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Season of Birth and Mother and Child Characteristics: Evidence from Spain and Chile*

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Abstract

By using birth certificates for Chile and Spain we investigate differences in mother and child characteristics according to season of birth. Our findings reveal that children born in winter are more likely to have a mother who is a teenager and unmarried at date of birth. Spanish data also reveals that women giving birth in winter are more likely to be out of the labor force, a result largely driven by high skilled mothers. We additionally find that children born in the winter months have fewer weeks of gestation, lower birth weights and smaller size. Finally for Spain, the 2001 population census and the 1999 fertility survey confirm the seasonal pattern in mother characteristics, and indicate that it is mostly driven by women who planned the births.

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1 Introduction

Long standing research has found a significant correlation between season of birth and a number of outcomes: test results (Cascio and Lewis, 2006), educational attainment (Angrist and Krueger, 1991), level of earnings (Angrist and Krueger, 1991; Bound and Jaeger, 2000; Plug, 2001), and health status (Watson et al., 1984; Gillberg, 1990; Tochigi et al., 2004; Costa and Lahey. 2005; Rock et al., 2006; Reher and Gimeno, 2006). Natural causes and institutional conditions affecting a child's development have been considered to explain the correlation, for instance, illnesses or nutrient deprivation during the pregnancy (Gortmaker et al., 1997; Sham et al., 1994; Suvisaari et al., 1999; Barker, 2001; Almond, 2006); or regulations on compulsory schooling (Angrist and Krueger, 1991). Because factors behind the said correlation have been considered orthogonal to season of birth, the latter's use as an instrumental variable is widespread in the literature.

Beyond natural and social factors explaining the correlation between season of birth and later outcomes in life, Buckles and Hungerman (2013) (BH, hereafter) find a seasonal pattern in women who give birth throughout the calendar year. Their results generate controversy because season of birth used as an instrumental variable[1] has been based on two tenets: 1) Family characteristics are not correlated with season of birth; and 2) family characteristics, and in particular the mother's background, are correlated with children outcomes.

In this paper we provide evidence that support BH's findings using data for Spain and Chile. We find that mother and child characteristics at birth vary in a systematic, seasonal pattern. Notice that Spain, located in the northern hemisphere, has an educational system comparable to that of the US. On the other hand, Chile is located in the southern hemisphere and its educational system is less likely to yield a seasonal pattern in the population completed years of education[2].

Two institutional features cause the seasonal pattern in years of education: 1) a minimum age required to start school coupled with a specific birth date threshold, and 2) a compulsory schooling age. In Chile, the first condition has only been met since 1992 as a new law requires that to enter school in a given year the child must have turned six as of April 1st.

[1] An extensive list of studies is provided in Buckles and Hungerman (2013).

[2] Minimum age requirements did not exist until the year 1992 when Chile's official enrollment cutoff was set at April 1st. Nevertheless, the Ministry of Education provides some degree of flexibility to schools for setting other cutoffs between April 1st and July 1st.

Before 1992, six was the minimum school entry age but no specific date of birth was indicated by law. That means that mothers considered in our analysis were not affected during their childhood by minimum age requirements. In Chile, compulsory education is defined in terms of years of education attained instead of a minimum schooling age to drop out.

Four main results are drawn from birth certificates for these two countries. First, the evidence from Chile and Spain supports BH findings for the US in terms of family settings. That is, mothers giving birth in winter months are more likely to be teenage mothers or coming from more unfavorable family settings. Moreover, Spanish birth certificates show that this pattern in family arrangements is driven by mothers who were more likely to plan their giving birth, measured by reduction in the likelihood that a mother is not married or in case of being married, this marriage had place during the time of conception and birth. Second, the results on the pattern of variables associated to human capital differ between the two countries. For Spain, we observe that mothers giving birth in winter months are more likely to be out of the labor force at the time of birth, which is driven by individuals taking part in high skill professions. For Chilean birth certificates, on the other hand, we do not find a seasonal pattern that fully supports that births among mothers with lower levels of education are concentrated in winter months. Third, we observe for these two countries that children born in winter months have worse birth outcomes, measured by weeks of gestation, birth weight and child size. Birth certificates for Spain, nevertheless, show that winter births are less likely to be cesarean or to present complications. The explanation for this last finding might be found in the fact that these characteristics of mothers giving birth in winter are correlated with public insurance and a lower chance of delaying motherhood, both factors negatively related with a cesarean birth. Finally, and different from BH, we do not find child outcomes being sensitive to the inclusion of mother characteristics.

Furthermore, for Spain we show this seasonal pattern is not restricted to birth certificates. Firstly, census data for the year 2001 confirms that mothers giving birth at the beginning of the year have lower levels of education and they became mothers during adolescence. Census data also shows that children born early in the year are less likely to stay at school and are not engaged in paid activities. Nevertheless, children born the second half of the year are the ones that accumulate fewer years of education. The institutional feature of minimum age

requirements existing in Spain explains these results.[3] Children born in January and February are not only born in winter but also are the older ones in their classes. So by reaching first the minimum compulsory age they are allowed to drop out and engage in paid activities before the rest of the children. On the other hand, children born in the last quarter of the year are the younger in their respective classes so they have to stay longer in school although they started school before their classmates. In fact, earlier age of entry has been associated with worse educational outcomes (Black et al. 2011). Finally, the most recent fertility survey for Spain not only confirms the seasonal pattern in mother characteristics but just as in BH, we show that this seasonality is driven by mothers who planned their births.

The paper is structured as follows. In Section 2, evidence about the seasonal pattern in mother and child characteristics using birth certificates for Chile and Spain is presented. In Section 3, we describe this pattern using census data for Spain. In Section 4 using the 1999 fertility data, we investigate which mothers are accountable for this seasonal pattern. We conclude in Section 5.

2 Birth Certificates, Spain (1980-2011) and Chile (1994-2009)

2.1 Mother characteristics

Using birth certificates for Chile and Spain, we first document the seasonal pattern in mother characteristics over the calendar year. Each of these data sets reports the full population of births taking place in each of these two countries for the selected years.[4] For Spain during the period under analysis, 1980-2011, we have approximately 13 million births and for Chile for the period 1994-2009, we have over 3 million births. For Spain we focus the analysis on first birth, which allows us to reduce the sample size to approximately 7 million births and speed up the computational time[5].

[3] A child is eligible to start school only if a minimum age has been reached by December 31st. That is, with two children turning 3 the same academic year but one in December and the other in January, the first one would be able to start school that year while the second one would have to wait for the next one.

[4] While Spanish birth records report both live and stillborn births, Chilean ones report just live births. We complement Chilean certificates with stillborn data files for the period in order to have a comparable sample. The results are robust to exclusion of stillborn births.

[5] Although we focus the analysis on the first birth for Spain, similar findings are obtained for higher birth order births.

An initial descriptive approximation to the data is presented in Figures 1 to 4. Specifically, we focus on three mother characteristics: marital status at birth, whether or not she is a teenage mother and measures of human capital.

The pattern of the fraction of married mothers, and teenage mothers within the calendar year is presented in Figures 1 and 2, respectively. For Spain over the period 1980-2011 the drop in the fraction of married mothers at the time of birth is remarkable. By early 1981 over ninety percent of the mothers were married at the time of the first birth. This fraction, however, is less than sixty percent by the end of the period under analysis. Consistent with BH for the US, we observe an inverse "U" shape in the monthly pattern of the fraction of married mothers within the calendar year. That is, the highest fraction of married mothers is observed among children born during the second or third quarter of the year with a lower fraction during the first and the last months of the year (winter months). For Chile the same two patterns are observed. First, over the period 1994-2009 we observe a reduction in the fraction of mothers married at the first birth from approximately 60% in 1994 to approximately 30% at the end of the period. Secondly, also consistent with BH, a lower fraction of married mothers is found in winter months, that is, between the months June and August.

The pattern for teen mothers, Figure 2, reveals differences in the long-run trend in this fraction between these two countries. While for Chile the fraction of teen mothers has been stable over the period with approximately 14% of the mothers being teenagers, for Spain this fraction has dropped from approximately 14% in the early 80's to less than 3.5% in the year 2011. Despite these differences in the long-run evolution, a similar seasonal pattern within the calendar year is observed. A higher fraction of births in winter months are due to teen mothers. That is, for Spain a higher fraction of teen mothers are observed during the first and last quarters of the year, though the pattern gets more noisy as we observe a lower fraction of teen mothers at the end of the period under analysis. For Chile, births of teen mothers concentrate between June and September.

BH also reported for the US that women becoming mothers during winter months have on average a lower level of education than those giving birth in other months. While Chile's birth certificates report the education of the mother for the complete period, for Spain we have information on mother's education only since 2007. Nonetheless, for Spain we have information about the profession of the mother for the complete period. Although it is not the

same as education, they are correlated. Nevertheless, profession is only defined for those mothers who were working at the time of birth. Therefore, we define three dummy variables for Spain: "Out of Labor Force", "In High Skill", and "In Low Skill". These variables indicate whether or not a mother is out of the labor force, in the labor force in a high skill profession, and in the labor force in a low skill profession, respectively, and zero otherwise.

