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How women's employment instability affects birth transitions: the moderating role of family policies in 27 European countries

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Why women in some countries are more likely than others to postpone childbirth when facing employment instability? This study uses 2010–2019 EU-SILC panel data to explore whether the impacts of women's employment instability, including being unemployed or temporarily employed by fixed-term contracts, on the first- and second-birth transitions differ across 27 European countries and how governments' provisions of different family policies moderate such relationships. Results showed that while unemployment and temporary employment could generally delay women's first- and second-birth transition, such effects varied across European countries and depended on the levels of family policy provisions. Countries with more generous family cash benefits were associated with less negative and even positive effects of women's employment instability on birth transitions. On the other hand, the birth effects of women's employment instability did not vary significantly across countries according to the length of paid maternity/parental leaves. Most strikingly, countries with higher childcare coverage rates were associated with more negative effects of women's employment instability on birth transitions. These findings highlight the importance of family policy contexts in shaping women's childbirth responses to unstable employment circumstances.

Introduction

The relationship between women's employment and fertility behaviours has been a prominent research topic in social sciences. At the macro level, theories and empirical evidence are converging to suggest a positive relationship between women's stable employment conditions and fertility rates (Goldscheider, Bernhardt and Lappegård, 2015; Comolli, 2017). However, whether such relationship manifests as well at the micro-level remains inconclusive. Several theories and empirical studies reach contrasting conclusions regarding how women's childbirth transitions are influenced by employment instability. While an economic tradition of family research has long argued a negative impact of women's employment stability on fertility (Becker, 1991), such perspective has been challenged by recent studies, which show that women's stable employment is not always an obstacle to childbirth (Kreyenfeld, Andersson and Pailhé, 2012). In fact, a meta-analysis (Alderotti *et al.*, 2021) has shown that women's employment instability, including being unemployed or being temporarily employed by fixed-term contracts, is more detrimental to childbirth transitions than being stably employed by permanent contracts in most European countries. These recent findings reflect a shifting family economic foundation towards a more gender-neutralized pattern in the context of increasing economic uncertainty following globalization and labour market flexibilization (Blossfeld *et al.*, 2005). As women's paid works become crucial sources of household income, their experiences of employment instability are more likely to discourage fertility intentions and childbirth transitions.[1]

Nevertheless, people's fertility responses to uncertain economic situations may differ across countries and population groups (Sobotka, Skirbekk and Philipov, 2011). Empirical studies in Europe showed that the impacts of employment instability on childbirth due to temporary employment or unemployment vary across institutional contexts (Özcan, Mayer and Luedicke, 2010; Adsera, 2011a, 2011b; Matysiak and Vignoli, 2013). A popular empirical strategy to study

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the interplay between female employment, fertility behaviours, and family policies is using a comparative welfare state approach (Blossfeld *et al*., 2005; Esping-Andersen, 2009). Accordingly, researchers drew conclusions based on either the effect variations across a small number of countries (Özcan, Mayer and Luedicke, 2010; Matysiak and Vignoli, 2013) or the variations across welfare regimes (Blossfeld *et al*., 2005; Adsera, 2011b). In general, women in Social Democratic (e.g. Sweden and Norway) or Liberal (e.g. the United States) welfare states are more likely to delay or forgo motherhood when they are temporarily employed or unemployed. However, some women, especially the lower educated, in Familistic (e.g. Italy and Spain) or Conservative welfare states (e.g. Germany) are more likely to become mothers facing employment instability (see Blossfeld *et al*., 2005; Kreyenfeld, Andersson and Pailhé, 2012 for literature reviews of these earlier comparative studies). While these studies provide valuable insights, their small-*n* comparative design cannot directly evaluate the degree to which the cross-national effect variations are explained by country-level differences in specific policy provisions. For policymakers and social scientists, it is crucial to understand whether people's childbirth responses to employment instability are shaped by family policy contexts.

To answer the unresolved question, this article utilizes large-scale comparative microdata and applies multilevel analyses on the policy moderation effects. Its contributions to the literature are threefold. First, this article provides a more comprehensive picture of the micro-level linkage between employment instability and birth transitions for women. Previous work usually focuses on the effect of a specific unstable employment status (e.g. being temporarily employed compared to permanently employed) and its impact on a specific birth transition (e.g. the first birth). This article, on the other hand, considers the different economic implications of having a temporary job and being unemployed for women (Adsera, 2011b) and investigates their potentially heterogeneous effects across women's first- and second-birth transitions (Andersen and Özcan, 2021). Second, unlike most studies featuring single-country cases and overrepresenting Western-European countries, this article investigates the consequences of unemployment and temporary employment on women's childbirth for 27 European countries across different welfare regimes. Its analyses enhance the generalizability of empirical findings by exploring the childbirth effects of women's employment instability both aggregately from a European perspective and separately for each country. Third, building on a comparative framework, this article extends the literature by empirically testing the moderating role of family policies. Focusing on three mainstream family policies that directly affect women's work–family decision-making[2]—family benefits via cash transfers or tax breaks, paid leaves for mothers, and early childcare services—our findings add nuance to the ongoing debates over the most 'effective' pronatalist family policies (Billingsley and Ferrarini, 2014; Bergsvik, Fauske and Hart, 2021), showing that the complex interactions between micro-level employment statuses and macro-level policy measures could either mitigate or exacerbate the fertility inequality across employment subgroups in various ways.

Theory and hypotheses

Employment instability and women's childbirth: theory and evidence

According to New Home Economics (Becker, 1991), women's demand for children is contingent on the costs of children. The theory assumes that raising children is costly for parents in terms of monetary and non-monetary resources. With limited resources, the costs of childbirth have to be weighed against the benefits gained from alternative activities, such as employment. In this economic model, women's employment instability can either depress or facilitate their childbirth transitions. On one hand, a stable employment status increases women's income, which compensates for the direct monetary costs of childrearing. This 'income effect' leads to a negative relationship between women's employment instability and childbirth. On the other hand, the indirect opportunity costs of childbirth are lower for women of unstable employment status compared to permanent employees because the formers, especially the unemployed, usually have more time flexibility to take care of children. This 'substitution effect' encourages women to become mothers earlier when they are facing employment instability.

Experiencing employment instability may also create a sense of economic uncertainty, which has been argued as a key mechanism affecting women's childbirth behaviours in sociological research (Kreyenfeld, 2010; Pailhé and Solaz, 2012). Perceiving uncertainty may on one hand discourage people's commitment to long-term relationships including parenthood (Oppenheimer, 1988; Blossfeld *et al*., 2005) and on the other hand produces psychosocial stress that impedes women's reproductive health (Gleason, Drew and Jones, 2020). Moreover, structural constraints accumulated in the past and present economic uncertainty lay the foundation for imaginaries of the future, through which the negative impact of passive narratives on fertility intentions might be reinforced (Lappegård *et al*., 2022).

In contrast, another sociological theory by Friedman, Hechter and Kanazawa (1994) argues that the intrinsic

socio-psychological values of children could counter the external uncertainty related to employment instability. Accordingly, women may strategically choose motherhood as an 'alternative career' when they cannot establish a satisfying working career in permanent jobs (Kreyenfeld, 2010), leading to a positive relationship between employment instability and women's childbirth transitions.

During the historical period, when the male-breadwinner system prevailed, earlier economic research usually assumed that the income effect of stable employment is less relevant to women's childbirth decisions and found a negative relationship between female employment and fertility outcomes (Kravdal, 1992). However, with the rise of the dual-earner model in developed countries, the income effect related to women's stable employment could become a dominant factor influencing women's fertility decisions (van Wijk, de Valk and Liefbroer, 2021). In the era of Globalization, people's perceived economic uncertainty due to temporary employment is also amplified because labour market flexibilization and deregulation not only create more temporary positions but also make temporary employees more marginalized compared to regular workers (Blossfeld *et al*., 2005). Moreover, with the emergence of individualistic social norms during Europe's second demographic transition (Lesthaeghe, 2010), the intrinsic value of children and social recognition of motherhood are decreasing. Drawing on these discussions, the general impact of women's employment instability on childbirth in European countries after 2010 is expected as follows:

H1: *On European average, women's temporary employment or unemployment compared to permanent employment has a negative effect on women's childbirth transitions.*

The moderating role of family policies

There has been much debate over the impacts of family policies on women's fertility outcomes (Gauthier, 2007; Baizan, Arpino and Delclòs, 2016; Bergsvik, Fauske and Hart, 2021). In general, research suggests that mainstream family policies, including the provision of early childcare services, paid maternity and parental leaves for women, and family benefits through cash transfer or tax breaks, have at least short-term influences on women's birth timings and parity transitions. However, studies also show that their underlying mechanisms to enhance female childbirth are substantially different because they address people's concerns about work and family lives in distinct ways (Billingsley and Ferrarini, 2014; Notten, Grunow and Verbakel, 2017). Building on two theoretical frameworks, this section illustrates that country-level differences in specific family policy provisions affect not only the economic incentives but also the normative conditions for women's birth decision-making. I argue that a country's reliance on specific policies may benefit specific employment groups, which may enlarge or close the fertility gaps between the permanently employed and the temporarily employed or unemployed women.

Focusing on the economic utility of family policies, scholars have distinguished between traditional income support and earner-career support policies (Billingsley and Ferrarini, 2014; Bergsvik, Fauske and Hart, 2021), depending on whether they are enhancing female childbirth by relieving the direct costs (i.e. moderate the income effects) or the opportunity costs (i.e. moderate the substitution effects). Another framework emphasizes the policy impacts on social norms (Baizan, Arpino and Delclòs, 2016; Lohmann and Zagel, 2016), arguing that the advocation of specific family policies can either familize or defamilize gender norms and childcare arrangements.

