Older mothers' employment and marriage stability when the nest is empty*

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Abstract. A significant literature in the social sciences addresses the impact of child-bearing and rearing on marital stability and on mothers' labour market outcomes. Much less is known about older mothers' employment and marriage patterns when the adult children leave the parental nest. This study aims to shed light on these issues using longitudinal labour force data for France. Exploiting retirement laws for identification purposes, and taking a regression discontinuity approach, we find that older women's retirement probability is positively associated with an empty nest. We also conclude that an empty nest is negatively associated with older mothers' marriage probability. There is scope for better targeting of both family and retirement policies for older mothers during those critical years when adult children leave the parental nest.

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1. Introduction

When children grow up and leave the parental home, parents, and especially mothers, may suffer from the so-called "empty nest syndrome", defined as experiencing feelings of loss and grief that may also lead to depression, according to the medical literature. (Harkness, 2008). Mothers' mental well-being is likely to impact their marriage and work life, and our study focuses on older mothers' marriage and work outcomes when the adult children leave home. This is a neglected issue to date in the social science literature that has mostly focused on the impact of children on younger mothers' labour and marriage market outcomes.

The sparse literature on the impact of adult children leaving the parental nest, on marriage stability and other outcomes, comes to controversial conclusions. In line with medical studies of the empty nest syndrome, some authors predict a negative impact on parents' marriage outcomes (for instance, Thapa, 2018), while others conclude that the quality of marital life improves when the adult children leave (Clay, 2003; Lyons, 2008; Parker-Pope, 2009). We contribute to this literature by examining older mothers' marital outcomes when the maternal nest in empty, using longitudinal data for France. Children leaving the parental nest are likely to induce a change in mothers' value of marriage, although the direction and size of this effect is difficult to anticipate a priori.

Moreover, we investigate the impact of an empty nest on mothers' labour market outcomes, which is a hitherto unexplored topic. In the original Becker model of the family (Becker, 1981), mothers specialize in home production and fathers in market work, and under this set-up, the prediction would be one of reduced unpaid work by mothers when the nest is empty. Moreover, a vast of literature in social sciences documents a negative impact of young children on mother's employment, hours and pay (for instance, Del Boca et al. 2009). One may then hypothesize that when adult children leave the parental next, mothers may be willing to invest more in the labour market, though the combination of older age and gender is unlikely to be rewarded by employers. Therefore, it is hard to anticipate a priori the direction of the impact of children's leaving the parental nest on mother's employment.

In particular, we focus here on mothers and pay no attention to fathers' outcomes, in line both with the prediction of the medical literature, that mothers are more likely than fathers to experience negative mental well-being when the "nest" is empty, and with a substantial social sciences literature that examines the impact of children on younger mothers' labour market outcomes (for instance. Baker, Gruber and Milligan, 2008). Our study also contributes to that literature by bridging the gap in knowledge of older mothers' labour market behaviour.

Nonetheless, we acknowledge that marriage stability and mothers' labour supply also depend on fathers' characteristics and labour supply.

A handful of studies examine adult children' decisions to leave the parental nest, in isolation from parents' marriage or labour market outcomes, and conclude that the "empty nest" depends on the business cycle, housing costs, demographics, social norms and family cultural background (Ermisch and Di Salvo 1997; Giuliano, 2007; Bitler, Marianne, and Hilary Hoynes, 2015; Blimer, *et al.* 2015; Matsudaira, 2016; Cooper and Luengo-Prado, 2018**)**. The same variables, often unobserved, may co-determine mothers' employment and marriage outcomes and children's decisions to leave the nest (or to return to it). For example, family cultural background may contribute to determine both the age at which children leave home and older mothers' labour market behaviour.[1] There may also be specific events or shocks that are unobserved to the researcher but that drive both the age at which adult children leave and mothers' employment and marriage outcomes, such as, job losses, or health shocks of other siblings, or the situation of the father. Most household surveys do not collect much information on adult children and often only ask about the number of children living in the parental home at the time of the data collection, which makes it difficult to discern sources of exogenous variation to identify the impact on mothers' outcomes of adult children having left the nest. Using administrative data that link parents to adult children may mitigate this concern, but it is difficult to find an identification strategy to isolate the impact of adult children leaving the nest from that of other factors affecting the economic decisions of mothers (often the secondary earner in couple households) and of their adult children.

Here, we exploit the rotating panel feature of the French labour force surveys 1990-2002, to try and pin down the association between changes in mothers' employment and marriage patterns and the existence of an empty nest. In addition, we take advantage of retirement laws to attempt to disentangle factors other than the departure of adult children, that may determine the employment decisions of older women.

Due to trends in postponing childbearing age (Eurostat, 2020) - which are such that the average age at which women have their first child is now 29 in Europe, as in France - the time at which adult children leave the parental home is close to the time at which mothers retire from the labour market. In addition, in France, mothers' pension rights used to increase by one year

[1] Notably, in Southern Mediterranean countries, like Italy, the age at which children leave the parental home is above the European average and, at the same time, the female employment rate is below the average in Europe, while in Scandinavian countries, children tend to leave earlier (Eurostat, 2018) and mothers' employment rates are higher. France stands somewhat in the middle in these statistics, but this may conceal large differences across different regions and parental backgrounds.

with each additional child, a provision that was removed by recent reforms for any child born after 2005 (for instance, Conseil d'Orientation des Retraites, 2008). This is why it matters to instrument mothers' retirement decisions with retirement laws, when empirically examining the association between mothers' employment patterns and their children having left the nest.

There is evidence that divorce rates are soaring among the "grey generations", which are also likely to overlap with an empty nest. In fact, Figure 1 (based on administrative data on divorces, collected by the French Ministry of Justice) illustrates that, by the end of the 1990s, as many marriages broke up after 30-34 years of duration as after the first five years of marriage.[2] Similar patterns have been shown to hold in the US (Susan Brown and Fen Lin, 2012) and the UK (Office for National Statistics, 2013). Consensual divorce law dates back to 1975 in France, and divorce rates soared thereafter (Figure 1). To date, we still lack a solid story to explain this steady rise in divorce rates of individuals close to retirement age. Moen et al. (2001) provide evidence of a negative association between retirement, gender roles, and the quality of marriage, using a two-year panel on American couples, taking the years through retirement as exogenous to the quality of marriage. Stancanelli (2015) and Doorley and Stancanelli (2019) use retirement laws in France to instrument the effects of retirement on individual marriage status, to conclude that retirement correlates negatively with the marriage probability. The authors argue that retirement may affect marital status according to the predictions of standard economic models of marriage and divorce. Nevertheless, as the time at which adult children leave the parental home also tends to coincide with parent's retirement from the labour market, this additional avenue also needs to be considered, to better grasp the factors increasing the risk of divorce at older ages. Therefore, we attempt to bring both retirement patterns and the presence of adult children in the household into our empirical model of the marital status of older women in France, in order to disentangle the impact of the one from the other.

