

## **Mothers' Union Status, Education and Birth Outcomes during the Economic Crisis in Spain**

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### **Introduction**

Cohabitation has become a more normal part of adult union formation and has been associated with the rise in unmarried births (Kennedy and Bumpass 2008). An increasing number of children were born to cohabiting women or expected to experience parental cohabitation during childhood. Therefore, the prevalence of unmarried cohabitation may have an imperative implication for families with children (Bumpass and Lu 2000; Setlzer 2004; Kennedy and Bumpass 2008).

Spain was always described as a paradox (Dalla Zuanna and Micheli 2004) owing to the coexistence of the lowest-low fertility and a low prevalence of cohabitation, which is at odds with the assumption of the Second Demographic Transition (Coleman 2004). However, recent research demonstrates that cohabitation has no longer been a rare type of union formation and becomes a relatively common partnership choice among the younger cohorts nowadays (Marta and Teresa 2013). Furthermore, the rapid increase in unmarried cohabitation in Spain has been accompanied by substantial childbearing and childrearing within cohabitation (Sweeney, Castro-Martín and Mills, 2015). The percentage of births occurring outside marriage is 40.83% of all births, with roughly one-half occurred within cohabitation (INE). Country-specific trends in Spain may result in different outcomes of children born to married and cohabiting unions in relation to other European countries.

Although cohabiting and married families are similar in the family structure (both parents are present, no matter they are biological parents or not), factors related to cohabitation may potentially reduce children's wellbeing (Manning 2015). Birth outcomes are the earliest and most important indicators of children's wellbeing, which are tied to the health inequity in early life. Children born to cohabiting women are more likely to have poorer birth outcomes than their counterparts born to married women (Padilla and Reichman 2001; Luo et al. 2004; Shah, Zao and Ali, 2011). By contrast, when parents' union status is measured at older ages of their children, those living in cohabiting and married families have similar levels of overall health (Schmeer 2008). Hence, mother's union status makes bigger difference for very young children's health outcomes than for older children's.

Maternal education is another key indicator and source of children's well-beings. Cohabiting mothers are more likely to have lower levels of education than married mothers do (Manning 2015; Perelli-Harris et al. 2012), which partly explains the

adverse outcomes for children born to cohabiting mothers. The studies that have done have yielded inconsistent results concerning the effect of maternal education, meaning that very little is actually known how cohabitation links to newborns' health outcomes.

The purpose of our research is to explore the association between mothers' union status, education and birth outcomes in Spain. There are four research questions in this paper: (a) whether or not mothers' living arrangements at birth are related to their educational attainments; (b) whether or not the newborn's health outcomes are associated with mothers' union status; (c) if so, whether the disparity in birth outcomes depends on mothers' educational levels; (d) whether or not the birth outcome gap between married and cohabiting women narrows over time.

## **Background**

### *Maternal union status and child well-being*

The prevalence of cohabitation in the western countries raised questions regarding how children fare in cohabiting unions. A large number of studies found that children in cohabiting unions were more likely to suffer from worse outcomes, such as lower academic attainments and more behavioral problems, in comparison with children in intact married families (Artis 2007; Hofferth 2006). The disadvantages for children living in cohabiting unions are mainly attributable to the features of cohabitation: instability, fragility and lack of institutionalization. On the one hand, children living in cohabiting households have higher risks of experiencing parental dissolution than their counterparts in married families (McLanahan, 2011; Manning et al. 2004). A quarter of cohabiting couples with children separated within 1 year (Graefe and Lichter 1999), and only 14% survived for more than 5 years (Kennedy and Bumpass 2008). Even if the biological relationship with both parents are concerned, the impact of cohabitation still exists (Brown 2004). On the other hand, there is a great deal of ambiguity in partners' roles and responsibilities in cohabiting families (Nock 1995). Hence, children living in two-biological-parent cohabiting households tend to experience poorer parenting practices, including less parental engagement (Artis 2007; Hofferth 2006), lower levels of parental sensitivity (Klausli and Owen 2009), and higher levels of corporal punishment (Gibson-Davis 2008).

Birth outcome is one of the most important and earliest indicator of child well-being, in that it is the major determinant of mortality and neonatal morbidity (Franaroff et al. 2007; Kramer et al. 2000; Wang et al. 2004), developmental and behavioral sequelae (Delobel-Ayoub et al. 2009; Gray, Indurkha and McCormick 2004; Huddy, Johnson and Hope 2001; Vohr et al. 2000), and it also has a long-term effect on health outcomes and in adult life (Odberg et al. 2010; Walter et al. 2009; Saigal and Doyle 2008). Given that the adverse birth outcome has serious consequences across individuals' life course, more attention should be paid on this inequity in maternal and infant health.

Research suggests that the birth outcome of cohabiting women is better than unmarried non-cohabiting women, but is still worse than married ones (Blondel and Zuber 1988; Kiernan and Pickett 2006; Raatikainen, Heiskanen and Heinonen 2005; Luo, Wilkins and Kramer 2004). The adverse birth outcome of cohabiting mothers is

mainly related to three factors: first, as the consistently higher dissolution rates among cohabiting parents are concerned, the gap between marriage and cohabitation in terms of legal rights and protections may present economic insecurity for cohabiting mothers (Kiernan and Pickett 2006). Second, maternal health and health-related behaviors are worse among cohabiting women than married women. In comparison to married women, their cohabiting counterparts are less likely to quit smoking after pregnancy (Bird et al. 2000; Teitler 2001), experience greater stress and higher risk of maternal depression during pregnancy (LeBourdais et al. 2000; O'Connor et al. 1998), after adjusting for the sociodemographic factors. Third, cohabiting women may receive inadequate prenatal care than married women (Zeitlin, Saurel-Cubizolles and Ancel 2002).