Family and child cash benefits via monthly allowances or tax breaks are categorized as traditional income policies, which subsidize the direct costs of childbearing (Kalwij, 2010; Riphahn and Wiynck, 2017). This design operates to increase women's fertility by decreasing the income threshold to afford a child, thus reducing the relevance of income effects on women's fertility behaviour. Therefore, a more generous family benefit may help to close the fertility gaps between the permanently employed, who are more economically secure, and the temporarily employed or unemployed women, who normally have lower incomes. From a sociological perspective, universal cash benefits provided to private household implies a familization of childcare responsibilities (Lohmann and Zagel, 2016). A generous family benefits program echoes the logic of the male-breadwinner gender norm and reinforces women's economic dependency. It creates financial incentives for and social expectations on women to stay marginally attached to the labour market for homecare (Billingsley and Ferrarini, 2014; Baizan, Arpino and Delclòs, 2016). According to both theories, I expect:

H2: *The childbirth effects of women's temporary employment and unemployment compared to permanent employment are more positive in countries with more generous family cash benefits.*

Maternity and parental leaves policies are earner-carer support policies aiming to reduce the opportunity costs of childbirth (Kalwij, 2010; Billingsley and Ferrarini, 2014). According to family economic theory, women who interrupt their labour market participation for childbearing may face high risks of long-term unemployment, downward career mobility, and reduced wage returns. Against the background, the provision of job-protected leaves for mothers

reduces their opportunity costs of losing a career. In addition, the wage-replacement benefits during the leaves period reduce the opportunity costs of losing monthly salaries.[3] Because these opportunity costs of childbirth are higher for women with an established working career, the economic perspective predicts that a long and well-paid parental leave scheme is particularly favourable for permanently employed women and may strengthen the negative effect of employment instability on women's childbirth. In contrast, a socio-psychological perspective predicts that temporarily employed or unemployed women are the major beneficiaries of a generous leave program because the childbirth-related economic concerns embedded in these unstable employment statuses are relieved in such policy context. Moreover, while paid parental leaves aim to support the earner-carer role of working mothers (Billingsley and Ferrarini, 2014), they also familize the care responsibilities to home caregivers. Given the fact that most women are the primary caregivers, an extended maternal leave scheme may create normative anchoring effects through which women's employment instability before and after childbirth is justified (Gangl and Ziefle, 2015). This social mechanism could neutralize the negative effect of employment instability on women's childbirth. In summary, the role of paid leaves in moderating women's employment instability-childbirth relationship is mixed, depending on which theoretical mechanism is dominating. Accordingly, I propose two counterhypotheses:

H3a: *The childbirth effects of women's temporary employment and unemployment compared to permanent employment are more positive in countries with more generous paid leaves for mothers.*

H3b: *The childbirth effects of women's temporary employment and unemployment compared to permanent employment are more negative in countries with more generous paid leaves for mothers.*

Similar to leave policies, governments' provision or subsidization of early childcare services are earner-carer support policies aiming to reduce the opportunity costs of childbirth (Kalwij, 2010; Billingsley and Ferrarini, 2014). However, they use very different designs to achieve the goal. Instead of using leave benefits to offset the opportunity costs resulting from mothers' career breaks, childcare policies aim to completely avoid such costs by 'outsourcing' parents' childcare responsibilities to the public or private sectors. This design facilitates women's combination of work and family and allows women with careers to continue working after childbirth. Since permanently employed women generally have higher involvement in paid work and higher wages, they will benefit more from the reduction in opportunity costs in a more comprehensive childcare system. The expansion of childcare services also 'defamilize' the childcare norm, reducing the economic dependency of women on the male-breadwinners and the care dependencies of children on their mothers (Lohmann and Zagel, 2016). This normative change toward an egalitarian gender division of labour may increase the importance of the income effect on female fertility (Kalwij, 2010; Baizan, Arpino and Delclòs, 2016), and thus enlarges fertility differentials between the permanently employed and the unstably employed women. Therefore, I expect:

H4: *The childbirth effects of women's temporary employment and unemployment compared to permanent employment are more negative in countries with higher coverage rates of early childcare services.*

The interplay between employment and policies across parity transitions

Some studies have argued that women's first-birth behaviour is influenced by family policies to a less extent than subsequent births (Baizan, Arpino and Delclòs, 2016; Bergsvik, Fauske and Hart, 2021). For example, the public childcare expansion in Germany stimulates women's fertility by increasing their probabilities of second- and third-birth transitions but not the first birth (Bauernschuster, Hener and Rainer, 2016). The various policy effects across parity status may result from people's dynamic fertility adaptations to the parity-specific costs of childbirth in different institutional contexts. For women with established careers, the opportunity cost of having one child is already high. Therefore, these women's second-birth transition could be further depressed if childcare supports to substitute the opportunity costs of childbearing are limited (Bratti and Tatsiramos, 2012). Besides, although many family benefit packages are designed to support economically disadvantaged groups by subsidizing the direct costs of childbearing, they might eventually enlarge the fertility gap because the fertility-enhancing effects of these policies might be more prominent for higher-order births among higher-income families (Milligan, 2005; Riphahn and Wiynck, 2017). Bearing in mind these parity heterogeneities, this study separately examines the interplay between women's employment instability and family policies in the first- and second-birth transitions.

Data and method

To test the research hypotheses, multilevel analyses using yearly data at both the micro- and the macro-level are required. Micro-level data are assembled from the 2010–2019 European Union Statistics on Income and Living Conditions (EU-SILC). The EU-SILC panel data in each wave compile comparable socio-economic statistics from nationally

representative samples in European countries. Using a rotational panel data design, a new national-representative sample is drawn every year and is followed up for four years before being replaced by another rotation group. Between years 2010 and 2019, more than 500,000 women from 32 countries are interviewed. Macro-level data on family policies and other characteristics come from multiple sources including the OECD Family Database, the OECD tax-benefit model (TaxBEN), Eurostat, and ILOSTAT. Macro data are combined with EU-SILC data from all country-rounds between 2010 and 2019. Restricting the analyses to country-rounds where macro data are available results in a gross sample of 210 country-rounds nested in 27 countries. Bulgaria, Cyprus, Malta, Romania, and Russia are excluded from the analyses because yearly data for at least one macro variable are unavailable. Supplementary Material S1 provides details about the data sources in each available country-rounds.

Micro-level data and variables

To utilize EU-SILC data's longitudinal traits, I select women who were first interviewed between the years 2010 and 2018 and were re-interviewed at least for another wave in the subsequent years. This sample selection secures the correct causal temporality for modelling the effect of her employment status in year t on her probability of a birth transition in year $t + 1$. To include partners' information as controls, I restrict the investigation to heterosexual women who lived with their married or cohabited male partners during the interview.

The dependent variables are the first and the second birth events in year $t + 1$, measured as time-varying binary variables (0 = no event; 1 = birth event). I construct two analytical subsamples for parity-specific analyses. All person-years from women who are at risk of a specific birth event are included in the subsample until the event occurred, union dissolution, or the date of panel exit. Following previous research (Greulich and Dasré, 2017; Nitsche *et al.*, 2018), I use the number of coresident children reported in the EU-SILC household roster to specify a woman's parity status at her first entry. The occurrence of a birth event in the consecutive panel years can be identified using the newly-included child's status identifier—a newborn since the last interview. Following Greulich and Dasré's (2017) suggestion, I restrict the analyses to the first and the second birth transitions for women between ages 16 and 40 because using the number of coresident children in EU-SILC data to proximate women's parity status is downward biased for those who aged more than 40 or had more than 2 children. The final sample for the first birth includes 24,944 observations from 14,576 women, with a first-birth transition probability of 14.91 per cent (3,719 birth events). For the second birth, 25,003 observations from 14,157 women are obtained, with a second-birth transition probability of 12.97 per cent (3,243 birth events).

The key independent variable is women's employment status in year t. I use respondents' self-defined working status to differentiate between the employed and the non-employed women. Among the employed, the contract status of women's current job is further applied to distinguish between permanent employment by open-ended contracts, temporary employment by fixed-term contract, and self-employment. Among the non-employed, I distinguish between labour market inactive and unemployed women. For this research, the statuses of self-employment and inactivity are excluded from analyses because theoretical discussions covered in the previous section do not apply. To test the research hypotheses where unstable employment is compared against stable employment, the key independent variable comprises three categories: 1 = permanent employment, 2 = temporary employment, and 3 = unemployment.

All analyses control for a set of variables that could theoretically confound the relationship between female employment and childbirth (Mills *et al.*, 2011). These variables include women's educational background (1 = low (ISCED 0-2), 2 = middle (ISCED 3-4), 3 = high (ISCED 5-8)), women's self-rated health status (0 = good/fair health, 1 = bad health), and women's age and its squared term.

From a couple perspective, women's employment and childbirth are also influenced by their male partners' characteristics (Barbieri *et al.*, 2015; Nitsche *et al.*, 2018). To rule out these confounding factors, I control for the current union status (0 = married, 1 = non-marriage partnership) and the male partners' age (and its squared term), educational level (1 = low (ISCED 0-2), 2 = middle (ISCED 3-4), 3 =high (ISCED 5-8)), and working status (1 = working, 2 = unemployed, and 3= I nactive). All control variables are measured in year t to align with the key independent variable. Table 1 provides the descriptive statistics on micro-level variables.

Some micro-level variables have a small portion of missing data. To handle this issue in a multilevel framework, I apply multiple imputations with chained equations (MICE) to create 10 imputed datasets for each country. Multilevel analyses are performed using each imputed dataset. The results of coefficient and standard error estimates across 10 analyses are combined using Rubin's rules. Supplementary Material S2 provides details about the imputation models and diagnostics.