Figure 3 reports the seasonal pattern of years of education for Chile and Figure 4, the seasonal pattern in mother's profession for Spain. The pattern for Chile reveals up to the year 2000 a slight drop in the average of years of education during the winter months, but after that point it is not possible to perceive a clear pattern within the calendar year. For Spain, what is first noteworthy is the increasing participation of mothers in the labor market during the last 30 years. At the beginning of the 80's, approximately 70% of the mothers were out of the labor market by the time of birth of the first child. By 2011, this fraction had fallen to approximately 20%. The monthly pattern shows a high fraction of children being born from mothers out of the labor force during the first quarter and during the last quarter of the year. Consistent with this U pattern in the fraction of mothers out of the labor force, Figure 4B shows the inverse pattern for the fraction of mothers in high skill professions by the time of the birth. That is, we observe a lower fraction of these mothers giving birth during the first and the last quarter of the year. Finally, for the variable "in a low skill" (Figure 5C), we do not observe such a clear pattern within the calendar year.

In order to measure and quantify the magnitude of this seasonal pattern we estimate the following expression,

$$y_{itp} = \theta_t + \rho_p + \sum_{s=2}^{12} \gamma^s * 1\{month = s\} + \varepsilon_{itp} \qquad \text{(E.1)},$$

with θ_t and ρ_p as time and region fixed effects.[6] The parameter of interest γ^s captures the average difference in the selected outcome in the s month with respect to January, which is the omitted month in equation (E.1). The results are presented in Tables 1 and 2 for Chile and Spain, respectively. We additionally plot the estimated coefficients in Figures 5 and 6.

[6] For Spain, regions are defined at the province level, while for Chile we use the political administrative division of the country into 13 regions.

The results for Chile confirm the previous graphic analysis. First, children born during winter months (June to September) are more likely to be born to mothers who were not married or in their adolescent years ("teen moms"). The magnitudes of these differences are economically important. For the outcome "Married" we find a difference of approximately 2.4 percentage points between January (summer) and July (winter), which is approximately 8% of the reduction observed in the last sixteen years in this variable. For the variable "teen moms" we observe a variation of 1.8 percentage points between January and August which in terms of the sample mean is approximately 12%. Different from BH, however, we do not observe that mothers giving birth in winter months as the being the ones with a lower education level. In fact, children born in January or February (middle of the summer) have mothers with a lower level of education than those whose children were born in winter. In fact, the pattern that comes from education reveals that children born in the second half of the year (late winter to early summer) are born to mothers with a higher average level of education, which is consistent with the higher (lower) observed fraction of mothers with some college (less than high school) during the second half of the year (last two columns in Table 1). In fact, it is not surprising that we do not find a similar pattern for education when we consider that our sample of mothers from Chile was not exposed to an institutional setting that initially creates a seasonal pattern in mother's years of education. In fact, minimum age requirements were not introduced until the year 1992, with 99.7 percent of our mothers being born previous to that year.

The results for Spain (Table 2) show first, that children born in January are more likely to be born to teen mothers than in any other month of the year, which is consistent with the evidence found for the US. On the other hand, although the results on the outcome "Married" confirm that children born in January are less likely to have a mother married at the time of birth compared with other children born during the first half of the year, children in the second half of the year are even less likely to be born to a married mother. Also, when we compare the magnitude in this seasonal pattern, we observe that the difference between a child born in January and one in May is 0.06 percentage points compared to that of 2.5 percentage points estimated for the US. Why is this effect on marital status weaker than the one reported in the US? As shown by BH for the US, women who want and plan their giving birth drive the seasonal pattern in mother characteristics. With this in mind and making use of the fact that birth certificates for Spain report the year and month of the last marriage, we define the dummy variable "Not married or *shotgun marriage*" that takes the value one in the

case where a mother is not married at birth or in the case of being married, the union took place during the 9 months prior to the birth, and zero otherwise. This variable is a more restrictive measure of marital status. It not only distinguishes individuals who were not married but also who did not decide to get married post-conception. The results are presented in the last column of Table 2. We observe now, compared with results for the outcome variable married, a stronger seasonal pattern that is comparable in magnitude to the one reported by BH for the fraction married in the US. Specifically, we find that in comparison to January, the fraction of mothers not married or classified as entering into a *shotgun marriage* are lower in the rest of the months. Nevertheless, this fraction is considerably lower during the spring and summer months. The importance of distinguishing *shotgun marriages* to describe the seasonal pattern in mothers' family settings reveals, first, that mothers for whom the birth is less likely an unexpected event are the ones driving this cyclical pattern. Secondly, the use of marriage weakens the seasonal pattern when some mothers surprised by a pregnancy decide to get married. For these individuals, the use of marriage not only reveals the relatively high cost of being born out of wedlock, but also the lower cost of marriage compared to that of the US.

The results for labor outcomes using Spanish birth certificates also show that children born during winter are more likely to be born to mothers who are out of the labor force at the time of the birth. When compared to January, children born in other months are less likely to have a mother out of the labor force. Moreover, the main reduction in the likelihood that a mother is out of the labor force is observed between the months of March and June. The analysis for the dummy variable "In High Skill Professions" reveals a mirror image to the one found for the previous outcome. That is, mothers giving birth in January, in relation to others giving birth in other months of the year, are less likely to be in high skill professions at the time of the birth. Also, these differences are particularly greater for those mothers giving birth between the months of March and June. Although we do not observe education, a positive correlation between high skill professions and higher educational levels is expected. Therefore, this finding suggests that mothers with higher levels of education are the ones driving the pattern for Spain.

Therefore, the evidence coming from birth certificates for Chile and Spain support BH findings for the US for family settings That is, mothers giving birth in winter months are more likely to be teenage mothers or coming from less stable family settings. That being said

seasonal pattern of variables reflecting human capital differ between these two countries. For Spain, we observe that mothers giving birth in winter months are more likely to be out of the labor force at the time of birth. The analysis by level of skill of the profession shows that the seasonal pattern is driven for individuals in higher skill professions. For Chilean birth certificates, on the other hand, we do not find a seasonal pattern that fully supports births being concentrated in winter months for mothers with lower levels of education. This latter finding is informative as to the channels behind the pattern. The similarity in our findings with the ones of BH for other outcomes suggests that education might be an important factor in explaining the pattern, but this variable is probably picking up other factors. The evidence of BH for the US and our findings for *shotgun marriages* in Spain suggests that the pattern has its origin in families that track and plan fertility. Educated mothers not only have a higher time opportunity cost but education is positively correlated with wealth. More educated mothers in a less developed country like Chile where a high return in education (high opportunity cost) is observed, coupled with one of the highest rates of inequality in South America makes childcare options for these mother really affordable. In order words, the return for planning a birth among more educated mothers in Chile is really low. Therefore, at least for Chile, the optimal timing of birth is defined by optimal family settings or by the optimal market conditions.

2.2 Children characteristics

Birth certificates also allow us to check the seasonal pattern in children characteristics and to investigate in which way this pattern is affected (explained) by mother characteristics. In order to do this we estimate again equation (E.1) but using birth outcomes as dependent variable. For each data set and outcome, we estimate the model with and without mother characteristics. We use as mother characteristics those analyzed in the previous section. That is, for specifications controlling for mother characteristics when using birth certificates from Chile, we include a dummy variable that indicates whether or not a mother is married, a dummy for teenage mother and a series of dummies for the different years of education. For Spanish birth certificates, we do not have years of education but we include a dummy variable that indicates whether or not a mother is out of the labor force and a dummy variable indicating whether or not a mother is in a low skill profession. The results are presented in Tables 3 and 4 for Chile and Spain, respectively.

A feature common to both countries, different from BH for the US, is the robustness of the seasonal pattern in birth outcomes to the inclusion of mother characteristics. Giving the seasonal pattern in mother characteristics already shown, this robustness suggests that either mother characteristics are not behind the seasonal pattern for the selected birth outcomes or these sub-group of mother characteristics are not the relevant ones for explaining the seasonal pattern.[7] We believe the second alternative to be true. First, there is widespread literature highlighting the role of family structure and family background on child wellbeing. Secondly, for four out the seven birth outcomes the pattern is consistent with mothers with less-favorable socio-economic backgrounds being less represented during winter months.

The results for Chile, Table 3, for the outcomes birth weight (grams), size (cms) and weeks of gestation, reveal that children born during winter months have lower birth weight, are smaller and have fewer weeks of gestation than those born in other months. Consistent, with the findings for Chile, the results in Spain reveal that those children born in winter months have fewer weeks of gestation and a lower birth weight compared to other children born in other months. Still for Spain, however, we observe that compared with January, children born in other months are more likely to be born through cesarean and with more complications during birth being reported. These differences may be explained in part by the type of insurance the mothers with distinct educational levels have. As we have shown, mothers giving birth in winter months are less likely to be married, more likely to be teen mothers and have on average lower levels of education. All these factors have been negatively correlated with the likelihood of having private insurance. Moreover, according the Ministry of Health, for the year 2009, 35 percent of the births were cesarean taking place in the private sector compared with 22 percent in the public hospital, despite the fact that births with higher risk take place more frequently in the public sector. Also, mother's education has been shown to be correlated with a delay in motherhood which is also consistent with the fact that months avoided by mothers with higher levels of human capital (more likely to delay motherhood) are the ones with a higher fraction of cesareans and complications reported.

3 Spanish Census 2001

[7] A third explanation, beyond the scope of this paper, speaks for an omitted variable bias when including some of these mother characteristics into the specification. For example, education has extensively been associated to unobserved measures of "ability".

