Center for Economic and Political Research on Aging (CEPRA)

Università
della
Svizzera
italiana

Faculty
of Economics

IdEP Economic Papers

2014 / 03

F. C. Billari, V. Galasso

Fertility decisions and pension reforms. Evidence from natural experiments in Italy

Fertility decisions and pension reforms. Evidence from natural experiments in Italy

Francesco C. Billari[1]

Department of Sociology and Nuffield College, University of Oxford

francesco.billari@nuffield.ox.ac.uk

Vincenzo Galasso

Dondena, IGIER, Università Bocconi and CEPR

vincenzo.galasso@unibocconi.it

April 2014

[1] Francesco C. Billari, Department of Sociology and Nuffield College, University of Oxford, Manor Road, Oxford, OX1 3UQ, UK, francesco.billari@nuffield.ox.ac.uk. Vincenzo Galasso, Università Bocconi, via Roentgen 1, 20136 Milano, Italy, vincenzo.galasso@unibocconi.it. We thank Alberto Alesina, Tito Boeri, Michele Boldrin, John Bongaarts, Raj Chetty, Flavio Cunha, Frank Furstenberg, Emily Grundy, Arie Hillman, Tullio Jappelli, Dirk Krueger, Tommaso Nannicini, Michele Pellizzari, Adrian Peralta-Alva, Thomas Piketty, Sam Preston, Paola Profeta, Emmanuel Saez, Hans-Werner Sinn, and participants at the Annual Meetings of the Population Association of America, New Orleans; IIPF, Maastricht; European Economic Association, Milan; North American Summer Meetings of the Econometric Society, Boston; the CESifo Conference on Employment and Social Protection, Munich, the Seminar on Family Support Networks and Population Ageing, Doha; CEPR Public Policy Symposium, and seminars at University of Bern, Università Bocconi, Università della Svizzera Italiana, University of Pennsylvania, New York University, Università di Salerno, Università di Venezia, FEDEA and Toulouse University for useful comments. All remaining errors are ours.

Abstract

The emergence of old-age social security has been linked to general fertility decline, and in recent years pension reforms have emerged as a response to the challenges of population ageing, in turn partially a consequence of fertility decline. Understanding the link between social security and low fertility is therefore very important. In this paper we analyse the link between fertility and social security in a novel way. We exploit a series of pension reforms that were implemented in Italy, one of the first 'lowest-low' fertility societies, during the 1990s, to test the effect of expected retirement income on fertility. The design of the reforms, which introduced a discontinuity depending on the numbers of years of contributions, allows considering them as a natural experiment. We analyse fertility data reconstructed from a series of surveys from the Bank of Italy and show that couples in which the husband was affected by the reform, therefore facing a lower pension, had subsequently higher fertility.

Keywords: old-age security, quantity-quality trade-off, public pension systems, fertility, altruism.

Introduction

The long-term decline of fertility within the demographic transition has been associated, in many western societies, with the rise of modern social security. The basic idea is that while children before the demographic transition were essential to insure old-age security, this motive has disappeared and intergenerational wealth flows have reversed. On top of this long-term trend, during the last two/three decases, pressures on social security, mostly induced by population ageing, have pushed towards a season of social security reforms, essentially aiming at lowering expected income from retirement pensions. Some of these reforms have been implemented in low and very low fertility societies, like Italy—the setting of our study. Understanding the effect of these social security reforms is therefore crucial both from a policy-oriented empirical perspective, i.e. what is the future of fertility in societies where younger generations face lower income from retirement, and from a fertility theory perspective, i.e. what theories can better explain fertility decision in a context of longer lives and lower pensions.

Pension reforms are particularly suited to test economic theories of childbearing. A decrease in expected future pension benefits that is not matched by a corresponding reduction in social security contributions induces a clear, negative income effect—which might affect fertility decisions. Moreover, to the extent that future pension benefits are linked to current labor income, incentives to work may also be reduced by a decrease in the future pension generosity. This latter effect amounts to a reduction in the opportunity cost of fertility—as long as that raising kids requires parental time. While a reduction in opportunity costs is, from a theoretical perspective, associated with higher fertility, the former, pure negative income effect associated with a reduction in the pension benefits leads instead to different predictions under different fertility theories. In this paper, we analyze the effect on fertility choices of a sequence of Italian pension reforms during the 1990s, which largely decreased future pension benefits, while leaving social security contributions virtually unchanged and introducing discontinuities that create a “natural experiment”. Italy represents a particularly interesting case for the study of fertility choices. Together with Spain, Italy has been the first country to steadily experience fertility levels below a threshold defined of lowest-low fertility (a total fertility rate of 1.3 children per woman or below) during the 1990s (Kohler, Billari and Ortega 2002). The period of lowest fertility levels coincided, in particular in Italy, with the period of implementation of the two reforms (Caltabiano, Castiglioni and Rosina 2009).

In our empirical analyses, we exploit several features of the Italian family structure, labor market and pension reforms to identify the causal effects of the reforms on fertility. First, in order to single out the pure negative income effects induced by the Italian pension reforms, we concentrate on the fertility decisions of couples, in which the male is a dependent worker, whose future pension benefits may (or may not) have been affected by the reforms. For these workers, due to institutional constraints in the Italian labor market, no (marginal) incentive effect is at work, since dependent workers are only able to modify their labor supply in discrete jumps, namely by choosing between not working, working part-time or full time. Moreover, the division of labor within Italian families during the 1990s was still such that the care of the children was almost entirely provided by the mothers. Hence, if a change of incentives might have emerged from the reform, it would at most have affected the female workers. Second, the design of the reform introduced a clear discontinuity in the size of future pension benefits across workers. Pension benefits of the individuals with 15 years of contributions or more at the end of 1992 were not modified, while pension entitlements were largely reduced for all other workers on a pro-quota basis, which took into account their contributory history. A discontinuity that affected exactly the same cohorts of workers was then introduced by the Dini reform in 1995. The magnitude of the discontinuity is sizeable. Due to the reforms, a one-year difference in the length of contributions in 1992 (14 vs. 15 years) for two individuals with otherwise the same characteristics commanded a difference in the pension replacement rate (measured as the ratio between the pension benefit and the last wage prior to retirement) of around 15 points -- that is, a replacement rate of 80% for the individual with 15 years in contributions in 1992 versus 65% for the other individual. This discontinuity may allow to identify a causal effect of income on fertility.

We concentrate on the effect of the reforms on the male workers, for whom we can identify a clear, negative income effect, while controlling for the effects on the female workers. We find a strong positive effect of the pension reform on the average number of post-reform children and on the probability of having a kid after the reform. More specifically, affected individuals are estimated to have 10.7% higher fertility after the reforms with respect to the unaffected ones. Sensitivity analyses confirm the robustness of our findings.

Our results have relevant implications. First, they constitute a clean causal evidence of a link running from public pension systems to fertility decisions: lower pension benefits increase fertility. Along these lines, our analysis might contribute to explaining, at least in part, recent fertility trends, including the (mild) reversal towards high fertility, which has been observed in Italy since the mid-1990s. Moreover, it also suggests that in many developed societies, at least where family ties matter, the strong decreasing trend in fertility may be partially due to the large rise in pension spending. Second, our empirical findings hint to the fact that either the old-age security motive or the Becker-Lewis (1973) version of the "consumption" theory matter for fertility decisions in a key contemporary low fertility society.