Macro-level data and variables

Time-varying indicators about specific family policy provisions and the institutional background at the

Table 1 Descriptive statistics on micro-level variables

	First-birth sample		Second-birth sample	
	Mean; %	SD	Mean; %	SD
Dependent variables				
Birth probability	0.149	0.356	0.130	0.336
Key independent variable				
Women's employment status				
Permanent employment	70.3		70.3	
Temporary employment	18.3		14.2	
Unemployment	11.4		15.4	
Control variables				
Women's age	29.827	4.738	32.918	4.282
Women's educational level				
Low (ISCED 0-2)	7.2		12.5	
Middle (ISCED 3-4)	38.2		45.1	
High (ISCED 5-8)	53.8		42.1	
Missing	0.8		0.3	
Women's health				
Good/fair health	95.2		94.7	
Bad health	1.2		1.9	
missing	3.6		3.4	
Marital status				
Married	44.9		73.1	
Non-marriage partnership	55.1		26.9	
missing	0.1		0.0	
Men's age	32.762	6.334	36.110	5.813
Men's educational level				
Low (ISCED 0-2)	12.2		18.6	
Middle (ISCED 3-4)	45.0		51.0	
High (ISCED 5-8)	39.0		28.1	
Missing	3.8		2.3	
Men's working status				
Working	89.0		90.5	
Unemployed	5.5		6.7	
Inactive	3.2		2.1	
Missing	2.3		0.8	
Observations	24,944		25,003	

country level are used to complement the EU-SILC data. The key macro variables of interest are the three family policy indicators that are hypothesized to moderate the employment instability-childbirth relationship. Rather than using policy expenditures as proxies (Kalwij, 2010), this study focuses on the contents of the policy measures to emphasize their roles in shaping people's childbirth responses (Billingsley and Ferrarini, 2014; Daly and Ferragina, 2018).

First, the generosity of family benefits through cash transfers or tax breaks is calculated from the OECD TaxBEN model, which incorporates detailed benefits and tax rules in the EU and OECD countries for income simulation. By setting the parameters regarding household size and income, the TaxBEN calculates the sum of family benefits received by the hypothetical family. Following the methodology of Gauthier (2007) and Thévenon (2011), I measure the generosity of family benefit as its equivalent percentage of a full-time

earner's average wages in a country (% AW). To highlight the wage-replacement effects of family benefits for women who interrupt paid work for childbirth, the hypothetical family is set as a single-earner 100 per cent work-time family with a 2-year-old child.

Second, the full-rate-equivalent (FRE) paid leaves for mothers measure the total length of full-time paid leaves during which individuals' incomes are compensated at 100 per cent average rates of salary (Thévenon, 2011). The indicator is widely used by policy researchers to capture the progressiveness of childcare leave provisions (Baizan *et al*., 2016; Daly and Ferragina, 2018; Bergsvik, Fauske and Hart, 2021). It is calculated by multiplying the duration of leaves and the wage-replacement rates of benefits during the leaves. Following previous studies, both FRE maternity and parental leaves entitled to mothers are added up to a single indicator representing the total length of paid leaves in weeks. Time-series data on maternity and parental leaves since the year 2010 are collected from different releases of the OECD Family Database on a biannual basis. Missing values in the gap years (i.e. 2011, 2013, 2015, 2017) are interpolated using the country averages of the nearby years.

Third, the childcare coverage rate for children under three, collected from the OECD Family Database, captures the comprehensiveness of a country's formal childcare policies. The indicator measures the percentage of 0- to 2-year-old children enrolled in centre-based childhood education and care services. It is worth noticing that this indicator refers to the total coverage rate from both public and private childcare participation. Therefore, some countries with limited public childcare provisions may have relatively high childcare coverage rates (e.g. the United Kingdom). Nevertheless, this indicator is usually referred to as the central component in capturing a country's policy orientation on care provisions (Thévenon, 2011; Billingsley and Ferrarini, 2014) and has been frequently applied to cross-national comparative studies (Baizan *et al*., 2016).

Besides the three moderators, the multilevel models include macro-level control variables that may confound the associations between women's employment and childbirth. The purchasing-power-adjusted GDP per capita is included to adjust for country differences in economic development, which may influence women's employment and fertility behaviours (Mills *et al*., 2011). Yearly data of GDP per capita, measured continuously in 1,000 Euro, come from Eurostat. To account for the procyclical nature of female employment and fertility (Sobotka, Skirbekk and Philipov, 2011), the models include period dummy variables (years 2010–2012, years 2013–2015, and years 2016–2018) and country-level unemployment rates for active workers aged 15–64 (continuous variable). Data on unemployment rates come from either Eurostat or ILOSTAT. Finally, to adjust for labour market institutions that affect the employment status-childbirth relationship (Karabchuk, 2020), I include an indicator measuring the strictness of employment protection against individual dismissals of regular workers (EPLR) and an indicator measuring the strictness of hiring temporary workers (EPLT). These data come from the OECD Employment Protection Database's EPR_V3 and EPT_V3 indicators, which are composite indicators of 9 and 8 items scaling from 0 (unregulated) to 6 (fully regulated). Table 2 provides descriptive statistics on the macro-level variables for each country. All macro-level variables are measured in year *t*.

Modelling and estimation strategy

Three types of models are applied in this study for different purposes. First, to estimate the average effects of employment instability on women's childbirth across Europe, I estimate ordinary least squares regressions (OLS) with period and country fixed effects. Linear probability models (LPM) are applied for each birth transition (see Supplementary Material S3 for the application of LPM models in childbirth research). In each model, a woman *i*'s probability of a specific birth *y* in time $t + 1$ is defined by the following equation:

$$P(y_{(t+1)i} = 1 \mid X_{ti}) = \beta_0 + X_{ti}\beta_p + \beta_t + \beta_c + \varepsilon_i \quad (1)$$

where β_0 reflects the grand average of the birth probability. The vector X_{ti} includes p micro-level variables for individual i measured in time t, such as women's employment status. Their corresponding parameters are presented as the vector β_p. I also include a set of period and country dummies in the model to account for the period fixed effects β_t and the country fixed effects β_c. By specifying these two fixed effects, the model controls for the time-variant common factors (e.g. common economic shock) and the time-invariant country-specific factors (e.g. cultural regimes). Finally, the ε_i is the idiosyncratic error term for each individual. Given a correct model specification, the coefficient estimates β_p denote the European average effects of the micro-level variables on women's birth probabilities. To account for the nesting structure and potential heteroscedasticity, standard errors are clustered at the country level.

Secondly, to reveal the cross-national heterogeneity of the micro-level effects, I use the same model in Equation (1) but without country fixed effects to fit 27 country-specific OLS–LPM models for each country. The coefficient estimates β_p in these models denote the country average effects of the micro-level variables on women's birth probabilities.

Thirdly, to test the research hypotheses regarding how macro-level policy contexts moderate the

Table 2 Descriptive statistics on macro-level variables by country

Country	ISO code	Family benefits for one-child family (% AW)[a]		Length of FRE paid leaves for mothers (in weeks)[b]		Childcare coverage rate for children under 3 (%)[c]		GDP per capita (in 1,000 EUR)		Unemployment rate (%)		Employment protection legislation (EPL)—individual dismissals		*N* (number of country-round)	*n* (number of observations)
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Austria	AT	16.4	2.3	54.5	3.3	17.0	3.7	35.3	1.9	5.3	0.5	2.1	0.0	9	1,976
Belgium	BE	2.4	0.0	18.8	4.8	47.1	5.6	32.7	1.8	7.6	0.8	2.1	0.2	9	2,553
Czechia	CZ	20.8	3.2	54.8	4.0	4.5	2.1	23.8	2.3	5.3	1.8	3.2	0.1	9	2,346
Germany	DE	4.7	0.1	43.0	1.1	29.9	1.7	36.1	1.1	3.9	0.4	2.4	0.0	4	1,176
Denmark	DK	4.4	0.1	26.7	0.1	70.3	4.8	34.9	2.0	6.8	0.9	1.4	0.0	9	606
Estonia	EE	6.7	0.7	99.2	11.8	23.1	4.3	21.1	2.2	8.1	2.9	1.7	0.0	9	1,762
Greece	GR	1.6	0.6	22.0	2.0	17.6	10.3	19.4	0.5	22.9	3.1	2.4	0.1	9	2,846
Spain	ES	0.0	0.0	16.0	0.0	39.3	4.4	24.7	1.4	21.7	3.3	2.0	0.1	9	4,051
Finland	FI	16.0	0.5	42.3	1.5	31.2	3.3	30.9	1.3	8.3	0.6	2.3	0.0	9	1,762
France	FR	4.2	1.5	27.4	11.5	46.2	4.5	29.7	1.3	9.7	0.5	2.7	0.0	9	2,256
Croatia	HR	0.0	0.0	39.5	0.9	15.2	2.1	17.8	1.0	12.4	2.7	2.3	0.0	4	733
Hungary	HU	16.5	2.0	87.4	10.5	11.3	3.3	18.1	1.4	8.7	2.7	1.6	0.2	9	2,607
Ireland	IE	3.8	0.2	9.4	1.2	29.7	4.1	42.5	9.3	11.4	3.6	1.3	0.1	9	1,040
Italy	IT	2.7	1.2	24.6	0.7	25.5	4.1	27.1	1.1	10.9	1.5	2.7	0.2	9	4,064
Lithuania	LT	1.0	1.5	62.0	0.0	16.9	4.4	22.7	1.6	7.4	1.1	2.3	0.2	4	412
Luxembourg	LU	5.7	0.2	27.2	2.0	52.2	5.5	73.6	4.0	5.9	0.5	2.2	0.0	8	1,562
Latvia	LV	1.3	0.1	52.7	0.7	26.5	2.4	19.2	1.2	9.0	1.0	2.8	0.0	4	637
Netherlands	NL	1.6	0.1	18.8	2.3	51.4	5.5	36.1	1.6	5.6	1.1	3.4	0.1	9	1,658
Norway	NO	3.4	3.0	40.7	3.3	50.2	4.3	45.5	2.7	3.9	0.5	2.2	0.0	9	732
Poland	PL	0.0	0.0	47.0	6.6	6.3	3.0	18.4	1.7	8.0	2.3	2.3	0.0	9	4,750
Portugal	PT	1.6	0.6	20.7	0.4	44.9	5.5	21.6	1.3	11.6	3.0	3.2	0.3	9	3,486
Sweden	SE	3.1	0.2	41.4	5.6	53.7	4.2	34.4	1.2	7.5	0.7	2.5	0.0	9	954
Slovenia	SI	5.2	1.3	49.4	1.5	40.9	3.7	23.6	1.9	7.6	1.6	2.1	0.2	9	1,923
Slovakia	SK	25.6	0.3	50.4	1.6	4.4	1.3	20.1	0.6	13.6	0.7	2.5	0.2	5	888
Switzerland	CH	2.7	0.1	9.2	1.4	29.1	2.3	45.5	1.3	4.7	0.2	1.3	0.0	6	1,120
Iceland	IS	1.8	0.5	16.2	0.3	43.9	6.8	32.4	2.1	5.5	1.2	1.9	0.0	6	201

