Family policy and female labour supply: A quasi-natural experiment

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Abstract

This paper analyses the impact of a birth cash benefit to reduce the cost of fertility on female's labour supply. In order to do so, we focus on the Spanish 'baby bonus', which was introduced in Spain over the period 2007-2010 to stimulate the birth rate. This family policy provides a unique setting for a quasi-natural experiment. Our results support evidence in line with the positive effect of family policy that reduces the costs of a new child on the labour supply of women.

JEL classification: J13, J18, J22, H31.

Keywords: cost of fertility, family policy, participation of women in the labour market, DiD, panel data, matching techniques, quasi-natural experiment.

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1. Introduction

The empirical evidence often shows a negative effect of fertility on female labour supply (Iacovou, 2001). However, reaching this evidence is not without problems because of the endogeneity of both the decision to have children and to participate in the labor market. In addition, cross-sectional studies do not include a time dimension that exploits the variability of variables that have an impact on the decision to participate in the labour market. Therefore, in this paper we focus on the birth cash benefit to reduce the monetary cost of child care.

In the present paper, we use individual data from Spain. The critical issue of country identification warrants further discussion. Spain is not only one of the countries with the lowest fertility rate worldwide, but it also has a female participation in the labour market significantly below the European average. In this context, two different political measures might be distinguished to increase birth rate. On the one hand, incentives to workers who have a child in their care and, on the other hand, measures that aim to reduce the cost of having a new child. In line with the latter purpose, the 'baby bonus' was introduced in Spain with the approval of Act 35/2007 in July 2007 in an attempt to increase the Spanish low birth rate. This measure was removed in December 2010 in a round of public spending cuts due to the international financial and economic crisis.

Therefore, the 'baby bonus' provides a unique setting for a quasi-natural experiment to analyse whether the participation of women in the labour market has increased as a consequence of a reduction in the monetary cost of child care.

To this end, we use microdata from the EU-SILC over the period from 2007 to 2010. A sample of women is divided into two groups: one group is affected by the measure (treatment group) and the other serves as a reference (control group). The treatment group consists of women aged 16 to 45 years old and the control group of women over 45 years old.

Our results support evidence in line with the 'baby bonus' has increased the labour supply of women and then, the lower the cost of child care the higher female labour supply. Three different methodologies are performed in order to obtain the average effect of the treatment on the treated group and to avoid biases due not only to changes in the business cycle, but also to unobservable characteristics of the sample. In particular, we employed the difference-in-differences method (DiD), panel data and matching techniques. Results corroborate the positive effect of the 'baby bonus' in terms of the participation of women in the labour market.

The article is organised as follows. The next section presents a number of stylised facts, a literature review and main hypothesis on the relationship between fertility, family policy and female's labour supply. Data are described in Section 3. The methodology is presented in the fourth section. Section five presents the results. Finally, section six concludes.

2. On the relationship between fertility, family policy and the participation of women in the labour market.

2.1. Stylised facts

Fertility and participation of women in the labour market

On the one hand, Spain is one of the countries with the lowest fertility rate worldwide (Table 1a, Appendix). In the context of the OECD, falling fertility has not been as sharp as in Spain, from 2.47 children per woman to 1.74 children per woman while in Spain it has gone from 2.90 children per woman to 1.38. In 1970, generational replacement, which is estimated at 2.1 children per woman, was guaranteed in OECD countries. In Spain in 1975, it begins an intense, progressive and continuous decline in fertility. This circumstance is accentuated by the decline in marriage rates, increasing the average age of motherhood, as well as increased life expectancy at birth (Table 2a, Appendix). On the other hand, the participation of women in the labour market has not stopped growing; however, there is still an important gap with respect to female participation in the labour market in Spain with respect to the rest of European Union (Table 3a, Appendix) and OECD (Sánchez-Mangas *et al.*, 2008:1128). Furthermore, the difference between men and women in the European Union is much lower (25.8%) than the difference between men and women in Spain (38.5%). Then, Spain is not only well below the EU figures, but also the differential between men and women is much higher.

Overall, an increasing female participation in the labour market, an increasing average childbearing age regarding the tenure of the first child and a decreasing the fertility rate co-exist in Spain. This process is also observed in Europe but at different moments of time and with different intensity.

The declining birth rate and the accelerated aging process that exist across Europe, and particularly in Spain,[1] might have important negative consequences for the social security and pension system. Therefore, the European governments have adopted different policy measures in the regulatory text, trying to offset higher costs caused by the new born (McDonald, 2006; Gauthier, 2007).

As noted above, if we observe data from 1970 to 1995 there is a widespread decrease of the fertility. Nonetheless, from 1995 to 2010 the trend changed to be positive and the fertility rate increased in a number of countries. Interestingly, this was also the case for Spain. For example, the fertility rate in Spain changes from 1.17 to 1.38 between 1995 and 2010 while the OECD average increases from 1.69 to 1.74 (see Table 1a, Appendix), with together with the observed continuous and progressive increase in female employment and participation in the labour market (Table 3a; Graphs 1a and 2a),[2] show the co-existence of a positive trend of fertility and a positive trend of female participation in the labour market from the second half of the nineties. Therefore, in recent years the correlation between fertility and female participation in the labour market is found to be positive (Figure 1a, Appendix). Historically, a negative

[1] The rate of aging in Spain, which represents the percentage population over 64 years on the population under 16 years on 1 January of year t, increases from 35% in 1975 to 107% in 2012. This means that, currently the population over 64 is quantitatively more important than young people, so a problem arises with respect to the pension guarantee in the future.

[2] Female participation in Spain increases from 34.90% to 55.80% during the same period and it increases from 52.80% to 62.10% in the case of the EU.

relationship has been the most frequent in developed countries, i.e. the co-existence of a negative trend of fertility and a positive trend of female participation in the labour market, while real wages for women have increased. This turnaround might be due to family policy measures that seek to encourage birth through transfers, tax reduction, improvements on the quality and availability of child care centers, while increasing the participation of women in the labor market.

Family policy

The new provision for the birth or adoption of a child under Act 35/2007,[3] which requires at least two years of actual residence in the Spanish territory, is set compatible with existing deduction maternity regulated in income tax for people discharged from Social Security in charge of a child with less than 3 years old. While the new provision aims to reduce the costs of the new child and thereby encourage the birth rate, the maternity deduction is intended to encourage the incorporation of women into the labour market. The beneficiaries of the measure will be the mother and/or wife in case of adoption. In cases of death the other parent will be the beneficiary of the aid. In cases of non-nationals must prove actual residence for at least two years in accordance with the Organic Law 4/2000.