Social security and motives for fertility

The family economics approach, pioneered by Becker (1960), suggests that individuals obtain direct pleasure from having and raising children, and from their well-being. Kids, and possibly their quality level, thus resemble a consumption good in the utility function of their parents. Evidence that genetic endowments influence the propensity to have children are consistent with this view (Kohler, Behrman and Skytthe 2005). However, the initial formulation of Becker's theory delivered a positive correlation between fertility and family income, which has not been supported in either cross-section or time-series data. The large literature that followed has emphasized two crucial aspects: a quantity-quality trade-off and the role of the cost of parental time (Guinnane 2011; Jones, Schoonbroodt and Tertilt 2011). Along the former lines, Becker and Lewis (1973) showed that an increase in income may lead to fewer children, but of higher quality. This is because rich parents value kids' quality, but higher quality increases the cost of having (and raising) kids, and may thus lead to lower fertility. The "price of time" consumption theory suggests that, since raising kids requires parental time, fertility is more costly for high-income parents, who thus choose to have fewer kids. Some theories that postulate heterogeneity in tastes for kids argue that the negative income-fertility correlation is caused by individuals with a strong taste for kids dedicating more time and effort to their family and less to acquire market skills and income---this is idea is in line with the "preference theory" approach of Catherine Hakim (Hakim 2003; Vitali et al. 2009).

Pensions have long been linked to fertility decision-making in the literature. For instance, Sinn (2004) argued in favor of public pension systems as they provide insurance against the risk of not having children, or of having ungrateful children, who are unwilling (or unable) to care for their old parents. Yet, as also suggested by Sinn, a drawback of public pension systems is that, even in households with grateful children, they tend to reduce kids-to-parents transfers. Parents have an incentive to free ride on the social security contributions paid by other people's children. As a result, with the spread of old-age social security fertility falls. Empirical studies on the negative correlation between fertility and various measures of the size or the generosity of the public pension system has been since some decades (Cigno and Rosati 1992; Galasso, Gatti and Profeta 2009; Hohm 1975). In a study that is particularly relevant for what we do, Gábos, Gál and Kézdi (2009) have used aggregate time-series data from post-war Hungary, comparing the effect of pensions and of child-related benefits on fertility, and estimate that a 1-per-cent increase in pensions would decrease fertility by 0.2 per cent, while a 1-percent increase in child-related benefits would increase it by the same amount.

The old-age security motive for fertility focuses on intergenerational flows within the family and considers children as an investment (or "production") good (Boldrin and Jones 2002; Cain 1981; Caldwell 1978; Leibenstein 1957; Neher 1971). Parents may decide to have children because they expect to receive back a (monetary or in-kind) transfer from them in their old age. In this case, altruism runs from the kids towards their parents. Rare empirical contributions have provided evidence in favor of the old-age security motive in contemporary societies, which should be particularly relevant in societies where family ties are more binding and/or no reliable saving instruments are available (Cunningham et al. 2013). Boldrin, De Nardi and Jones (2005) quantify the effect of the rise in pension spending on fertility trends. According to their model, around 50% of the long-term drop in fertility in the US is accounted for by the pension system. Kağitçibaşi (1982) argued that old-age security was not a reason for fertility in societies such as Germany and the U.S. during the 1970s, despite this motive having been cited as somewhat important or very important by 32 percent of married German women and 27 percent of married U.S. women during interviews.

Rendall and Bahchieva (1998) point out the potentially high relevance of old-age security motives in contemporary developed societies. They provide an extensive documentation of the relevance of children for providing support to their elderly parents in contemporary U.S: 11 percent of all unmarried elderly in the U.S. live above poverty only because of co-residence with adult children, and observed poverty rates would double in absence of such co-residence. Consistently, McGarry and Schoeni find that the increase of social security benefits in the U.S. has contributed to rising residential independence of elderly widows (McGarry and Schoeni 2000). Co-residence is therefore a crucial way to transfer income from adult children to their elderly parents also in the US, a country that has almost the same strength of family ties as Italy, according to the measure of Alesina and Giuliano (2007). Recent analyses of comparative data on support for parents show that, in countries with strong family ties, help to parents is more widespread (Kalmijn and Saraceno 2008). In a 1998 Eurobarometer survey, 76 percent of adult Italians state that in the future working adults may have to look after their parents more than they do now, 52 percent that a needy elderly parent should co-reside with a child, 23 percent state that children should have the main economic responsibility when elderly parents are in need (Kalmijn and Saraceno 2008). Despite its relevance, however, systematic empirical evidence of the existence of the old-age security motive for fertility in contemporary developed societies is lacking up to date.

Setting: Italian pension reforms

A sequence of major pension reforms took place in Italy in the 90s, after that pension spending had almost reached 15% of GDP, thereby becoming one of the largest in the world. The pension system featured also a large deficit, since yearly contributions were not sufficient to finance yearly benefits, and large transfers from the central government were needed to balance the budget. Faced with the expectations of further aging and financial crisis, the Italian system was hence largely re-designed, mainly through the Amato reform in 1992 and the Dini reform in 1995 (see Table 1 for details).

The Amato reform introduced a gradual tightening, over a ten-year period, of the eligibility requirements. Retirement age was increased to 60 years for women and to 65 years for men, and the minimum contribution period for pension eligibility was extended to 20 years. Moreover, the minimum contribution period for being eligible to an early retirement pension was extended to 35 years for all (private and public) workers. These measures introduced a clear and sizeable negative income effect. The reference wage in the pension benefit formula moved from the average wage over the last five years prior to retirement to the average wage during the entire working carrier, with past earnings capitalized at the cost of living index plus 1% per year. This typically caused a reduction in the reference wage, due to the labor earning profile being increasing in age (Galasso 2006). Since pension benefits were calculated as the product between the number of years of contributions, this reference wage, and a rate of return of two per cent per year, the accrual rate associated with one additional year of contribution decreases in those working years in which the wage was below the average wage calculated in the five years prior to retirement. The accrual rates were hence typically reduced in youth[2]. Pension benefit indexation moved from nominal wages to prices. Social security contributions slightly increased, from 24.5% to 27%, although this was mostly due to the relabeling of existing contribution items.

TABLE 1 ABOUT HERE

However, most of these reforms applied only to some cohorts of (young) workers. In fact, the benefit calculations for the workers with at least 15 years of contributions at the end of 1992 were untouched, and access to early retirement remained virtually the same. For workers with fewer years of seniority, instead, the new rules were applied *pro-quota*. Only to individuals who entered the labor market in 1993 were the new rules entirely applied. Hence, this reform design gave raise to large differences in

[2]The changes in the accrual rates introduced by the Dini reform reinforced the effects of the Amato reform.

the reduction of social security wealth across workers with different seniorities, as well as across public and private employees, who initially enjoyed different treatments.

To better understand this discontinuity, consider two male, dependent workers in the private sector with a high-school degree, who entered the labor market at the same age (20), and featured the same labor earning profile. However, they were born one year apart and thus had different years of contributions at the end of 1992. While Mr. Old is one year older -- he was born in 1957 -- and already had 15 years of contributions, Mr. Middle (born in 1958) only had 14. Suppose that they will both retire at age 60 upon reaching forty years of contributions. Mr. Old will then retire in 2017 and his pension benefits will entirely be calculated according to the pre-reform rules. His replacement rate -- that is, the share of his labor income at age 59 replaced by the pension benefit -- would be around 80%. Mr. Middle will instead retire a year later, in 2018. His pension benefits will be calculated for almost two thirds (26/40) according to the new rules, and only for the remaining part (14/40) according to the pre-Amato reform scheme. For Mr. Middle, the replacement rate would only be around 70%. This amounts to a large discontinuity: the pension treatment of individuals who at the end of 1992 differed in one year of contribution only was set to be noticeably large. Analogously, Attanasio and Brugiavini (2003) estimated that, in the private sector, the drop in social security wealth due to the Amato reform was equal to 27.6% for workers born after 1957 and to 17% for those born between 1945 and 1957. This reduction was even larger among the public employees: respectively 32.1% for the younger workers and 27.1% for the 1945-1957 generation.