### *The effect of maternal education*

Maternal education may modify the impact of union status on children's well-beings, since the disadvantages and resources of children born to cohabiting women are largely conditioned by the socioeconomic situation of their mothers. McLanahan (2004) contends that there are two trajectories for women during the Second Demographic Transition, which is also widening the disparities in children from different backgrounds. In addition to more economic resources, highly educated women are more likely to marry (Murray 2013), give birth within marriage (Perelli-Harris et al. 2010) and have a lower risk of divorce (Härkönen and Dronker 2006). Children born to college-educated women experienced greater gains than the those born to less educated women. Maternal education is of particular interest because education encapsulates several advantages, for instance, labor market prospects, earning potential and cultural outlook (Ní Bhrolcháin and Beaujouan 2013). Even if mothers' age, employments are significantly related to the inequality in children's resources, maternal education contributes more to their gains and losses (McLanahan and Jacobsen 2015).

Previous studies demonstrated the fact that children living in married rather than cohabiting unions fare better can be partially or completely attributable to maternal education. Manning and Brown (2006) found that the advantage of children living with married parents in terms of economic well-being appears to be explained by parents' education instead of their living arrangements. Harknett (2008) examined the mechanisms under the association between union status and child health using the risk of asthma among young children. Results showed cohabitation is equivalent to marriage once maternal education, income and race are controlled. As birth outcomes are concerned, maternal union status was no longer significantly associated with birth outcome when controlling for mothers' socioeconomic characteristics (MacDonald, Peacock and Anderson 1992; Albrecht, Miller and Clarke 1994). A Canadian study found that after adjustments for mothers' education and other demographic characteristics, the risk of low birth weight among cohabiting women does not significantly differ from married women (Doucet, Baumgarten and Infante-Rivard 1989). In addition, higher maternal education may mitigate the negative effect of cohabitation but not eliminate it (Luo, Wilkins and Kramer 2004). Studies on birth outcomes demonstrated that, after adjusting for maternal education, age and the degree

of urbanization, poor birth outcomes (perinatal mortality, preterm delivery and low birth weight) were more likely to occur among single mothers than married women, whereas cohabiting mothers were more similar to married mothers (Manderbacka et al. 1992). Likewise, MacDorman and Atkinson (1999) found that union status does not have effect on the risk of infant mortality among those who born to college-educated women.

As a result, the mechanism underlying the relationship between maternal union status and birth outcomes is unclear. We should explore if mothers' union status is truly associated to birth outcomes, or it just proxies for socioeconomic and demographic characteristics of mothers in different living arrangements.

### *Cohabitation and childbearing in Spain*

Spain has consistently been regarded as a country with a low diffusion of cohabitation due to its strong Catholic tradition and the Mediterranean pattern of family formation. However, Spanish society has a remarkable characteristic that the process of family changes once emerged, the pace of changes was generally faster and more intensive than in other European countries (Dominguez-Folgueras and Castro-Martín 2013; Lesthaeghe 2010). For example, only 6.4 percent of Spanish women who born in the 1950s entered their first conjugal union through cohabitation by age 35, increased to 38.8 percent of women who born in the 1970s (Dominguez-Folgueras and Castro-Martín 2013). People's attitudes toward cohabitation and births outside marriage have changed substantially too. In the International Social Survey Program 2012 on Family and Changing Gender Roles, 87% of Spanish respondents agreed with the statement "it is alright for a couple to live together without intending to get married", only 30.13% insisted that "people who want children ought to get married". Therefore, as a select group (2013) concluded, Spain has no longer been labelled as "marginal"<sup>1</sup> path to family formation nowadays.

The lowest-low fertility in Spain emerged in the 1990s (total fertility rate is 1.36) and became the second lowest country in fertility in 2013 (1.27, slightly higher than Portugal). On the contrary, the unmarried births kept increasing, from 11.1% in 1995 to 40.8% in 2013 (the National Statistical Institute of Spain), largely driven by the growing proportion of births to cohabiting mothers (more than 50 percent). However, Spain still lags behind most European countries in terms of first births within cohabitation. Children born to cohabiting mothers account for 36% in Austria, 52% in France, 27% in the Netherlands, 54% in Norway and 31% in the UK at the early 2000s (Perelli-Harris et al. 2012), while the proportion in Spain was 24.1% in 2009. Zeitlin and her colleagues (2002) found that the effect of union status on the adverse birth outcomes varies by the marital practices in a country. Countries like Spain where the consensual union is relatively less common, the risk of adverse birth outcomes is significantly higher among cohabiting mothers than their married counterparts. Whereas in countries where cohabitation is more common, such as France and Sweden, there is no risk associated with union status.

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<sup>1</sup> Heuveline and Timberlake (2004) compared the prevalence of unmarried cohabitation in the 17 industrialized nations and classified Spain to the "marginal" type, implying that social stigma and institutional penalizations confined cohabitation to a small minority of couples.

*The characteristics of cohabiting women and mothers in Spain*

Although cohabitation spreads rapidly in Spain, a considerable heterogeneity has been identified between Spain and other European nations with regards to the characteristics of cohabitators and the meanings of cohabitation. Kalmijn (2013) posited that in poorer countries where gender roles are less egalitarian, such as Italy, Greece and Spain, cohabitation is more common among less educated women, while in wealthier countries where gender roles are more egalitarian, such as Sweden and Denmark, better-educated women are more likely to be in a cohabiting unions. On the contrary, other researchers demonstrate that cohabitators in Spain are confined to a select group of people: better educated women. (Baizán, Aassve and Billari 2003; Pereiro, Pace and Didonna 2014). The opposite results in the characteristics of cohabiting women in Spain may be attributable to the differences of the focus group. Kalmijn (2013) emphasized on middle-aged people (ages 40-49), while cohabitators in Spain mainly consist of younger cohorts and never-married people after 1990s (Garcia Pereiro et al. 2012; Muñoz-Pérez and Recaño-Valverde 2011).

In Spain, the educational gradient is positive in cohabitation (Sweeney, Castro-Martín and Mills 2015), that is, highly educated women are more likely to be in a cohabiting union than their less educated counterparts. One explanation is the capacity of economic independence and better economic situation. Spanish families are characterized by adult children's prolonged co-residence with their parents and high synchronization among leaving parents' home, union formation and giving birth (Billari, Philipov and Baizan 2001). Due to the lack of resources, young adults have to postpone leaving their parents' home and forming their own families. Hence, considering economic returns to education, highly educated women have the capacity to live independently and form unions other than marriage. The other explanation applies to the Second Demographic Transition theory (e.g., Lesthaeghe 1995; Van de Kaa 1987), which highlights the magnitude of ideational changes in shaping partnership formation patterns. In comparison to lower educated women, those with higher education are forerunners of receiving and accepting new family patterns. They value gender equity and autonomy, thus may prefer cohabitation to marriage for rejecting traditional gender roles.