To isolate older mothers' employment decisions from other factors that may have impacted both mothers' employment and adult children's decision to leave home, we exploit the minimum legal retirement age (which was 60 at the time covered by our data in France) as well as a pioneering retirement reform that postponed retirement for generations born in 1934 and later.[3] The reform was announced in the summer of 1993 and implemented from January 1994, when those born in 1934 would turn 60, thus taking the targeted generations by surprise

[2] There are notable spikes in divorce rates both after the introduction of consensual divorce (1975) and a recent reform (2004) that eased divorce procedures in France.
[3] This reform only applied to individuals working in the private sector; it did not apply to the public sector.

and leaving no scope for anticipation effects (see, for example, Stancanelli, 2017). Although we do not have to hand any source of exogenous variation to neatly identify the time at which adult children leave home, we control for household fixed effects to capture changes in the presence of any children in the household. However, when using the reform of 1993 to identify mothers' employment patterns, we can only take a household random effects approach, given that the policy reform hinged on individual birthdays, which is constant over time. To get around this, we also estimate models restricting the sample to mothers with children still at home in the preceding year. Although we are careful to interpret our empirical estimates in terms of statistical associations, rather than causality effects, we believe that this study makes an important contribution to the sparse literature on older mothers' employment and marital outcomes.

Based on our estimation results, we conclude that an empty nest is associated with a lower labour market attachment of older mothers and a higher degree of marriage instability. However, we also find some evidence that mothers' marriage probability is positively associated with the combination of an empty nest and the retirement of older mothers, suggesting that marital stability may perhaps improve once children have left and mothers have retired from the labour market.

The structure of this study is as follows. In the next section, we describe the data for the analysis. The conceptual framework and the empirical model are presented next. The results of our estimations are then discussed, and the final section draws conclusions.

2. The data and preliminary graphical analysis

The data for the analysis is drawn from the French Labour Force Surveys (LFS) of the years 1990 to 2002. These annual surveys are collected by personal interviews at the respondent's home and they have a rotating panel structure with one third of the sample being replaced each year, which enables us to follow households for a three-year span. The response rate is high and equal to almost 90%. As the LFS series was broken in 2003 to comply with Eurostat requirements, with LFS surveys being carried out quarterly and households being followed at most for a year and a half (i.e., six quarters), we chose to use the LFS 1990-2002.

We select for the analysis a sample of older women, regardless of their marital status, in order to investigate how the presence or absence of children at home is associated with older women's marital status. In addition, we draw a subsample of partnered women, either cohabiting or

married, obtained by matching women to their partner's records and dropping from the sample same sex couples, as well as households with more than one couple under the same roof.[4] The LFS surveys only collect information on the age and the number of children living with the respondent. Our empirical models hinge on a fixed effects approach to depict the outcomes for older mothers when the "nest" becomes empty. Alternatively, we also estimate random effects models and select older mothers with children still living at home in the previous year.

In terms of sample size, considering older women aged between 56 and 64, the subsample of partnered women includes 71,612 observations and the full sample of older women counts 95,435 observations. Considering only women who are observed at least twice (for the panel models), these observations drop to, respectively, 58,870 observations for the partnered women sub-sample and 78,173 observations for the full sample of women. When restricting these samples to mothers with children still at home the previous year, the sample size shrinks dramatically to fewer than 8,000 mothers.

The retirement status is subjectively assessed by LFS survey respondents and measured on the interview date. Marital status was also self-assessed. We construct an indicator variable for the absence of children in the household, setting it equal to one for households in which there are no children present and to zero for households with a positive number of children. The LFS collects month and year of birth together with records of the day, month, and year of the interview. Therefore, we construct an approximately continuous measure of mothers' age in days, on the day of the interview, assuming that individuals were born on the 15th day of the month. As for other variables, we construct completed education dummies - the excluded group being respondents with college education (university). We also consider region[5] and year fixed effects. The latter may capture macroeconomic changes, such as the secular increase in female labour supply. We show that none of these variables is discontinuous at age 60 (the minimum legal retirement age at the time of the data) or for those born in 1934 (the birth date threshold for the 1993 retirement reform). This is a necessary condition to be able to apply a regression discontinuity method, since if the sample characteristics varied around the policy threshold, this may confound the estimation results of the effect of the policy on the outcomes.

[4] By doing so we may drop few young couples living under the parental nest, but it is not really possible to pin them down given the scant information on who are the adults co-residing in the household.
[5] The most disaggregated area of residence is the region.

Descriptive statistics of the data are provided in Table 1, distinguishing older women aged below (aged 56 to 59) or above (aged 60 to 64) the minimum legal retirement age of 60. It is shown that 15% of women aged below 60 had retired from work, against 58% of those aged 60 and above. The proportion of married or cohabiting women is smaller among women over 60, but this seems to be explained by the larger number of widows. About 76% of older women under 60, and 72% of women over 60 were married. In contrast, about 11% of women under 60 were widows, against 16% for women over 60. There are no children living at home in 75% of households with a woman aged 56 to 59, and 84% of households with a woman aged 60 to 64. These proportions are almost identical whether one considers all women (the top block of Table 1) or only partnered women (the bottom block of Table 1). Women over 60 are on average less well educated than those under sixty, which is likely due to the increasing educational achievements of younger cohorts, and we control for education and other observables in all the empirical models.

Next, we checked whether respondents' survey participation was continuous at the age 60 threshold. If participation were discontinuous at the policy threshold, this would invalidate using a regression discontinuity approach (see, for instance, McCrary, 2008). Thus, we plot mothers' survey participation in Figure 2 and show that this is continuous at the policy thresholds of the age 60 minimum legal retirement age.

Moreover, we verified in Figure 3 that the presence of children in the parental nest is not discontinuous at the policy thresholds, since this would also confound the estimation results. In fact, none of the explanatory variables is discontinuous at the policy thresholds (results not shown for lack of space, but available from the authors).

We plot in Figures 4 and 5 the raw kernel estimates of the retirement and marriage probability of older women as a function of their birthdays. It is shown that women's retirement probability increases sharply at the legal retirement age of 60 (left chart in Figure 4) but it drops sharply for those born in 1934 (right chart in Figure 4), who were affected by the 1993 retirement reform that postponed retirement for cohorts born in 1934 and later. Specifically, for the latter chart, we only consider survey years 1992 to 1995, because the policy was announced in the summer of 1993 and came into force in 1994. The two charts in Figure 4 indicate that we can identify older women's retirement decisions, using either the legal retirement age or the 1993 reform. In fact, the 1993 reform provides a neater identification strategy as it came unexpectedly,

though its impact is smaller as it only postponed retirement by a quarter for each year of birth past 1933, with the retirement probability dropping by a few percentage points for older women affected by this reform. Moreover, when implementing an RDD for the 1993 reform, we cannot apply a fixed effects model, as respondent's birthday is time invariant. In contrast, the minimum legal retirement at age 60 leads to a jump in retirement at age 60 that is outstandingly large and equal to about 30 percentage points and, though age can be anticipated, it is not possible to change one's birthday. When using the minimum legal retirement age in an RDD framework, it is possible to implement it by also controlling for household fixed effects, since the running variable is set equally between the date of the interview and the respondent's 60^{th} birthday, and this distance varies from one survey year to the next for the same respondent (contrary to the distance between the respondent's birthday and the January 1934 birthday which is constant in all survey years).