As the 'baby bonus' supposes a financial support to mothers, which is given with independence of participating or not in the labour market, we argue that it is a unique setting to analyse whether a direct reduction in the monetary cost of child care, the more likely is that women participate in the labour market.

[3] B.O.E. nº 275 de 16 de noviembre de 2007.

2.2. Literature Review

One of the most dramatic changes that have experienced modern societies is the transition from rapid population growth, with low mortality and high fertility rates, a process known as the *demographic transition*, towards more advanced societies characterized by low rates of mortality and fertility while per capita income has grown and economies have developed, a process that demographers name as *demographic efficiency*. One of the existing theses in literature about the causes of fertility decline in developed countries has to do with the causal relationship between the number of children and the quality of parenting (Becker et al., 1973). When infant mortality declines, increases the incentive to invest in human capital and also it increases the cost of having children. Then, there is a trade-off between quality and quantity of children (Becker and Barro, 1988; Galor and Weil, 1996, Galor and Weil, 2000). Moreover, the greater female participation in the labour market along with the highest educational level of women increases the opportunity cost of not working leading to a change with respect to preferences regarding tenure children. For example, a special report by The Economist (2011) points out that "women who have been out of the labour force for a while find it hard to get back in because their skills deteriorate, they become less confident and employers fret about the hole in their CV […] That is why many women are prepared to work for only a small net return while their children are young."

The analysis of the causal relationship between fertility and labor supply has led to both theoretical and empirical related research. Therefore, a number of models that attempt to explain this causal relationship have been developed in the literature (Angrist and Evans, 1998, Apps and Rees, 2004, Becker 1960, 1992; Becker et al, 1973, 1992;

Nakamura and Nakamura, 1992; Rosenzweig and Wolpin, 1980, Schultz, 1990). In this line, McConnell *et al.*, (2010) point out that "the presence of young children is currently less of an inhibitor to labour market participation than it has been in the recent past. In fact, the largest increases in labour force participation have been for wives with very young children."[4]

With regards family policy, most of the existing literature that analyses the impact of a subsidy, consisting of a sum of money for the care of children, on the labor supply of mothers, shows increased participation in the labour market (Bos et al, 1999; Granger and Cryton, 1999; Blau and Tekin, 2007). This subsidy is an incentive that allows mothers either to participate in the labour market or to increase the number of available hours for the care of children. However, when the participation of women in the labour market is very high, this subsidy may not generate increased participation in the labour market but reduced participation to devote more time to childcare. Therefore, the income effect compensates for the loss of wages by reducing the hours of work offered. Fitzpatrick (2010) found that there was not increased participation in the labor market of mothers as a consequence of the introduction of a subsidy for studies in the case of preschool children of 4 years old in Georgia and Oklahoma in the 90s.

In this debate, empirical studies have emerged in the literature to analyse the effect of policy measures that aim to encourage the birth rate and, at the same time, to increase or maintain the level of participation of women in the labour market. A number of researchers focus their analysis on the relationship between taxes and family size (Apps and Rees, 1999, 2004; Balestrino, 2001; Balestrino et al, 2002; Cigno and Pettini,

[4] Page 62.

2001). Much of this work focuses on how the size of the family should be taxed, taking into account a social welfare function. Apps and Rees (2004) analysed, from a theoretical point of view, the impact of a policy designed to increase the birth rate, which can be done in two ways: through a system of free grants for children or through subsidies for childcare. The greater the supply and quality of services offered in an economy for childcare outside the home, the weaker the negative relationship between female participation in the labor market and fertility. In turn, this relationship might become positive. The theoretical models used to analyse the relationship between fertility and female labour supply are based on the analysis of the relationship between female wage rate and the demand for children. The increase in female wage increases the opportunity cost of time devoted to the care of children and, therefore, would tend to reduce demand. However, as an increase in female wage also increases the family income, it might have the opposite effect and then, increasing the demand for children (normal good).

Using a quasi-experiment, as we do in the present paper, Bauernschuster and Schlotter (2013) show positive causal effects of public (young) child care on mothers' employment in Germany. In particular, they exploited a policy reform from 1996 that resulted in a marked increase in *kindergarten* attendance of three-year old children in the following years. In this same line, we focus on the analysis of a direct reduction of the cost of fertility, which in fact reduces the opportunity cost of mothers, on female labour supply. To our knowledge, the present paper is the first study that focuses on a quasi-natural experiment in order to prove whether a direct reduction in the cost of fertility that is introduced to increase the birth rate, results in a reduction or in an increase of female labour supply.

2.3. Hypotheses

This paper tests two main hypotheses. The first hypothesis states that with the non-labour income that the 'baby bonus' supposes, a reduction in the supply of female labour hours should be observed (income effect). This hypothesis is in line with related literature that shows an incompatibility between work and childcare for women (Angrist and Evans, 1998).

Nonetheless, Table 4a (Appendix) shows a progressive increase in the annual average percentage of work permits for birth in the group of women aged 16 to 45 years during the period taken into account. A priori, we could think that the higher the work permits for birth (for mothers), the lower the female labour supply.

However, the second hypothesis tests whether the non-labour income of the 'baby bonus' might lead to an increase in the desired number of hours of work for women and then, the participation of women in the labour markets would increase. This result would be in line with previous research showing that a subsidy for childcare increases participation in the labour market (Bos et al, 1999; Granger and Cryton, 1999, Blau and Tekin, 2007) and would provide evidence of the importance of taking into account external facilities made available, which vary by country and/or region, in the female labour supply function; while taking into account the degree of participation of women in the labor market. If female participation in the labor market is low, the income effect

leads to increased participation in the labor market of women and to cover the childcare with external services.

3. Data

The empirical analysis relies on a new survey, which replaces the "European Community Household Panel" (ECHP) from 2002,[5] thus being the "European Union Statistics on Income and Living Conditions" (EU-SILC). This survey includes microdata that are useful not only for the purposes of estimating the econometric model, but also in that it provides information on two variables that affect both the fertility decision and the participation in the labor market decision, such as education, income and civil state, but also because it allows to obtain the DiD estimator on the same sample of individuals.