The motivations and determinants of forming a cohabiting union differ from the transition to motherhood within cohabitation (McLanahan and Jacobsen 2015). Women may practice cohabitation because it is popular in the society, easier to exit, or uncertainty of the current partner. But the transition to motherhood means more responsibilities, commitments, and investments. Therefore, it is possible the traits of cohabiting mothers and that of all cohabiting women are diverse. Moreover, these characteristics are not invariable but change over time. Perelli-Harris and her colleagues (2012) found the educational gradient of childbearing within cohabitation changed over time in Europe. In the early 1970s, the educational gradient of cohabiting mothers did not significantly differ from married mothers. In the late 1970s and early 1980s, highly educated women were more likely to give birth within cohabitation than within marriage. In the mid-1980s and the late 1990s, very little difference in the educational gradient of childbearing was found between married and cohabiting mothers. Finally,

the education gradient of childbearing reversed, i.e. the risk of childbearing within cohabitation is lower than within marriage for women with higher education at the start of twenty-first century.

Little is known about the relationship between maternal education and cohabitation in Spain. Davia and Legazpe (2015) showed that cohabitation declined the average probability of having the first child regardless of maternal education. Nevertheless, the differences between married and cohabiting women with tertiary education were smaller than women with less education. Research on birth outcomes in Spain always classified births to cohabiting women as unmarried births (Delgado-Rodríguez et al. 1998; Juárez et al. 2014; Rodríguez, Regidor and Gutiérrez-Fisac, 1995). Castro-Martín (2010) included both maternal cohabiting status and education in order to fill up the deficiency in prior research. The results showed the risk of low birth weight was among children born to cohabiting mothers was closer to single mothers than to married mothers. But she only suggested the medicating effect of maternal education on the discrepancy between married and unmarried mothers, regardless of the cohabiting status.

#### *The effect of economic crisis in Spain*

Outside economic factors may affect people's union formations and children's well-beings. Due to the economic crisis, Spanish government has substantially cut public health and reduced the aid to families with children from the disadvantaged background (Rajmil et al., 2015). As a result, the proportion of children at risk of poverty or social exclusion increased from 28.6% in 2007 to 35.8% in 2014, 2.5 times higher than in Denmark (from Eurostat). In addition, empirical studies found that macroeconomic recession was related to people's mental and somatic health (Dooley, Fielding and Levi, 1996). Unemployment or the fear of job loss increased mothers' psychological stress (Kasl et al., 1975) and led to worsened nutrition (Roger et al., 1998), thus had an effect on gestation and subsequent birth outcomes (Dooley and Prause 2005). Although a raft of research examined the family patterns (married and unmarried) and the influence on child well-being in Spain, there has been less work under the background of economic crisis. Juárez et al. (2014) compared the economic growth period (2000-2007) and economic recession period (2008-2010) with regards to perinatal outcomes in Southern Spain, and suggested a negative impact of the economic crisis on infants' health outcomes.

The effect of economic crisis may vary by women's union status and educational levels. As cohabitation and childbearing within cohabiting unions become more common in Spain, the impact of maternal union status has been weakened over time (Dominguez-Folgueras and Castro-Martín 2008). Meanwhile, the magnitude of maternal education has increased because education can buffer the adverse influence of macroeconomic situation. Therefore, there will be two main trajectories for mothers and children during the crisis: first, for children born to highly educated mothers, their well-beings become more alike among different union status over time. Second, for children born to lower educated mothers, the differences of their well-beings change between cohabiting and married mothers over time. Because of the higher level of

economic insecurity during the financial crisis, especially for women with lower education, increasing number of them will enter into cohabitation instead of marriage (Kok and Leinarte 2015). Furthermore, cohabitation is more common among young people in Spain, who have suffered disproportionately in the financial crisis (Bell and Blanchflower 2011). Therefore, due to the lack of protections from education, children born to lower-educated cohabiting mothers are more vulnerable over time. And the gap of birth outcomes between married and cohabiting mothers with lower education becomes bigger.

Thus, the hypotheses are stated as follows:

H1: We expect mothers' union status at birth is associated with their educational attainments. Highly educated women have lower risks of being in a cohabiting union at the time of giving birth.

H2: When cohabitation becomes widespread, the degree of the institutionalization of cohabitation is higher, and relationship between cohabitation and women's education coverts from positive to negative.

H3: We propose that newborns' health outcomes are related to mothers' union status. Infants born to cohabiting mothers are worse than those born to married mothers, but healthier than newborns of single mothers.

H4: As the selection effect is concerned, we expect that the relationship between maternal living arrangements (marriage, cohabitation or single) and birth outcomes can be partially explained by maternal education. The differentials in maternal living arrangements in terms of birth outcomes will be lessened (but not disappeared) after adjustment for maternal education.

H5: We expect that recent economic crisis in Spain is negatively associated to birth outcomes for mothers in all union patterns, but the degrees vary by maternal education. For highly educated mothers, union status has a declined impact on birth outcomes across time; for lower educated mothers, union status has an increased effect on birth outcomes.

## **Methods**

### **Data and Sample**

The data to be analyzed came from the Spanish Vital Statistics, provided by the National Statistical Institute of Spain (INE, Instituto Nacional de Estadística). The birth registration forms were filled out by the newborns' parents at the time of birth, which include data concerning maternal union status, socioeconomic and demographic information of both parents, delivery characteristics of all newborns in Spain. The use of population-based data has several advantages, such as sufficient power to detect the effect of union status, high coverage and accuracy. However, the disadvantage is limited information is provided due to the small number of variables, for instance, mothers' smoking or drinking habits, their psychological and physical health during pregnancy.