Finally, Figure 5 shows the divorce and marriage outcomes, respectively, as functions of how far respondents are from their 60^{th} birthday (top panel charts in Figure 5) or from a 1934 birthday (bottom panel charts in Figure 5). These graphs indicate no discontinuity in marriage stability for women around their retirement years.

3. Conceptual framework and empirical model

According to a vast literature, young children impede mothers' labour supply and therefore, mothers' labour supply may increase when children leave the nest. However, due to the combination of older age and gender, which is unlikely to be rewarded by employers, their labour market prospects may not improve. Therefore, it is difficult to anticipate a priori the impact of an empty next on mother's employment. Here, we exploit retirement laws to disentangle the impact of other institutional factors that may codetermine mothers' employment decisions.

As for the impact of children leaving the nest on mothers' marriage decisions, the existing literature presents no consensus. Adult children living at home may be a source of joy but also a source of stress, which may lead to marital conflict.

In particular, individual j may initiate divorce (or separation) if their expected value of marriage $E(V_{m,j})$ falls short of their expected value of being single $E(V_{s,j})$, where these value functions depend on the utility of consumption under the two states of marriage and separation, subject to a budget and time constraint (there are 24 hours per day that can be allocated to paid

work, household work, leisure), and given the current environment (see, for instance, Becker 1977; Peters, 1986; Grossbard-Shechtman, 1993; Friedberg and Stern, 2003; Sevilla-Sanz, 2010; Curtado et al. 2013). The value of marriage for each spouse may well differ from the sum of the value of being single for each spouse, as marriage generates some extra surplus for the spouses, such as love, caring, children, or in the form of the output of household production. Children leaving the nest are likely to induce a change in the spouses' value of marriage. However, the direction and magnitude of these changes are difficult to anticipate a priori.

Moreover, the time at which adult children leave the parental nest is often close to that at which parents retire, and retirement is also likely to impact spouses' values of marriage and marriage stability (Dilender, 2014; Stancanelli, 2014; and Doorley and Stancanelli, 2019). Generally, retirement is likely to add considerable uncertainty to the expected value of marriage as it represents a dramatic change for spouses in several dimensions, such as role models fading away, time allocation, stress, joy, and so forth, which are difficult to anticipate ahead of retirement and that may have an immediate effect on marriage stability.

In addition to this, caring parents may wait until their adult children leave the parental nest to separate, though this seems quite unlikely in the French context, where divorce rates are high and are well above the European average, with more than one in two couples divorcing in 2017 (Eurostat, Marriage and Divorce statistics). Here we use the retirement laws to try to disentangle the impact of retirement from that of children leaving the nest, on mothers' marriage/divorce probability.

Thus, our empirical model for the relation between mother's retirement and an empty nest is the following:

$$R_{it} = \gamma_r T_{it} + \beta_r f(d_i) T_{it} + \lambda_r f(d_i) (1-T_{it}) + \kappa_r K_{i\,t} + Þ_r X_i + v_i + u_{it} \quad (1)$$

Where R denotes mother's retirement status and K the empty nest, i.e., no children still living in the parental home. T is a dummy that takes value one for mothers aged 60 and above and value zero for mothers younger than 60, while d is the running variable that is the distance in days from the respondent's 60^{th} birthday, i.e., the time elapsed between the respondent's age on the day in which the respondent answered the survey and the respondent's 60^{th} birthday. The symbol f stands for a polynomial function of the running variable, and we determine it to be linear after inspection of the data. As customary in the RDD set up, the running variable, i.e., d, is interacted with the treatment from the right and the left of the discontinuity, which is here the minimum legal retirement age of 60. The matrix X includes controls for education, French nationality, region of residence, size of the city/village of residence, and year fixed effects.

Mothers' fixed effects are captured by v, and u is a random error that we assume to be distributed normally and clustered at the level of the running variable. In order to apply an RDD, we also need to choose the optimal bandwidth for the estimation sample and we do this by applying the procedure in Calonico *et al.* (2014), which gives a 48 months bandwidth. We also experiment with varying the bandwidth, for robustness checks.

The parameter of interest in Equation 1 above is κ, which captures the effect of an empty nest on mother's retirement from the labour market, thanks to the panel fixed-effect structure of the model, ensuring that the dummy K (equal to one when there are no children at home, and zero otherwise) captures the effect of children leaving home, i.e., the empty nest effect. We also estimate the model depicted in Equation 1 for the outcome of mothers' employment, so in that case the outcome variable becomes E, instead of R, and takes value one for mothers whose main economic status is employment, and zero otherwise. Because some older mothers may transit into unemployment before retiring from the labour market, focusing on the employment probability is not the exact counter-picture of the retirement probability.

We also allow the variable for the empty nest, K, to be fully interacted with the RDD terms and estimate an additional specification (see Equation 2 below) in which K is interacted with T and with $f(d_i)\,T_i$ and with $f(d_i)\,(1-T_i)$, in addition to being entered separately in the model. This more complex specification enables us to capture direct and indirect effects of children leaving the parental nest on mothers' retirement/employment decision.

$$R_{it} = \gamma_{rk}\,T_{it} + + \kappa_{rk}\,K_i\,T_i + \beta_{rk}\,f(d_i)\,T_{it}\,K_i + \lambda_{rk}\,f(d_i)\,(1-T_{it})\,K_i + \beta_{rk}\,f(d_i)\,T_{it}$$

$$+ \lambda_{rk}\,f(d_i)\,(1-T_{it}) + \kappa_{rk}\,K_{i\,t} + Þ_{rk}\,X_i + w_i + z_{it} \qquad (2)$$

Also, in an RDD set-up, we exploit the 1993 retirement reform that essentially required individuals born in 1934 and later to work longer before being able to retire with full pension rights. The same model as in Equation 1 is estimated, but this time "T" takes value one for mothers born in 1934 and later and value zero for those born before 1934, while the running variable is the time elapsed between the mother's birthday and being born in January 1934. When implementing an RDD around this policy threshold (being born in 1934), we restrict the sample for analysis to the years 1992 to 1995, to include two years before the policy and two years after, and to specify the household effects "v" as random effects.

Finally, to estimate the relation between an empty nest and divorce, we specify the following Instrumental Variable model (equivalent to a "Fuzzy" Regression Discontinuity Design, as in Hahn, Todd**,** and Van der Klaauw, 2001), in which retirement is instrumented

with "T", the minimum legal retirement age (or being born in 1934, in the alternative RDD set-up). Equation 4 below provides the first stage IV equation for retirement while Equation 3 depicts the IV outcome model. In addition to the outcome S, equal to one if older women report being divorced at the time of the LFS survey interview, and zero otherwise, we also consider the outcomes of marriage and singlehood.

$$S_{it} = \gamma_s R + \kappa_s K_{i\,t} + Þ_s X_i + m_i + n_{it} \qquad (3)$$

$$R_{it} = \gamma_{iv} T_{it} + \beta_{iv} f(d_i) T_{it} + \lambda_{iv} f(d_i) (1-T_{it}) + \kappa_{iv} K_{i\,t} + Þ_{iv} X_i + o_i + p_{it} \quad (4)$$

Again, in this context, we specify and estimate a more complex model, in which the variable for the empty nest, K, is fully interacted with retirement, R, and with the RDD terms, T , $f(d_i)$ T_i and $f(d_i)$ $(1-T_i)$ in the first stage equation (Equation 6 below), as follows.

$$S_{it} = \gamma_{sk} R K + \gamma_{ss} R + \kappa_{sk} K_{i\,t} + Þ_{sk} X_i + q_i + c_{it} \qquad (5)$$

$$R_{it} = \gamma_{ivk} T_{it} K + \beta_{ivk} f(d_i) T_{it} K + \lambda_{ivk} f(d_i) (1-T_{it}) K + \gamma_{ivv} T_{it} + \beta_{ivv} f(d_i) T_{it} + \lambda_{ivv} f(d_i) (1-T_{it}) + \kappa_{ivk} K_{i\,t} + Þ_{ivk} X_i + y_i + e_{it} \qquad (6)$$

Again, we consider two alternative treatment avenues, the minimum legal retirement age set-up (in which the treatment dummy, T, is equal to one for women 60 and over), and the 1993 retirement reform (when T is set equal to one for women born in 1934 or later and the sample for analysis is restricted to the LFS survey years 1992 to 1995).