EU-SILC includes longitudinal information, i.e. referring to the same people at different moments of time. In the case of Spain, is tracked over four years. The survey is designed as a rotating panel. Households remain for a certain number of periods in the sample and are then replaced. The panel sample is composed of four panel subsamples so that each year one of them is replaced by a new subsample. Every subsample remains in the survey for 4 years and then, it is replaced by another subsample. For each cycle (year) a quarter of the sample (25%) is renewed. A quarter of the units selected in the sample of the first cycle only stay one year, another quarter two and another quarter

[5] In 2002, a pilot test was conducted, and in 2004 began the final survey.

three years. Every year there is an overlap of 3/4 parts (75%) of the sample in the previous year. For each subsample, selection follows a two-stage design with stratification of the units of the first stage. The first stage of the survey includes the census tracts and the second stage includes main family dwellings. Among them no subsampling is performed, investigating all households who have their habitual residence there. In each region (NUTS2) the first stage units are grouped into strata according to the size of the municipality to which the section belongs. For each region an independent sample is designed. Sections were selected within each stratum with probability proportional to its size. The homes in each section are selected with equal probability by systematic sampling with random start. This procedure leads to self-weighting samples in each stratum. Therefore, the sample is divided into four groups of rotation. The survey consists of four files: basic household data, basic person data, detailed household data and detailed data from adults. The basic data file of the person has a variable (RB060 to RB064) which is the basic factor to be used for longitudinal analysis. In the file of detailed data from adults, details of the person, education, employment, health and income are provided.

In particular, the period from 2007 to 2010 in the EU-SILC includes 72,464 adults of whom 34,472 are men and 37,992 are women. Their distribution according to the cycle of the survey, gender, age, treatment and control group is shown in Table 5a (Appendix). The treatment group is composed for the 43% of the women in the sample, i.e. they are women aged between 16 and 45 years. The remaining 57% belongs to the control group (women older than 45 years old). From the analysis of the survey no structural change is observed in the behavior of women with regard to the supply of working hours (Table 7a) and then, the groups show a similar trend of behaviour. In

both groups, a reduction in the supply of working hours is observed during the entire period. When applying a test of equality of means between the hours offered by the treatment group and by the control group we cannot reject the null hypothesis of equal means in both groups, both under the assumption of equal variances as under the assumption of inequality. Table 8a shows that divorced, separated and single women offer longer hours of work on average with respect to married and widows over 45 years (control group) that offer on average less hours. The null hypothesis of independence between the two variables is rejected.

Tables 5 to 10 summarise the variables used in the regression model and show statistical tests and measures of association between variables. There is a balance of the sample with respect to gender throughout the period. By marital status, married women predominate (54.40%). The remaining 45.60% is distributed among single, separated, divorced and widowed women. According to the group, the weight of married women in the treatment group (43.48%) is lower than in the control group (63.68%) (Table 6a, Appendix).

Regarding the level of education, lower and secondary education level predominate (75.78%), representing women with higher education level, the 23.70% of the sample. The 33.18% of women in the treatment group have a higher education level, compared to 14.73% in the control group (Table 9a, Appendix).

With regard to the supply of working hours by educational level, the groups of women that most hours offer are those with job training and a higher education level (Table 10a, Appendix). The average net income of women stands at €5,232.13, being the average higher for the treatment group (€7,187.81) than for the control group (€3,559.52) (Table 11a, Appendix). Table 12a (Appendix) shows that the growth rate of average income by group has been similar.

4. Methodology

4.1. Difference-in-Differences

In a first step, the effect of the measure the effect of the reduction of the cost of fertility on female labour supply is estimated by DiD. To do so, we need to have two groups and two periods. The DiD estimator does not require of longitudinal data but requires that the treatment and control groups are the same before and after the application of the measure. The groups are selected according to the condition of the measure so that there is a group, affected by the measure, women aged 16-45 years, and another group that is not affected by the measure, women over 45. Comparison of the outcome variable is the

variable "horash" ("PL060") defined as usual hours devoted to the main job,[6] before and after adopting the family policy in both groups and allows us to obtain a measure of the causal impact of this policy. Specifically, the following analysis is performed:

$$ATT = E\left\{Y_{1t'} - Y_{1t} \middle| D = 1\right\} - E\left\{Y_{0t'} - Y_{0t} \middle| D = 0\right\} \qquad [1]$$

According to this expression, $Y_{1t'}$ is hours of work offered by the group of women aged 16 to 45 years (treatment group) after entry into force of the policy. Y_{1t} is hours of work offered by the group of women aged between 16 and 45 years old before entering into force the policy. $Y_{0t'}$ is hours of work offered by the group of women over 45 years old (control group) after entry into force of the policy. Finally, Y_{0t} is hours of work offered by the group of women over 45 years old before entering into force the policy.

So, with expression 1 the outcome variable is weekly hours of work offered by two groups of women during the same time period before and after the family policy entered into force, thus saving macroeconomic shocks occurred during the studied period. To overcome the biases that may result from unobservable characteristics, the sample should be the same throughout the period. This method of estimating difference-in differences allows us to obtain a measure of the causal effect that the reduction of the cost of fertility has on female labour supply.

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[6] The variable is measured in hours and minutes (hhmm) so that "hh" is hours worked by all persons over 16 years who worked or had a job in the reference week, and takes values from 01 to 98. The "mm" is minutes, takes values from 00 to 59. In the survey, this variable is expressed in terms of hours, taking values from 1 to 99.

The average treatment effect in the treatment group which is known as ATT (*average effect of treatment on the treated*) can be estimated in a regression model as follows:

$$Y_{ist} = \alpha + \lambda(T=t') + \gamma(D=1) + \delta \mathrm{I}_{ist} + \varepsilon_{ist} \qquad [2]$$

Where Y_{ist} is the result, in this case the hours of work offered in period t by each individual i in group s; λ denotes the time effect; γ is the systematic difference in outcome for group effect D=1. δ the treatment effect. $\mathrm{I}_{ist} = 1(T=t')1(D=1)$ is a *dummy* variable to control for the treatment effect after the family policy entered into force. Finally, $E[\varepsilon_{ist}|s,t]=0$.