Table 2. Continued

Country	ISO code	Family benefits for one-child family (% AW)[a]		Length of FRE paid leaves for mothers (in weeks)[b]		Childcare coverage rate for children under 3 (%)[c]		GDP per capita (in 1,000 EUR)		Unemployment rate (%)		Employment protection legislation (EPL)—individual dismissals		N (number of country-round)	n (number of observations)
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
United Kingdom	UK	3.5	0.7	14.8	4.1	30.3	2.7	28.8	1.0	7.2	1.0	1.5	0.1	7	1,846
All		6.0	6.8	35.9	22.7	30.5	16.5	29.6	11.5	9.7	5.6	2.3	0.6	210	49,947

Notes:
[a]This statistic denotes the maximum benefits that can be received by a hypothetical single-earner household with one child aged 2 years, measured as the percentage of the average worker's wages.
[b]Full-rate equivalent (FRE) method measures the length of full-time paid leaves during which individuals' income are compensated at 100 per cent average rates of salary The length of FRE leaves equals the duration of maternal and parental leaves in weeks times the income replacement rates for each. The statistics only include leave payments by the states; employers' 'top-ups' payments are not included.
[c]This statistic measures the percentage of 0- to 2-year-old children enrolled in early childhood education and care services (ECEC).

micro-level effects of employment instability, I apply a three-level mixed-effects LPM model with cross-level interactions. The model can be written as follows:

$$P(y_{c(t+1)i} = 1 \mid X_{cti},\ Z_{ct}) = \beta_0 + \beta_t + X_{cti}\beta_p + Z_{ct}\beta_q + X_{cti}Z_{ct}\beta_{pq} + v_c + u_{ct} + e_{cti} + U_cX_{cti} \quad (2)$$

where the left-hand side is individual *i*'s probability of a specific birth *y* in time *t*+1 in country *c*. Different from the pooled model in Equation (1), the mixed-effects model on the right-hand side accounts for country variations in micro- and macro-level variables and allows such effects to vary across *c* countries. The 'fixed part' of the model estimates the following terms: the grand average of the birth probability β_0, the period fixed effects β_t. The effects of *p* micro-level variables X_{cit} are denoted by β_p. The effects of *q* macro-level variables Z_{ct} are denoted by β_q. The parameter estimates of β_{pq} for the cross-level interactions $X_{cti}Z_{ct}$ reflect the moderating effects of the country- and time-variant family policy indicators on the micro-level relationship between employment instability and childbirth. The 'random part' of the model includes three variance components v_c (country level), u_{ct} (country-round level), and e_{cti} (individual level) to account for country and country-round variances of women's average birth probability (i.e. the random intercepts). It also includes two random slopes U_c at the country level for women's temporary employment and unemployment statuses to capture the unexplained contextual variations in their effects (Heisig and Schaeffer, 2019). I use the restricted maximum likelihood estimator for model estimation. These models are performed in the statistical software STATA (version 17) using the 'mixed' command.

Results

European and country-specific effects of employment instability on childbirth

Table 3 presents the first analysis of the European average effects of employment instability on women's first and second births. To evaluate the social significance and uncertainty of estimated effects, I follow Bernardi, Chakhaia and Leopold's (2017) approach to benchmark the point estimates and 90 per cent confidence intervals against substantively meaningful values.[4] A 10% increase or decrease in the average birth transition probability is identified as the minimum relevant value ($\theta_{1st\ birth}$ = ±0.015; $\theta_{2nd\ birth}$ = ±0.013), while a 100 per cent increase or decrease in the average birth transition probability serves the maximum plausible value ($\theta_{1st\ birth}$ = ±0.15; $\theta_{2nd\ birth}$ = ±0.13). In line with H1, Model 1 shows that temporary employment has a negative effect on women's first-birth transition. On the European average, being temporarily employed, compared to being permanently employed, decreases

Table 3 Pooled ordinary least squares linear probability models of women's first- and second-birth probabilities

	Model 1 First-birth transition (n = 24,944)		Model 2 Second-birth transition (n = 25,003)	
	β	90% CIs	β	90% CIs
Employment status (Ref. = Permanent employment)				
Temporary employment	−0.028	[−0.040, −0.017]	−0.009	[−0.023, 0.006]
Unemployment	−0.003	[−0.018, 0.013]	−0.009	[−0.019, 0.001]
Control variables				
Women's age	0.043	[0.029, 0.057]	0.038	[0.028, 0.047]
Women's age2	−0.001	[−0.001, −0.001]	−0.001	[−0.001, −0.001]
Women's education (Ref. = Low, ISCED 0-2)				
Middle (ISCED 3-4)	0.010	[−0.007, 0.027]	0.012	[−0.006, 0.030]
High (ISCED 5-8)	0.028	[0.007, 0.049]	0.051	[0.032, 0.070]
Women's health (Ref. = Good/fair health)				
Bad health	−0.059	[−0.093, −0.024]	−0.050	[−0.074, −0.025]
Marital status (Ref. = Married)				
Non-marriage partnership	−0.098	[−0.116, −0.081]	−0.011	[−0.020, −0.001]
Men's age	−0.003	[−0.004, −0.002]	−0.004	[−0.005, −0.003]
Men's education (Ref. = Low, ISCED 0-2)				
Middle (ISCED 3-4)	−0.013	[−0.028, 0.003]	0.002	[−0.011, 0.016]
High (ISCED 5-8)	−0.012	[−0.029, 0.006]	0.035	[0.019, 0.050]
Men's working status (Ref. = Working)				
Unemployed	−0.015	[−0.028, −0.002]	−0.005	[−0.018, 0.008]
Inactive	−0.059	[−0.078, −0.040]	−0.021	[−0.042, 0.000]
Country fixed effects	✓		✓	
Period fixed effects	✓		✓	

Notes: Standard errors are clustered by country.

women's first-birth probability by −2.8 percentage points (CI = [−0.040, −0.017]). The negative effect is statistically and substantively significant, which amounts to a 19 per cent decrease in the first-birth transition probability in our sample. On the other hand, the European average effect of unemployment on women's first birth is neither substantial nor statistically significant (β = −0.003, CI = [−0.018, 0.013]). These results echo the recent findings from a meta-analysis of 34 European studies (Alderotti *et al*., 2021), which showed that women's temporary employment has a more negative effect than unemployment on European women's first-birth transition. However, comparing in terms of odds ratio (OR),[5] the estimated effect of temporary employment on women's first birth (OR = 0.79) is more negative than that in the meta-analysis (OR = 0.90, from Alderotti *et al*., 2021: Table 9).

Among women with one child, Model 2 shows that temporary employment compared to permanent employment decreases the second-birth probability by −0.9 percentage points (CI = [−0.023, 0.006]). Being unemployed decreases women's second-birth probability also by −0.9 percentage points (CI = [−0.019, 0.001]). While both effects are not statistically smaller than zero according to the 5 per cent one-tailed significance test, their lower CIs overlap with the substantively meaningful values. Therefore, I suggest a cautious interpretation of the minor negative effects of employment instability on women's second birth while acknowledging the uncertainty of these estimates.

The second analysis further explores cross-national heterogeneity in the employment instability-childbirth nexus. Figure 1 presents the country-specific OLS–LPM results on women's first-birth transition. Figure 1a shows that cross-national variations in the effect of temporary employment are remarkable. On one hand, negative effect estimates of temporary employment on first birth are observed in more than half of the European countries (18 of 27), among which I identify the estimates for France, Finland, Italy, Luxembourg, Slovenia, Sweden, Belgium, the United Kingdom, and Croatia as substantively important and statistically plausible.