In 1995, the Dini reform completely redesigned the architecture of the Italian social security system, shifting from defined benefit (DB) to notional defined contribution (NDC), in which returns on social security contributions are not fixed (as in the previous DB system), but depend on the growth rate of the economy. Social security contributions were increased to 33%, although this large raise was due to regrouping existing contributions under the social security contribution rate. Eligibility criteria were also largely revised. Seniority pensions, whose eligibility was exclusively based on reaching a minimum contribution period, were abolished. Under the private employees' scheme, the minimum number of years of contribution to be eligible for a pension was reduced to 5 years only; however, only individuals aged between 57 and 65 years are entitled to a pension. Again, these retrenchment measures induced to a negative and sizable income effect.

As for the Amato reform, these measures were introduced along a transition path that left workers with at least 18 years of contributions at the end of 1995 unaffected. The less senior workers were affected pro-quota, while workers entering the labor market in 1996 were completely embedded into the new system. Interestingly, the same workers who escaped the retrenchment of the Dini reform had already slipped through the Amato reform. Returning to our example, while Mr. Old maintained his (expected) replacement rate of 80%, Mr. Middle only had 17 years of contributions in 1995 and thus had to face a further reduction in his (expected) pension benefits. Leaving his retirement age unchanged at 60 years, his replacement rate would in fact drop to around 65%.

The literature has exploited the peculiar discontinuity and the related natural experiment created by the Italian (Amato and Dini) pension reforms. These contributions include Attanasio and Brugiavini (2003), who estimate the effect of the reduction in pension benefits on savings, Bottazzi, Jappelli and Padula (2006), who analyze the impact on retirement decisions, Manacorda and Moretti (2006), who concentrate on the decision of young children to leave the parental home, and Battistin et al. (2009), who investigate the size of the consumption drop at retirement. Bottazzi et al. (2006) assessed the differential impact of the Amato and Dini reforms on three classes of workers: those with a seniority of

18 years in 1995 (and 15 in 1992), those with a lower seniority and those who entered the labor market after 1995. The differences in the reduction of their replacement rate -- as measured by the ratio of pension benefit to the average wage in the last five years prior to retirement -- are quite large. Among the private employees retiring at age 60, the replacement rate is reduced by 1 point (from 67.3% to 66.3%) for the senior workers, by 9.1 points (from 67.3% to 58.2%) for the less senior and by 12.4 points for the young. The impact is larger among public sector employees, with a drop of 5.1 points among the senior, of 20.6 among the less senior and of 26.7 among the young.

These major changes did not come unperceived, nor was the differential impact of the reform across generation of workers underplayed. Quite the opposite. Massive strikes broke out in 1992 and 1994, and a large debate took place in the press. Moreover, estimates by Bottazzi et al. (2006) suggest that private employees were well aware of the magnitude of the reform and of the fact that its differential impact depended on the years of contributions. In particular, less senior private employees expecting to retire at age 60 quite accurately forecasted their replacement rate to be reduced by 8.4 points. The relevance of these reforms and their differential effect is also evident in the workers' intention to postpone retirement after the reform. Consistently with this differential effect, Bottazzi et al. (2006) estimate the increase in the expected retirement age to be larger for middle aged (born after 1957) than for more senior workers.

Data and modelling strategy

Data

In order to assess the effect of pension reforms in Italy on fertility choices, we compare individuals who are affected by these reforms and individuals who are not affected. We therefore exploit the discontinuity discussed in the previous section. We analyze two specific datasets that we build using data from the Bank of Italy's Survey of Italian Households' Income and Wealth (SHIW from now onwards). This is a biannual survey, with some individuals repeatedly interviewed, which mostly collects, as the title says, data on income and wealth of Italian households. Crucial for our identification strategy is the fact that the SHIW contains data, provided by respondents, on the total number of years each household member has contributed to the pension system (at December 31st of the reference year of the survey). Given the strong attachment of Italian men to the labor market, we assume that the number of years of contributions at December 31st 1992 (or 1995), i.e., the reform reference date, can be derived from the number of years of contributions at December 31st 1992+ζ , where ζ =6,8,10,12,14, depending on the most recent SHIW wave for which a given respondent was interviewed. For example, a person who has at least 27 years of contributions in 2004 (December 31st) is assumed to have had at least 15 years of years of contributions in 1992 (December 31st) -- and therefore to be unaffected by the reforms. On the contrary, a person who has 26 years of contributions in 2004 is assumed to have less than 15 years of contributions in 1992 -- and thus to be affected by the reforms.

$reform^M$ is a therefore a simple dichotomous variable representing the treatment effect in this natural-experiment setting. Recall bias and lack of precision in reporting years of contributions certainly induce measurement error in the identification of the treatment and control group. However, the bias of such measurement error implies an underestimation of the effect of the reform, therefore the subsequent results might be conservative[3]. We use this strategy to identify affected and unaffected men.

Fertility is considered as a household decision. We focus on households with individuals who were married at the time of the surveys, and evaluate the effect of the reform primarily focusing on men as

[3]The lack of more precise data on contributions (e.g. months, or weeks) prevents us from adopting a full regression discontinuity design in subsequent analyses.

the affected or unaffected individuals. The focus on married couples should not bias our results, given the particularly low extra-marital birth rates and divorce rates during the period covered (see, e.g., Castiglioni and Dalla Zuanna, 2008).

We also build a similar $reform^F$ for the wives of affected individuals, in order to control for incentive effects that might have affected women (although this is not useful to test alternative theories of fertility). Given the low labor force attachment of Italian women during the period we are studying, however, there are very few women who are not affected by the reform during their childbearing ages. Moreover, the indicator is only poorly measured for women, since it is based on the less likely assumption of a continuous labor force attachment between the time of the reform and the time of the survey. We however choose to keep this indicator to test the robustness of our results concerning the impact on husbands.

We exploit additional data provided by the SHIW, such as the date of births of all household members, including husband, wife, and co-resident children. Moreover, we use data on the number (although not the date of birth) of non-resident children. In our analyses, we also include other control variables, such as educational level of both partners and the area of birth of the husband. We can reconstruct the couple's fertility history by using the date of birth of co-resident children. All non co-resident children are born before the time of the first reform, i.e. up to 1992 (this assumption does not affect subsequent results as we focus on childbirths from 1993 onwards). These assumptions are relatively mild in the case of Italy where children tend to co-reside with parents for a long time (well into their mid 20s). We only use data on household with wives born in 1955 or after (who are therefore not older than 41 in 1996).

The reforms affected couples in what in Italy are central childbearing ages. In our sample, men in married couples who had 15 years of contribution at the end of 1992 had on average about 35 years of age (to be precise, their average age in 1992 was 34.45 years). Their wives were on average 3.8 years younger (the average age of the wife in 1992 was 30.67 years). This age interval is particularly relevant, in contemporary Italy, for fertility choices. Although we later provide specific figures on the dataset we use, it is useful here to recall that fertility at ages 30+ has been increasing ever since the mid 1980s. Indeed, Italy has become the leading industrialized country in late childbearing (Billari et al., 2007). This is a clear consequence of the postponement of childbearing, a phenomenon that accompanies (and partly causes) the emergence of lowest-low fertility, and that is linked to a -- at least partial -- recuperation of the postponed births at later ages. It is therefore increasingly important, in the explanation of fertility, to understand the motives of childbearing of women aged 30 and over.

Modelling Strategy

We perform a series of simple t-tests in order to compare the mean fertility of individuals who are just before (up to a year) and just after (up to a year) the threshold (15 years of contributions at the end of 1992, 18 years of contributions at the end of 1995) using information available or reconstructed at the time of the surveys. Table 2 contains the results of these tests on individuals who are as close to the discontinuity as we could get, performed on a sample of 200 unaffected individuals and 198 affected individuals. Indeed, while the number of children prior to 1993 is not significantly different between the two groups, fertility after the reforms is significantly higher for the treated. More specifically, up to 1993 unaffected individuals have on average 1.39 children, while affected individuals have on average 1.38 children. After 1993, affected individuals have on average 0.49 children, while unaffected individuals have on average 0.31 children during the same period, which includes the effect of both reforms. The average number of children up to 2006 for affected individuals (1.87) is 10.6% higher than the total number of children for unaffected individuals (1.69). Our first evidence is therefore in favor of a significant, and sizable, negative effect of pensions on fertility. This is in accordance with both the quality-quantity trade-off model and the old-age security motive, and against the kids as consumption good model based on parental time.

