7.54)	-0.070***	(-7.58)	-0.069***	(-7.52)	-0.069***	(-7.57)
Rho	0.112		0.433***		-0.377***		-0.405***		0.367**		0.334**	
N	23,136		23,136		23,136		23,136		23,136		23,136	

Notes: The Table shows marginal effects derived from probit models with sample selection illustrated in Eq. 1, 2 and 3. The marginal effects of year of birth of the first child are not shown. *Source*: Authors' elaborations based on AD-SILC.

Figure 1: Marginal Effects after probit model with sample selection by childbirth cohort



Notes: The marginal effects derive from probit model with sample selection illustrated in Eq. 2 computed for each childbirth cohort. *Source*: Authors' elaborations based on AD-SILC.

4.2 Comparing Couples: determinants of partner differences in labor market downward transitions

In this final section, we reinforce our previous individual-level evidence by focusing on couples to explore the determinants of differences in probabilities in post-childbirth labor market transitions within the same couple. Members of a couple may start from a position where both are employed full-time but, after the birth of their first child, find themselves in part-time employment or even unemployed. The probability of ending up in a "worse" position varies between partners within the same couple. Our goal is to investigate the specific characteristics of the couple that explain these differences.

Therefore, we consider only couples who start from the same position before the birth of their first child, meaning couples where both partners are employed, both are employed full-time, or both are in higher-paid positions at $t-1$. In the previous section, we estimated the probability of each individual experiencing a downward labor market transition one and three years after childbirth—that is, the

probability of transitioning from employment to unemployment, from full-time to part-time work, or from a higher-paid to a lower-paid position.

At this stage of the analysis, the unit of reference becomes the couple. For each couple, we compute the difference between partners in the probability of experiencing a downward labor market transition. Specifically, we focus on couples where both partners were employed before the birth of their first child and examine which individual and family characteristics best explain the difference in the likelihood of partners of becoming unemployed one and three years after childbirth. We apply the same approach to couples where both partners were initially employed full-time, analyzing what factors account for differences in the probability of transitioning to part-time work after childbirth. Finally, we explore differences in the likelihood of transitioning to a lower-paid position among couples in which both partners were in higher-paid jobs before the birth of their first child.

More in detail, we relate the difference in probability of downward transition of men and women to specific features of the couple: difference in educational titles of partners, age of the mother and age of the father at childbirth, maximum earner in the couple, area of living of the household. Therefore, the dependent variables are computed as simple differences in probability points of downward transition of women with respect to men as retained from equations 1, 2, 3 respectively concerning: (i) transition from employment to unemployment one year and three years after childbirth; ii) transition from full-time job to part-time jobs one year and three years after childbirth; iii) transition from higher-paid to lower-paid jobs one year and three years after childbirth.

Given the strong interconnections among the outcome variables one and three years after childbirth, we employ a seemingly unrelated regression (SUR) estimator (Zellner, 1962), which accounts for correlations among the residuals of each pair of equations. Accordingly, we estimate three systems, each consisting of two equations. In the first system, the outcome variables represent the difference between partners in the probability of transitioning from employment to unemployment at $t+1$ and $t+3$. In the second system, the dependent variables capture differences in the probability of transitioning from full-time to part-time employment at $t+1$ and $t+3$. Finally, in the third system, we analyze differences in the probability of moving from higher-paid to lower-paid positions at $t+1$ and $t+3$[4]

Therefore, we estimate the following equations:

$$\text{DIFF}^{\text{UN}}_{c,t+j} = X'_c\beta_{t+j} + \varepsilon_{h,t+j} \tag{4}$$

$$\text{DIFF}^{\text{PT}}_{c,t+j} = X'_c\beta_{t+j} + \varepsilon_{c,t+j} \tag{5}$$

[4]The number of couples in each system of equations varies due to the selection criteria applied: (i) employed partners at $t-1$ for the first system of two equations, (ii) full-time workers at $t-1$ for the second two outcomes, and (iii) higher-paid occupations at $t-1$ for the last two equations.

$$\text{DIFF}^{\text{LP}}_{c,t+j} = X'_c\beta_{t+j} + \varepsilon_{c,t+j} \tag{6}$$