To control for the observable variables (X_{ist}) the model is expanded as follows:

$$Y_{ist} = \alpha + \lambda(T=t') + \gamma(D=1) + \delta \mathrm{I}_{ist} + X'_{ist}\beta + \varepsilon_{ist} \qquad [3]$$

4.2. Panel data

To use panel techniques, we construct a set of microdata from the variables of the survey "fixed identification number for each respondent along cycles" and "year of

survey". In this model the fixed effect by group $(\alpha + \gamma 1(D=1))$ is replaced by an individual fixed effect U_i,[7] according to the following expression:

$$Y_{ist} = U_i + \lambda\, 1\ (T=t') + \delta\, 1(D=1)\, t\ + \varepsilon_{ist} \qquad [4]$$

The model is extended in order to control some observable characteristics (X_{ist}):

$$Y_{ist} = U_i + \lambda\, 1\ (T=t') + \delta\, 1\,(D=1)\, t\ + X_{ist}^{'}\beta + \varepsilon_{ist} \qquad [5]$$

The fixed effects model allows that the individual effects are correlated with the regressors. In the random effects model, [8] which is the preferred model according to the Hauman test (see, for example, Wooldridge, 2009), assume that the individual effects are random. That is, it is assumed that the individual effects are uncorrelated with the regressors. The model estimation is performed by generalized least squares in Stata by using the option *vce(cluster)* to specify that observations are independent across groups (clusters) but not necessarily within groups.

4.3. Matching technique

Matching is a tool based on the observable characteristics of individuals. The assignment of individuals to the treatment group should be random, conditional on the observable

[7] Both fixed effects and random effects are estimated.
[8] The extended model is taken into account to estimate the random effects model.

characteristics of individuals. These technique uses nonparametric estimation methods, as is the case of DiD, although it establishes a system of weights by observation. Estimation by *matching* follows the expression:

$$ATT = \mathrm{E}\left\{\mathrm{E}\left\{Y_i(1)\middle|D_i=1,X\right\}-\mathrm{E}\left\{Y_i(0)\middle|D_i=0,X\right\}\middle|D_i=1\right\} \qquad [6]$$

That can also be expressed as:

$$ATT = \mathrm{E}\left\{\delta_X\middle|D_i=1\right\} \qquad [7]$$

where $\left\{\delta_x = \mathrm{E}\left\{Y_i(1)\middle|D_i=1,X\right\}-\mathrm{E}\left\{Y_i(0)\middle|D_i=0,X\right\}\right\}$ is the mean difference between the treatment group and the control group for each value of X_i.

In this case, the Kernel estimation method is used (Becker and Ichino, 2002) that follows the expression:

$$\tau^K = \frac{1}{N^T}\sum_{i\in T}\left\{Y^T - \frac{\sum_{j\in C} Y_j^C G\left(\frac{pj - pi}{h_n}\right)}{\sum_{k\in C} G\left(\frac{p_k - p_i}{h_n}\right)}\right\} \qquad [8]$$

where $G(\bullet)$ is a Kernel function and h_n is a *bandwidth* parameter.

The main methodological difference from the regression method is the assignment of weights (the system of Kernel weights is used). The variables used for the matching estimates are the same as those used in regression: hours of work offered, the time effect dummy, the group dummy, educational level, marital status and income. It is also important to note here that with *matching* we are using the entire sample, i.e. men and

women during the period 2007-2010, opposite to what is done in the regression analysis, where only women where used.

5. Results

5.1. Difference-in-Differences

The period of analysis is 2007-2010. The year previous to the entry into force of the family policy taken into account is 2007, while three years (2008-2010) are taken to analyse the subsequent effect on the adoption of the policy. This sample of microdata allows for longitudinal analysis and maintains the same sample. The latter aspect is crucial for obtaining the DiD estimator. It is important to note that there is not observed a change of behavior in the range of female working hours in both groups (Table 7a).

The estimation of the average effect of Equation (1) shows that there was an increase in average working hours offered in the treatment group as a result of the implementation of the family policy and then, as a decrease in the cost of fertility. The average effect was +0.57 (see Table 13a, Appendix).

In this case, the change in hours offered by women is exclusively due to the policy as the control group, women over 45, is not affected by the measure and the variation of the number of hours offered in this group should only be due to economic

circumstances, macroeconomic shock. As no structural change is observed under the period taken into account,[9] and the same sample is considered before and after the implementation of the policy, the change in the offered hours in the treatment group, women aged 16 to 45, is due to the effect of the policy. This effect is the opposite of that expected *a priori* (hypothesis 1). It seems plausible that reducing costs of fertility by the increase of non-labour income should reduce the supply of female working hours to devote to childcare; however, it increases the supply of female working hours in the treatment group.

In line with hypothesis 2, the 'baby bonus' leads to an increase in the desired number of hours of work for women. So when the cost of fertility is reduced, the non-labour income might help to pay for the care of children and facilitate increased participation in the labour market. This result makes sense in a country where the participation of women in the labor market is not very high (see Table 3a, Appendix). In fact, Spain not only has a female participation in the labour market significantly below than the European average and, but also the opportunity costs of not working for women is relatively high as a gap between opportunities provided to men and women persist in the Spanish modern society.

The average effect of the family policy can also be estimated by using regression analysis. Table 14a in Appendix summarises the obtained results. When equations 2 and 3 are estimated, the value of the constant term is similar to the average of hours offered

[9] The same pattern of behaviour is observed in both groups (Table 7a): a reduced supply of working hours in the group of women aged 16 to 45 years old and in the group of women over 45 years old.

by the group of women during this period, around 36 hours a week (see Table 7a, Appendix).

The variables present the expected sign. The time effect (λ) is negative, as well as the supply of working hours in the treatment group (γ). The negative impact obtained in the time effect could be explained by the economic crisis, which is a dummy variable that takes the value of one for the period 2008 to 2010 and zero for 2007. In Table 7a a reduction of hours of work offered is observed during 2008 to 2010 compared to 2007. The variable that captures the effect of the group is a dummy variable that takes the value 1 for the group of women aged 16 to 45 years old and zero for the rest of women (control group). In this case the sign of the coefficient is also negative. As in the previous case, a lower supply of hours of work is observed on average in the treatment group compared to the control group from 2007 to 2010. However, the average effect in the treatment group after adopting the family policy is positive (δ). This variable is a dummy that is obtained by multiplying the dummies of treatment group and time effect. The effect is positive as that obtained by DiD although the magnitude of the estimation is lower than in DiD. In a first step, we find that it is not possible to accept the constant variance of the random perturbations, and so we proceed to re-estimate the model using a robust technique to the correlation between groups. Therefore, the variable used as a cluster for robust estimation is the dummy variable that takes the value 1 for the group of women aged 16-45 years.