TABLE 2 ABOUT HERE

FIGURE 1 ABOUT HERE

A graphical representation on this effect is shown in Figure 1. In the upper panel, average pre-reform fertility by years of contribution at the end of 1992 is shown. There is a clear increasing trend, which heavily depends on the link between age and years of contributions--an issue that we will address next. In the lower panel there is an equally clear decreasing trend in the average number of post-reform children. At first glance, when looking at simple nonparametric (moving average) trend estimates, there is a discontinuity of about 0.15 children corresponding to the reform. The low number of data points in terms of years of contributions, however, does not allow us to rely on a straightforward regression-discontinuity estimation strategy. We will rather focus on regression models that explicitly control for the effect of age (as well as for other variables) when estimating the effect of the reforms.

Whether a person is affected or not by the reforms depends on the assumption of continuous labor market attachment and on the good measurement of the variable of our interest. Moreover, other covariates may influence the estimation of the reform effect. The results of the simple comparisons using t-tests displayed in Table 2 and of the discontinuity plots in Figure 1 are hence subject to limitations. In particular, given the link between age at entry in the labor market and exposure to the reform, we can expect that unaffected individuals are, on average, older than affected individuals. If we take, as in Table 2, a one-year window around the reforms' threshold, we find that affected individuals (husbands) have an average age of 35.45 years, against an average age of 36.62 years for unaffected individuals. An average difference of one year in age translates almost equally into an average difference of one year in contributions. The same is true for the wives, as the average age of the wives of affected individuals is 31.67 years, against 32.91 years for the unaffected. Figures 2 and 3 show, however, that, despite the average one-year age difference between affected and unaffected individuals, there is a substantial amount of variability, with common support and an important overlap in the age distributions of affected and unaffected individuals, which allows us to identify the effect of reform, while controlling for the age of individuals (both husbands and wives). Therefore, in what follows we choose to develop a series of regression models that control for the different age distribution, as well as for other potentially influential factors. As we shall see, these models confirm the findings of the previous approach.

FIGURES 2 AND 3 ABOUT HERE

We therefore extend our analyses with the inclusion of a series of control variables which are likely to affect both inclusion into the treatment or control group and fertility outcomes. In particular, we control for age (and education) of the husband, age (and education) of the wife, geographical area (using the area of birth of the husband). In order to have a more robust sample size, we also extend our sample to include individuals who are more distant from the discontinuity induced by the reform. In the next section, we will also carry some additional sensitivity analyses for the robustness of our results.

Most analyses are conducted using a dataset where we compare individuals who are up to 7 years below the threshold number of years of contributions (and thus affected by the reform) with individuals who are up to 7 above the threshold (unaffected). The sample size is 2,675, with 59.65 percent of husbands being affected by the reform (92.89 percent of wives). Table 3 presents descriptive statistics on this extended dataset (all variables, with the exception of fertility and reform refer to the time of the survey). We estimate simple OLS models of the type

$$f_i = \beta_0^0 + \beta_1^0 \cdot reform_i^M + \beta_2^0 \cdot x_i + \varepsilon_i$$

where f_i is post-reform fertility for the *i*-th individual in our sample, $reform_i^M$ is a dichotomous indicator (=1 if the *i*-th husband is affected, =0 otherwise), x_i is a vector of control variables, ε_i is white noise. The coefficient β_1^0 therefore allows to estimate the average effect of the reform on treated individuals on the number of post-reform children.

TABLE 3 ABOUT HERE

In order to assess whether our findings are robust with respect to incentive effects on wives, we also estimate parallel models with the effect of reforms on both husbands and wives in the same household:

$$f_i = \beta_0^0 + \beta_1^{0M} \cdot reform_i^M + \beta_1^{0F} \cdot reform_i^F + \beta_2^0 \cdot x_i + \varepsilon_i$$

Here the coefficient β_1^{0M} allows to estimate therefore the average effect of the reform on treated husbands net of the effect on wives, which is estimated through β_1^{0F}.

In a second series of models we focuses on the probability that at least one post-reform child is born, with a probit specification:

$$\Phi^{-1}\left(\Pr(f_i > 0)\right) = \beta_0^1 + \beta_1^1 \cdot reform_i^M + \beta_2^1 \cdot x_i$$

where $\Phi^{-1}(.)$ is the inverse standard-normal distribution, and the estimated coefficient β_1^1 allows to estimate the average effect (via inverse Mill's ratio) of the reform on the probability of having at least one post-reform child for treated individuals. Analogously, we estimate probit models which include the potential effect of the reform on women.

The data, however, contain more information than just the number of post-reform children. More specifically, we can also exploit information on the timing of births and build a discrete-time event-history analysis model (see, e.g., Jenkins, 1995) with the adoption of a hazard rate approach to the timing of births (see, e.g., Newman and McCulloch, 1984). Moreover, we can exploit the fact that some of the factors we focus on vary over the observation time (this is the case of husband's and wife's ages, or calendar year). To this purpose, we build a second dataset that contains observations in terms of persons-years, i.e., an entry for each individual *i* in each given year of observation *t*, from 1993 onwards. In this second dataset, the age of husbands and wives is updated every year. The appropriate method to analyze persons-years datasets is discrete-time event history analysis. Each household contributes to the sample as long as they are observed, and they leave the sample either when they are interviewed (in this case information is right-censored) or when they have another child. As the number of post-reform children is low on average, we only consider the progression to the first birth after the reform. Therefore, with the second dataset, we use a discrete-time probit specification, where the left-hand-side variable is the hazard rate, i.e., the annual probability of having an additional birth for the individual *i* during the year *t*, given that the same individual has not yet had an additional birth in earlier years of observation:

$$\Phi^{-1}\left(\Pr(B_i = t \mid B_i \geq t)\right) = \beta_0^2 + \beta_1^2 \cdot reform_i^M + \beta_2^2 \cdot x_i + \beta_3^2 \cdot v_{ij}$$

In this equation, B_i denotes the time of first post-reform birth, t is the year of observation, potentially between 1993 (t=1) and 2006 (t=14), (t=1,…,J_i, where J_i=14 is the last year of observation for the i-th individual), x_i is a vector of time-constant control variables, v_{ij} is a vector of variables that vary across years. β_1^2 is related the estimated average effect (via inverse Mill's ratio) of the reform on the yearly hazard of a post-reform birth for treated individuals. Also in this case, we will control for wives' potential reform effect.

RESULTS

We now examine the results of our analyses (complete results of regressions and scripts are available upon request from the authors), starting from our first dataset. Table 4 displays the results on the effect of the reform on the: a) number of children born starting from the year after each of the reforms and until the date of the survey (column (1), OLS as in eq. regress; column (2), OLS as in eq. regress wife); b) probability of having an additional child during the same period (columns (3) Probit, as in eq. probit1; column (4) controlling for wives' reform). The estimated effects of the reforms on husbands are displayed in the Reform line (in terms of marginal effects for the Probit). The estimated effects of the reforms on wives are displayed in the "Wife's reform" line. In these regressions, we control for several elements that may affect the number of years of contributions individuals had up to the end of 1992 and their fertility behavior. In particular, we control for: age of husbands and wives (using age fixed-effects), level of education of husbands and of wives, geographical area, and the number of kids that they already had prior to the reforms. As might be expected, some of these controls have a significant effect. For instance, more educated women -- who presumably decided to postpone fertility -- are more likely to have kids after the reform. Individuals in the South are more likely to have children, whereas individuals who had more kids prior to the reform are less likely to have additional children afterwards.