Are these differences in mother characteristics specific to birth records? Do mothers and children overcome adverse socio-economic markers at birth? Are these differences in mothers and children outcome at birth present in future periods? In order to answer these questions we use Spanish census data coming from IPUMS International[8]. Specifically, we make use of the 2001 census records that provide month of birth for all individuals within the household[9].

The resulting pattern after estimating equation (E.1) is reported in Tables 5 and 6. Table 5 presents the pattern for mother's characteristics while Table 6 the ones for children.

Consistent with the findings when using birth certificates, mothers giving birth in January compared to those giving birth in other months present worse socio-economic measures. First, in terms of human capital accumulation, children born in January or February have mothers with fewer years of education and who are more likely to have reached compulsory education at most. Specifically in terms of years of education, on average, mothers giving birth in the last three quarters of the year have 0.15 more years of education than those giving birth in the first two months of the year. Also, mothers giving birth in the last three quarters present between 1 to 2 percentage points fewer individuals with an education level lower than compulsory. In addition, consistent with the findings for birth certificates, children born in January and February have a higher fraction of mothers who were teenage moms. Specifically, children born during the last three quarters of the year present we observe between 0.5 to 1.5 fewer percentage points in the fraction of mothers who had children during adolescence.

We observe two major differences in relation to our findings when using birth certificates. Although we observe that children born in January and February have mothers with less favorable socio-economic characteristics, these differences are not between winter and non-winter months but rather between being born during the first two months of the first quarter against the rest of the year. In fact, the major differences are observed between the first two months of the year and December: all winter months. Unlike birth certificates, when using

[8] Census data for Chile does not identify month of birth. Moreover, we are not aware of other nationally representative samples that identify month of birth and mother characteristics.

[9] Although Spanish census data for the year 1981 provides information about the month of birth, the relationship of family members within the household is not defined.

census data we do not observe the level of human capital or other characteristics at birth. In particular, individuals could go on accumulating human capital after giving birth. Specifically, mothers giving birth during the first quarter of the year, different from those giving birth in December, not only present worse characteristics at birth but also have children who due to the institutional settings are less likely to accumulate more human capital because of the combination of minimum age requirements to enroll children in school and compulsory age requirements for dropping out of school (Angrist and Kruger, 1991). Now, if these institutional restrictions prevent continuing with their own investment in human capital, we would end up with this observed pattern among these mothers: mothers giving birth in December being able to continue with their human capital accumulation while mothers giving birth during the first quarter not being able to do so. In fact, Gelbach (2002) shows for the US that mothers with children born in the first quarter of the year have a lower labor attachment due to a delay in their return to the labor market, since they must wait a year to enroll their children in public schools. The second departure with respect to the findings observed in birth certificates, is the lack of a statistically significant difference in terms of marital status between mothers giving birth during distinct months over the year, probably also due to the fact we observe marital status at the time of the census but not at birth.

In Table 6, we observe again that children outcomes are robust to the inclusion of mother characteristics. Specifically, in terms of the outcomes we get two different pictures. On the one hand, and consistent with the institutional setting that establishes a minimum age at the beginning of the school year together with the age restriction associated to compulsory education, we see that children born during the first quarter of the year are less likely to stay at school and more likely to engage in paid activities in the labor market. Nevertheless, this fact that children born in the first quarter of the year, are less likely to stay at school and out of the labor force does not translate into more years of education. Nevertheless, we find that children born during the second half of the year have fewer years of education and are more likely to finish, at most, compulsory education. In other words, despite the advantages observed at birth among children born in the last three quarters of the year and also the fact the system keeps these children at school and out of the labor market, these advantages do not materialize in more years of education. One explanation can be found in widespread literature analyzing the impact of age at entry. Children born in the last quarter of the year are the youngest in their classes and they are the ones who start school at younger age as well. These

two issues have been linked to worse academic outcomes such as grade retention rates (Black et al. 2011).

Therefore, besides some similarities in the patterns observed in birth certificates and Spanish Census data, some differences are noticeable. The fact that we do not observe outcomes at the time of birth and the interaction with other factors that attenuate or exacerbate the seasonal pattern such as minimum age of entry, compulsory age requirements and differences in the age at entry of school explain these differences.

4 Fecundity Survey

The analysis of BH showed that mothers who planned a specific birth as the factor behind the pattern in mother characteristics in the US. Specifically, BH find that among mothers who were planning their births, but not among mothers for whom the birth was unwanted, those ones giving birth in January have worse socio-economic markers. Using the 1999 Fertility Survey for Spain[10] we investigate these differences between mothers who planned the birth or not. We focus the analysis on Spain since we do not have a similar data set for Chile that allows us to define if a mother was planning a birth and the specific month of birth.

Differently from BH who define whether or not each birth of a woman was planned, the fertility data for Spain allow us to define indirectly whether or not a woman had at least one birth not planned. For this reason, we consider all births of a woman in this analysis. Specifically, we define a dummy variable "wanted" that takes a value one when a mother reports a failure in the use of contraceptives, a higher number of children than the one planned, or the fact that childbearing interrupted the education or work life and zero, otherwise.

Specifically the following expression is the one we wish to estimate,

$$y_{ibp} = \theta_b + \rho_p + \sum_{s=2}^{12} {\gamma_1}^s * 1\{month = s\} * wanted + \sum_{s=2}^{12} {\gamma_2}^s * 1\{month = s\} * (1 - wanted) + \varepsilon_{ibp}$$

[10] The purpose of the 1999 Fertility Survey is to collect information on demographic characteristics of women aged 15 to 49 (fertile ages), their social and familiar environment and all factors influencing fertility.

with θ_b and ρ_p year of birth and province of birth fixed effects.[11] The parameter ${\gamma_1}^s$ and ${\gamma_2}^s$ correspond to the average difference in a selected outcome, y_{ibp}, in the s month with respect to January for mothers that "wanted" and those who did not plan one of their births, respectively.

First, Table 7 reproduces the analysis done with birth certificates. Using the specification in equation (E.1), those mothers giving birth in months other than January (compared to January) have lower levels of education, are less likely to have a education equal or lower than compulsory, are less likely to be married and are less likely to be part of a *shotgun marriage*. Nevertheless, there are two differences regarding the results presented when using birth records. First, given the considerably smaller sample size, some of the estimated coefficients are not statistically significant. Second, although the estimated pattern for education supports the fact that mothers in January have lower levels of education and they are more likely to have education equal or below compulsory, we cannot say that the estimate is similar to the one observed among mothers giving birth during December, which is as well a winter month. Indeed, the major observed difference is between December and January, both winter months. Unlike birth data, and probably explaining in part these differences in the pattern, is the fact that the fertility survey reports educational attainments at the time of the survey rather than at the birth date. In fact, the results for the variables "Marriage" and "Not Married or *shot gun*," both measured at the time of the birth, show a pattern similar to the one observed in birth certificates; that is mothers giving birth in winter being less likely to be married and more likely to have entered into a shotgun marriage.

Table 8 presents the estimates for equation (E.2) when using these selected outcomes. The results are in line with the ones found by BH for the US. Beside the sample size, for all the selected outcomes except for the variable "*shotgun* or not married," significant differences between mothers giving birth in January and those giving birth in other months is observed among mothers defined as planning the birth but not among those mothers we define as having at least one birth unplanned. Moreover, the lack of significance among mothers who were less likely to have planned all their births is not completely due to a lack of precision. In fact, in only nine of the 55 pares of estimates, we observe that this estimate is larger in absolute terms for mothers that did not plan at least one of the births. Moreover, the fact that

[11] We introduce child and mother's year fixed effects. Moreover, the specification controls for the gender of the child.

we find some differences in the variable "not married or *shotgun*" but not in the outcome "married" across months of birth for mothers defined with at least one birth as unplanned reveals that some of these mothers react to an unexpected pregnancy by entering into a *shotgun marriage*.

5 Conclusions

Using birth certificates for Chile and Spain, our results support BH findings for the US for family setting. That is, mothers giving birth in winter months are more likely to be teenage mothers or coming from less favorable family arrangements measured by not being married or having taken part in of a shotgun marriages. Nevertheless, we detect some differences among these two countries in the seasonal pattern for the variables related to human capital with respect to the one found in BH. First, for Spain and in line with BH, we observe that mothers giving birth in winter months are more likely to be out of the labor force at the time of birth, which is driven by individuals taking part in higher skill professions. However, for Chilean birth certificates, on the other hand, we do not find a seasonal pattern that fully supports births being concentrated in winter months for mothers with lower levels of education.

Birth certificates also reveal for these two countries that children born in winter months have worse birth outcomes measured by weeks of gestation, birth weight and child size. Birth certificates for Spain, nevertheless, show that winter births are less likely to be cesarean or present complications. The explanation for this last finding might be found in the fact that these characteristics of mothers giving birth in winter are correlated with public insurance and a lower chance of delaying motherhood, both factors negatively related with cesarean birth. Furthermore, for Spain we show this seasonal pattern is not restricted to birth certificates. Census data for the year 2001 confirms that mothers giving birth at the beginning of the year have lower levels of education and became mothers during adolescence. Census data also shows that children born early in the year are less likely to stay at school and not engage in paid activities. Finally, the most recent fertility survey for Spain not only confirms the seasonal pattern in mother characteristics but like BH, we show that this seasonality is driven by mothers who planned their births.