Regarding the results of equation (3), as expected, efficiency and accuracy of the model increases as more regressors are included: in particular, those variables related to

individual characteristics, i.e. education level, marital status and income. The educational level is a dummy variable that takes the value 1 for women with higher educational level and 0 otherwise. The sign of the variable is negative indicating that the higher the educational level, in this case, college education, the lower the supply of hours of work comparatively with respect to the other educational levels. In fact, the higher the educational level, the best working conditions in terms of wages and working hours tend to be. It is possible that the level of education is producing an income effect so that it is possible to maintain the same level of income with lower supply of working hours. In this line, a positive correlation between income and education level is found. Previously, Lemieux (2006) established a direct relationship between the highest level of wages and high education levels.

It is usual in the related literature that analyses the participation of women in the labour market (Fitzpatrick, 2012) to divide groups by marital status, and then we include this variable as a control in our regression. The marital status variable takes the value 1 for married women and 0 otherwise. Married women offer fewer hours of work, which is probably due to the existence of another family income (non-labour income or income of the spouse) and may also be due to the dependents of older married women.

The average effect of the measure (ATT) remains positive and its quantitative impact is greater than in equation (2). In addition, the upper end of the range of the confidence interval at 95% coincides with the calculation of the DiD estimate (+0.57). The coefficients of time and variables remain negative signed although quantitatively, they present a greater impact than in equation (2).

5.2. Panel data

Firstly, a fixed effects model according to the expression of equation (4) is estimated. Table 15a (Appendix) shows the obtained results. A positive average effect is observed in the treatment group (ATT), in line with hypothesis 2 and with the previous estimates. Also in line with the previous results, the time effect is negative signed. Similar conclusions hold by using the model of random effects.

The results of the Hausman test are presented at the bottom of the same table, which are in line with the idea that the model of random effects best fits the data, and also reduces the variance due to individual effects. Interestingly, the average effect (ATT) is similar in the model of random effects (0.0429) and fixed effects (0.0454). The upper end of the range of the confidence interval (+0.34) is lower than the one estimated by OLS (+0.57).

5.3. Matching Kernel

The most conservative result is obtained by this method, in comparison with DiD and regression analysis. As found previously, the average effect (ATT) is positive signed, but it is close to zero. Although the net quantitative impact seems to be rather limited, the effect is important enough to compensate the expected reduction that would occur as

a consequence of an additional non-labour income for mothers. Therefore, in any case, it seems clear that a reduction in the cost of fertility increases the participation of women in the labor market in line with the hypothesis 2 stated above.

6. Conclusions

The empirical analysis of fertility on female labour supply is not easy. First, due to the endogeneity of both decisions for women: to have children and to participate in the labor market. Second, due to data limitation and to the fact that longitudinal series are required to take into account unobservable heterogeneity at individual level. To overcome these problems, we focus on the cost of fertility, and argue that is not fertility *per se* what inhibits women of participating in the labour market (in line with McConnell et al, 2010), but the cost of fertility, i.e. the opportunity cost of not working. Also to overcome these problems, we focus on a family policy in Spain, which provides a unique setting for a quasi-natural experiment. The results obtained by the three different methods employed in this research (DiD, regression analysis and matching) are in line with hypothesis 2: a decrease in the cost of fertility significantly increases female participation in the labour market. With respect to the different measures obtained for the average effect of family policy in the treatment group (ATT), Andam et al. (2008) obtains an over estimation of the effect of the policy in conventional methods of estimation compared to the matching method. In this paper, we have also obtained this result (see Table 16a, Appendix).

We find evidence in line of the second hypothesis in the case of Spain and shed some light on the opportunity costs of not working in modern societies, as even with the

existence of an additional non-labour income that stimulates fertility, which would be expected to decrease the desired number of hours of work for workers (income effect), leads to higher female labour supply. Therefore, if children were seen as the responsibility of society as a whole, and more facilities would be provided, the gap in opportunities between men and women could be reduced.

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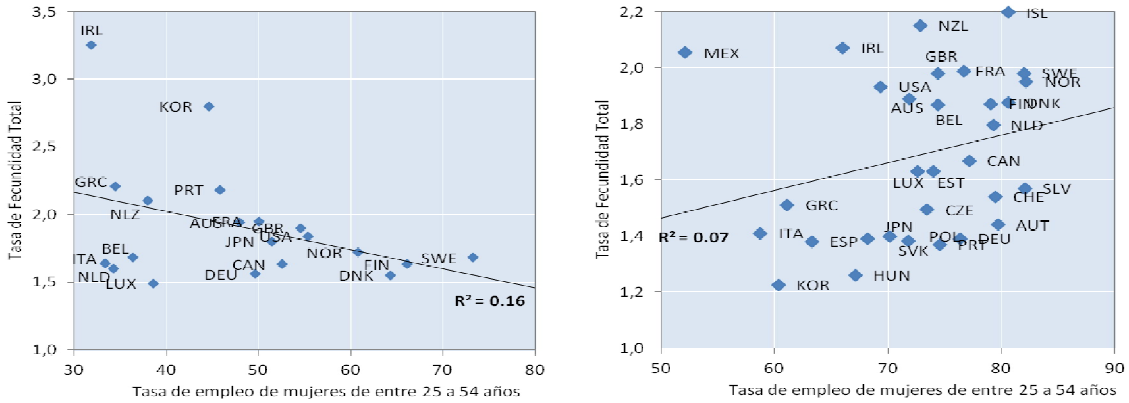
Appendix

Figure 1a: Relation between fertility rate female employment rate

1980 **2010**



Source: Employment rates - OECD Employment Outlook UN World Statistics Pocketbook, 2010; Fertility rates - National statistical authorities, UN Statistical Division and Eurostat Demographic Statistics, 2010.

Table 1a.- Number of child per woman, OECD.