TABLE 4 ABOUT HERE

According to these estimates, after controlling for all these covariates, the average number of children for treated couples is 0.0542 higher (significant at the 10% level). This effect only slightly diminishes when controlling for the effect of the reform on wives. Interestingly, the effect on wives is positive, in accordance with theory, albeit not statistically significant, perhaps due to the small sample of unaffected wives. The magnitude of the first effect (on husbands) should be compared to an average of 0.5089 post-reform children (i.e., it amounts to 10.7% higher fertility for affected individuals). Results of regression models on the larger sample of individuals therefore confirm the findings obtained with the smaller time window around the reform. Coupled with the estimates of Attanasio and Brugiavini (2003) on the effect of pension wealth of the reforms, our estimates suggest that a 1 per cent decrease in pension wealth increases fertility by 0.26 per cent. This is therefore slightly higher than the effect obtained by Gábos, Gál and Kézdi (2009) using time-series, who estimate that a 1 per cent decrease in pensions increases fertility by 0.2 per cent, with a magnitude similar to a 1 per cent increase in child-related benefits.

Results on the Probit model on the probability of having an additional post-reform child also point towards the same direction: individuals who are affected by the reform have a 7.1% higher probability of having post-1992 reform children. Also the effect of the reform due to the change in the wives' future pension benefits is positive, as predicted by all fertility theories, and statistically significant. Therefore, the findings from this set of regression models confirm that the joint effects of the two reforms (post-1992) is statistically significant, and strong.

From now onwards, our results refer to the second dataset, i.e., the one with discrete-time data on persons years, and to estimates based on eq. probit2. We specify a model in which we estimate the joint effect of the reforms, i.e., the post-1992 effect. Table 5 displays the results of a first probit hazard model, in which age of the husband and age of the wife (using fixed-effects) are time-varying covariates, and in which we control for fixed period effects using dummy variables for each year. The marginal effect of the reform on the annual probability of having an additional birth is 0.67%. This effect can be compared to the observed (average) annual probability, which is above 5%. The reform is estimated to raise the annual probability of having a(nother) child by 12.9% in relative terms. The effect is statistically significant at the 5% level. This analysis, which makes use of additional information contained in the data and controls for time-varying effects, thus confirms the results obtained with the first dataset.

TABLE 4 ABOUT HERE

We also ran two types of robustness checks for the reform effect using the second dataset (similar robustness checks have been run on the first dataset giving analogous results). A first robustness check regards the size of the time window around the reform that we use. Our standard models use a +/-7 year-wide window. The fact that age (controlled via fixed effects) is not behind the estimated effect is reassuring, but we conduct a robustness check by using shorter time windows around the reform. Table 6 contains the output of such checks, compared to the reform effect displayed in Table 5. The effect is stable with a +/- 3 year window. It is much higher, still significantly positive, but estimated with lower precision, as the window becomes the smallest one (+/- 1 year). The stability of the estimates with the variation of the time window is a sign of robustness of the positive effect of the reform on fertility, while the fact that the effect becomes higher with the shorter window is consistent with the effect of reform being captured in a cleaner way with the shorter window.

TABLE 6 ABOUT HERE

A second robustness check of our identification strategy is a "placebo" test, which is often used in studies on natural experiment, like ours, which exploit discontinuities. More specifically, we estimate the effect of two discontinuities that we expect not to matter, as they are in fact not related to the reform. A first discontinuity (Younger placebo) is placed around 10 years of contributions in 1992, with a window of +/- 1 years around the discontinuity. A second discontinuity (Older placebo) is placed around 20 years of contributions in 1992, with a window of +/- 1 years around the discontinuity. The estimates of placebo effects are compared with the estimates of the reform effect with a +/-1 years time window in Table 7. Indeed, placebo effects are not statistically significant, which is what we expect if our identification strategy through a discontinuity in years of contributions picks the reform effect: only the discontinuity around the actual reform matters.

TABLE 7 ABOUT HERE

SUMMARY AND CONCLUDING REMARKS

In a contemporary low fertility society, characterized by strong family ties -- Italy, we have exploited the discontinuity induced by two parallel pension reforms held in 1992 and 1995 to test the effect of a change in future family income on fertility. These reforms have in fact generated a natural experiment that has exogenously reduced the pension income prospects of individuals with years of contribution below specific thresholds, while leaving others unaffected. Our results show that individuals who have lower pension income prospects, because they are affected by the reform, have significantly higher fertility. The relative increase of the realized fertility or of the probability of having a child is above 10%. The strong impact is entirely due to a negative income effect on the husbands' future pension benefits. We are thus able to establish the existence of a causal, negative effect of husbands' income on wives' fertility.

Interestingly, these findings are not in line with the "consumption" theories of fertility based on parental time. Perhaps surprisingly, they are in line either with the original Becker-Lewis version of the "consumption theory" based on the interaction between quality and quantity or with the old-age security motive for fertility. The latter case would also be consistent with the existence of strong family ties in the Italian (Dalla Zuanna 2001; Reher 1998), as well as in several other contemporary developed societies.[4] In this environment of family culture, parents may reasonably expect their kids to give them old-age support, for instance as in-kind, monetary transfers or co-residence.

We believe that our results are of general relevance for the study of fertility motives in developed societies, as they contribute to identify a clear negative impact of pension policy on fertility decisions. This is of particular relevance to the study of very-low and lowest-low fertility. If part of the fertility decline can be attributed to the diffusion of pension systems, the introduction of pension reforms that decrease the income prospects after retirement might contribute to a rise in fertility. Indeed, fertility in Italy had its minimum in 1996 and since then it is slowly rising. Further empirical evidence is needed on the contribution of the old-age security motive to total fertility in contemporary societies.

[4]According to a measure of the strength of family ties constructed by Alesina and Giuliano (2007), Italy ranks third among the OECD countries, after Mexico and Poland and followed closely by the US and Spain, while Germany and the Scandinavian countries have the weakest family ties.

References

Alesina, A.and P. Giuliano. 2007. "The Power of the Family." in *NBER Working Papers*. Cambridge, MA: National Bureau of Economic Research.

Attanasio, O.P. and Brugiavini, A. (2003) Social security and households' saving, Quarterly Journal of Economics, vol. 118, pp. 1075-1119.

Battistin, E., A. Brugiavini, E. Rettore and G. Weber (2009), The Retirement Consumption Puzzle: Evidence from a Regression Discontinuity Approach, American Economic Review, 99(5), pp. 2209-2226

Becker, G.S. 1960. "An Economic Analysis of Fertility." Pp. 209-231 in *Demographic and Economic Change in Developed Countries*, edited by G.S. Becker. Princeton, NJ: Princeton University Press.

Becker, G.S.and H.G. Lewis. 1973. "On the Interaction between the Quantity and Quality of Children." *Journal of Political Economy* 81(2):S279-S288.

Billari, F.C., Kohler, H.-P., Andersson, G., Lundstrom, H. (2007) Approaching the Limit: Long-Term Trends in Late and Very Late Fertility, Population and Development Review, vol. 33, pp. 149-170.

Boldrin, M., M.D.N. De Nardi, and L.E. Jones. 2005. "Fertility and Social Security." in *NBER Working Papers*. Cambrige, MA: National Bureau of Economic Research, Inc.

Boldrin, M.B.M.and L.E. Jones. 2002. "Mortality, Fertility and Saving in a Malthusian Economy." *Review of Economic Dynamics* 5:775-814.

Bottazzi R,. Jappelli, T., and Padula, M. (2006) Retirement expectations, pension reforms, and their impact on private wealth accumulation, Journal of Public Economics, vol. 90, pp. 2187-2212.

Cain, M. 1981. "Risk and Insurance: Perspectives on Fertility and Agrarian Change in India and

Bangladesh." *Population and Development Review* 7(3):435-474.

Caldwell, J.C. 1978. "A Theory of Fertility: from High Plateau to Destabilization." *Population and Development Review* 4:553-577.