The IV models described in Equations 3, 4, 5, and 6, are estimated applying random effects and also, as an additional specification, restricting the analysis sample to older women who had at least some children living at home in the previous year. The sample bandwidth is set equal to 48 months, as for the retirement outcome RDD model (see discussion above).

4. Results of estimations

We have estimated the empirical models (in Section 4 above) for older women's labour market and marriage market outcomes, as a function of an empty nest (defined as no children living at home).

The results of the estimation of these RDD models are presented, respectively, in Tables 2 and 3, using the legal minimum retirement age (in Table 2) and the 1993 retirement reform (in Table 3) to identify the impact of other factors that may co-determine mothers' retirement and employment decisions resulting from children leaving the parental nest. The upper blocks of results in each Table relate to the sample of older women, regardless of their marital status, while the lower blocks of results focus on partnered women who reported being married or cohabiting and whose partner also participated in the LFS survey (see Section 2 for more details of sample selection and analysis variables). For each outcome, we present two sets of results, corresponding to Equations 1 and 2 of Section 3, respectively.

Under each RDD specification, exploiting either the minimum legal retirement age (Table 2) or the 1993 retirement reform (Table 3), we find that an empty nest has a significant positive association with mothers' retirement probability and a negative association with mother's employment probability.

Specifically, an empty nest increases mothers' retirement probability by 3 to 5 percentage points (see right-hand block of results in Table 2) and lowers mothers' employment probability by about 1 percentage point, with the employment effect being statistically significant only for non-married women. This conclusion is reached by comparing the upper and lower results in Table 2, relating, respectively, to all women (upper block) and to partnered women, both married and cohabiting women (lower block). This is confirmed by re-estimating the model only for non-married women (results not shown for lack of space, but available from the authors).

Table 2 shows that an empty nest does not, per se, impact mothers' retirement (or employment) decisions, but its positive impact on retirement (and negative impact on employment for non-married women) only kicks in when mothers approach retirement age, since the dummy for an empty nest is only statistically significant when it is interacted with the dummy for women's being aged 60 and above, although it is not statistically significant when entered separately.

Table 3 hinges on the 1993 retirement reform that provided incentives for individuals born in 1934 and later to postpone retirement, and controls for women's random effects (while the model estimated in Table 2 controls for women's fixed effects, as discussed in Section 3).[6] An empty nest is associated with an increase of 6 to 9 percentage points in older women's probability to retire, and with a reduction of 4 percentage points in employment probability. In

[6] As already mentioned, we cannot estimate a fixed-effects RDD model for the 1993 reform, since individual birthdays do not vary over time.

line with the findings in Table 2, the negative employment associated with an empty nest is only statistically significant for unmarried women.

In particular, the set-up in Table 3, that exploits the 1993 reform to single out retirement drivers other than an empty nest, is such that we consider only the years prior to (1992 and 1993) and after (1994 and 1995) the reform year, to capture the unanticipated impact of the reform on mothers' retirement decisions, as the reform was announced in the summer of 1993 and implemented as from January 1994. Under this empirical RDD framework, we find that an empty nest affects mothers' retirement and employment decisions by itself and not via the reform, as the interaction term with the reform is not statistically significant (right-hand block of results in Table 3, for the retirement and employment probabilities). This contrasts with the findings in Table 2, where we show that the empty-nest impact kicks in only via its interaction with mothers reaching the legal retirement age.

To check whether these different estimates may be due to having controlled for fixed effects in the model of Table 2 and for random effects in the model of Table 3, we re-estimate the model in Table 3 only for older women with a positive number of children at home in the previous year (see Table 4). We conclude that our estimates of the association between an empty nest and women's retirement probability is robust both in significance and in size. Moreover, the interaction terms between an empty nest and being born in 1934 or later (see right-hand blocks of results in Table 4) indicates that for partnered women (right-hand lower block of results in Table 4) the effect of an empty nest on retirement (or employment) works via its interaction with the policy reform but has no effect when considered separately from the reform. This is in line with the findings in Table 2 and confirms our intuition that the positive impact of an empty nest on mothers' retirement probability only applies to mothers who are close to retirement age. However, this seems to hold true here only for partnered mothers, since when we consider mothers altogether (right-hand upper block of results in Table 4) the interaction term between an empty nest and being born in 1934 or later is not statistically significant. The treatment effect of being born in 1934 also loses its statistical significance. This could possibly be driven by the heterogenous responses of the group of unpartnered mothers, with the reform and the empty nest working in opposite directions (as children' departure from the nest would strongly encourage mothers to retire but, on the other hand, the reform was pushing them to postpone retirement). Some unpartnered mothers are perhaps more sensitive to the policy incentives, while others respond more to the empty nest. Notwithstanding this, the estimates of the association between an empty nest (considered separately from the policy reform) and mothers' retirement remains strongly positive, and that with mothers' employment strongly

negative. All in all, we conclude that an empty nest is strongly and positively associated with older women's retirement from the labour market while the findings are less clear-cut for employment.

Next, we estimate the relation between the empty nest and older women's marital status, distinguishing the outcomes of marriage, divorce and singlehood and taking an instrumental variable approach, which can also be seen as a fuzzy Regression Discontinuity Design, hinging on the minimum legal retirement age, with women's fixed effects in the lower block of results in Table 5. Alternatively, when exploiting the 1993 policy reform for identification, women's random effects are used (see the upper block of results in Table 5). We estimate two separate models, one in which we fully interact the variable for an empty nest with the treatment (right-hand sets of results in Table 5) and one in which we do not (left-hand sets of results in Table 5).

We find that an empty nest is negatively associated with older women's marriage probability and positively associated with older women's probability to divorce or to be single. However, when taken together with retirement, an empty nest is positively associated with older women's marriage probability, and also shows a positive association with their divorce probability (see Table 5). Moreover, retirement appears to have a negative impact on older mothers' marriage stability (see Dorley and Stancanelli, 2019, for a discussion of the relation between retirement and partners' marriage stability). To better grasp what underlies these estimates, the models are re-estimated after restricting the sample to women with a positive number of children in the previous year (see Table 6). We then conclude that the intersection of mothers' retiring from the labour market and children leaving the parental home is positively associated with mothers' marriage probability, while the association with divorce becomes not statistically significant.