Countries	1970	1995	2010
Latvia	2.02	1.26	1.17
Korea	4.53	1.63	1.23
Hungary	1.97	1.57	1.26
Portugal	2.83	1.41	1.37
Romania	2.90	1.34	1.38
Spain	**2.90**	**1.17**	**1.38**
Malta	2.17	1.82	1.38
Poland	2.20	1.55	1.38
Germany	2.03	1.25	1.39
Japan	2.13	1.42	1.39
Slovak Republic	2.40	1.52	1.40
Italy	2.43	1.19	1.41
Austria	2.29	1.42	1.44
Croatia	1.83	1.50	1.46
Bulgaria	2.17	1.23	1.49
Czech Republic	1.91	1.28	1.49
Cyprus	2.48	2.03	1.51
Greece	2.40	1.32	1.51
Switzerland	2.10	1.48	1.54
Lithuania	2.40	1.55	1.55
Slovenia	2.21	1.29	1.57
Luxembourg	1.98	1.67	1.63
Estonia	2.16	1.32	1.63
Canada	2.33	1.62	1.67
OECD mean	**2.67**	**1.69**	**1.74**
Netherlands	2.57	1.53	1.80
Belgium	2.25	1.55	1.87
Finland	1.83	1.81	1.87
Denmark	1.95	1.81	1.88
Australia	2.86	1.82	1.89
U.S.	2.48	1.98	1.93
Chile	3.95	2.35	1.94
Norway	2.50	1.87	1.95
Sweden	1.94	1.74	1.98
UK	2.43	1.70	1.98
France	2.48	1.71	1.99
Turkey	5.00	2.75	2.03
Mexico	6.77	2.94	2.05
Ireland	3.87	1.85	2.07
New Zeland	3.17	1.98	2.15
Iceland	2.81	2.08	2.20
Israel	3.97	2.88	3.03

Source: OECD.

Table 2a.- Demographic Indicators, Spain.

Period	Fr	Ai	Aam			Marriage
			Total	Spain	Foreign	
1975	2.80	35.87	25.23	-	-	-
1976	2.80	37.00	24.94	-	-	1.02
1977	2.67	37.74	24.85	-	-	1.01
1978	2.55	38.47	24.81	-	-	0.97
1979	2.37	39.25	24.78	-	-	0.91
1980	2.21	40.06	25.05	-	-	0.80
1981	2.03	40.88	25.23	-	-	0.72
1982	1.94	42.31	25.41	-	-	0.68
1983	1.80	43.77	25.51	-	-	0.68
1984	1.73	45.41	25.64	-	-	0.67
1985	1.64	47.24	25.78	-	-	0.67
1986	1.56	49.36	25.89	-	-	0.69
1987	1.49	51.77	26.13	-	-	0.71
1988	1.45	54.57	26.24	-	-	0.72
1989	1.40	57.67	26.55	-	-	0.72
1990	1.36	61.17	26.80	-	-	0.71
1991	1.33	65.06	27.15	-	-	0.70
1992	1.32	68.87	27.49	-	-	0.69
1993	1.27	72.92	27.79	-	-	0.64
1994	1.20	77.28	28.10	-	-	0.63
1995	1.17	81.91	28.38	-	-	0.63
1996	1.16	86.72	28.44	-	-	0.61
1997	1.17	91.47	28.67	-	-	0.61
1998	1.15	96.02	28.86	-	-	0.64
1999	1.19	100.28	28.97	-	-	0.64
2000	1.23	103.99	29.07	-	-	0.65
2001	1.24	106.76	29.10	-	-	0.62
2002	1.26	108.35	29.17	29.52	27.22	0.62
2003	1.31	108.42	29.24	29.65	26.85	0.61
2004	1.32	108.33	29.29	29.77	26.53	0.61
2005	1.34	108.20	29.33	29.88	26.06	0.58
2006	1.38	107.77	29.31	29.94	26.17	0.57
2007	1.39	107.40	29.44	30.18	26.08	0.56
2008	1.46	106.58	29.30	30.13	26.09	0.53
2009	1.39	106.04	29.60	30.36	26.15	0.48
2010	1.38	106.08	29.83	30.55	26.08	0.47
2011	-	106.60	30.12	30.77	26.02	0.46
2012	-	107.78		-	-	-

Note: Fr= Fertility rate (Number of child per woman);

Ai= Aging index (Percentage of population greater than 64 years with respect to the population less 16 years);

Aam= average age of motherhood (first child).

Source: National Institute of Statistics.

Table 3a.- Participation in the labour market. Employment rate (%).

Period	Total		Female		Male	
	EU	Spain	EU	Spain	EU	Spain
1992	**64.50**	**53.60**	**51.70**	**34.50**	**77.50**	**73.00**
1993	63.50	51.30	51.40	33.70	75.80	69.10
1994	63.30	50.80	51.50	33.80	75.20	67.90
1995	64.00	51.70	52.80	34.90	75.30	68.60
1996	64.30	52.70	53.40	36.30	75.20	69.30
1997	64.70	54.20	53.90	37.90	75.40	70.80
1998	65.40	55.90	54.80	39.10	76.00	72.80
1999	66.40	58.30	56.10	41.60	76.70	75.20
2000	67.30	60.70	57.30	44.50	77.40	76.90
2001	67.90	62.10	58.20	46.30	77.70	77.80
2002	68.10	62.70	58.80	47.60	77.40	77.70
2003	68.40	64.00	59.50	49.50	77.40	78.30
2004	68.90	65.20	60.30	51.50	77.50	78.70
2005	68.30	67.20	60.20	54.40	76.50	79.90
2006	69.20	68.70	61.30	56.40	77.30	80.70
2007	69.90	69.50	62.10	58.00	77.80	80.70
2008	70.30	68.30	62.80	58.30	77.90	78.10
2009	69.00	63.70	62.30	56.30	75.80	71.00
2010	68.60	62.50	62.10	55.80	75.10	69.10
2011	**68.60**	**61.60**	**62.30**	**55.50**	**75.00**	**67.60**

Source: Eurostat.

Table 4a.- Reasons for not work, taking a job. License for childbith (=1). Leave for childbith (=2).