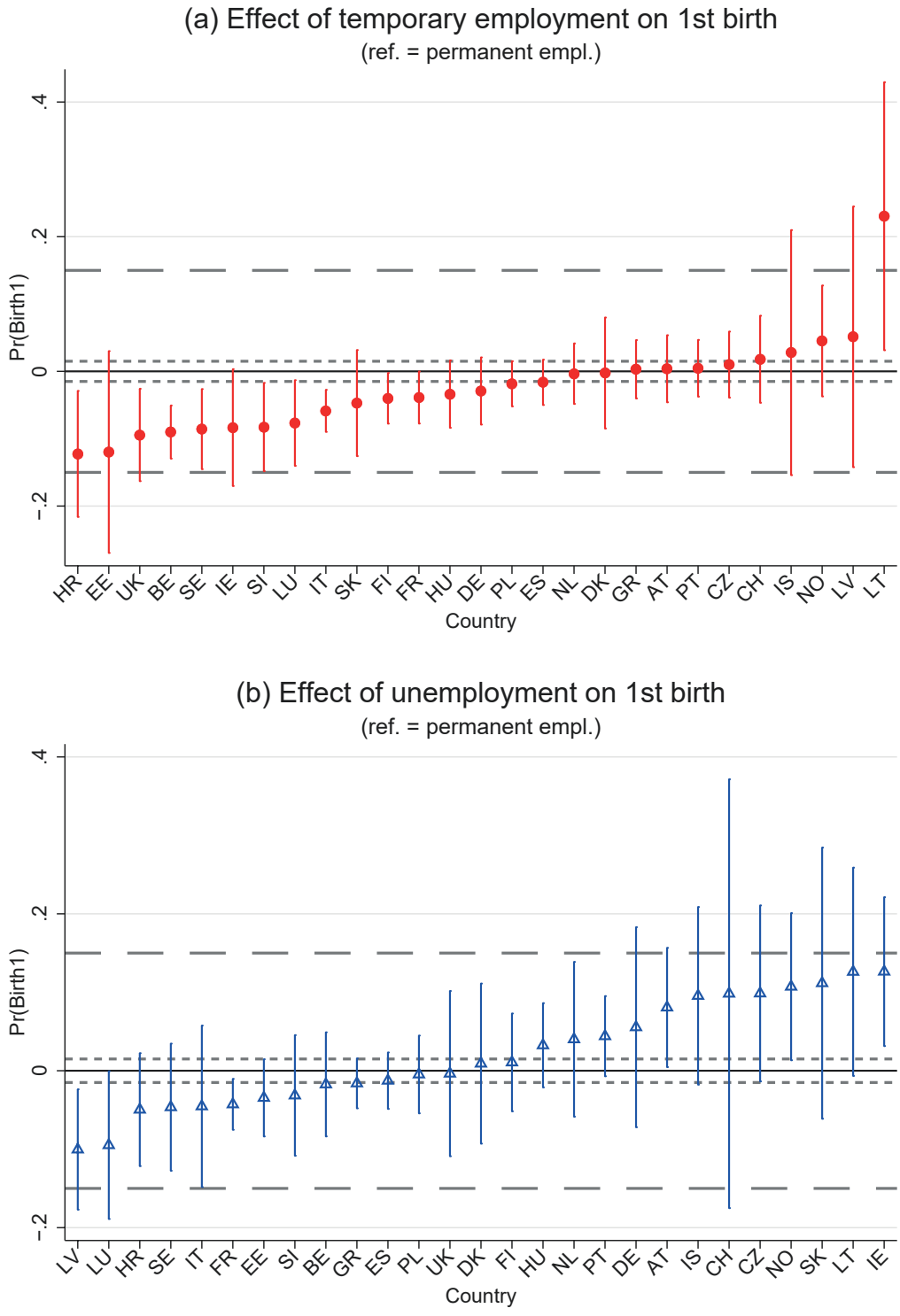

Figure 1 Country-specific effects of women's temporary employment and unemployment on the first-birth probability

Notes: Marginal effects estimates with 90 per cent confidence intervals are based on country-specific OLS–LPM models. The dotted lines present the 10 per cent average first-birth probability deviations from 0 (±0.015), which benchmark the minimum relevant values of the estimates. The dashed lines present the 100 per cent average first-birth probability deviations from 0 (±0.15), which benchmark the maximum plausible values of the estimates.

The most negative effect is observed in Croatia, where temporarily employed women have a −12.3 percentage points (CI = [−0.216, −0.029]) lower probability of the first-birth transition than the permanently employed. The other substantively negative effects observed in Italy (Barbieri *et al.*, 2015; Vignoli, Tocchioni and Mattei, 2020), France (Pailhé and Solaz, 2012), Finland (Sutela, 2012), and Sweden (Lundström and Andersson, 2012) are largely in line with previous research. On the other hand, being temporarily employed might be linked to higher first-birth probabilities in some countries. However, all positive effect estimates are either lacking statistical confidence or implausibly large (i.e. Lithuania). The effect of unemployment on women's first birth is also heterogeneous (Figure 1b), ranging from the most negative effect in Latvia (β = −0.100, CI = [−0.177, −0.024]) to the most positive effect in Ireland (β = 0.126, CI = [0.031, 0.221]). However, wide confidence intervals are observed in many countries whose effect sizes are substantive, indicating rather high statistical uncertainties in these estimates. Nevertheless, the cross-national divergent effects of female unemployment versus permanent employment on the first-birth transition are largely in line with previous country-specific studies, such as the negative effect in France or the positive effect in Germany (González and Jurado-Guerrero, 2006).

Figure 2a presents country-specific effects of women's temporary employment on second birth. The most negative effect is observed in Switzerland, where temporarily employed women have −12.8 percentage points (CI = [−0.217, −0.040]) lower probability of second-birth transition than the permanently employed. While the effect point estimates are substantively negative in 13 countries and substantively positive in six countries (excluding the implausibly large positive effect in Iceland), their confidence intervals mostly contain zero and thus cannot confidently rule out the null hypothesis of a zero effect. Similarly, Figure 2b shows that although women's unemployment might have substantively negative effects on second birth in several European countries, the rather wide confidence intervals or implausibly large values indicate high uncertainty in these estimates. Despite these statistical uncertainties, Figures 1 and 2 still provide crucial evidence that the influence of women's employment instability on birth transitions could go in both directions (i.e. birth enhancing or depressing effects) and differ considerably across countries. To tackle the moderating role of family policies behind these variations, the following section applies multilevel regressions to test Hypotheses 2–4.

The moderating role of family policies

Table 4 presents the results of multilevel mixed-effects models on women's first-birth transition. Model 1 includes micro and macro control variables as well as country and country-round random intercepts. Country random slopes for women's employment status are also specified. Model 1 reconfirms Table 3's findings: on the European average, women's temporary employment compared to permanent employment has a negative effect on first-birth transition (β = −0.028, CI = [−0.039, −0.017]), while the effect of unemployment is neither substantive nor statistically significant (β = 0.003, CI=[−0.013, 0.018]).

Models 2–4 include cross-level interactions between women's employment status and the three family policy indicators to estimate how micro-level effects of women's employment instability differ across policy contexts. First, results from Model 2 indicate that the effects of women's temporary employment and unemployment on first birth are more positive in countries with more generous family cash benefits. The direction of the moderating effects is in line with H2, although only the moderating effect on the unemployment-first birth relationship is statistically larger than zero. Second, Model 3 indicates that countries with longer paid leaves for mothers tend to have slightly more positive effects of temporary employment and unemployment on women's first-birth probability. However, both moderating effects are substantively negligible and statistically insignificant. Third, Model 4 suggests that more negative effects of employment instability on women's first-birth transition are observed in countries with high childcare coverage rates. These results are in line with H4, although only the moderating effect on the temporary employment-first birth relationship is statistically negative.

To better illustrate these findings, Figure 3 plots the effects of temporary employment and unemployment on the first-birth probability (y-axis) against the respective policy indicators (x-axis). In Figure 3a, the steep blue line indicates that more generous family benefits may alleviate the negative effect of women's unemployment on the first-birth transition. In contrast to the substantively negative effect of unemployment found in countries with zero family benefit (e.g. Spain 2015), a substantively positive effect of women's unemployment on first-birth transition is found in countries with family benefits up to 25 per cent AW (e.g. Slovakia 2015). Figure 3b shows that the effects of women's temporary employment and unemployment on first birth depend less on the length of FRE leaves. Finally, Figure 3c shows that women's employment instability, particularly being temporarily employed, has more negative effects in countries with higher childcare coverage rates. While temporary employment decreases women's first-birth probability only by −2 percentage points in countries with 20 per cent childcare coverage rates (e.g. Austria 2016), it substantially decreases

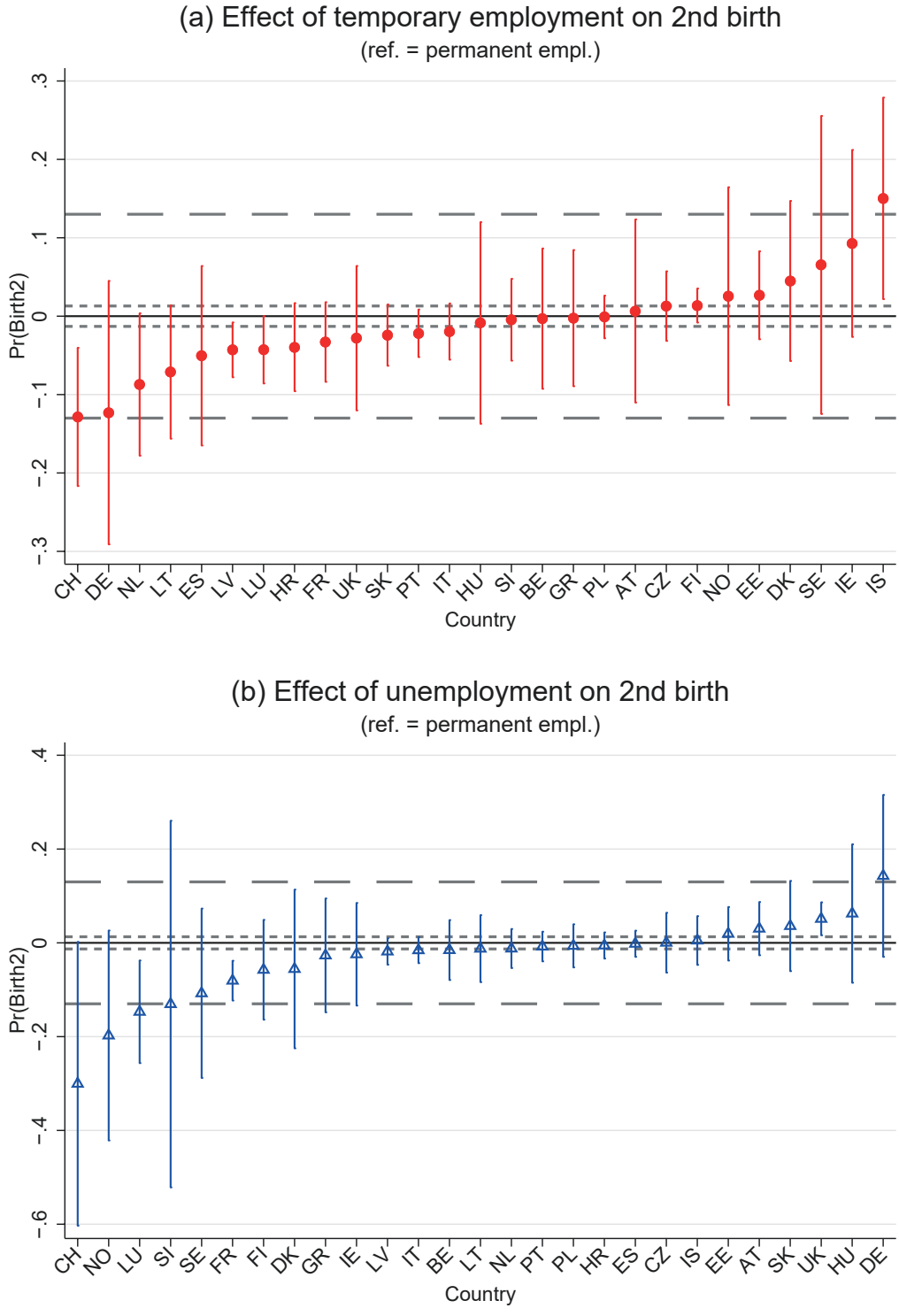

Figure 2 Country-specific effects of women's temporary employment and unemployment on the second-birth probability

Notes: Marginal effects estimates with 90 per cent confidence intervals are based on country-specific OLS–LPM models. The dotted lines present the 10 per cent average second-birth probability deviations from 0 (±0.013), which benchmark the minimum relevant values of the estimates. The dashed lines present the 100 per cent average second-birth probability deviations from 0 (±0.13), which benchmark the maximum plausible values of the estimates.