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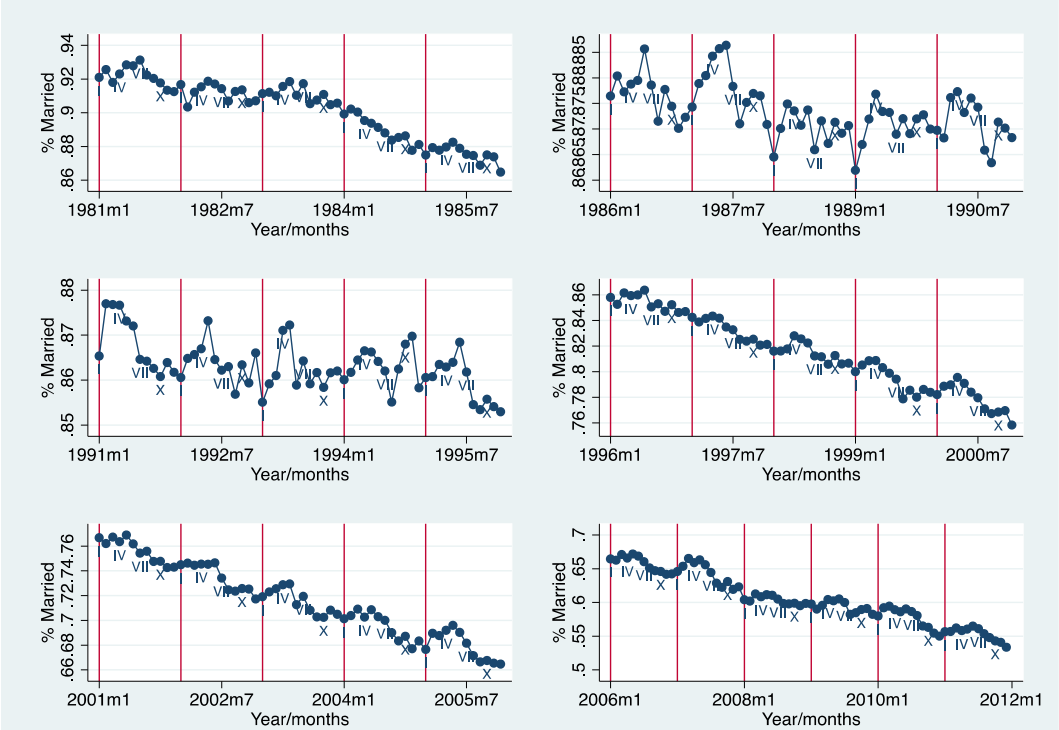
Figure 1

A) Fraction of married mothers by month of birth. Birth data files. Spain. 1980-2011



B) Fraction of married mothers by month of birth. Birth data files. Chile. 1994-2009

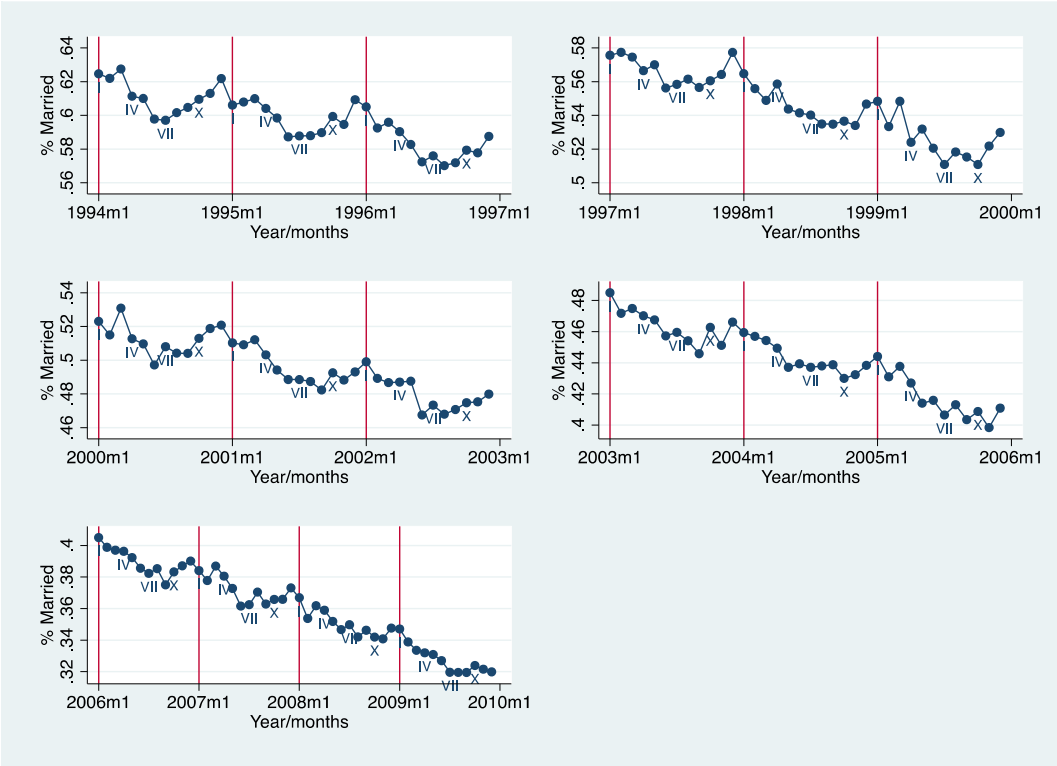
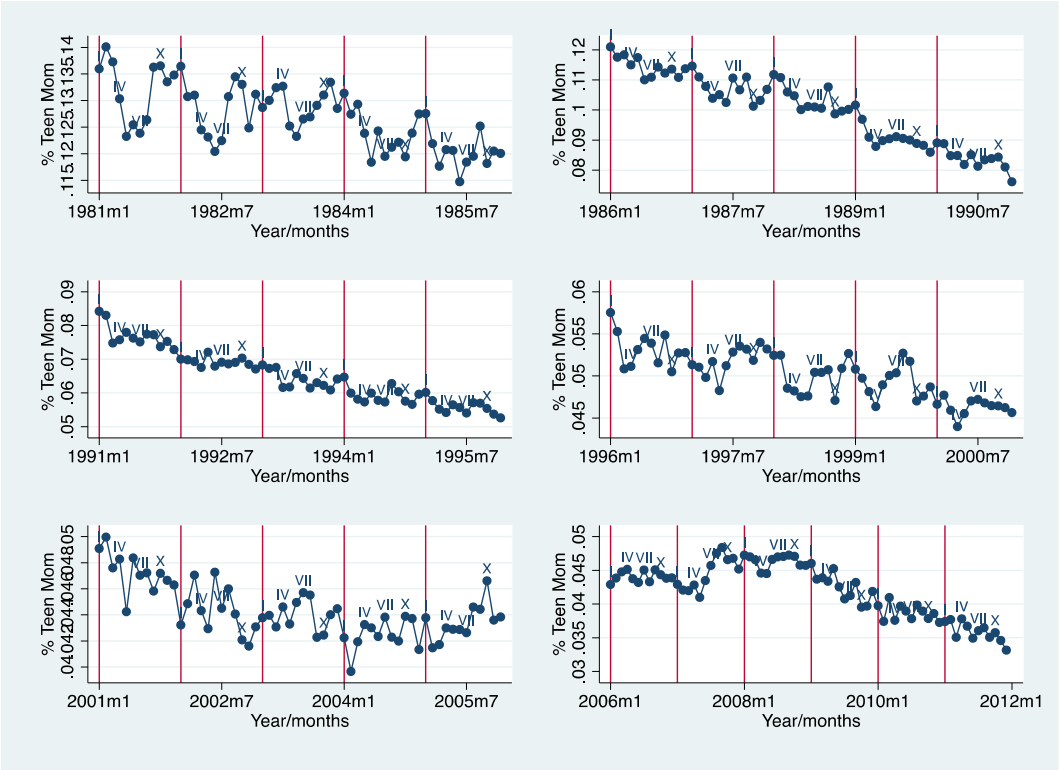


Figure 2

A) Fraction of teen mothers by month of birth. Birth data files. Spain. 1980-2011.