We restricted our analysis from 2007 and 2014 because the data regarding mother's living arrangements and education was introduced for the first time in 2007. Although married and unmarried births have been clearly distinguished and recorded since 1871 (Castro-Martín 2010), there was no detailed information on unmarried mothers' living arrangements, i.e. whether or not they were cohabiting with a partner. Moreover, 2007 was just around the start of the economic crisis in Spain. So we can examine the potential influence of the crisis on birth outcomes of mothers in different union status. In addition, only singleton deliveries are included in the analysis. In comparison with singleton births, the risks of adverse birth outcomes (low birthweight) are much higher (50% higher of twins and 90% higher of triplets) among live births after multiple gestation (Martin and Taffel 1995; Joseph et al. 1998). Considering multiple births are more common among married women than unmarried women (Fuster et al. 2008)<sup>2</sup>, we excluded all the multiple births (3.6% of total births in 2007; 4.5% in 2013).

### Variables

*Low birth weight.* Low birth weight is associated with infant mortality, healthy and developmental problems in childhood and adolescence, stroke and heart disease in adults. Therefore, it is an essential predictor of social inequalities in the health status of children (Pfinder 2014). According to the World Health Organization (WHO), newborns are classified to LBW if their weights at birth are less than 2500 grams.

*Union status.* The birth registration forms contained questions on both mothers' marital status (married, divorced, widowed and never-married) and living arrangements (living in a common-law relationship, "*pareja de hecho*"). Mothers whose marital status was "married" at the time of birth were considered legally married. Unmarried mothers who claimed living in a common-law union or lived at the same address as the father were considered as cohabitators. Unmarried mothers who were neither in common-law relationships nor shared the same address with fathers (or did not respond to the question of father's address) were considered "single" mothers.

*Mother's socioeconomic status.* Maternal education is the highest academic degree obtained by mothers at the time of giving birth. The variable is categorized into four levels on the basis of the International Standard Classification of Education (ISCE): primary education, lower secondary education, upper secondary education and tertiary education. In addition, we classified maternal occupation to four categories based on the International Standard Classification of Occupations (ISCO-08): inactive, low-skilled occupation, medium-skilled occupation and high-skilled occupation.

*Other covariates.* We adjusted for variables that were found to be significantly related to low birth weight (LBW) in previous studies. Mothers' age at birth was classified into five groups: 18-24, 25-29, 30-34, 35-39 and 40+ years. Mothers' nationality was

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<sup>2</sup> The rise in the proportion of multiple births in Spain has been attributed to the change in age structure of married mothers and the extensive practice of assisted reproductive techniques, which is more common among married women too (Fuster et al. 2008).

categorized into three types: Spanish; developed economies and European countries; developing economies (the World Economic Situation and Prospects 2014). Areas of mother's residence were classified according to the autonomic communities of Spain (19 in total). The degree of urbanization was categorized to three levels (<20,000; 20,000-100,000; >100,000 or capital) based on population size. We also explored whether or not the incident birth is the mother's first or higher-order birth, because first births are associated with higher risks of low birth weight and earlier gestational age (Slattery and Morrison 2002; Wen et al. 2004). Normality of childbirth refers to whether child born with difficulties or not. Newborn's sex, the "male advantage" with respect to poor perinatal outcomes was demonstrated in many studies (Di Renzo et al. 2007; Melamed et al. 2009). The classifications of fathers' socioeconomic characteristics were same as mothers'.

## Results

Table 1 shows the distributions of birth outcomes and mothers' characteristics by union status in 2007 and 2014. In Spain, the total number of singleton births to adult mothers declined from 470,118 in 2007 to 406,182 in 2014. On the contrary, unmarried births have risen rapidly during this period (from 30% in 2007 to 42% in 2014), to which cohabiting mothers contributed much more than single mothers (about 70% of all unmarried births). Hence, births within cohabitation has no longer been a rare and deviant behavior in Spain.

(Table 1 is about here)

Children's birth outcome is measured by the indicator: birth weight. Infants born to cohabiting mothers have a higher risk of adverse birth outcomes than those born to married mothers, but are better off than their counterparts born to single mothers. Moreover, the risk of poor birth outcomes decreased in all types of union status in 2014 than in 2007. As low birth weight is concerned, we observed a slightly decline of the risk for singleton births during the period, which is opposite to the trend in the previous years. The proportion of low birthweight infants increased steadily from 4.5% in 1990 to 7.2% in 2006. It is noteworthy that the risk of LBW dropped greater for children born to single mothers (from 8.2% in 2007 to 7.86% in 2014) than those born to cohabiting (from 7.18% to 6.93%) and married mothers (from 5.82% to 5.7%).

Cohabiting mothers (39% in 2014) have greater expectations for having more children than single mothers (31%), while still less than married mothers (56%). Although the total fertility rate decreased in Spain, mothers are more likely to have more than one child in all union patterns in 2014 than in 2007. The proportion of first births decreased by 8.8% for married mothers, by 5.7% for cohabiting mothers and by 6.1% for single mothers during the period.

Mothers' socioeconomic and demographic characteristics vary by union status and over time. In 2007, the risk of giving birth for cohabiting women with the lowest education (20.27%) is much higher than married women (10.16%), and vice versa, 32.71% of all married births and 17.69% of all cohabiting births born to highly educated

women. Married women with tertiary education are nearly three times as likely to give birth as married women with primary education. Whereas cohabiting women with medium education (lower secondary and upper secondary) have higher risks of having children. In 2014, fertility was associated with a positive educational gradient for both married and cohabiting women. While the educational gradient of married births is more positive than that of cohabiting births. Furthermore, the educational gradient remained positive for cohabiting women if we restrained to first births. That is, cohabiting women with high levels of education (31.15%) have a greater risk of first births than women with low (11.99%) in 2014. We should note that the increase in mothers' education for all types of union status during the period may be related to the economic crisis. Owing to the crisis, the unemployment rates rose from 8.3% in 2007 to 23.6% in 2014 (INE), increasing number of Spanish people returned to school and pursued higher education in order to find a job. According to Eurostat, female early leavers (18-24 years) from education and training in Spain reduced from 24.7% in 2007 to 18.1% in 2014. The participation of married mothers (77.93%) in the labor market was higher than cohabiting (71.96%) and single mothers (72.46%), as well as the proportion of married mothers with a high-skilled occupation was higher than both types of unmarried mothers. There has been a greater rise in the labor market participation for cohabiting mothers (4.6%) than married (1.08%) and single mothers (0.65%) from 2007 to 2014.