The take-away from all this is that:

1. An empty nest has a positive statistical association with mothers' retirement probability.
2. An empty nest has a negative statistical association with mothers' marriage probability and a positive association with mothers' divorce probability.
3. The interface of an empty nest and retirement is less clear, suggesting that for some mothers, marital stability may possibly improve when the children leave home and mothers retire from work.

These findings are globally robust to variations in the bandwidth for the estimation sample and to dropping controls for the model (results not shown for lack of space, but available from the authors).

5. Conclusions

This study aims to gather evidence on the largely unexplored relationship between an empty nest, defined as the situation in which children leave the parental home, and mothers' employment and marriage stability outcomes. We take from the medical literature that highlights an empty nest syndrome, which may especially affect mothers when their adult children leave home, and we expand on the sparse social sciences literature on the impact of an empty nest on parents' marriage stability.

Mothers' employment and marital stability are difficult to predict a priori when children leave the parental nest. Because the time at which adult children leave the parental nest is often close to parents' retirement from the labour market, we must disentangle the factors that may co-determine mothers' labour market and marriage outcomes, and the adult children's decision to leave home. To do so, we examine the minimum legal retirement age, as well as a retirement reform that was announced and implemented within a short time frame, thus taking the targets by surprise. We use the longitudinal structure of the French Labour Force Surveys of 1990-2002 to estimate fixed effects models, as well as random effects models, in which we select only mothers with children still living at home in the previous year.

We find a large and positive statistical association of an empty nest with mothers' retirement from the labour market, with estimates of mothers' retirement probability being in the range of 3 to 9 percentage points higher when the nest is empty. Moreover, there is global evidence that an empty nest is associated with lower marriage probability and higher divorce probability of older mothers. However, when taken in combination with retirement from work, an empty nest may be associated positively with the marriage chances of some mothers. All in all, this suggests that when there are children still living at home, mothers postpone retirement, but when those children leave, marital stability is at stake.

The evidence gathered in this study suggests a need for family and retirement policies to target older mothers during the years when adult children are likely to leave the parental home.

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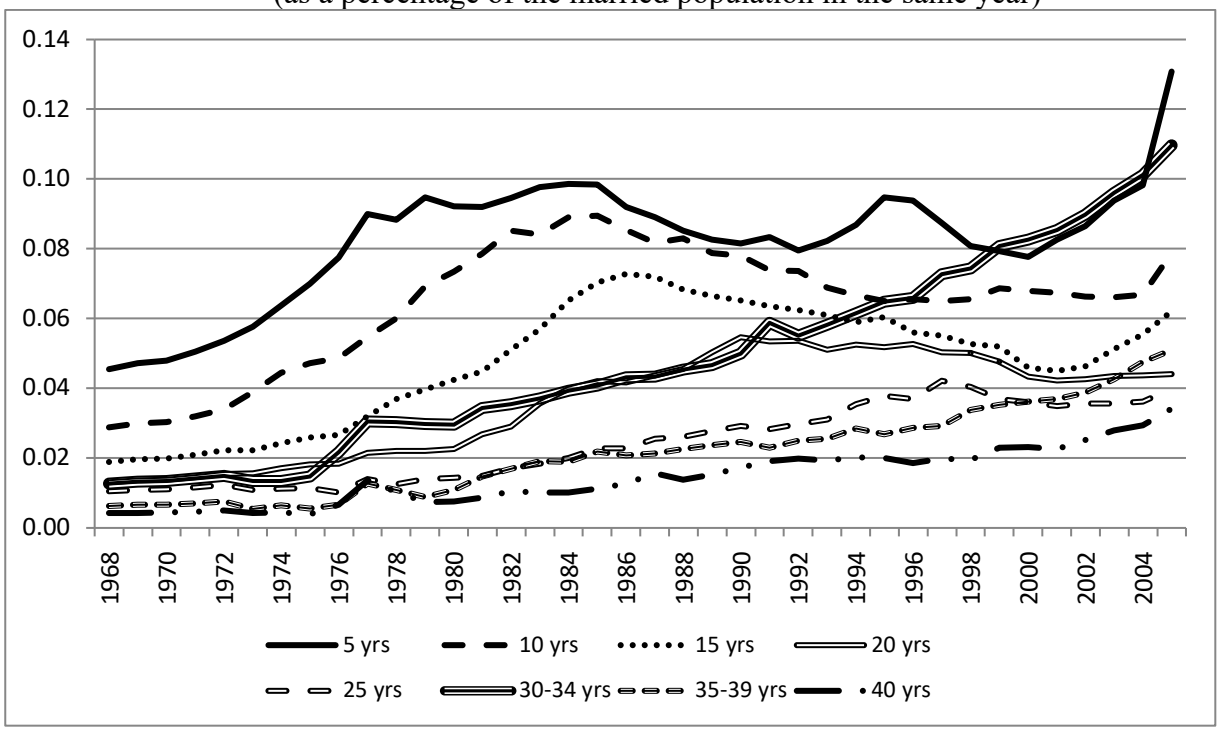
Figure 1. Divorced French persons by year of divorce and duration of the marriage (as a percentage of the married population in the same year)



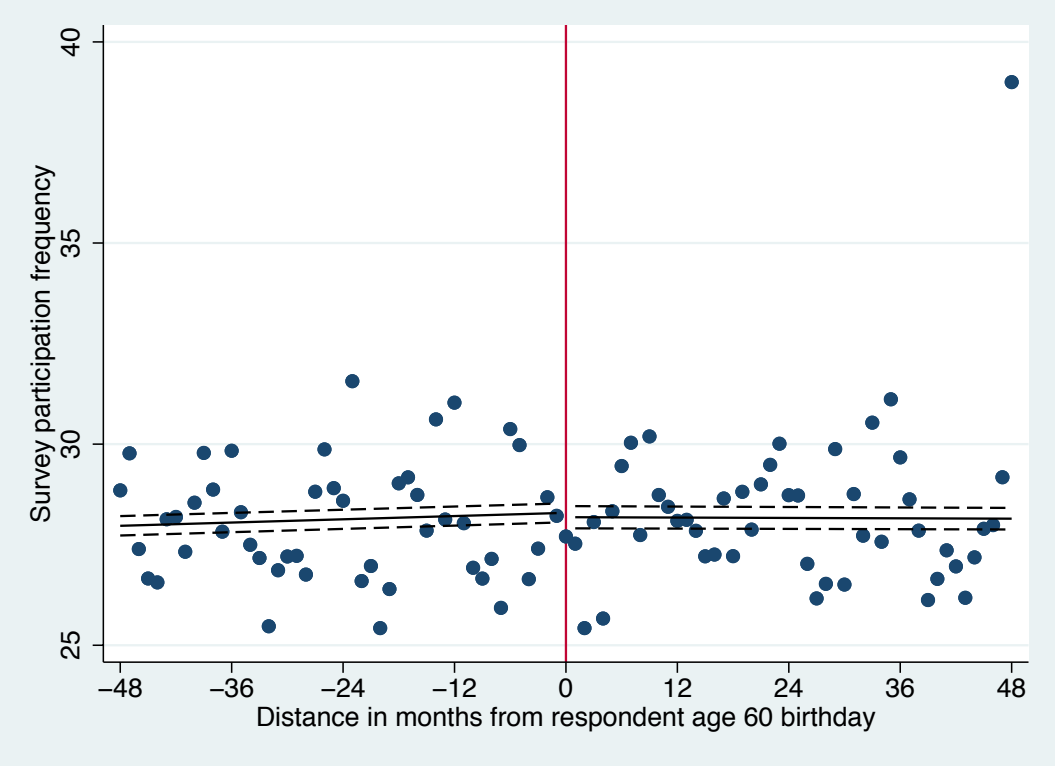
Source: Author's plot of data from the French Ministry of Justice.