B) Fraction of teen mothers by month of birth. Birth data files. Chile. 1994-2009

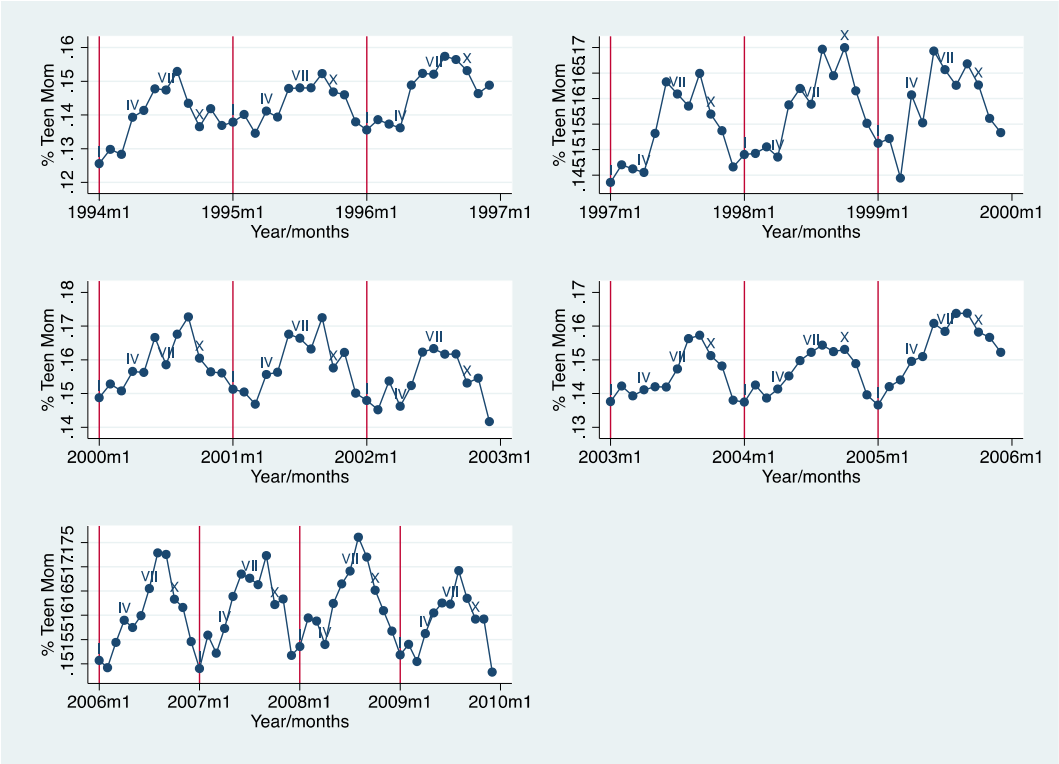


Figure 3

A) Average years of education of the mother by month of birth. Birth data files. Chile. 1994-2009

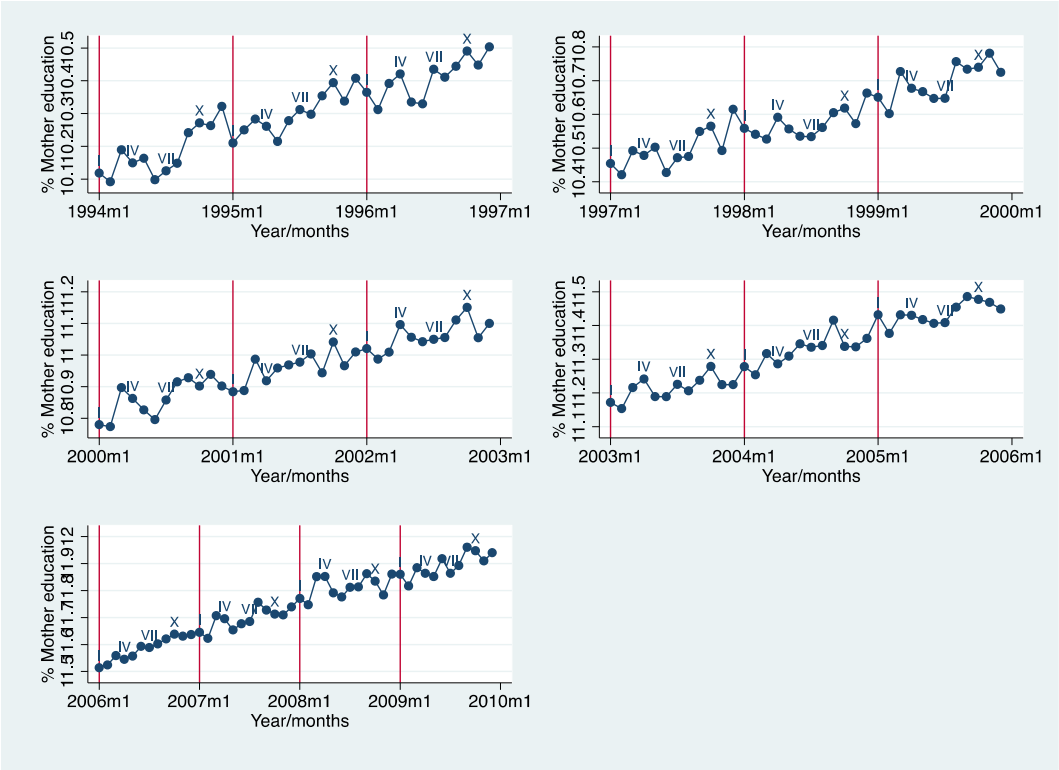
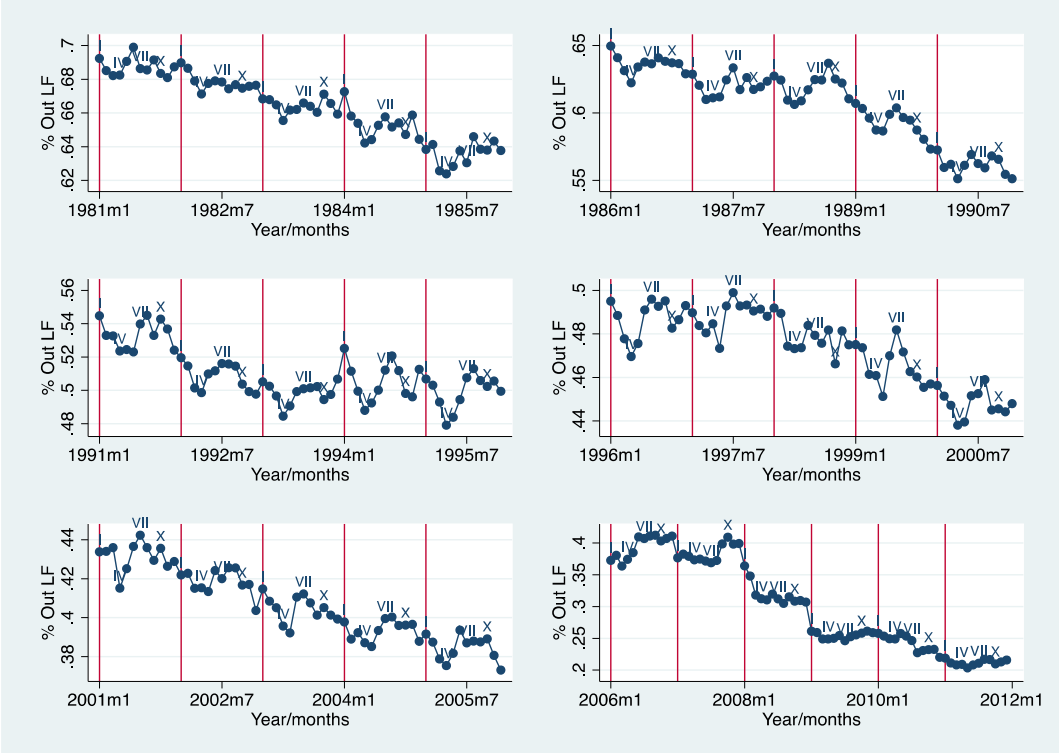
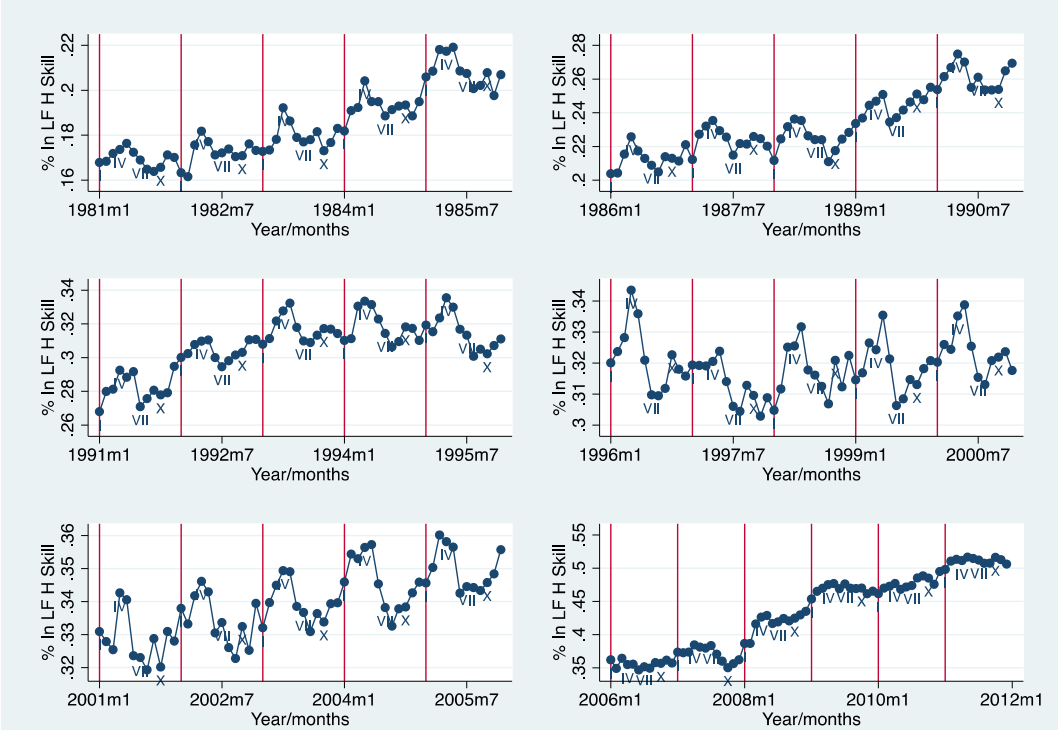


Figure 4

A) Fraction out of the labor force by month of birth. Birth data files. Spain. 1980-2011.