Caltabiano, M., M. Castiglioni, and A. Rosina. 2009. "Lowest-Low Fertility: Signs of a recovery in Italy?" *Demographic Research* 21(23):681-718.

Castiglioni, M., Dalla Zuanna, G. (2008) Marital and Reproductive Behavior in Italy After 1995: Bridging the Gap with Western Europe?, European Journal of Population, OnlineFirst .

Cigno, A.and F.C. Rosati. 1992. "The effects of financial markets and social security on saving and fertility behaviour in Italy." *Journal of Population Economics* 5(4):319-341.

Cunningham, S.A., K.M. Yount, M. Engelman, and E. Agree. 2013. "Returns on Lifetime Investments in Children in Egypt." *Demography* 50(2):699-724.

Dalla Zuanna, G. 2001. "The banquet of Aeolus: A familistic interpretation of Italy's lowest low fertility." *Demographic Research* 4(5):133-162.

Gábos, A., R.I. Gál, and G. Kézdi. 2009. "The effects of child-related benefits and pensions on fertility by birth order: A test on Hungarian data." *Population Studies* 63(3):215-231.

Galasso, V. 2006. *The Political Future of Social Security in Aging Societies*. Cambridge, MA: MIT Press.

Galasso, V., R. Gatti, and P. Profeta. 2009. "Investing for the old age: pensions, children and savings." *International Tax and Public Finance* 16(4):538-559.

Guinnane, T.W. 2011. "The Historical Fertility Transition: A Guide for Economists." *Journal of Economic Literature* 49(3):589-614.

Hakim, C. 2003. "A New Approach to Explaining Fertility Patterns: Preference Theory." *Population and Development Review* 29(3):349-374.

Hohm, C.F. 1975. "Social security and fertility: An international perspective." *Demography* 12(4):629-

644.

Jenkins, S.P. (1995) Easy estimation methods for discrete-time duration models. Oxford Bulletin of Economics and Statistics, vol. 57, 129--138.

Jones, L.E., A. Schoonbroodt, and M. Tertilt. 2011. "Fertility Theories. Can They Explain the Negative Fertility-Income Relationship?" Pp. 43-100 in *Demography & The Economy*, edited by J.B. Shoven. Chicago: University of Chicago Press.

Kağitçibaşi, Ç. 1982. "Old-Age Security Value of Children: Cross-National Socioeconomic Evidence." *Journal of Cross-Cultural Psychology* 13(1):29-42.

Kalmijn, M.and C. Saraceno. 2008. "A comparative perspective on intergenerational support: Responsiveness to parental needs in individualistic and familialistic countries." *European Societies* 10(3):479-509.

Kohler, H.-P., J.R. Behrman, and A. Skytthe. 2005. "Partner + Children = Happiness? The Effects of Partnerships and Fertility on Well-Being." *Population and Development Review* 31(3):407-445.

Kohler, H.-P., F.C. Billari, and J.A. Ortega. 2002. "The Emergence of Lowest-Low Fertility in Europe During the 1990s." *Population and Development Review* 28(4):641-680.

Leibenstein, H. 1957. *Economic Backwardness and Economic Growth*. New York: Wiley.

Manacorda, M. and E. Moretti (2006) Why Do Most Italian Youths Live With Their Parents? Intergenerational Transfers and Household Structure. Journal of the European Economic Association, 4, 800-829.

McGarry, K.and R.F. Schoeni. 2000. "Social security, economic growth, and the rise in elderly widows' independence in the twentieth century." *Demography* 37(2):221-236.

Neher, P.A. 1971. "Peasants, Procreation, and Pensions." *The American Economic Review* 61(3):380-389.

Newman, J.L. and McCulloch, C.E. (1984) A Hazard Rate Approach to the Timing of Births.

Econometrica, 52(4), 939-961.

Reher, D.S. 1998. "Family ties in western Europe: Persistent contrasts." *Population and Development Review* 24(2):203-234.

Rendall, M.S.and R.A. Bahchieva. 1998. "An Old-Age Security Motive for Fertility in the United States?" *Population and Development Review* 24(2):293-307.

Sinn, H.-W. 2004. "The pay-as-you-go pension system as fertility insurance and an enforcement device." *Journal of Public Economics* 88(7-8):1335-1357.

Vitali, A., F.C. Billari, A. Prskawetz, and M.R. Testa. 2009. "Preference theory and low fertiliy: A comparative perspective." *European Journal of Population* 25(4):413-438.

TABLES AND FIGURES

Table 1. Pension reforms of the 1990s in Italy

	Pre-1993 regime	1992 reform	1995 reform
Normal retirement age	60 (men) 55(women)	65 (men) 60(women)	Any age after 56 (for both men and women)
Transitional period		Until about 2032	Until about 2035
Pensionable earnings	Average of last 5 years real earnings (converted to real values through price index)	Career average earnings (converted to real values through price index + 1%)	Career contributions (capitalized using a 5-year moving average of GDP growth rate)
Pension benefit	2%*(pensionable earnings)*(t), where t is years of tax payments (at most 40)	2%*(pensionable earnings)*(t), where t is years of tax payments (at most 40)	Proportional to capitalized value of career contributions, the proportionality factor increasing with age at retirement (from .04720 at age 57 to .06136 at age 65)
Pension indexation	Cost of living plus real earnings growth	Cost of living	Cost of living
Pension to survivor	60% to spouse 20% to each child 40% to each child (if no spouse)	Same	Same
Years of contributions for eligibility	15	20	5
Early retirement provision	Any age if contributed to SS for 35 years or more, no actuarial adjustment	Any age if contributed to SS for 35 years or more, no actuarial adjustment	No early retirement provision
Total Payroll tax	24.5% of gross earnings	27.17% of gross earnings	32.7% of gross earnings

Table 1. Differences between husbands who are affected and unaffected by the reforms. +/- 1 year-window around the reforms' thresholds.

	Unaffected (up to - 1 year)	Affected (up to +1 year)
Number of children (up to 1993)	1.3850	1.3788
	(0.0746)	(0.0802)
Number of children (after 1993)	0.3050	0.4899***
	(0.0414)	(0.0468)
Total number of children (up to 2006)	1.6900	1.8687*
	(0.0670)	(0.0772)
N	*200*	*198*

Standard errors in parentheses.
*Significance levels on the 2-tail t-test on the hypothesis of difference between the affected and the unaffected: * significant at 10%; ** significant at 5%; *** significant at 1%*
Source: own analyses on Bank of Italy's Survey on Household Income and Wealth (joint dataset waves 1998, 2000, 2002, 2004, 2006).

Figure 1. Mean number of children before 1993 (upper panel) and 1993 onwards (lower panel) by years of contribution at the end of 1992. Husbands affected by the reform to the left (up to 14 years), individuals unaffected by the reform to the right (15 years and over). Marks are empirical means, lines represent nonparametric smoothed values (3-values moving average up to the discontinuity point.