Where $\text{DIFF}^{\text{UN}}_{c,t+j}$ is a continuous variable computed at the couple level c as the difference (in probability points) between women's probability of transitioning downward from employment to unemployment compared to men at $t+j$ (DIFF stands for difference in downward mobility). This is our first system of equations, where the first equation is for $j = 1$ and the second for $j = 3$. Similarly, $\text{DIFF}^{\text{PT}}_{c,t+j}$ is a continuous variable computed at the household level c as the difference (in probability points) between women's probability of transitioning from full-time to part-time employment compared to men at $t+j$, while $\text{DIFF}^{\text{LP}}_{c,t+j}$ is a continuous variable computed at the couple level c as the difference (in probability points) between women's probability of transitioning from higher-paid to lower-paid jobs compared to men at $t+j$. The vector X'_c includes the observable determinants of the dependent variables in the main equation. These are a categorical variable capturing the educational attainment of partners, with the following categories: man tertiary educated and woman less than tertiary; woman tertiary educated and man less than tertiary; partners having different educational titles but both less than tertiary; partners having the same educational title lower than tertiary; and both partners having tertiary education (base category). The equation also includes two continuous variables representing the age of the father and the mother at childbirth. Another categorical variable indicates the relative earnings of the woman compared to the man, with values as follows: the man is the highest earner in the household; the woman is the highest earner in the household; and both partners earn the same amount from work (base category). Furthermore, each equation incorporates a set of geographical dummies representing the macro-area of residence of the household, as well as a set of year dummies corresponding to the year of childbirth. Since the error terms are correlated across each set of equations, standard ordinary least squares estimates remain consistent but are less efficient compared to the seemingly unrelated regression (SUR) method [5]. Moreover, residuals have been clustered at the household level.

The results strongly align with prior evidence and provide valuable insights into how couple composition, particularly in terms of educational background and earnings, relates to gender disparities in labor market transitions. The coefficients in Table 5 suggest that couples with differing educational backgrounds between partners tend to exhibit wider differences in the probability of experiencing downward labor market transitions. A notable exception occurs when women have a tertiary education while their partners have less than tertiary education. In this case, gender differences in probability of downward transition from employment to unemployment are lower compared to couples where both partners have tertiary education. This pattern is also observed in other types of labor transitions, such as shifts

[5]The SUR method is equivalent to feasible generalized least squares and accounts for the specific structure of the variance-covariance matrix, leading to more efficient estimates.

Table 5: Within-couples determinants of differences in downward labor market transition

Difference in probability points	$DM^{UN}_{i,t+1}$		$DM^{PT}_{i,t+1}$		$DM^{LP}_{i,t+1}$	
	1yr	3yr	1yr	3yr	1yr	3yr
Man tertiary edu, woman lower edu	0.033***	0.073***	0.074***	0.142***	0.022***	0.064***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)
Woman tertiary edu, man lower edu	-0.014***	-0.024***	-0.016***	-0.028***	-0.013***	-0.026***
	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)
Different edu between partners, lower than tertiary	0.023***	0.053***	0.054***	0.102***	0.016***	0.044***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Same edu between partners, lower than tertiary	0.030***	0.060***	0.059***	0.107***	0.021***	0.050***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Age of mother first child	-0.010***	-0.009***	-0.012***	-0.013***	-0.007***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age of father first child	0.003***	0.003***	0.004***	0.004***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Man max earner	0.038***	0.031***	0.064***	0.089***	0.007*	0.013***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.004)	(0.005)
Woman max earner	-0.066***	-0.044***	-0.051***	-0.054***	-0.012***	-0.007
	(0.005)	(0.006)	(0.005)	(0.005)	(0.004)	(0.005)
Centre	0.030***	0.033***	0.027***	0.022***	0.029***	0.033***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
South	0.072***	0.078***	0.071***	0.063***	0.067***	0.077***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.267***	0.282***	0.354***	0.477***	0.238***	0.305***
	(0.008)	(0.009)	(0.009)	(0.009)	(0.006)	(0.007)
Observations	6,564	6,564	5,547	5,547	5,350	5,350
R-squared	0.736	0.711	0.782	0.808	0.645	0.719

Notes: Year dummies included for the birth of child; base category: equal tertiary education between partners; equal pay between partners. Robust standard errors in parentheses.*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source: Authors' elaborations based on EU-SILC 2019

from full-time to part-time employment and from higher-paid to lower-paid occupations. The effect is slightly stronger in the case of transitions from full-time to part-time work. When both partners have an education level lower than tertiary, the difference in the probability of downward labor market transition is greater compared to when both partners have tertiary education. However, more than the level of education, it is the amount of money each partner brings home that explains differences in labor market transitions within the couple. Looking at earnings, it is evident that when the woman is the primary earner in the couple, differences in the probabilities of downward mobility tend to lower compared to couples where partners have the same level of earnings. Not surprisingly, couples where men are the primary earners exhibit the greatest gender differences. Moreover, the older a mother is at the time of childbirth, the smaller the difference in the probability of a downward transition between partners. It can also be noted that in both Southern and Central Italy, the differences in probabilities between couples are significantly higher compared to Northern regions. However, this difference is much larger in the South, highlighting that women face greater penalties in these regions, where also labor markets are particularly fragile, with higher levels of unemployment and inactivity compared to other parts of the country.