In addition, women in all kinds of living arrangements postponed the transition to motherhood during the period of 2007-2014. Unmarried mothers were significantly younger than married mothers when they gave birth. For married women, the majority of births occurred above 30 years old, and they kept delaying childbearing from 75.06% in 2007 to 83.09% in 2014. It is also true for first births to married women (67.43% in 2007 to 77.07% in 2014). For unmarried women, cohabiting mothers were generally older than single mothers. More than a half of all births within cohabitation occurred to mothers aged 25-34 years, compared to 18-29 years old for single mothers.

Previous suggested that foreign mothers contributed significantly to the growth of nonmarital fertility in Spain since the mid-1990s (Arango 2000; Castro-Martín 2010). However, we found that not only less births were to foreign mothers (18.21% in 2007 compared to 16.56% in 2014), but also children born to non-Spanish women were less likely to be unmarried births (from 25.01% in 2007 to 15.22%) than those born to Spanish mothers. Contrary to the rapid growth of immigrants at the time of economic prosperity, there has been a retreat from Spain among immigrants as a result of the financial crisis since 2007 (from 958,266 in 2007 to 280,772 in 2013, Eurostat). And the fertility rates of foreign mothers declined from 1.72 in 2007 to 1.53 in 2013 (Spanish National Statistical Institute). Moreover, Spanish women (84.69%) were more likely to have children within married unions in 2007, whereas childbearing within cohabitation became more common among them (85.38%) in 2014. The degree of urbanization was measured by the town size of mothers' residential areas. The proportions of cohabiting and single mothers were positively associated to the urbanization of mothers' residential areas in the both years. Women lived in small towns were more likely to give birth within marriage, and the distribution of childbearing within cohabitation was more alike

to married women than single mothers.

(Table 2 is about here)

In table 2, we examined the association between mothers' union status and educational attainments in 2007 and 2014 using the multinomial logistic regression. The results in model 1 show that women are less likely to be in a cohabiting union or be a single mother at the time of giving birth in all educational levels. Moreover, the relative risk of being in a cohabiting union reduce with the increase in mothers' education. Women with tertiary education are least likely to bear a child within cohabitation (0.27) in comparison to those in a marital union. The educational gradient in being a single mother is even more negative than the gradient in being a cohabiting mother. Increasing number of mothers reported cohabitation at birth in 2014 than in 2007 at all levels of education. However, it is noteworthy that the gap in the relative risk ratios of cohabitation at birth between mothers with lower secondary education and tertiary education widened a little (4%) from 2007 to 2014.

After adjustment for all the covariates in model 2, the relative risk of being cohabitating or single mothers elevated in all educational levels and both years. The relative risk ratios of cohabiting at birth increased from 0.69 to 0.91 among mothers with lower secondary education, from 0.48 to 0.74 among mothers with upper secondary education and from 0.27 to 0.55 among mothers with tertiary education. In 2007, the effect of education on women's living arrangements at birth could partially be explained by mothers' other characteristics such as occupation, age cohorts, nationality, residential areas and their partner's socioeconomic status. Younger cohorts, foreign nationality (only for developed and other European countries) and living in bigger cities are traits related to higher risks of cohabitation at birth. The association between maternal occupation and their living arrangements at birth is in the opposite direction compared to maternal education. Compared with those who are inactive in the labor market, the risks of cohabitation at birth are higher among employed women and increased by the levels of skills requiring by the job. Partner's economic potential and status are determinants of mother's union status as well. The results suggest that education and occupation of mothers' partner (most likely the newborn's father) are negatively associated with the relative risk of cohabiting at birth.

In 2014, after adjustment for other control variables, the relative risk ratios of cohabiting at birth increased slightly, range from 2% among women with lower secondary education to 14% among highest educated women. This trend of rise in 2014 was also steeper than in 2007 ranging from 22% to 28%. Furthermore, employed women have higher risks of cohabiting at birth than who are inactive in the labor market. Nevertheless, the relationship between the occupation of employed mothers and the risks of cohabitation converted to negative. Compared to women who are inactive in the labor market, those with low-skilled work have 20% higher relative risks of cohabitation at birth, while those with high-skilled work only have 11% higher relative risks of cohabitation. Partner's socioeconomic status became a more essential determinant of women's living arrangements at birth.

(Table 3 is about here)

Table 3 presents the results of the logistic regression models predicting the odds ratios (ORs) of low birth weight birth. Model 1 investigates the association between mothers' union status and adverse birth outcomes in 2007 and 2014 separately. Compared to married mothers, the odds of having a low weight birth are significantly higher among both cohabiting and single mothers. Birth outcomes among cohabiting mothers were worse than among married mothers, but much better than among single mothers. Regarding the trends in the influence of maternal union status on adverse birth outcomes over time, we compared the model 1 for 2007 and the model 1 for 2014. The results show a slightly weakening impact of union status on the odds of low weight birth. For example, the crude ORs of LBW for cohabiting versus married mothers decreased from 1.25 in 2007 to 1.23 in 2014.

In order to assess whether and to what extent the excess risks of adverse birth outcomes among cohabiting and single mothers are attributable to their educational levels, we included maternal education in Model 2. As expected, mother's education is significantly related to the risks of low weight. The ORs are progressively higher from mothers with tertiary education to lower secondary education. It is important to note that the gap in birth outcomes between women with tertiary education and women with lower secondary education widened from 2007 to 2014. In addition, differentials in the risk of adverse birth outcomes by maternal union status attenuate once mother's educational levels are introduced in the Model 2. Compared with the crude ORs, the adjusted ORs of both LBW are lower in magnitude after adjustments in both years. But maternal union status is still significantly associated with birth outcomes. And the adjusted ORs for cohabiting versus married mothers decreased by 6% for LBW in 2007, and by 5% for both in 2014. Therefore, mother's education may account for the risk of adverse birth outcomes in different types of union status, but it cannot completely explain this diversity.