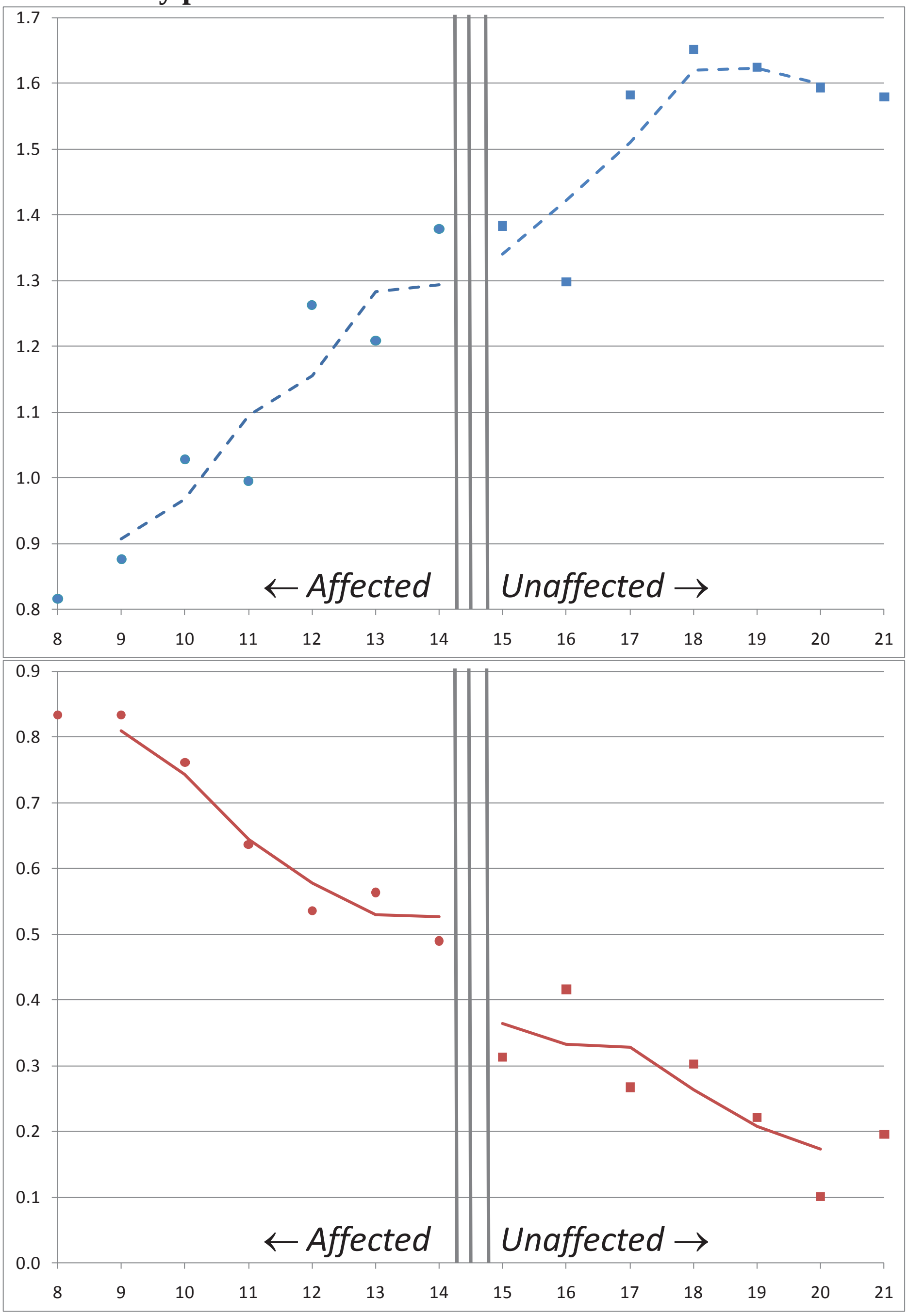
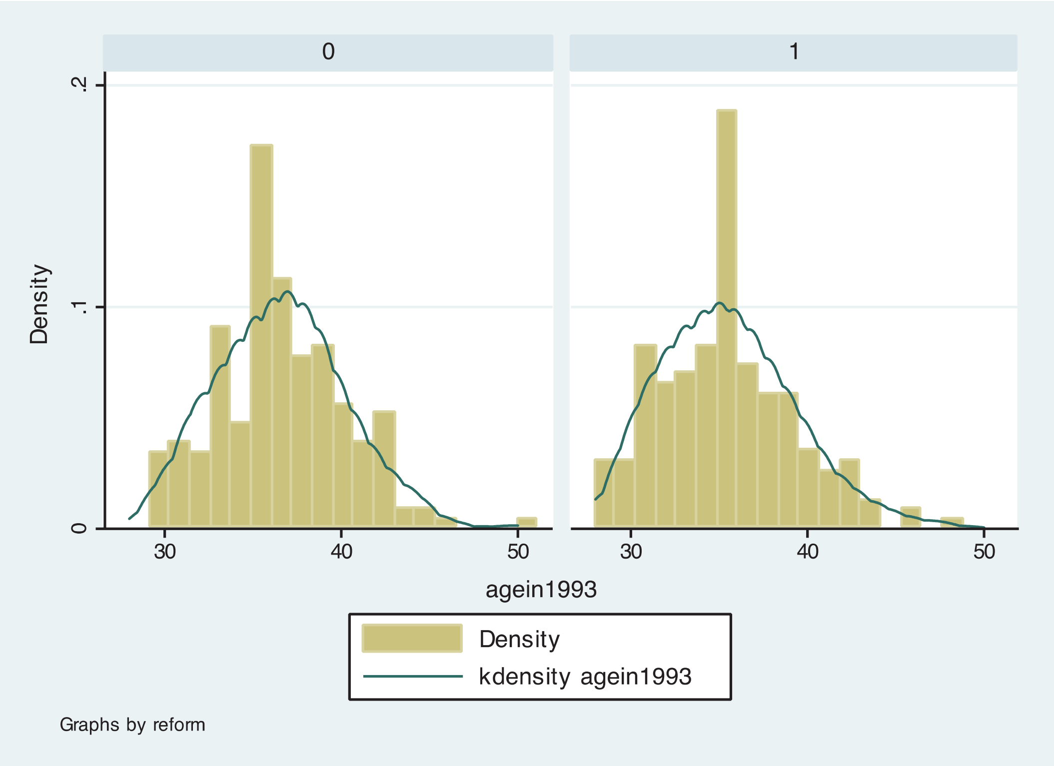
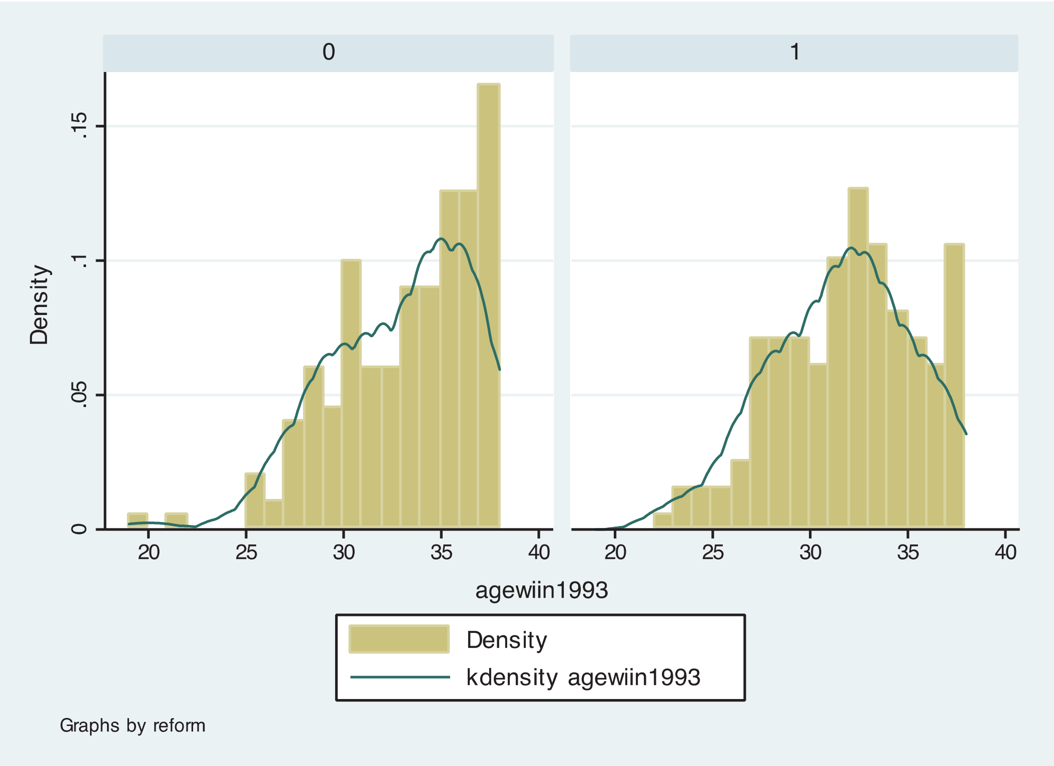


Figure 2. Age distribution in 1993 for husbands unaffected and affected by the reforms. Window: +/- 1 year of contributions around the reforms' thresholds. Wives born 1955 or after.