B) Fraction of mothers in high skill professions by month of birth. Birth data files. Spain. 1980-2011.



C) Fraction of mothers in low skill professions by month of birth. Birth data files. Spain. 1980-2011.

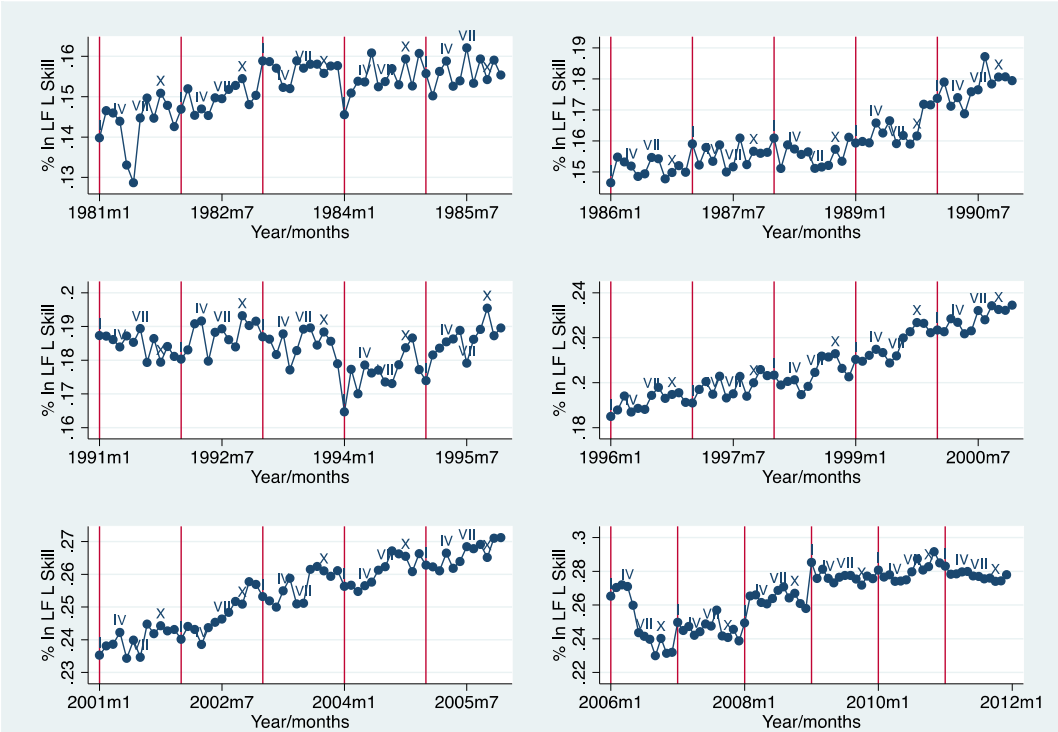


Table 1
Mother's Characteristics by Month of Birth. Birth certificates Chile, 1994-2009.

	Married	Teen Mom	Mothers education	Some college or more	High school drop out
February	-0.007***	0.003***	-0.023***	-0.004***	0.003***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
March	-0.004***	0.001*	0.039***	0.003***	-0.004***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
April	-0.011***	0.005***	0.032***	0.002**	-0.004***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
May	-0.015***	0.009***	0.015*	0	-0.001
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
June	-0.023***	0.015***	0.019**	-0.001	0
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
July	-0.024***	0.015***	0.039***	0	-0.001
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
August	-0.024***	0.018***	0.063***	0.004***	-0.004***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
September	-0.026***	0.019***	0.101***	0.006***	-0.008***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
October	-0.022***	0.012***	0.113***	0.008***	-0.010***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
November	-0.022***	0.010***	0.085***	0.003***	-0.009***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
December	-0.014***	0.004***	0.116***	0.006***	-0.016***
	[0.001]	[0.001]	[0.008]	[0.001]	[0.001]
Observations	3,972,572	3,972,572	3,972,254	3,972,572	3,972,572
R-squared	0.039	0.003	0.062	0.018	0.042

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1)

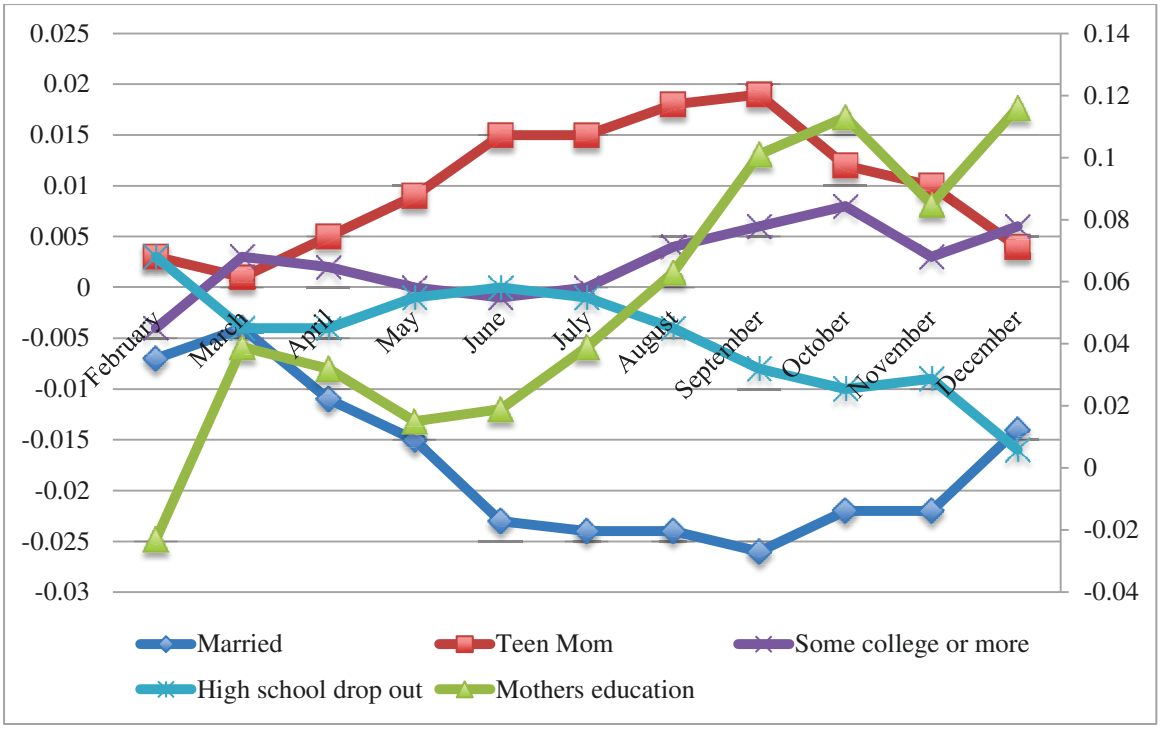
Table 2
Mother's Characteristics by Month of Birth. Birth Certificates Spain, 1980-2011.

	Married	Teen Mom	Out LF	In LF H Skill	In LF L Skill	Not Married or Shotgun
February	0.002**	-0.001***	-0.004***	0.003***	0.001	-0.018***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
March	0.004***	-0.002***	-0.012***	0.010***	0.002***	-0.026***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
April	0.005***	-0.003***	-0.016***	0.014***	0.002***	-0.029***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
May	0.006***	-0.004***	-0.013***	0.013***	0.001	-0.028***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
June	0.003***	-0.004***	-0.006***	0.005***	0.001	-0.028***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
July	-0.001*	-0.004***	-0.005***	0.003***	0.002***	-0.025***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
August	-0.008***	-0.003***	-0.007***	0.002**	0.005***	-0.017***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
September	-0.009***	-0.003***	-0.006***	0.004***	0.003***	-0.012***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
October	-0.007***	-0.004***	-0.009***	0.005***	0.004***	-0.018***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
November	-0.010***	-0.004***	-0.009***	0.005***	0.004***	-0.012***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
December	-0.012***	-0.004***	-0.012***	0.008***	0.003***	-0.007***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]
Observations	7,305,520	7,305,520	7,305,520	7,305,520	7,305,520	7,305,520
R-squared	0.092	0.028	0.105	0.063	0.021	0.073

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1)

Figure 5

Seasonal variation of mother's characteristics. January reference month. Birth certificates, Chile. 1994-2009.



Secondary axis for mother's education.

Figure 6
Seasonal variation of mother's characteristics. January reference month. Birth certificates, Spain. 1980-2011.