The effects of the other covariates on birth outcomes were examined in the model 3, including mother's sociodemographic and father's socioeconomic characteristics, newborn's gender and birth order. Children born to mothers who were active in the labor market and have a job requiring higher skills have lower risks of being a low weight birth. Occupation is more directly related to the economic situation of a mother, thus to the economic resources obtained by her children. The significance of maternal education and occupation increased from 2007 to 2014. Mothers with low-skilled work did not significantly differ from those who were inactive at birth in 2007, but they have an obviously lower risk of LBW in 2014. As expected, young mothers are less likely to deliver a low weight birth and the ORs of LBW increase by mother's age cohort. We did not find statistically significant difference between mothers aged 18-24 and aged 25-29. Consistent with previous research on the birth outcomes of immigrant women, we find that foreign women who residing in Spain have lower risks of LBW than native ones. Moreover, the size of mothers' residential regions was significantly associated to their birth outcomes for 2007 but not for 2014. In 2007, mothers living in big cities or

capitals had higher ORs of LBW than those in small towns.

The results suggest that the differentials in LBW by maternal union status can partially be attributed to paternal education and occupation as well. Although fathers' socioeconomic characteristics are less important than mothers' in terms of birth outcomes, they can provide material and emotional protections to their pregnant partner/ spouse. Children born to fathers with higher educational levels are less likely to be low weight at birth than those born to fathers with low education. However, we find the lessened effect of paternal occupation on birth outcomes from 2007 to 2014. In 2014, only children born to fathers who have a job requiring high skills were significantly related to reduced ORs of being low weight (0.9). Additionally, baby boy and higher birth order are linked with lower risks of poor birth outcomes.

(Table 4 is about here)

The results in table 3 shows that maternal education is significantly associated with birth outcomes, infants born to highly educated women have lower odds of LBW than those born to least educated women. Although the higher risk of poor birth outcomes for cohabiting women can be attributable to the lower educational attainment compared to married women, education cannot explain the total differentials in low birthweight risks by union status. In table 4, we include interaction terms between mothers' union status and education to test the extent to which the impact of union type depends on the maternal education levels. The results indicate that the diversity in low birthweight by union status is significantly larger among women with the lowest educational level than those with highest education. The negative educational gradient of single mothers' LBW risks is steeper than the educational gradient of cohabiting mothers', and then married mothers' risks.

In 2007, for women with primary and lower secondary education, the risk of LBW among cohabiting mothers was more similar to single mothers. For those with upper secondary education, the odds of LBW among cohabiting mothers were just in the middle of married and single mothers. For women with tertiary education, the probability of delivering a low weight birth did not vary substantially by union status, and cohabiting women were more alike to married women. After adjustment for covariates in the model 3 in Table 3, the low weight birth risks for cohabiting mothers were lowest in 2007, even lower than their married counterparts.

In 2014, the gap between married and cohabiting mothers widened with regards to the LBW among those with primary education. Hence, the probabilities of LBW for cohabiting women became more alike to single mothers due to the greater decrease in LBW for married mothers from 2007 to 2014. For mothers with primary, lower secondary and upper secondary education, cohabiting mothers were more similar to single mothers in 2014. However, for those with tertiary education, the probability of LBW is highest among cohabiting women. After adjustments for other covariates, there were greater changes among women with tertiary education. The risk of LBW for cohabiting mothers became more similar to married mothers again, but both of them were higher than single mothers.

(Table 5 is about here)

Results in Table 3 indicated that the effect of union status on low weight risks reduced from 2007 to 2014, and their relationships also varied by maternal education. In order to explore the association between union status and newborns' health outcomes across time, we pooled the 2007 and 2014 birth files and examined the interactions between union status and year of birth by mothers' educational levels. Model 1 tested the association between mothers' union status and LBW in total and by maternal education. Model 2 included all the covariates in the model 3 in Table 3. Table 5 revealed that the observed risk of delivering a low weight baby significantly rose by 4% among married women from 2007 to 2014 among all mothers and by 6% among those with lower secondary education in model 2. There is no significantly changes in the risk of LBW among cohabiting and single mothers from 2007 to 2014. For mothers with lower secondary education, the probability of delivering a low weight birth for single mothers in 2014 is even lower than their married counterparts in 2014. One possible explanation of the rise in married mothers' LBW risks may be related to the reduction of family and children's benefits in Spain since the economic crisis. For example, the income maintenance benefit in the event of children decreased from 41.33 euro per habitant in 2008 to 36.07 in 2013, and the birth grand fall from 24.52 euro per inhabitant in 2008 to 0.88 in 2013.

## **Conclusion**

In this study, we examined the association between maternal education and living arrangements at birth firstly, in order to fill up the research gap in Spain and better understand the differentials in birth outcomes by maternal union status. The results reveal the negative educational gradient in the risk of cohabiting at birth. Highly educated women are less likely to be in a cohabiting union at the time of giving birth.

Regarding maternal union status and birth outcomes, we find a statistically significant relationship between mothers' union types and the risk of delivering a low weight birth. The disparity in low birthweight risks by union status may be partially attributable to the differentials in maternal educational levels. As we demonstrated above, the risk of cohabiting at birth is lower among women with higher educational attainments. The results also show that the diversity in odds of low birth weight lessened after controlling for maternal education. Among highly educated mothers, low birthweight risks did not differ significantly by union patterns, especially between married and cohabiting women. Maternal education has become more essential to the birth outcome over time as well. As a result, the impact of maternal union status on birth outcomes may decrease over time; on the contrary, mothers' educational attainments become more important in terms of child well-being, particularly under the background of the economic crisis. In the context of the crisis, the Spanish government cut some benefits for family and children, also the high unemployment rates endangered child well-being. Considering that the fact that social protections during crisis in Spain mainly focused on retired/old people instead of families with children, the percentage

of children (<6 years old) who at risk of poverty and social exclusion increased from 23.2% in 2007 to 34% in 2014. Hence, children's well-beings rely more on their parent's, particularly mother's economic resources.