Overall, the results from Table 5 suggest that the types of households where women are less penalized are those where women have achieved tertiary education while their partner has not and households where the woman is the primary earner. In these cases, women may face a greater opportunity cost in terms of earnings, and thus, men in these types of couples are more likely to reduce their labor supply compared to men in other types of couples. Moreover, it can be inferred that in couples where women earn more and have a higher level of education, women may have significant bargaining power within the household, enabling them to negotiate alternative childcare arrangements after childbirth that help mitigate career penalties.

5 Conclusions

In this paper we have focused on gender disparities in experiencing downward labor market transition following the birth of the first child in the Italian context. Our analysis, based on the AD-SILC dataset, a unique source of data that combines administrative archives with survey information, has allowed us to determine whether labor market outcomes at a given year (one and three years after childbirth) and the transition to a 'worse' job condition, defined as unemployment, part-time and lower-paid positions, are influenced by the partner's gender in the couple. The econometric analysis highlights that female partners one year after childbirth have a higher probability of experiencing unemployment, engaging in part-time employment, and being employed in a lower-paid occupation. This probability increases even further when we consider what happens three years after childbirth. Moreover, when looking

at transitions to a 'worse' employment status, we estimate remarkable penalties for women across the three different measures of downward mobility (in terms of employment, time and pay). These figures are even worsened when observing the medium term transitions (comparing the outcomes before childbirth to those three years after). Still, the main driver of downward mobility is part-time, since the gender penalties of moving from full-time employment to part-time employment (or unemployment) display the highest values. This suggests that part-time arrangements may play a discriminating role after childbirth, as it is typically the woman who changes her contract. Indeed, although the gender disparities are reducing over cohort of childbirth, their size is still significant in the latest observed period (2012-16), but way lower with respect to the first (1995-1999).

The main novelty of our paper lies in the ability to examine differences in the probability of experiencing a downward labor market transition between partners in the case of Italy. To the best of our knowledge, this is the first paper that explores labor market transitions of partners within-couple after childbirth in Italy, thanks to the rich data available to us. The types of couples where these differences are smaller, and where women are less penalized, are those where the woman is the primary earner, as well as couples where the woman has a tertiary level of education and the man has an education level lower than tertiary. In these couples, women are less likely to reduce their labor supply by opting out of the labor market or working part-time. This can be explained by the fact that, in such couples, women face a higher opportunity cost when working fewer hours (or no hours), and thus, they are less likely to bear the burden of childcare responsibilities. These results may also be attributed to the fact that, in these households, women possess greater bargaining power, enabling them to negotiate more egalitarian forms of childcare distribution with their partners. Furthermore, to better interpret these results, they should be viewed in light of the fact that the Italian labor market is characterized by a high level of flexibility, which can lead to a greater likelihood of experiencing downward labor market transitions. Additionally, in Italy, traditional cultural norms that position women as the primary caregivers for children still prevail (Aloé et al., 2024).

From a policy perspective, our analysis highlights that significant downward mobility for women after childbirth occurs through a transition from full-time to part-time positions. The latter represents an increasing proportion of non-standard work in Italy, and it has been found that low work intensity is one of the main drivers of in-work poverty(Bavaro and Raitano, 2024). Therefore, the fact that women are more likely to transition to part-time work after childbirth also makes them more exposed to the risk of in-work poverty or, at the very least, economic vulnerability. Thus, labor market reforms aimed at increasing flexibility can have unequal gendered effects, amplifying the penalties women face after childbirth.

As expected, the analysis has some caveats and would benefit from incorporating additional dimensions. For instance, despite the uniqueness of the linked survey-administrative dataset, we were not able

to fully exploit the characteristics of the workplace where women and men work. We recognize this as a limitation since a lot of heterogeneity in wage setting and personnel policies occurs at the workplace level. Therefore, as a future avenue of research, we aim to explicitly account for all these elements that contribute to shaping labor market transitions of partners and can either alleviate or deepen the care burden in the couple. Moreover, a thorough examination of labor market mobility should not overlook the role of the tasks undertaken by men and women at the workplace level. After childbirth and a period of detachment from work, it is important to investigate to what extent women and men might experience labor market downgrading in their work activities. To date, we have not been able to control for these specific aspects, which would require time-variant data on job tasks. Additionally, while we focused on unemployment and part-time employment as potential outcomes of labor market transitions, we were unable to distinguish between voluntary and involuntary unemployment, and voluntary and involuntary part-time work. As mentioned, involuntary part-time work constitutes a large portion of total part-time employment for both men and women, due to the particular characteristics of the Italian labor market. Lastly, our analysis does not take into account the availability of public care services, which could alleviate the caregiving burden that couples face after childbirth and potentially influence the bargaining power of women within the household. Although the provision of public care services has expanded over time, their distribution remains uneven across regions, and their quality varies significantly nationwide. Indeed, investigating how labor market transitions within couples could be improved by targeted public care services would be a valuable avenue for future research.

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