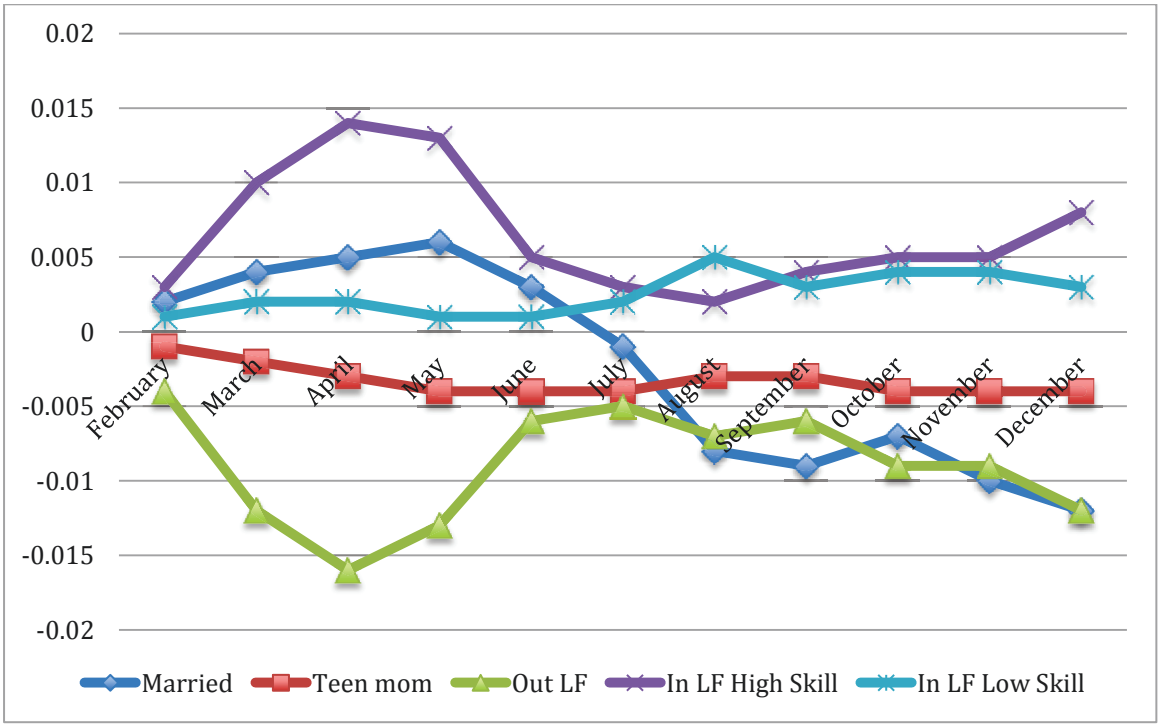


Table 3
Children Characteristics by Month of Birth. Birth Certificates Chile, 1994-2009.

	Without Mother's Characteristics			With Mother's Characteristics		
	Weeks gestation	Size	Birth weight	Weeks gestation	Size	Birth weight
February	0.001	0.026***	1.993	-0.001	0.025***	2.052
	[0.005]	[0.008]	[1.381]	[0.005]	[0.008]	[1.376]
March	0.013***	0.011	3.919***	0.014***	0.013	4.351***
	[0.005]	[0.008]	[1.349]	[0.005]	[0.008]	[1.344]
April	-0.015***	-0.037***	-2.840**	-0.015***	-0.035***	-1.911
	[0.005]	[0.008]	[1.370]	[0.005]	[0.008]	[1.365]
May	-0.020***	-0.057***	-4.027***	-0.021***	-0.054***	-2.728**
	[0.005]	[0.008]	[1.361]	[0.005]	[0.008]	[1.356]
June	-0.013***	-0.063***	-5.405***	-0.016***	-0.059***	-3.222**
	[0.005]	[0.008]	[1.363]	[0.005]	[0.008]	[1.358]
July	-0.025***	-0.094***	-10.862***	-0.026***	-0.090***	-8.554***
	[0.005]	[0.008]	[1.354]	[0.005]	[0.008]	[1.350]
August	-0.030***	-0.089***	-8.537***	-0.031***	-0.082***	-5.703***
	[0.005]	[0.008]	[1.355]	[0.005]	[0.008]	[1.351]
September	0.007	-0.033***	3.089**	0.006	-0.026***	6.213***
	[0.005]	[0.008]	[1.328]	[0.005]	[0.008]	[1.324]
October	0.015***	-0.050***	2.642**	0.016***	-0.043***	5.119***
	[0.005]	[0.008]	[1.334]	[0.005]	[0.008]	[1.330]
November	0.010**	-0.011	3.802***	0.009*	-0.007	5.749***
	[0.005]	[0.008]	[1.351]	[0.005]	[0.008]	[1.347]
December	-0.015***	-0.052***	-3.630***	-0.014***	-0.048***	-2.218*
	[0.005]	[0.008]	[1.345]	[0.005]	[0.008]	[1.341]
Observations	3,967,795	3,936,253	3,969,293	3,967,477	3,935,937	3,968,975
	0.008	0.015	0.009	0.012	0.017	0.016

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1). Mother's characteristics in the last three columns include a dummy in case the mother is married, dummies for the different years of education and a dummy variable in case the mother is a teen mom.

Table 4
Children Characteristics by Month of Birth. Birth Certificates Spain, 1980-2011.

	Without Mother's Characteristics				With Mother's Characteristics			
	Weeks gestation	Birth weight	Cesarean	Complications	Weeks gestation	Birth weight	Cesarean	Complications
February	-0.023***	-1.445	0.003***	0.004***	-0.023***	-1.599	0.003***	0.004***
	[0.005]	[1.041]	[0.000]	[0.001]	[0.005]	[1.041]	[0.000]	[0.001]
March	0.047***	3.370***	0.003***	0.005***	0.045***	3.007***	0.003***	0.004***
	[0.005]	[1.013]	[0.000]	[0.001]	[0.005]	[1.013]	[0.000]	[0.001]
April	0.052***	7.090***	0.003***	0.005***	0.050***	6.673***	0.002***	0.005***
	[0.005]	[1.021]	[0.000]	[0.001]	[0.005]	[1.021]	[0.000]	[0.001]
May	0.087***	10.701***	0.003***	0.006***	0.085***	10.265***	0.002***	0.005***
	[0.005]	[1.011]	[0.000]	[0.001]	[0.005]	[1.010]	[0.000]	[0.001]
June	0.040***	1.379	0.003***	0.005***	0.039***	1.082	0.003***	0.005***
	[0.005]	[1.024]	[0.000]	[0.001]	[0.005]	[1.024]	[0.000]	[0.001]
July	0.076***	2.612***	0.004***	0.003***	0.075***	2.472**	0.004***	0.003***
	[0.005]	[1.006]	[0.000]	[0.001]	[0.005]	[1.005]	[0.000]	[0.001]
August	0.079***	7.099***	0.002***	0	0.078***	7.177***	0.002***	-0.001
	[0.005]	[1.010]	[0.000]	[0.001]	[0.005]	[1.010]	[0.000]	[0.001]
September	0.102***	12.080***	0.003***	0	0.101***	12.227***	0.003***	0
	[0.005]	[1.007]	[0.000]	[0.001]	[0.005]	[1.006]	[0.000]	[0.001]
October	0.109***	6.037***	0.004***	0.005***	0.107***	6.070***	0.003***	0.005***
	[0.005]	[1.011]	[0.000]	[0.001]	[0.005]	[1.011]	[0.000]	[0.001]
November	0.074***	3.945***	0.004***	0.007***	0.073***	4.049***	0.004***	0.007***
	[0.005]	[1.022]	[0.000]	[0.001]	[0.005]	[1.022]	[0.000]	[0.001]
December	0.033***	-1.726*	0.004***	0.005***	0.032***	-1.593	0.004***	0.005***
	[0.005]	[1.017]	[0.000]	[0.001]	[0.005]	[1.017]	[0.000]	[0.001]
Observations	5,494,794	6,422,894	7,305,520	7,305,520	5,494,794	6,422,894	7,305,520	7,305,520
R-squared	0.02	0.02	0.228	0.038	0.021	0.021	0.228	0.04

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1). Mother's characteristics in the last four columns include a dummy in case the mother is married, a dummy variable in case the mother is a teen mom, a dummy in case the mother is out of the labor force and a dummy variable in case a mother is in a low skill profession.

Table 5
Mother's Characteristics by Month of Birth. 2001 Spanish census.

	Years of education	Compulsory or less	Not married or divorced	Single mom	Divorced mom	Mother HH head	Teen mother	Squared mts per family member
February	0.034	-0.004	0.004	0	0.003*	0.002	-0.002	0.115*
	[0.030]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.064]
March	0.169***	-0.015***	-0.001	-0.001	-0.001	0.003	-0.002	0.199***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
April	0.167***	-0.013***	-0.003	-0.001	0	-0.004	-0.005***	0.224***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
May	0.170***	-0.015***	-0.002	-0.001	0	0.001	-0.003**	0.261***
	[0.028]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.061]
June	0.139***	-0.011***	-0.002	0	-0.002	-0.001	-0.005***	0.096
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
July	0.070**	-0.003	-0.001	0	-0.001	-0.001	-0.001	0.126**
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
August	0.069**	-0.005	0	0	0	-0.003	-0.001	0.131**
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
September	0.131***	-0.014***	0	0	0	-0.001	0	0.168***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
October	0.171***	-0.018***	-0.002	-0.002*	0	0.001	-0.002	0.165***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.062]
November	0.127***	-0.011***	-0.002	0	-0.002	-0.001	-0.015***	0.232***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.064]
December	0.162***	-0.018***	-0.001	0.001	-0.002	0.003	-0.016***	0.203***
	[0.029]	[0.003]	[0.002]	[0.001]	[0.002]	[0.003]	[0.002]	[0.063]
Observations	490,068	490,068	490,068	490,068	490,068	490,068	490,068	490,068
R-squared	0.167	0.113	0.031	0.092	0.012	0.012	0.18	0.03

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1).