The main limitation of the research is unmeasured variables. First, the information concerning mother's diet, nutrition, health status, smoking habits and psychological health is not available in the vital registration data. Second, the disparity in newborns' health outcomes by maternal union status may stem from differences in paternal care during pregnancy. Father involvement in the care of his pregnant partner, from daily care to the awareness of maternal health problems, may result in better birth outcomes and mother's health status. Third, we lack the indicators to measure the impact of economic crisis on family changes and newborn's health well-being. Further research is needed in order to focus better on the family changes and child welfare under the circumstances of the economic crisis.

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**Table 1. Maternal characteristics by union status in 2007 and 2014**

			2007			2014		
			Married	Cohabiting	Single	Married	Cohabiting	Single
Birth	LBW		5.82	7.18	8.20	5.70	6.93	7.86
	Gender	Boy	51.59	51.64	51.63	51.67	51.86	51.60
	Birth order	1	53.36	66.70	74.62	44.52	60.97	68.50
		2	36.80	23.95	18.26	44.02	30.64	23.05
		3+	9.85	9.35	7.12	11.46	8.39	8.45
Maternal	Education	Primary	10.16	20.27	20.53	9.61	15.79	16.53
		Lower secondary	22.20	30.78	26.77	16.68	23.58	21.78
		Upper secondary	29.08	27.71	21.72	26.37	27.44	23.19
		Tertiary	32.71	17.69	12.21	41.82	27.45	18.97
		No info.	5.85	3.55	18.76	5.51	5.73	19.53
	Occupation	Inactive	22.07	28.04	27.54	19.99	23.44	28.19
		Low-skilled	5.45	7.34	6.72	5.94	7.85	8.20
		Semi-skilled	36.28	34.23	32.13	39.45	43.31	38.59
		High-skilled	21.29	12.58	10.45	33.14	24.41	20.20
		No info.	14.91	17.81	23.16	1.47	0.98	4.81
	Age	18-24	5.10	22.69	30.72	3.19	11.74	20.57
		25-29	19.85	26.15	25.05	13.71	20.83	22.25
		30-34	43.31	28.89	24.44	38.57	32.48	26.78
		35-39	26.79	17.52	14.88	35.55	26.92	22.02
		40+	4.96	4.75	4.91	8.97	8.03	8.37
	Nationality	Spanish	84.69	74.63	76.18	82.46	85.38	83.11
		Developed & Europe	4.07	8.77	5.79	4.84	6.58	4.73
		Developing	11.24	16.60	18.03	12.70	8.04	12.16
	Town size	<20,000	31.52	27.95	22.47	30.11	28.57	23.35
		20,000-100,000	27.82	28.46	27.05	27.89	28.98	28.67
		>100,000 or cap	40.66	43.59	50.49	42.00	42.44	47.99
Paternal	Education	Primary	12.09	21.08	14.52	11.91	19.34	18.21
		Lower secondary	25.72	31.98	19.65	23.44	29.33	23.99
		Upper secondary	29.58	27.38	15.87	30.70	29.44	21.08
		Tertiary	24.07	12.51	6.74	30.44	18.25	12.41
		No info.	8.55	7.06	43.22	3.52	3.64	24.30
%			70.13	22.97	6.90	57.76	31.16	11.08
N			314242	102927	30898	221730	119629	42544

Data are presented as percentages.

Chi-squared tests for overall differences in maternal characteristics were all significant at  $P < 0.001$

**Table 2. The relative risk ratios from multinomial regressions predicting maternal living arrangements at birth, 2007 and 2014**

		2007				2014			
		Model 1		Model 2		Model 1		Model 2	
		Cohabitation /marriage	Single /marriage	Cohabitation /marriage	Single /marriage	Cohabitation /marriage	Single /marriage	Cohabitation /marriage	Single /marriage
<b>Maternal</b>									
Education	lower secondary	0.69***	0.59***	0.91***	0.94***	0.86***	0.76***	0.88**	1.01
(ref.=primary)	upper secondary	0.48***	0.37***	0.74***	0.74***	0.63***	0.51***	0.71***	0.83***
	tertiary	0.27***	0.18***	0.55***	0.52***	0.40***	0.26***	0.54***	0.58***
	no info.	0.31***	1.59***	0.41***	0.43***	0.63***	2.06***	0.74***	0.59***
Age	25-29			0.34***	0.24***			0.43***	0.1***
(ref.=18-24)	30-34			0.19***	0.12***			0.26***	0.15***
	35-39			0.19***	0.11***			0.25***	0.14***
	40+			0.28***	0.19***			0.29***	0.19***
Nationality	developed & Europe			1.74***	0.82**			1.01	0.56***
(ref.=Spanish)	developing			0.97**	0.62***			0.35***	0.29***
Town size	20,000-100,000			1.10***	1.23***			1.13***	1.28***
(ref.=<20,000)	>100,000 or cap.			1.34***	1.95***			1.27***	1.7***
Community	Aragon			0.82***	0.53***			0.92**	0.4***
(ref.=Andalucia)	Asturias			1.19***	0.61***			1.04	0.68***
	Balears			1.99***	0.58***			1.53***	0.65***
	Canarias			2.53***	3.06***			2.34***	2.6***
	Cantabria			1.2***	1.01			1.05	0.98
	Castillay Leon			0.99	0.78***			1.05**	0.66***
	Catilla la Mancha			0.84***	0.58***			0.79***	0.54***

	Catalunya	1.22***	2.26***	1.03*	2.67***
	Valencia	1.17***	0.67***	1.09***	0.6***
	Extremadura	0.81***	0.92	0.82***	0.82***
	Galicia	1.29***	0.79***	1.27***	0.84***
	Madrid	1.44***	0.43***	1.08***	0.61***
	Murcia	0.99	0.48***	0.81***	0.54***
	Navarra	0.99	0.55***	1.01	0.46***
	Pais Vasco	1.3***	1.32***	1.19***	0.91**
	Rioja	0.67***	0.76**	0.76***	0.38***
	Cuenta	0.3***	0.68***	0.23***	0.55***
	Melilla	0.65***	0.8	0.62***	0.72***
Occupation (ref.=inactive)	low-skilled	1.13***	1.25***	1.2***	1.26***
	semi-skilled	1.14***	1.19***	1.18***	1.11***
	high-skilled	1.16***	1.16***	1.11***	1.03
	no info.	1.09***	0.76***	0.75***	0.45***
Paternal Education (ref.=primary)	lower secondary	0.96***	0.91***	0.87***	0.85***
	upper secondary	0.9***	0.85***	0.77***	0.7***
	tertiary	0.68***	0.71***	0.57***	0.55***
	no info.	0.76***	9.29***	0.79***	4.2***
Occupation (ref.=inactive)	low-skilled	0.74***	0.68***	0.65***	0.49***
	semi-skilled	0.7***	0.67***	0.66***	0.46***
	high-skilled	0.65***	0.53***	0.64***	0.42***
	no info.	0.84***	1.37***	0.71***	3.69***
N		448067		383903	