Table 4 Multilevel mixed-effects linear probability models of women's first-birth probability

	Model 1		Model 2		Model 3		Model 4	
	β	90% CIs	β	90% CIs	β	90% CIs	β	90% CIs
Employment status (Ref. = Permanent employment)								
Temporary employment	−0.028	[−0.039, −0.017]	−0.031	[−0.046, −0.017]	−0.033	[−0.056, −0.010]	−0.006	[−0.028, 0.016]
Unemployment	0.003	[−0.013, 0.018]	−0.015	[−0.032, 0.002]	−0.005	[−0.032, 0.023]	0.014	[−0.017, 0.045]
Micro-level control variables	✓		✓		✓		✓	
Period fixed effects	✓		✓		✓		✓	
Macro-level variables								
GDP per capita	−0.001	[−0.002, 0.001]	−0.001	[−0.002, 0.001]	−0.001	[−0.002, 0.001]	−0.001	[−0.002, 0.001]
Unemployment rate	−0.001	[−0.003, 0.001]	−0.001	[−0.003, 0.001]	−0.001	[−0.003, 0.001]	−0.001	[−0.003, 0.001]
EPLR	0.015	[−0.004, 0.034]	0.015	[−0.004, 0.034]	0.015	[−0.004, 0.034]	0.015	[−0.003, 0.034]
EPLT	−0.008	[−0.023, 0.008]	−0.008	[−0.023, 0.008]	−0.008	[−0.023, 0.008]	−0.008	[−0.023, 0.008]
Family benefits (10% AW)	−0.008	[−0.026, 0.010]	−0.011	[−0.029, 0.008]	−0.008	[−0.026, 0.010]	−0.008	[−0.026, 0.010]
Length FRE leaves (10 weeks)	0.003	[−0.003, 0.009]	0.003	[−0.003, 0.009]	0.003	[−0.003, 0.008]	0.003	[−0.003, 0.009]
Childcare coverage rates (10%)	0.005	[−0.002, 0.013]	0.005	[−0.002, 0.013]	0.006	[−0.002, 0.013]	0.007	[0.000, 0.014]
Cross-level interactions								
Temp. empl. × Family benefits			0.005	[−0.011, 0.021]				
Unempl. × Family benefits			0.031	[0.009, 0.053]				
Temp. empl. × Length FRE leaves					0.001	[−0.005, 0.007]		
Unempl. × Length FRE leaves					0.002	[−0.004, 0.009]		
Temp. empl. × Childcare coverage							−0.007	[−0.013, −0.001]
Unempl. × Childcare coverage							−0.004	[−0.013, 0.005]
Constant	−0.332	[−0.488, −0.177]	−0.332	[−0.488, −0.176]	−0.333	[−0.489, −0.178]	−0.340	[−0.495, −0.184]
Variance components (random part)								
Country variance (U_c^2 (Temp. empl.))	0.013	(0.011)	0.013	(0.011)	0.014	(0.011)	0.008	(0.016)
Country variance (U_c^2 (Unempl.))	0.021	(0.013)	0.013	(0.016)	0.021	(0.014)	0.023	(0.013)
Country variance (v_c^2)	0.030	(0.007)	0.031	(0.007)	0.030	(0.007)	0.030	(0.007)
Country-round variance (u_{ct}^2)	0.022	(0.004)	0.022	(0.004)	0.022	(0.004)	0.022	(0.004)
Individual variance (e_{cti}^2)	0.350	(0.002)	0.350	(0.002)	0.350	(0.002)	0.350	(0.002)
n (observations)	24,944		24,944		24,944		24,944	
N (country-rounds)	210		210		210		210	
M (countries)	27		27		27		27	

Notes: Standard errors of the variance components instead of confidence intervals are presented in the parentheses.

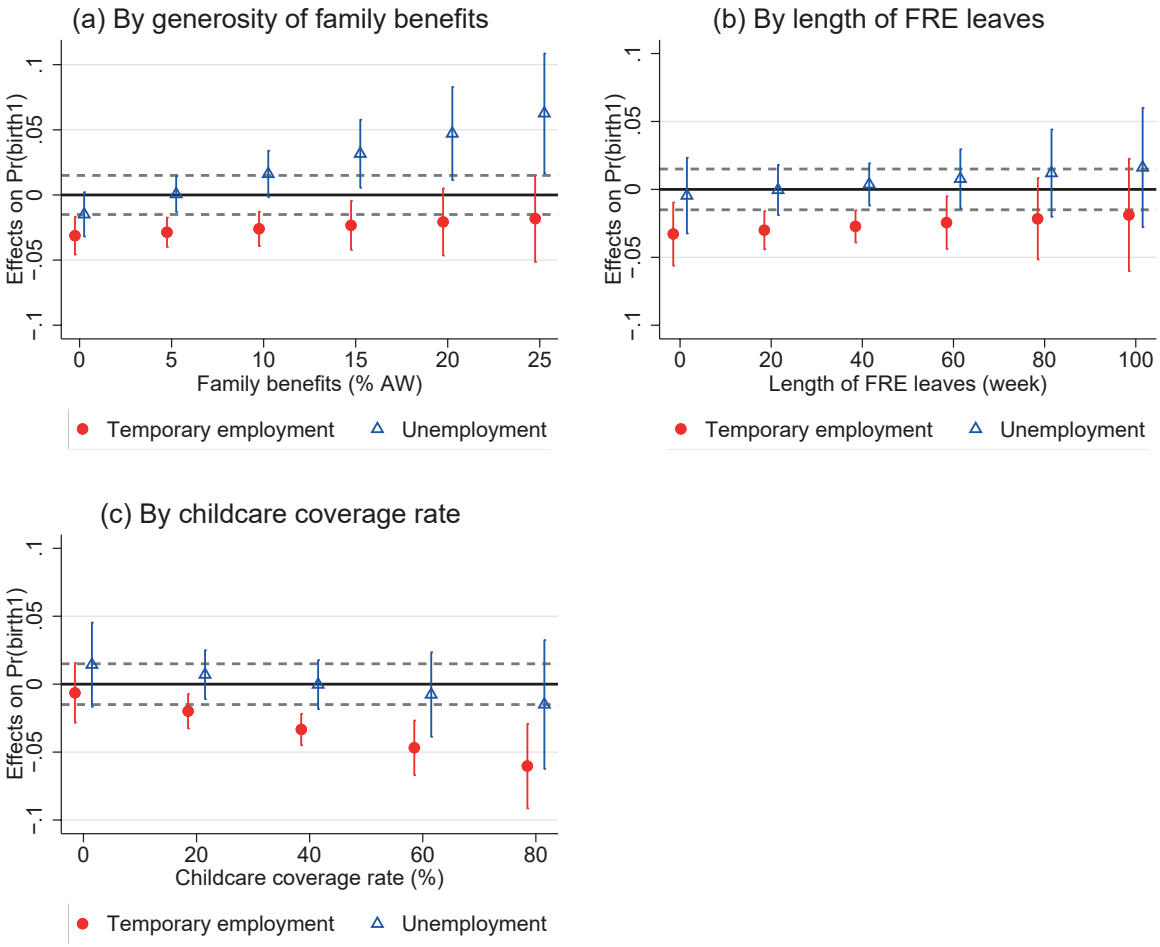

Figure 3 Effects of women's temporary employment and unemployment (vs. permanent employment) on the first-birth probability by level of family policy indicators

Notes: Marginal effects estimates with 90 per cent confidence intervals are based on Models 2–4 in Table 4. The dotted lines present the 10 per cent average first-birth probability deviations from zero (±0.015), which benchmark the minimum relevant values of the estimates.

women's first-birth probability by −4.7 percentage points in countries with 60 per cent childcare coverage rates (e.g. the Netherlands 2017).

Table 5 presents the results of multilevel mixed-effects models on women's second-birth transition. In line with Table 3's results, Model 1 shows that women's temporary employment (β = −0.008, CI = [−0.022, 0.006]) and unemployment (β = −0.008, CI = [−0.022, 0.006]) compared to permanent employment *on average* has negative yet insubstantial effects on second-birth transition.

Models 2–4 in Table 5 further examine the moderating roles of family policies on women's second birth. First, Model 2 suggests that the effect of women's temporary employment and unemployment on second birth might be more positive in countries with more generous family benefits schemes. While the estimated effects are in line with the predictions in H2, the relatively wide confidence intervals indicate a higher degree of statistical uncertainty. Second, Model 3 shows that countries with longer paid leaves for mothers tend to observe a more positive effect of employment instability on women's second-birth probability. Although these effect sizes seem to be small and statistically insignificant, their moderating effects could become substantial with a large increase in leave provisions. Third, Model 4 suggests that higher childcare coverage rates associate with a more negative effect of women's employment instability, particularly due to unemployment, on the second-birth transition (in line with H4).