Table 6
Children's Characteristics by Month of Birth. 2001 Spanish census.

	Without mom's characteristics					With mom's characteristics				
	Years of education	Years of education older 16	At school older 16	Hrs. Worked	Employed	Years of education	Years of education older 16	At school older 16	Hrs. Worked	Employed
February	-0.001	0.019	0.001	0.023	-0.001	-0.003	0.02	0.001	0.026	-0.001
	[0.016]	[0.033]	[0.005]	[0.190]	[0.005]	[0.016]	[0.032]	[0.005]	[0.186]	[0.005]
March	0.016	0.051	0.007	-0.187	-0.005	-0.001	0.022	0.003	-0.084	-0.002
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.015]	[0.031]	[0.005]	[0.179]	[0.004]
April	0.007	0.028	0.010**	-0.162	-0.005	-0.013	-0.009	0.005	-0.028	-0.001
	[0.016]	[0.032]	[0.005]	[0.183]	[0.004]	[0.015]	[0.031]	[0.005]	[0.179]	[0.004]
May	0.023	0.049	0.018***	-0.608***	-0.015***	0.004	0.008	0.013***	-0.464***	-0.011**
	[0.016]	[0.032]	[0.005]	[0.179]	[0.004]	[0.015]	[0.030]	[0.004]	[0.176]	[0.004]
June	0.004	0.015	0.016***	-0.378**	-0.010**	-0.014	-0.023	0.011**	-0.251	-0.007
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.016]	[0.031]	[0.005]	[0.180]	[0.004]
July	-0.026	-0.04	0.014***	-0.389**	-0.011**	-0.035**	-0.070**	0.010**	-0.295*	-0.008*
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.015]	[0.030]	[0.005]	[0.179]	[0.004]
August	-0.041***	-0.074**	0.003	-0.151	-0.005	-0.049***	-0.090***	0.001	-0.106	-0.004
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.015]	[0.031]	[0.005]	[0.180]	[0.004]
September	-0.032**	-0.042	0.011**	-0.366**	-0.011**	-0.043***	-0.066**	0.007	-0.252	-0.008*
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.015]	[0.031]	[0.005]	[0.179]	[0.004]
October	-0.040**	-0.069**	0.011**	-0.351*	-0.008*	-0.055***	-0.106***	0.006	-0.194	-0.004
	[0.016]	[0.032]	[0.005]	[0.183]	[0.005]	[0.015]	[0.031]	[0.005]	[0.179]	[0.004]
November	-0.335***	-0.220***	0.020***	-0.874***	-0.022***	-0.348***	-0.247***	0.016***	-0.757***	-0.019***
	[0.016]	[0.034]	[0.005]	[0.191]	[0.005]	[0.016]	[0.032]	[0.005]	[0.187]	[0.005]
December	-0.334***	-0.223***	0.021***	-0.859***	-0.021***	-0.347***	-0.243***	0.018***	-0.768***	-0.019***
	[0.016]	[0.033]	[0.005]	[0.190]	[0.005]	[0.016]	[0.032]	[0.005]	[0.186]	[0.005]
Observations	490,068	224,534	224,534	224,534	224,534	490,068	224,534	224,534	224,534	224,534
R-squared	0.801	0.223	0.153	0.131	0.134	0.812	0.297	0.22	0.166	0.169

Robust standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification is the one presented in equation (E.1).

Table 7
Mother's Characteristics by Month of Birth. 1999 Fertility Survey, Spain.

	Education	Compulsory (10 or less years)	Compulsory Basic educ. or prof. of 1st degree	Marriage at birth	Not Married or Shotgun
February	0.137	-0.022	-0.01	0.026	-0.053**
	[0.234]	[0.026]	[0.027]	[0.016]	[0.024]
March	0.173	-0.038	-0.035	0.031**	-0.082***
	[0.237]	[0.026]	[0.028]	[0.015]	[0.023]
April	0.299	-0.034	-0.035	0.037**	-0.04
	[0.221]	[0.025]	[0.027]	[0.016]	[0.026]
May	0.003	-0.042*	-0.024	0.022	-0.011
	[0.226]	[0.025]	[0.026]	[0.016]	[0.025]
June	0.202	-0.026	-0.025	0.015	-0.005
	[0.210]	[0.024]	[0.026]	[0.017]	[0.026]
July	0.123	-0.035	-0.032	0.023	-0.047*
	[0.231]	[0.026]	[0.029]	[0.016]	[0.025]
August	-0.033	0.001	0	0.026*	-0.083***
	[0.223]	[0.025]	[0.027]	[0.015]	[0.024]
September	0.134	-0.049*	-0.068**	0.003	-0.006
	[0.245]	[0.026]	[0.028]	[0.017]	[0.025]
October	0.095	-0.01	-0.015	0.015	-0.087***
	[0.222]	[0.026]	[0.028]	[0.018]	[0.025]
November	0.38	-0.056**	-0.054**	0.014	-0.042*
	[0.232]	[0.026]	[0.028]	[0.017]	[0.025]
December	0.404*	-0.069**	-0.064**	0.002	-0.034
	[0.232]	[0.027]	[0.028]	[0.019]	[0.026]
Observations	10,101	10,101	10,101	9,349	9,349
R-squared	0.142	0.092	0.103	0.032	0.039

Standard errors in parentheses (clustered at mother's level); * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification similar to the one presented in equation (E.1) with the difference in the exclusion of the year fixed effect and inclusion of year of birth fixed effects.

Table 8
Mother's Characteristics by Month of Birth. 1999 Fertility Survey, Spain.

	Education		10 or less years of educ.		At most Basic educ. or prof. of 1st degree		Marriage at birth		Not Married or Shotgun	
	Wanted	Unwanted	Wanted	Unwanted	Wanted	Unwanted	Wanted	Unwanted	Wanted	Unwanted
February	0.293	-0.261	-0.033	0.006	-0.021	0.018	0.032*	0.009	-0.057**	-0.043
	[0.274]	[0.322]	[0.030]	[0.035]	[0.031]	[0.039]	[0.017]	[0.029]	[0.025]	[0.037]
March	0.216	0.067	-0.048	-0.014	-0.04	-0.022	0.034**	0.022	-0.079***	-0.091***
	[0.259]	[0.423]	[0.029]	[0.038]	[0.031]	[0.041]	[0.016]	[0.025]	[0.024]	[0.034]
April	0.412*	0.072	-0.061**	0.02	-0.044	-0.016	0.038**	0.034	-0.050*	-0.019
	[0.242]	[0.363]	[0.027]	[0.038]	[0.030]	[0.043]	[0.016]	[0.023]	[0.027]	[0.040]
May	0.05	-0.105	-0.064**	0.011	-0.035	0.001	0.029*	0.003	-0.01	-0.012
	[0.258]	[0.315]	[0.028]	[0.038]	[0.029]	[0.040]	[0.017]	[0.023]	[0.027]	[0.037]
June	0.284	-0.001	-0.023	-0.035	-0.022	-0.036	0.016	0.01	0.006	-0.035
	[0.224]	[0.389]	[0.026]	[0.040]	[0.028]	[0.042]	[0.017]	[0.028]	[0.028]	[0.039]
July	0.255	-0.122	-0.05	-0.008	-0.041	-0.016	0.030*	0.009	-0.069***	-0.002
	[0.275]	[0.334]	[0.031]	[0.037]	[0.034]	[0.041]	[0.016]	[0.026]	[0.026]	[0.038]
August	0.163	-0.433	-0.015	0.034	-0.012	0.026	0.022	0.033	-0.088***	-0.071**
	[0.244]	[0.348]	[0.028]	[0.039]	[0.030]	[0.041]	[0.017]	[0.020]	[0.025]	[0.035]
September	0.369	-0.478	-0.079***	0.03	-0.086***	-0.021	0.001	0.008	0.004	-0.033
	[0.274]	[0.390]	[0.030]	[0.038]	[0.031]	[0.042]	[0.018]	[0.023]	[0.027]	[0.037]
October	0.179	-0.138	-0.024	0.029	-0.024	0.01	0.018	0.006	-0.088***	-0.085**
	[0.244]	[0.339]	[0.028]	[0.036]	[0.031]	[0.040]	[0.019]	[0.033]	[0.027]	[0.038]
November	0.568**	-0.187	-0.075***	0.001	-0.052*	-0.062	0.009	0.032	-0.04	-0.048
	[0.260]	[0.358]	[0.029]	[0.041]	[0.030]	[0.044]	[0.018]	[0.023]	[0.027]	[0.040]
December	0.747***	-0.503	-0.104***	0.025	-0.085***	-0.01	-0.011	0.036	-0.036	-0.03
	[0.263]	[0.334]	[0.030]	[0.035]	[0.032]	[0.039]	[0.022]	[0.023]	[0.028]	[0.038]
Observations	10,101		10,101		10,101		9,349		9,349	
R-squared	0.146		0.096		0.104		0.033		0.04	

Standard errors in parentheses (clustered at mother's level); * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. Each column presents the estimated from a different regression that has as dependent variable the one indicated on the head of the column and the specification similar to the one presented in equation (E.2).