Table 1. Descriptive statistics

All women	Age 56 to 60			Age 60 to 64	
	Mean	Standard deviation		Mean	Standard deviation
retired	0.155	0.362	retired	0.583	0.492
employed	0.376	0.484	employed	0.109	0.312
married	0.758	0.428	married	0.722	0.448
cohabitant	0.027	0.163	cohabitant	0.022	0.148
single	0.041	0.2	single	0.043	0.203
divorced	0.079	0.27	divorced	0.063	0.244
widowed	0.113	0.317	widowed	0.165	0.371
no children still at home	0.75	0.432	no children still at home	0.842	0.364
age	58.01	1.157	age	62.01	1.155
less than high school	0.598	0.49	less than high school	0.667	0.471
high school	0.251	0.433	high school	0.217	0.412
university and above	0.077	0.268	university and above	0.064	0.245
Observations	*46,780*		*Observations*	*48,655*	
Partnered women	Age 56 to 60			Age 60 to 64	
	Mean	Standard deviation		Mean	Standard deviation
retired	0.151	0.358	retired	0.559	0.496
employed	0.35	0.477	employed	0.097	0.296
married			married		
single			single		
divorced			divorced		
widowed			widowed		
no children still at home	0.744	0.436	no children still at home	0.841	0.365
age	58.01	1.157	age	62.01	1.155
less than high school	0.605	0.488	less than high school	0.672	0.469
high school	0.254	0.435	high school	0.219	0.414
university and above	0.074	0.262	university and above	0.06	0.238
Observations	*36,077*		*Observations*	*35,535*	

Note. The data are drawn from the French Labour Force Surveys 1990-2002. The sample of partnered women includes married or cohabiting women living in a couple together with their partner (for whom also the partner participated in the LFS survey. The variable *no children still living at home* is set equal to one for households in which there are no children present and to zero for households with a positive number of children. Age is measured in months, since we know the birth year and month of each LFS respondent as well as the date of the LFS interview. Employment and retirement is measured as the main activity at the date of the LFS interview.

Figure 2. Survey participation

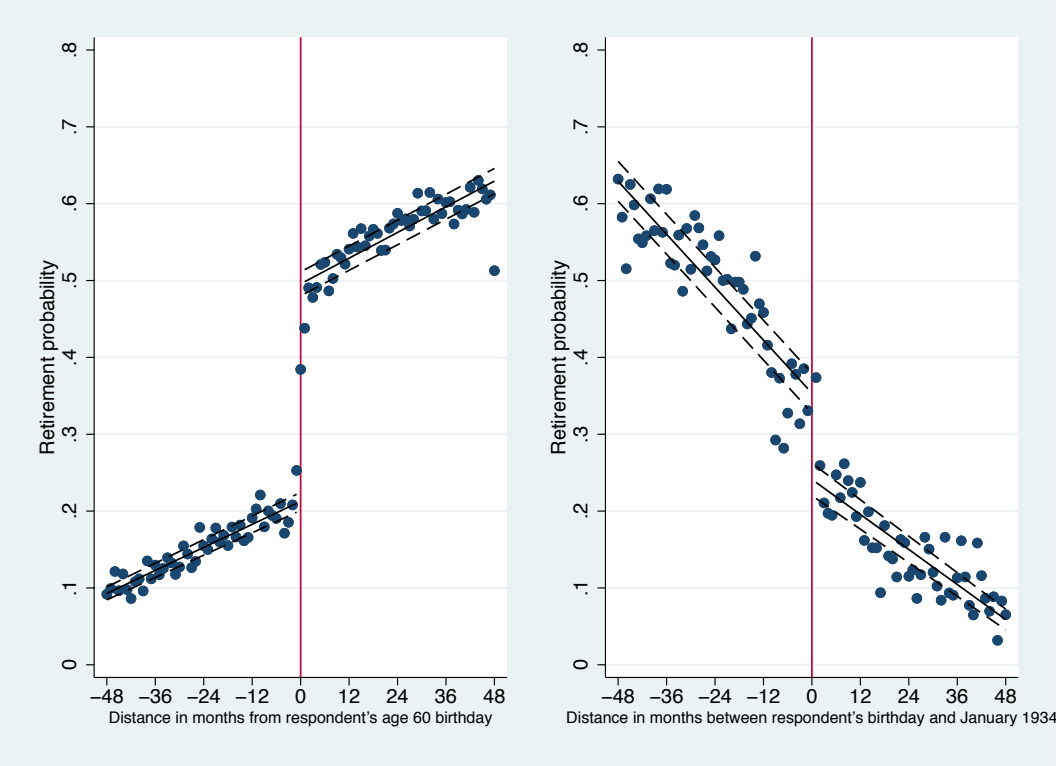


Note: The graph plots the frequency of older women's survey participation as a function of their age, measured in months distance from their 60th birthday. The point 0 corresponds to age 60, the point -12 to age 59, and the point 12 to age 61, and so forth. The solid lines are plotted through the triangular kernel estimates while the dashed lines are the 95 per cent confidence intervals around those estimates.

Figure 3. Any children living at home as function of the mother's age.