Figure 4 illustrates the moderating effects of the three family policies on women's second-birth transition. Figure 4a shows that while women's temporary employment and unemployment might have

Table 5 Multilevel mixed-effects linear probability models of women's second-birth probability

	Model 1		Model 2		Model 3		Model 4	
	β	90% CIs	*β*	90% CIs	*β*	90% CIs	*β*	90% CIs
Employment status (Ref. = Permanent employment)								
Temporary employment	−0.008	[−0.022, 0.006]	−0.015	[−0.033, 0.003]	−0.025	[−0.052, 0.002]	−0.001	[−0.029, 0.027]
Unemployment	−0.008	[−0.019, 0.003]	−0.014	[−0.028, 0.000]	−0.025	[−0.045, −0.005]	0.018	[−0.003, 0.039]
Micro-level control variables	✓		✓		✓		✓	
Period fixed effects	✓		✓		✓		✓	
Macro-level variables								
GDP per capita	0.002	[0.000, 0.003]	0.002	[0.000, 0.003]	0.002	[0.000, 0.003]	0.002	[0.000, 0.003]
Unemployment rate	−0.004	[−0.006, −0.002]	−0.004	[−0.006, −0.002]	−0.004	[−0.006, −0.002]	−0.004	[−0.006, −0.002]
EPLR	0.020	[−0.003, 0.042]	0.020	[−0.003, 0.042]	0.020	[−0.003, 0.042]	0.019	[−0.003, 0.042]
EPLT	−0.017	[−0.035, 0.002]	−0.016	[−0.035, 0.002]	−0.016	[−0.035, 0.002]	−0.016	[−0.035, 0.002]
Family benefits (10% AW)	−0.013	[−0.034, 0.009]	−0.015	[−0.037, 0.006]	−0.013	[−0.003, 0.001]	−0.012	[−0.034, 0.009]
Length FRE leaves (10 weeks)	−0.007	[−0.013, 0.000]	−0.007	[−0.014, 0.000]	−0.008	[−0.014, −0.001]	−0.007	[−0.013, 0.000]
Childcare coverage rates (10%)	−0.003	[−0.012, 0.005]	−0.004	[−0.012, 0.005]	−0.004	[−0.001, 0.000]	−0.002	[−0.010, 0.007]
Cross-level interactions								
Temp. empl. × Family benefits			0.012	[−0.008, 0.032]				
Unempl. × Family benefits			0.013	[−0.004, 0.031]				
Temp. empl. × Length FRE leaves					0.004	[−0.002, 0.011]		
Unempl. × Length FRE leaves					0.005	[0.000, 0.009]		
Temp. empl. × Childcare coverage							−0.002	[−0.010, 0.006]
Unempl. × Childcare coverage							−0.010	[−0.016, −0.003]
Constant	−0.212	[−0.397, −0.027]	−0.208	[−0.394, −0.022]	−0.209	[−0.395, −0.023]	−0.218	[−0.403, −0.032]
Variance components (random part)								
Country variance (U_c^2 (Temp. empl.))	0.023	(0.012)	0.024	(0.012)	0.021	(0.013)	0.024	(0.013)
Country variance (U_c^2 (Unempl.))	0.007	(0.019)	0.009	(0.014)	0.006	(0.020)	0.008	(0.014)
Country variance (v_c^2)	0.046	(0.008)	0.047	(0.008)	0.047	(0.008)	0.047	(0.008)
Country-round variance (u_{ct}^2)	0.017	(0.004)	0.017	(0.004)	0.017	(0.004)	0.017	(0.004)
Individual variance (e_{cti}^2)	0.327	(0.001)	0.327	(0.001)	0.327	(0.001)	0.327	(0.001)
n (observations)	24,944		24,944		24,944		24,944	
N (country-rounds)	210		210		210		210	
M (countries)	27		27		27		27	

Notes: Standard errors of the variance components instead of confidence intervals are presented in the parentheses.

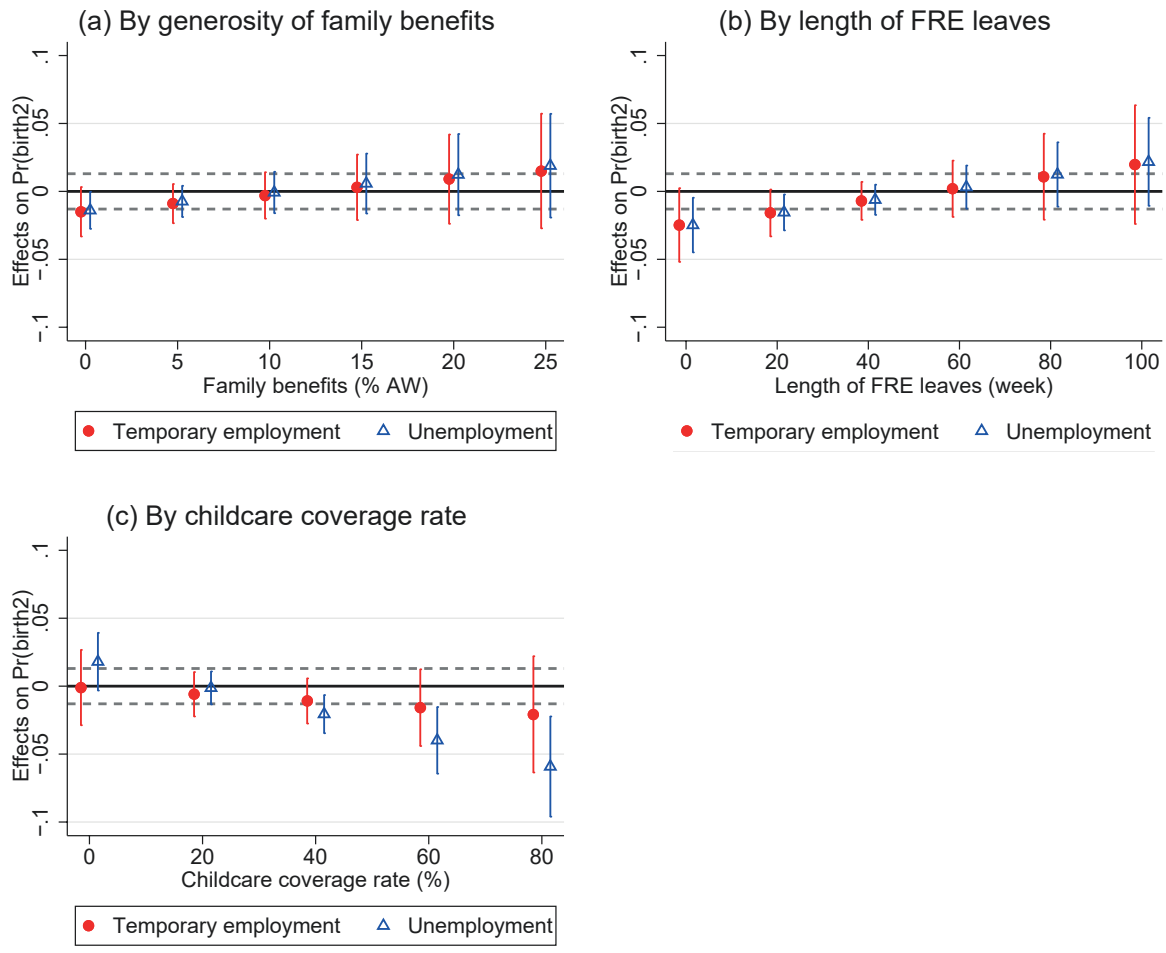

Figure 4 Effects of women's temporary employment and unemployment (vs. permanent employment) on the second-birth probability by level of family policy indicators

Notes: Marginal effects estimates with 90 per cent confidence intervals are based on Models 2–4 in Table 5. In each panel, the dotted lines present the 10 per cent average first-birth probability deviations from zero (±0.013), which I use to benchmark the minimum relevant values of a negative or positive estimate.

substantively negative effects on the second-birth transition in countries with no family benefit (e.g. Poland 2015), such negative effects diminish as the level of family benefits increase. In countries with 10 per cent AW family benefits (e.g. Austria 2018), both effects diminish to zero. Similarly, the effects of employment instability become more positive in countries with longer paid leaves for mothers. Figure 4b shows that being temporarily employed or unemployed may substantially decrease women's second-birth probability by 1.6 percentage points in countries with 20 weeks of FRE leaves (e.g. the Netherlands 2014); but such negative effects vanish in countries with 60 weeks of FRE leaves. In countries with very long FRE leaves (e.g. Estonia, averaged around 100 weeks), a positive linkage between women's employment instability and second-birth probability is found after conditioning on other variables. Finally, Figure 4c suggests a strong negative moderating effect of childcare provisions on the effect of women's unemployment on second birth. In countries with very low childcare coverage rates (e.g. Czechia), unemployment compared to permanent employment may substantially increase women's second-birth probability. However, in countries where childcare coverage rates are higher than 40 per cent (e.g. France, averaged around 46 per cent), a negative relationship between women's unemployment and second-birth transition becomes dominating.

Besides these main findings, an additional analysis using couple-dyadic data (see Supplementary Material S4) shows that country differences in family policy contexts could also moderate the influences of within-couple employment patterns on birth transitions. Specifically, women's own employment instability

regardless of their partners' employment situation would be more detrimental to birth transitions in countries where family policies are geared to support earner-carer combination and defamilization of women's homecare roles (e.g. in Belgium and Luxembourg). On the other hand, in countries where family policies emphasize traditional income support and a high degree of childcare familization (e.g. in Czechia and Slovakia), women's employment instability combined with men's permanent employment might even accelerate birth transitions.

Discussion

This article examines how women's employment instability affects women's first and the second birth transitions in Europe. Previous studies on this topic are mainly confined to single-country analyses, which raise concerns about the generalizability of empirical findings. Besides, existing knowledge about how macro-level contexts moderate the strength and direction of such micro-level effect is limited. To fill the gap, this article proposes a theoretical framework and empirically tests whether the impacts of women's temporary employment and unemployment on their first- and second-birth transitions vary across 27 European countries, and if so, how such cross-national variations are explained by the country-level differences in family policy provisions.