Note: The analysis is restricted to singleton births. \*p<.05, \*\*p<0.01, \*\*\*p<.001

**Table 3. Unadjusted and adjusted odds ratios from logistic regressions predicting low birth weight, 2007 and 2014**

Low Birth Weight		2007			2014		
		model 1	model 2	model 3	model 1	model 2	model 3
<b>Maternal</b>							
Union status	cohabiting	1.25***	1.19***	1.14***	1.23***	1.18***	1.01***
	(ref.=married) single	1.44***	1.35***	1.27***	1.41***	1.31***	1.11***
Education	lower secondary		0.87***	0.85***		0.9***	0.85***
	(ref.=primary) upper secondary		0.78***	0.78***		0.83***	0.77***
	tertiary		0.68***	0.68***		0.69***	0.66***
	no info.		0.84***	0.82***		0.95***	0.81***
Occupation	low-skilled			0.97			0.91**
	(ref.=inactive) semi-skilled			0.91***			0.9***
	high-skilled			0.89***			0.87***
	no info.			0.99			0.88*
Age	25-29			1.04			0.99
	(ref.=18-24) 30-34			1.12***			1.1**
	35-39			1.31***			1.34***
	40+			1.62***			1.64***
Nationality	developed & Europe			0.94*			0.92**
	(ref.=Spanish) developing			0.76***			0.78***
Town size	20,000-100,000			1.04*			0.97
	(ref.=<20,000) >100,000 or cap.			1.1***			1.02
Community	Aragon			1.24***			0.98
	(ref.=Andalucia) Asturias			1.16**			1.02
	Balears			0.95			0.96
	Canarias			1.18***			1.13***
	Cantabria			1.03			1.11
	Castilla y Leon			1.14***			1.01
	Catilla			1.15***			1.03
	la Mancha						
	Catalunya			1.11**			0.97
	Valencia			1.16***			1.04
	Extremadura			0.97			1.00
	Galicia			1.07*			1.02
	Madrid			1.25***			1.15***
	Murcia			0.99			1.03
	Navarra			1.08			0.90
	Pais Vasco			0.93*			0.83***
	Rioja			1.03			0.81*
Cuenta			0.76*			0.60***	
Melilla			0.71*			0.72**	
<b>Paternal</b>							
Education	lower secondary			0.91***			0.92***

(ref.=primary)	upper secondary	0.83***	0.86***
	tertiary	0.79***	0.76***
	no info.	0.90***	0.91*
Occupation	low-skilled	0.92	0.94
(ref.=inactive)	semi-skilled	0.89*	0.94
	high-skilled	0.86**	0.90*
	no info.	0.94	1.21**
Newborns'			
Gender		0.79***	0.82***
(ref.=girl)	boy		
Birth order	2	0.72***	0.65***
(ref.=1)	3+	0.79***	0.69***
N		448067	383903

Note: The analysis is restricted to singleton births. \*p<.05, \*\*p<.01, \*\*\*p<.001

**Table 4. Unadjusted and adjusted odds ratios from logistic regression predicting low birth weight. Interaction between maternal union status and education in 2007 and 2014**

	2007		2014	
	Model 1	Model 2	Model 1	Model 2
Union status*Maternal education (Ref. = married*primary)				
Married* Lower secondary	0.88***	0.85***	0.99	0.91*
Married* Upper secondary	0.82***	0.81***	0.94	0.86***
Married* Tertiary	0.72***	0.72***	0.80***	0.76***
Married* No info.	0.87***	0.83***	0.97	0.84**
Cohabiting* Primary	1.28***	1.20***	1.40***	1.25***
Cohabiting* Lower secondary	0.97	1.02	0.86**	0.90*
Cohabiting* Upper secondary	0.91*	0.93	0.82***	0.84**
Cohabiting* Tertiary	0.81***	0.81***	0.77***	0.78***
Cohabiting* No info.	0.98	1.02	0.91	0.97
Single* Primary	1.45***	1.34***	1.59***	1.35***
Single* Lower secondary	0.99	1.05	0.80**	0.86*
Single* Upper secondary	0.91	0.92	0.78***	0.83**
Single* Tertiary	0.80*	0.78**	0.65***	0.66***
Single* No info.	0.91	0.96	0.99	0.91
N	448067		383903	

Note: The analysis is restricted to singleton births. \*p<.05, \*\*p<.01, \*\*\*p<.001



**Table 5. Unadjusted and adjusted odds ratios from logistic regression predicting low birth weight. Interaction between union status and year by maternal education**

	Total		Primary		Lower secondary		Upper secondary		Tertiary	
	model 1	model 2	model 1	model 2	model 1	model 2	model 1	model 2	model 1	model 2
Union status*Year (ref.=married*2007)										
married*2014	0.98	1.04**	0.9**	1.01	1.01	1.06*	1.03	1.04	0.99	0.99
cohabiting*2007	1.25***	1.13***	1.28***	1.16***	1.23***	1.22***	1.16***	1.1**	1.04	0.94
cohabiting*2014	0.98	0.97	1.09	1.02	0.98	0.93	0.99	0.96	1.04	1.03
single*2007	1.44***	1.24***	1.45***	1.22***	1.45***	1.36***	1.32***	1.22***	1.16*	1.05
single*2014	0.97	0.95	1.1	1.08	0.89*	0.87*	0.95	0.94	0.89	0.88