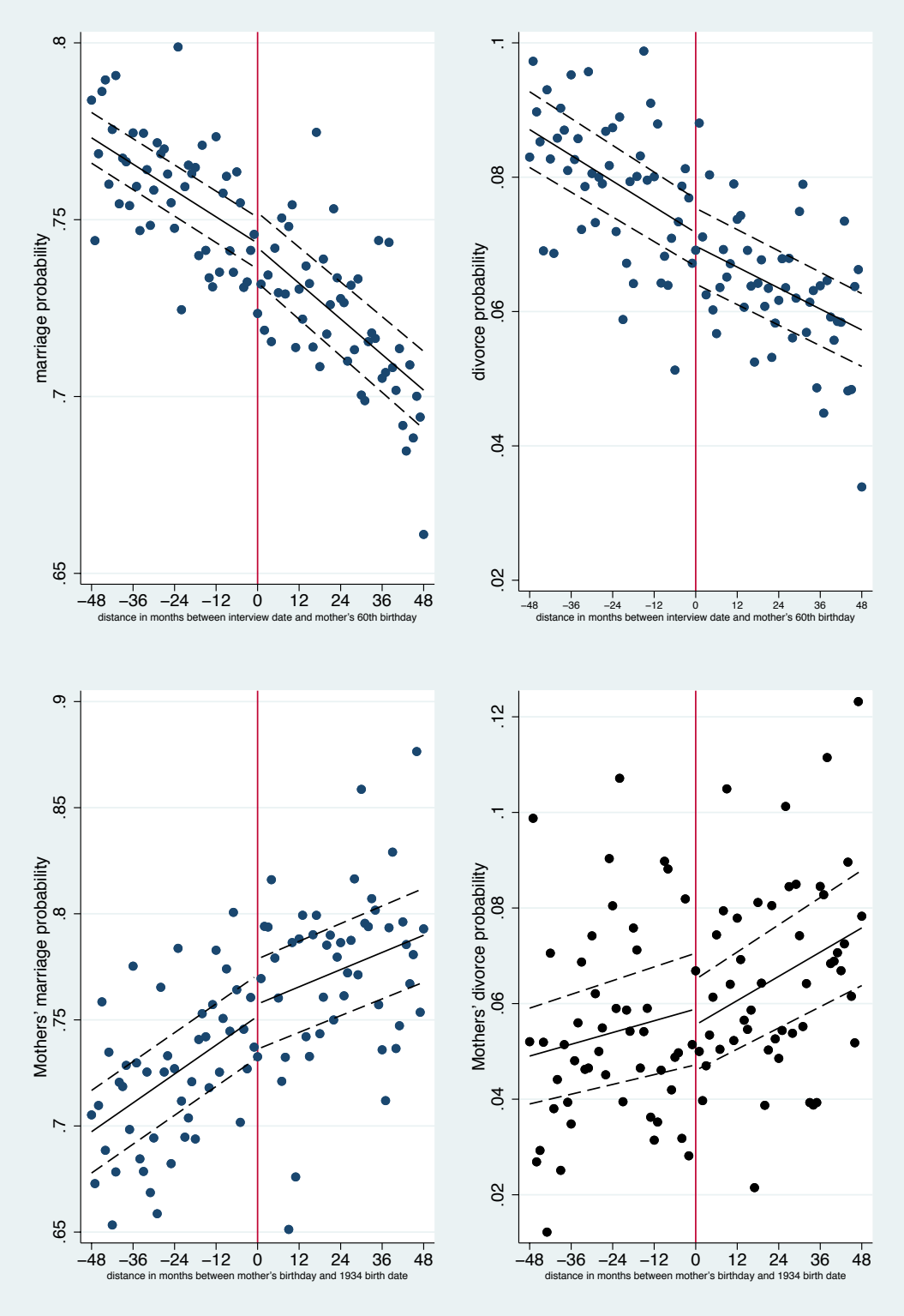
Note: The graph plots the proportion of children living in the respondent's home as a function of the respondent's age, measured in months distance from their 60th birthday. The point 0 corresponds to age 60, the point -12 to age 59, and the point 12 to age 61, and so forth. Here the proportion of children living in the parental nest is set equal to one if there are any children still living at home, and to zero otherwise. The solid lines are plotted through the triangular kernel estimates while the dashed lines are the 95 per cent confidence intervals around those estimates.

Figure 4. Retirement probability as a function of mother's birthday



Note: The graphs plot older women's retirement probability as a function of their age, measured in months distance from their 60th birthday (left chart) or from birthdate on January 1934 (right chart), respectively. The latter reflecting the effect of the 1993 reform that postponed retirement for those born in 1934 and later. The solid lines are plotted through the triangular kernel estimates while the dashed lines are the 95 per cent confidence intervals around those estimates.

Figure 5. Marriage and divorce probability as a function of mother's birthday



Note: The graphs plot older women's marriage (right panel charts) and divorce probability (left panel charts) as a function of their age, measured in months distance from their 60th birthday (top panel charts) or from birthdate on January 1934 (bottom panel charts), respectively. The latter reflects the effect of the 1993 reform that postponed retirement for those born in 1934 and later. The solid lines are plotted through the triangular kernel estimates while the dashed lines are the 95 per cent confidence intervals around those estimates.

Table 2. Results of estimation of the relation between the retirement/employment probability of older women and an empty nest: exploiting minimum legal retirement age to identify retirement. Regression Discontinuity Design with fixed effects models.

All women	Retirement probability	Employment probability	Retirement probability	Employment probability
Being aged 60 and above	0.280***	-0.108***	0.241***	-0.0916***
	(0.00599)	(0.00462)	(0.0124)	(0.00912)
No children at home* age 60			0.0480***	-0.0197*
			(0.0137)	(0.0102)
No children living	-0.00279	0.00230	0.000228	-0.00182
at the parental home	(0.00731)	(0.00602)	(0.0114)	(0.00967)
Women observations	*30279*	*30279*	*30279*	*30279*
Panel women observations	*78,173*	*78,173*	*78,173*	*78,173*
R squared	*0.821*	*0.873*	*0.821*	*0.873*
Partnered women				
Being aged 60 and above	0.270***	-0.0995***	0.248***	-0.0904***
	(0.00688)	(0.00508)	(0.0145)	(0.0105)
No children at home* age 60			0.0267*	-0.0105
			(0.0158)	(0.0117)
No children living	-0.00517	0.00263	0.00481	-0.00454
at the parental home	(0.00825)	(0.00680)	(0.0129)	(0.0109)
Women observations	*22781*	*22781*	*22781*	*22781*
Panel women observations	*58,870*	*58,870*	*58,870*	*58,870*
R squared	*0.819*	*0.868*	*0.819*	*0.868*

Note: The models estimated are linear Regression discontinuity model, with individual random effects. The bandwidth is 48 months. The controls include interactions of the dummy for being aged 60 and over with the running variable from the left and the right of the age 60 discontinuity, education dummies, and fixed effects for department of residence, size of the commune of residence, and year of the survey. The standard errors are clustered at the level of the running variable. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3. Results of estimation of the relation between the retirement and employment probability of older women and an empty nest: exploiting the 1993 retirement reform to identify retirement. Regression Discontinuity Design with random effects models.

All women	Retirement probability	Employment probability	Retirement probability	Employment probability
Being born 1934 or later	-0.0814***	0.0260*	-0.0665***	0.00777
	(0.0179)	(0.0138)	(0.0258)	(0.0264)
No children at home* born 1934			-0.0164	0.0208
			(0.0271)	(0.0259)
No children living	0.0591***	-0.00162	0.0989***	-0.0426**
at the parental home	(0.00749)	(0.00703)	(0.0213)	(0.0204)
Women observations	*16,667*	*16,667*	*16,667*	*16,667*
Panel women observations	*31,452*	*31,452*	*31,452*	*31,452*
R squared overall	*0.2209*	*0.1235*	*0.2209*	*0.1245*
Partnered women				
Being born 1934 or later	-0.0892***	0.0177	-0.0955***	0.0173
	(0.0200)	(0.0147)	(0.0248)	(0.0301)
No children at home* born 1934			0.0117	-0.00241
			(0.0259)	(0.0290)
No children living	0.0529***	-0.0113	0.0776***	-0.0365
at the parental home	(0.00795)	(0.00742)	(0.0189)	(0.0241)
Women observations	*12,360*	*12,360*	*12,360*	*12,360*
Panel women observations	*23,514*	*23,514*	*23,514*	*23,514*
R squared overall	*0.2039*	*0.1011*	*0.205*	*0.1019*

Note: The models estimated are linear Regression Discontinuity Models, with individual random effects. The bandwidth is 48 months. Only survey years 1992 to 1995 are included in the estimation. The controls include interactions of the dummy for being born in 1934 or later with the running variable from the left and the right of the 1934 birth date discontinuity, education dummies, and fixed effects for department of residence, size of the commune of residence, and year of the survey. The standard errors are clustered at the level of the running variable. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4. Results of estimation of the relation between the retirement and employment probability of older women and an empty nest: exploiting the 1993 retirement reform to identify retirement. Regression Discontinuity Design with random effects models. Restricting the sample to women with children living at home the previous year.