Period	Male			Female			Women aged between 16 and 45 years		
	1		2	1		2	1		2
2007_1t	0.24		0.19	8.48		5.05	11.55		6.82
2007_2t	0.74	0.53	0.05	10.57	7.48	4.57	14.20	10.12	6.14
2007_3t	0.34		0.05	3.79		1.81	5.06		2.39
2007_4t	0.80		0.21	7.09		4.83	9.70		6.61
2008_1t	1.30		0.11	7.94		4.53	10.70		6.11
2008_2t	1.13	0.93	0.16	10.53	7.73	7.28	14.24	10.49	9.77
2008_3t	0.44		0.03	3.96		2.56	5.38		3.46
2008_4t	0.87		0.08	8.50		5.33	11.66		7.21
2009_1t	0.96		0.12	8.82		6.07	12.03		8.17
2009_2t	1.26	0.90	0.30	9.38	7.76	6.65	12.78	10.62	8.82
2009_3t	0.45		-	3.64		2.49	5.04		3.39
2009_4t	0.95		0.08	9.23		5.79	12.66		7.83
2010_1t	0.81		0.17	9.94		5.93	13.97		8.20
2010_2t	1.30	0.95	0.11	11.49	8.84	6.95	16.05	12.40	9.51
2010_3t	0.44		0.11	3.96		2.58	5.51		3.58
2010_4t	1.28		0.24	9.98		4.91	14.10		6.94
2011_1t	1.38		0.06	10.22		5.92	14.73		8.58
2011_2t	1.46	1.10	0.28	9.23	8.60	5.43	13.34	12.34	7.88
2011_3t	0.48		0.10	4.23		2.02	6.06		2.84
2011_4t	1.11		0.04	10.74		3.77	15.25		5.32
2012_1t	1.61		0.16	13.23		4.38	19.32		6.35
2012_2t	0.92	0.99	0.06	10.41	9.71	4.20	15.49	14.28	6.16
2012_3t	0.42		0.02	3.80		1.66	5.65		2.49
2012_4t	1.01		0.14	11.42		3.40	16.67		4.98

Source: Labour Force Survey (National Institute of Statistics).Values in terms of percentage. Filter: All persons with more than 16 years who did not work during the reference week, or help in the family business, and were employed.

Table 5a.- Distribution of the sample. EU-SILC 2007-2010**.**

Period	Gender		Treatment vs. Control groups		Total
	Female	Male	Women aged between 16 and 45 years	Women older than 45 years old	
2007	4.690	4.194	2.033	2.657	8.884
2008	8.840	7.989	3.779	5.061	16.829
2009	12.788	11.608	5.506	7.282	24.396
2010	11.674	10.681	4.916	6.758	22.355
Total	37.992	34.472	16.234	21.758	72.464

Source: EU-SILC. National Institute of Statistics.

Table 6a.- Distribution group of women by marital status. EU-SILC 2007-2010**.**

Marital status	Women		Women aged between 16 and 45 years		Women older than 45 years old	
	Obs.	Frec. %	Obs.	Frec. %	Obs.	Frec. %
Single	10.451	27,76	8.823	51,01	1.628	8
Married	20.484	54,40	7.521	43,48	12.963	63,68
Separated	865	2,30	356	2,06	509	2,50
Widowed	4.767	12,66	111	0,64	4.656	22,87
Divorced	1.086	2,88	486	2,81	600	2,95
Total	37.653	100	17.297	100	20.356	100

Source: EU-SILC. National Institute of Statistics.

Table 7a.- Evolution of supply of hours of the main job *(pl060[10]_* EU-SILC 2007-2010

Period	Women		Women aged between 16 and 45 years		Women older than 45 years old		Obs.
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
2007	36,87	10,56	36.81	10,13	36.96	11,25	1.780
2008	36.14	10.43	36.11	10.03	36.18	11.04	3.453
2009	36.21	10.25	36.20	9.89	36.22	10.76	4.602
2010	36.13	10.02	36.23	9.74	36.00	10.41	4.276

Test of equality of means under the assumption of equal variances:

Group |	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Control|	4792	36.32366	.1567417	10.85033	36.01638	36.63095
Treatment |	9319	36.2232	.1031635	9.958886	36.02098	36.42542
combined |	14111	36.25732	.0864555	10.27002	36.08785	36.42678
diff |		.1004645	.1825652		-.2573873	.4583164

diff = mean(0) - mean(1) t = 0.5503

Ho: diff = 0 degrees of freedom = 14109

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0

Pr(T < t) = 0.7089 Pr(|T| > |t|) = 0.5821 Pr(T > t) = 0.2911

Test of equality of means under the assumption of unequal variances:

Group |	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Control|	4792	36.32366	.1567417	10.85033	36.01638	36.63095
Treatment|	9319	36.2232	.1031635	9.958886	36.02098	36.42542
combined |	14111	36.25732	.0864555	10.27002	36.08785	36.42678
diff |		.1004645	.1876451		-.2673627	.4682917

[10] Número de horas trabajadas normalmente por semana en el trabajo principal. Son todas las horas, incluidas las extraordinarias, remuneradas o no, durante las que el encuestado trabaja normalmanente en su actividad principal, excluyendo el tiempo empleado en desplazarse al o desde el lugar de trabajo y las interrupciones para las comidas.

diff = mean(0) - mean(1)		t = 0.5354
Ho: diff = 0	Satterthwaite's degrees of freedom = 8974.97	
Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.7038	Pr(|T| > |t|) = 0.5924	Pr(T > t) = 0.2962

Source: EU-SILC. National Institute of Statistics.

Table 8a.- Distribution of female working hours offered by Marital Status**.** EU-SILC 2007-2010**.**

Marital status	Group	Working hours offered				
		Mean of the period	2007	2008	2009	2010
Single	**Total**	37,27	37,58	37,14	37,12	37,40
	Treatment	37,18	37,33	37,06	37,08	37,40
	Control	37,92	39,23	37,74	37,32	37,39
Married	**Total**	35,32	35,97	35,20	35,31	35,17
	Treatment	35,00	35,75	34,66	34,91	34,87
	Control	35,75	36,22	35,74	35,73	35,46
Separated	**Total**	38,17	40,32	36,04	38,96	38,16
	Treatment	38,08	40,43	36,15	39,22	37,63
	Control	38,25	40,23	35,97	38,78	38,45
Widowed	**Total**	35,21	34,16	35,40	35,40	35,26
	Treatment	36,42	39,00	38,50	38,37	37,50
	Control	34,94	33,60	35,02	34,99	34,90
Divorced	**Total**	38,89	40,73	39,81	38,60	37,96
	Treatment	38,96	40,15	40,58	39,44	37,97
	Control	38,81	41,25	39,23	37,98	37,95
Measure of association between hours of work offered and marital status						
Pearson: $\chi^2(300) = 725{,}18 \quad \Pr = 0.0000$						
Likelihood-ratio: $\chi^2(300) = 715{,}04 \quad \Pr = 0.0000$						

Source: EU-SILC. National Institute of Statistics.