Mean age in 1993 for N=200 unaffected husbands is 36.62 years, for N=198 affected husbands is 35.45 years. The difference is statistically significant at the 1% level (t-test).

Figure 3. Age distribution in 1993 for wives whose husbands have been unaffected and affected by the reforms. Window: +/- 1 year of contributions around the reforms' thresholds for husbands. Wives born 1955 or after.



Mean wife's age in 1993 for N=200 with unaffected husbands is 32.91 years, for N=198 with affected husbands is 31.67 years. The difference is statistically significant at the 1% level (t-test).

Table 3. Descriptive statistics for variables used in subsequent analyses. Window: +/- 7 years of contributions around the reforms' thresholds for husbands. Wives born 1955 or after.

	Mean	s.d.
Reform (dummy)	0.5965	
Wife's reform (dummy)	0.9289	
Number of children (up to 1993)	1.2522	1.0260
Number of children (after 1993)	0.5089	0.7338
Education (husband, years)	10.4411	3.4473
Education (wife, years)	10.6971	3.4377
Age at interview (husband)	45.6997	5.4437
Age at interview (wife)	41.6651	5.1768
Center as area of birth (dummy)	.1803	
South as area of birth (dummy)	.3882	
Survey year 1998 (dummy)	.0384	
Survey year 2000 (dummy)	.2086	
Survey year 2002 (dummy)	.2198	
Survey year 2004 (dummy)	.1907	
N	2675	

Source: own analyses on Bank of Italy's Survey on Household Income and Wealth (joint dataset waves 1998, 2000, 2002, 2004, 2006).

Table 4. Effect of pension reforms on post-reform fertility (total number of children or probability of having at least an additional child). Window: +/- 7 years of contributions around the reforms' thresholds for husbands. Wives born 1955 or after.

	(1)	(2)	(3)	(4)
	OLS Model 1	OLS Model 2	Probit Model 1 (marginal effect)	Probit Model 2 (marginal effect)
Reform	0.0542*	0.0487*	0.0714***	0.0646***
	(0.0287)	(0.0289)	(0.0248)	(0.0250)
Wife's reform		0.0749		0.0966**
		(0.0496)		(0.0442)
Education (husband)	0.00413	0.00432	0.00472	0.00497
	(0.00437)	(0.00437)	(0.00391)	(0.00391)
Education (wife)	0.0169***	0.0165***	0.0161***	0.0155***
	(0.00428)	(0.00429)	(0.00378)	(0.00378)
Center	-0.00391	-0.00660	0.0286	0.0262
	(0.0339)	(0.0340)	(0.0300)	(0.0300)
South	0.105***	0.100***	0.0833***	0.0776***
	(0.0287)	(0.0289)	(0.0254)	(0.0255)
Year 1998	-0.736***	-0.728***	-0.342***	-0.340***
	(0.0730)	(0.0731)	(0.0168)	(0.0172)
Year 2000	-0.457***	-0.450***	-0.292***	-0.287***
	(0.0413)	(0.0415)	(0.0251)	(0.0255)
Year 2002	-0.321***	-0.317***	-0.215***	-0.211***
	(0.0369)	(0.0370)	(0.0259)	(0.0261)
Year 2004	-0.147***	-0.145***	-0.101***	-0.0992***
	(0.0361)	(0.0361)	(0.0284)	(0.0284)
Number of children (up to 1993)	-0.175***	-0.176***	-0.131***	-0.132***
	(0.0141)	(0.0141)	(0.0127)	(0.0127)
Age fixed effects (husband)	YES	YES	YES	YES
Age fixed effects (wife)	YES	YES	YES	YES
N	2675	2675	2652	2652
R-squared	0.321	0.321		
Observed P			0.3839	0.3839

*Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 5. Marginal effect of pension reforms on the annual probability of having an additional child (discrete-time probit event-history model on persons-years). Window: +/- 7 years of contributions around the reforms' thresholds for husbands. Wives born 1955 or after.

	Person-period Probit Model 1	Person-period Probit Model 2
Reform	0.00672**	0.00618**
	(0.00286)	(0.00288)
Wife's reform		0.00790
		(0.00518)
Education (husband)	0.000513	0.000526
	(0.000428)	(0.000427)
Education (wife)	0.00155***	0.00151***
	(0.000402)	(0.000402)
Center	0.00980***	0.00941***
	(0.00285)	(0.00285)
South	0.00264	0.00244
	(0.00326)	(0.00325)
Number of children (up to 1993)	-0.0144***	-0.0145***
	(0.00147)	(0.00147)
Age fixed effects (husband, time-varying)	YES	YES
Age fixed effects (wife, time-varying)	YES	YES
Year fixed effects (husband, time-varying)	YES	YES
Year fixed effects (wife, time-varying)	YES	YES
N (persons-years)	19708	19708
Observed P	0.0521	0.0521

*Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 6. Marginal effect of pension reforms on the annual probability of having an additional child (discrete-time probit event-history model on persons-years) (varying window around the reforms' thresholds for husbands, wives born 1955 or after).

	(1) window: +/- 7 years	(2) window: +/- 3 years	(3) window: +/- 1 year
Reform	0.00672** (0.00286)	0.00662* (0.00341)	0.0170** (0.00726)
N (persons-years)	19708	9150	2447
Observed P	0.0521	0.0483	0.0527

*Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%*
Source: own analyses on Bank of Italy's Survey on Household Income and Wealth (joint dataset waves 1998, 2000, 2002, 2004, 2006, persons-years reconstruction).
Same control variables as for the models in Table 4.

Table 7. Marginal effect of pension reforms on the annual probability of having an additional child (discrete-time probit event-history model on persons-years). Placebo test (one-year window around different contribution thresholds for husbands, wives born 1955 or after).

	(1) "Younger" placebo (window: +/- 1 year)	(2) Real reform (window: +/- 1 year)	(3) "Older" placebo (window: +/- 1 year)
Reform	-0.0096 (0.0118)	0.0170** (0.00726)	0.0043 (0.0049)
N (persons-years)	2197	2447	1137
Observed P	0.0992	0.0527	0.0237

Standard errors in parentheses
** significant at 10%; ** significant at 5%; *** significant at 1%*
Source: own analyses on Bank of Italy's Survey on Household Income and Wealth (joint dataset waves 1998, 2000, 2002, 2004, persons-years reconstruction).
Same control variables as for the models in Table 4. The "Younger" placebo model estimates the effect of a discontinuity around 10 years of contributions in 1992, with a window of +/- 1 year around the discontinuity. The "Older" placebo model estimates the effect of a discontinuity around 20 years of contributions in 1992, with a window of +/- 1 year around the discontinuity.

IdEP Economic Papers

The series IdEP Economic Papers, ideally continues the work of the "Quaderni della Facoltà" the publication of which began in 1998 and ended in 2013.
For a complete list of the Quaderni see: http://econpapers.repec.org/paper/lugwpaper/

IdEP Economic Papers also gathers the legacy of the CEPRA Working Papers, published from 2012 to 2013.
The full list at: http://econpapers.repec.org/paper/luqwcepra/

2014:

No. 01
F. Mazzonna, F. Peracchi, *Unhealthy retirement? Evidence of occupation heterogeneity*

No. 02
L. Di Giorgio, M. Filippini, G. Masiero, *The relationship between costs and quality in nonprofit nursing homes*

No. 03
F. C. Billari, V. Galasso, *Fertility decisions and pension reforms. Evidence from natural experiments in Italy*