Restricting the sample to older mothers with children living at home the year before				
All women	Retirement probability	Employment probability	Retirement probability	Employment probability
Being born 1934 or later	-0.0713***	0.00948	-0.159***	0.0905***
	(0.0242)	(0.0265)	(0.0235)	(0.0245)
No children at home* born 1934			0.0791*	-0.0420
			(0.0467)	(0.0412)
No children living	0.0535***	0.0164	0.0598*	-0.0175
at the parental home	-0.0127	-0.0112	(0.0324)	(0.0283)
Women observations	6,254	6,254	6,254	6,254
Panel women observations	8,260	8,260	8,260	8,260
R squared overall	0.224	0.119	0.223	0.116
Partnered women				
Being born 1934 or later	-0.0938***	0.0359	-0.0749**	0.00519
	(0.0229)	(0.0230)	(0.0319)	(0.0336)
No children at home* born 1934			-0.0282	0.0463
			(0.0348)	(0.0355)
No children living	0.0483***	-0.00826	0.0891***	-0.0709***
at the parental home	(0.00964)	(0.0101)	(0.0298)	(0.0256)
Women observations	4,642	4,642	4,642	4,642
Panel women observations	7,369	7,369	7,369	7,369
R squared overall	*0.1935*	*0.0906*	*0.2064*	*0.0935*

Note: The models estimated are linear Regression Discontinuity Models, with individual random effects. The estimation samples include only women with children living at home the previous year. The bandwidth is 48 months. Only survey years 1992 to 1995 are included in the estimation. The controls include interactions of the dummy for being born in 1934 and later with the running variable from the left and the right of the 1934 birth date discontinuity, education dummies, and fixed effects for department of residence, size of the commune of residence, and year of the survey. The standard errors are clustered at the level of the running variable. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5. Results of estimation of the relation between the marriage/divorce/singlehood probability of older women and an empty nest. Fuzzy Regression Discontinuity Design with random effects models.

	Marriage probability	**Divorce probability**	**Singlehood probability**	**Marriage probability**	**Divorce probability**	**Singlehood probability**
All women	**Random effects model, retirement instrumented with being born in 1934**					
Retired	-0.144***	-0.0324***	0.0184**	-0.583***	-0.163***	0.0546
	(0.0175)	(0.00940)	(0.00788)	(0.0865)	(0.0442)	(0.0361)
No children at home* retired				0.534***	0.158***	-0.0450
				(0.0821)	(0.0422)	(0.0343)
No children living at	-0.00714	0.00242	0.0155***	-0.133***	-0.0353***	0.0261***
at the parental home	(0.00482)	(0.00320)	(0.00236)	(0.0191)	(0.00997)	(0.00804)
Women observations	*16,667*	*16,667*	*16,667*	*16,667*	*16,667*	*16,667*
Panel women observations	*31,452*	*31,452*	*31,452*	*31,452*	*31,452*	*31,452*
R squared overall	*0.0323*	*0.0188*	*0.0397*	*0.0166*	*0.0131*	*0.037*
All women	**Random effects model, retirement instrumented with being aged 60**					
Retired	-0.0531***	-0.0326***	0.00354	-0.0612***	-0.0163**	-0.000329
	(0.00459)	(0.00329)	(0.00228)	(0.00928)	(0.00709)	(0.00476)
No children at home* retired				0.0441***	0.0117*	0.00560
				(0.00901)	(0.00694)	(0.00463)
No children living	-0.00651**	0.00402**	0.0133***	-0.0202***	-0.00143	0.0118***
at the parental home	(0.00269)	(0.00197)	(0.00135)	(0.00354)	(0.00263)	(0.00179)
Women observations	*47,529*	*47,529*	*47,529*	*47,529*	*47,529*	*47,529*
Panel women observations	*95,423*	*95,423*	*95,423*	*95,423*	*95,423*	*95,423*
R squared overall	*0.0264*	*0.023*	*0.0306*	*0.0238*	*0.0258*	*0.0308*

Note: The models estimated are Fuzzy Regression Discontinuity, with individual random effects. Widows are not included in any of the outcome categories. The bandwidth is 48 months. The controls include education dummies, and fixed effects for department of residence, size of the commune of residence, and year of the survey. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6. Results of estimation of the relation between the marriage/divorce/singlehood probability of older women and an empty nest. Fuzzy Regression Discontinuity Design with random effects models. Restricting the sample to women with children living at home the previous year.

	Marriage probability	**Divorce probability**	**Singlehood probability**	**Marriage probability**	**Divorce probability**	**Singlehood probability**
All women	**Random effects model, retirement instrumented with being born in 1934**					
Retired	-0.337***	-0.0142	0.0368**	-0.374***	-0.0267	0.0417**
	(0.0403)	(0.0213)	(0.0145)	(0.0544)	(0.0279)	(0.0179)
No children at home* retired				0.0961**	0.0324	-0.0127
				(0.0395)	(0.0198)	(0.00880)
No children living	-0.0868***	0.0133***	0.00431***	-0.112***	0.00450	0.00764***
at the parental home	(0.00884)	(0.00447)	(0.00140)	(0.0130)	(0.00648)	(0.00258)
Women observations	4,642	4,642	4,642	4,642	4,642	4,642
Panel women observations	7,369	7,369	7,369	7,369	7,369	7,369
R squared overall	*0.0654*	*0.0351*	*0.0393*	*0.0598*	*0.0347*	*0.0374*
All women	**Random effects model, retirement instrumented with being aged 60**					
Retired	-0.152***	-0.00498	0.00481	-0.111***	-0.0379**	-0.00650
	(0.0121)	(0.00723)	(0.00370)	(0.0221)	(0.0163)	(0.0117)
No children at home* retired				0.0970***	0.0327**	0.0115
				(0.0218)	(0.0161)	(0.0116)
No children living	-0.111***	0.0245***	0.0117***	0.0478***	-0.0343***	0.00713*
at the parental home	(0.00497)	(0.00294)	(0.00140)	(0.00740)	(0.00553)	(0.00394)
Women observations	12,741	12,741	12,741	12,741	12,741	12,741
Panel women observations	20,774	20,774	20,774	20,774	20,774	20,774
R squared overall	*0.0863*	*0.0381*	*0.0299*	*0.0907*	*0.0385*	*0.0309*

Note: The models estimated are Fuzzy Regression Discontinuity, with individual random effects. Widows are not included in any of the outcome categories. The bandwidth is 48 months. The controls include education dummies, and fixed effects for department of residence, size of the commune of residence, and year of the survey. The sample for analysis includes only women with a positive number of children living at home the year before. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1