Using multilevel analyses on cross-nationally harmonized data, my first key finding is that women's employment instability, *on the European average*, had a negative effect on the first-birth transition. However, such a statement mainly applied to the negative relationship between women's temporary employment and the first birth. In contrast, no robust evidence was found regarding the negative effect of women's unemployment on first-birth transition. These findings are in line with a recent meta-analysis of European studies (Alderotti *et al*., 2021), and the estimated effect sizes are comparable. Regarding the second birth, I found that women's temporary employment and unemployment could negatively affect European women's second-birth transition to some extent. However, these effects were rather small and statistically insignificant. In this regard, previous findings in Alderotti *et al*.'s (2021) meta-analysis and Adsera's (2011a) comparative study that temporary employment compared to permanent employment significantly delays women's second birth transition are short of robust support from our data. A possible explanation to the inconsistency is that our study covers substantially more countries across Europe than previous research. Most crucially, it is the first comparative study on the micro-level relationship between employment instability and fertility that includes multiple counties in Central Eastern Europe (i.e. CEE, including Poland, Czechia, Hungary, Slovakia, Slovenia, Croatia) and Baltic States (Estonia, Latvia, Lithuania). In a supplementary analysis (see Supplementary Material S5), I found that the average effects of women's temporary employment and unemployment on second-birth transition both became substantively negative once the CEE and Baltic countries were excluded from the estimation sample, while such effects were averagely near zero in CEE and Baltic countries. Such findings indicate that this paper's enlarged analytical scope not only enriches the empirical literature in Europe, which has been underrepresenting the experiences of CEE and Baltic countries (Alderotti *et al*., 2021), but may also change the effect size of employment instability on fertility when concluding an aggregate *European average effect*.

Taking a closer look into the employment instability-childbirth linkage in Europe, my second analysis revealed that the direction and magnitude of such relationship diverged across European countries. For example, women's temporary employment could substantively decrease the first-birth transition probability in France, Finland, Italy, Luxembourg, Slovenia, Sweden, Belgium, the United Kingdom, and Croatia. In contrast, such effects might be positive in Switzerland, Iceland, Norway, Latvia, and Lithuania, despite higher statistical uncertainty in the estimates. The cross-national divergent patterns were also found in the relationships between women's unemployment and the second birth, between women's temporary employment and the second birth, and between women's unemployment and the second birth. In line with the suggestions from previous studies (Adsera, 2011a; Matysiak and Vignoli, 2013; Alderotti *et al*., 2021), I argued that the country-level welfare differences could be a key factor shaping the observed cross-national effect heterogeneity. Building upon but going beyond the empirical approach of previous comparative welfare states research (Blossfeld *et al*., 2005; Esping-Andersen, 2009), this study applied multilevel regressions and showed specifically that the effects of women's employment instability on childbirth transitions could be moderated by country variations in family policy provisions.

To this end, my key findings regarding the moderating roles of family policies on women's first birth are threefold. First, I found that the effect of women's unemployment on first-birth transition was more positive in countries with more generous family cash benefits (in line with H2). In the context of generous family cash benefits (such as Czechia and Slovakia), unemployed women could have higher probabilities of motherhood transition in the following years compared to permanently employed women. Second, the

effects of women's temporary employment and unemployment on the first-birth transition were rather insensitive to country differences in the length of paid leaves. This finding might result from the joint operation of opposite mechanisms implied in the counter hypotheses H3a and H3b, which offset the moderating effects of each other. Specifically, longer paid leaves may on one hand strengthen the negative effects of employment instability on childbirth because the opportunity costs of childbirth for women with a permanent job are largely relieved. On the other hand, a comprehensive leave policy may buffer the socio-psychological uncertainty related to unstable employment and create a social norm that familizes women's home childcare responsibilities, thereby neutralizing the negative effect of employment instability on women's childbirth. Because the effect-enhancing and the effect-reduction mechanisms are like to offset each other's influences, it is not surprising that I only found a negligible moderating effect of paid leaves on the relationship between women's employment instability and first birth. Thirdly, more comprehensive early childcare services at the country level could enlarge the negative effect of temporary employment on women's motherhood transition (in line with H4). This finding has important policy implications because previous studies usually highlighted the fertility-enhancing and the conflict-reducing effects of childcare policies but underemphasized their potential role in reinforcing the structural disadvantages of certain groups, such as women who encounter employment instability.

Key findings on the moderating roles of family policies on women's second-birth transition are similar. First, countries with more generous family benefits tended to observe more positive effects of women's temporary employment and unemployment on the second-birth transition. Second, countries with longer paid leaves for mothers were associated with less negative and even positive effects of temporary employment and unemployment on second birth. This finding is somewhat different from the patterns observed in the first birth, where I found nearly zero moderating effects of leave policies. A potential explanation is that familization of homecare responsibilities is high in countries with very long paid leaves schemes (Lohmann and Zagel, 2016), which creates a social norm that discourages women's combination of regular paid work and childrearing (Gangl and Ziefle, 2015). Because mothers of two children generally bear much higher childcare responsibilities than mothers of one child, it is likely that in such context mothers with established careers in permanent jobs are more reluctant to progress to higher-order births compared to mothers with unstable employment statuses. Third, a more negative effect of unemployment on women's second birth was found in the context of higher childcare coverage rates (in line with H4). Again, this finding suggests that in addition to discussing the 'bright sides' of a comprehensive childcare system, policymakers should also pay attention to the potentially enlarged social stratification in fertility across employment groups.

Overall, the above findings about the impacts of women's employment instability on childbirth and the moderating role of family policies are largely consistent with the theoretical expectations. Nevertheless, several limitations should be noted before concluding. First, this study focused only on the objective aspect of employment instability by referring to women's employment status as the key explanatory variable of childbirth. While this design is in line with the mainstream literature (see Alderotti *et al*., 2021), some studies have argued that individuals' subjective feelings of employment uncertainty may have unique impacts on childbirth, which are independent of the impacts of the objective instability of employment status (Kreyenfeld, 2010; van Wijk, de Valk and Liefbroer, 2021). Because the EU-SILC data did not have subjective measurements of employment instability or uncertainty, a parallel analysis using these variables was not available for this study. Second, this study explored policy-specific moderating effects of family benefits, paid maternity/parental leaves, and childcare policies respectively. While using policy-specific evaluations provides clear-cut results for hypotheses testing (Kalwij, 2010; Baizan *et al*., 2016), this methodology fails to account for the holistic constellations of welfare policies (Thévenon, 2011; Billingsley and Ferrarini, 2014). Future research may extend our approach by utilizing composite indicators to capture the latent factors behind different policy constellations and test their moderating effects on the relationship between women's employment instability and childbirth. Third, while this study clearly illustrated that the effects of women's employment instability on childbirth were contingent on the 'levels' of family policy provisions, causal interpretations of the moderating effects of family policies should be cautious. This is because the mixed-effects multilevel models cannot reliably partial out unobserved country-level heterogeneities that might confound the micro-level relationship between women's employment instability and childbirth and the micro-macro interactions between such relationship and policies. Future research might consider using quasi-experimental designs to examine whether within-country policy 'changes' may act as a factor of stratification by changing women's childbirth responses to employment instability (Bergsvik *et al*., 2021). From a methodological point of view, country-specific quasi-experimental designs may complement the cross-national comparative approach

very well to establish both internal and external validities of empirical findings.

Despite these limitations, this study is the first to use multilevel analyses and comparative microdata from most European countries to examine the effects of women's employment instability on childbirth and the moderating roles of family policies on such relationships. Its findings contribute to the knowledge about whether institutional innovations, such as family policy provisions, may attenuate the social inequality in people's family behaviours or may reinforce such inequality in an unintended way (Blossfeld *et al*., 2005; Esping-Andersen, 2009). Most importantly, it highlights that different family policies may create distinct incentives or constraints across employment status groups, leading to their divergent fertility outcomes.

Notes

1. Following previous research, I consider uncertainty arises in a condition where 'outcomes are not homogeneous enough to be estimated through probability calculus, or they are purely unknown' (Vignoli *et al*., 2020: p. 27). *Economic uncertainty* thus arises when individuals cannot expect or feel secure about their future economic outcomes in several aspects, such as employment careers, financial situations, and their ability to handle adverse economic situations (Buh, 2023). While the concept of uncertainty is inherently subjective, the operationalization of economic uncertainty in the empirical literature involves both subjective and objective measurements (Vignoli *et al*., 2020). On the other hand, following Alderotti *et al*. (2021), I define *employment instability* as an individual risk factor related to unstable, insecure employment experiences. Empirically, the concept is mostly operationalized using objective measurements, such as employment status, contract types, job characteristics, or the intersection of these factors (Buh, 2023). Accordingly, this study discusses the childbirth influences of employment instability, with a specific focus on women's objective employment situations, in the broader literature linking economic uncertainty and fertility.
2. To this end, I do not discuss a wide range of policies that are without a specific demographic target, such as labour market policies, education policies, and social or health security policies, although such policies could affect women's work–family decisions (Blossfeld *et al*., 2005; Esping-Andersen, 2009; Bergsvik *et al*., 2021). With a focus on women, I also leave aside paternity or parental leaves reserved for fathers because the influences of paternity quota on mothers' work and fertility decisions are mainly indirect, contingent on how fathers respond to their increased efforts at homecare (Bergsvik *et al*., 2021).
3. In theory, women's entitlement to paid leaves does not guarantee job protection. In practice, European countries' leave programs generally cover both dimensions; employed women who received wage-replacement benefits during the leave period are also entitled to job protection. Still, the length of leave entitlement and the wage replacement rates of the benefits differ largely across countries. This article focuses on the length and generosity of paid maternity and parental leaves for mothers, assuming job protection for employed mothers during the leave period.
4. When the 90 per cent confidence interval contains only values that are more negative than the benchmark of a substantively negative effect, it indicates that the *p*-value is less than 0.05 for a one-tailed test of the null hypothesis that the effect is equal to or higher (i.e. weaker) than the substantively negative value.
5. See Supplementary Material S3 for the method translating predictive probabilities to odds ratios.

Supplementary Data

Supplementary data are available at *ESR* online.

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