Table 9a.- Distribution group of women, by educational level. EU-SILC 2007-2010.

Educational level	Women		Women aged between 16 and 45 years		Women older than 45 years old	
	Obs.	Frec. %	Obs.	Frec. %	Obs.	Frec. %
Primary ed.	10.883	31,03	1.580	9,26	9.303	51,64
Secondary Ed. -1st stage	8.576	24,45	4.807	28,18	3.769	20,92
Secondary Ed. -2st stage	7.120	20,30	4.894	28,69	2.226	12,36
Labour training	185	0,53	120	0,70	65	0,36
University Ed.	8.313	23,70	5.660	33,18	2.653	14,73
Total	35.077	100,00	17.061	100,00	18.016	100,00

Source: EU-SILC. National Institute of Statistics.

Table 10a.- Distribution of offered hours of women's work, by education level. EU-SILC 2007-2010.

Educational level	Group	Working hours offered				
		Mean of the period	2007	2008	2009	2010
Primary ed.	Total	35,59	37,25	35,07	35,63	35,13
	Treatment	35,18	36,20	34,52	35,39	35,14
	Control	35,79	37,74	35,32	35,71	35,13
Secondary Ed. -1st stage	Total	35,81	36,49	35,30	35,98	35,77
	Treatment	35,91	36,43	35,42	36,15	35,95
	Control	35,62	36,58	35,08	35,73	35,52
Secondary Ed. -2st stage	Total	36,38	36,93	36,92	36,13	35,93
	Treatment	36,22	36,94	36,66	36,05	35,99
	Control	36,78	36,92	37,48	36,29	35,83
Labour training	Total	37,50	44,80	36,44	35,25	37,52
	Treatment	37,60	44,76	37,44	35,37	40,21
	Control	37,25	45,00	34,81	35,00	33,33
University Ed.	Total	36,58	36,82	36,47	36,52	36,65

	Treatment	36,48	36,80	36,37	36,43	36,54
	Control	36,85	36,86	36,69	36,68	36,85

Measure of association between hours of work offered and marital status
Pearson: $\chi^2(300) = 1.5e+03; \quad \Pr = 0.0000$
Likelihood-ratio: $\chi^2(300) = 1.4e+03; \quad \Pr = 0.0000$

Source: EU-SILC. National Institute of Statistics.

Table 11a.- Average income by population group. EU-SILC 2007-2010.

Group	**Average net income [11]**		
	Obs.	**Average**	**Standard Deviation**
Women	37.992	5.232,13	8.515,14
Treatment	17.514	7.187,81	8.532,59
Control	20.478	3.559,52	8.135,58

Source: EU-SILC. National Institute of Statistics.

Table 12a.- Distribution of average income by period and group. EU-SILC 2007-2010.

Ciclo	**Women**			**Women aged between 16 and 45 years**			**Women older than 45 years old**		
	Obs.	**Average**	**SD**	**Obs.**	**Average**	**SD**	**Obs.**	**Average**	**SD**
2007	4.690	4.639	7.619	2.033	6.370	7.496	2.657	3.315	7.446
2008	8.840	5.093	8.163	3.934	7.056	8.158	4.906	3.519	7.819
2009	12.788	5.370	8.602	5.977	7.386	8.584	6.811	3.600	8.221
2010	11.674	5.423	8.995	5.570	7.365	9.057	6.104	3.651	8.564

Source: EU-SILC. National Institute of Statistics.

[11] Net monetary or cash employee income in the year prior to the interview.

Tabla 13a.- DiD estimate. EU-SILC 2007-2010.

Variable	Women aged between 16 and 45 years $[Y_1]$	Women older than 45 years old $[Y_0]$
Hours of work per week offered in 2007 $[Y_{0,1;t}]$	36.72	36.89
	N=1.377	N=798
Hours of work per week offered between 2008-2010 $[Y_{0,1;t'}]$	36.19	35.79
	N=1.431	N=894
Diference	-0.53	+1.1

$$ATT = E\{Y_{1t'} - Y_{1t} | D=1\} - E\{Y_{0t'} - Y_{0t} | D=0\} = [36.19 - 36.72] - [35.79 - 36.89] = -0.53 + 1.1 = +0.57$$

Note: N is the average sample size for each period.

Tabla 14a.-ATT effect estimated by OLS (vce_cluster_women group)

Regresors	Ec. (2)				Ec. (3)			
	Dependent: Hours of work per week offered [12]							
	Coef.	Err.Std. robust	P>t	[95% Conf. Interval]	Coef.	Err.Std. robust	P>t	[95% Conf.Interval]
Time effect	-,748	1.94e-12	0.000	[-,74; -,74]	-1,034	.10348	0.063	[-2,349; ,2807]
Group effect	-,151	1.67e-12	0.000	[-,15; -,15]	-,2917	.04582	0.099	[-,8739; ,2905]
ATT	**,0728**	**1.94e-12**	**0.000**	**[,072; ,072]**	**,2164**	**.02786**	**0.082**	**[-,1377; ,5705]**
Level of education					-,879	.18306	0.131	[-3,205; 1,446]
Marital status					-2,22	.34486	0.098	[-6,603; 2,160]
Income					,00017	.00006	0.214	[-,0006; ,00096]
_cons	36,96	1.66e-12	0.000	[36,96; 36,96]	36,57	.47208	0.008	[30,57; 42,57]

Note: Time effect = λ ; Group effect= γ ; ATT= δ

[12] Hours offered by both groups of women.

Tabla 15a.-DiD estimate and panel data (vce_cluster)

	Fixed Effect Model Ec. (4)				Random Effects Model Ec. (5) (GSM)			
	Dependent: Hours of work per week offered							
Regresors	**Coef.**	**Err.Std. robust**	**P>t**	**[95% Conf. Interval]**	**Coef.**	**Err.Std. robust**	**P>t**	**[95% Conf.Interval]**
Time effect	-0,53	1,65e-14	0,000	[-0,53;-0,53]	-0,87	0,062	0,000	[-0,99;-0,75]
ATT	**0,045**	**1,65e-14**	**0,000**	**[0,04;0,04]**	**0,042**	**0,155**	**0,782**	**[-0,26; 0,34]**
Group effect					-0,37	0,265	0,162	[-0,89; 0,14]
Level of education					-0,16	0,287	0,569	[-0,72; 0,40]
Marital status					-1,73	0,14	0,000	[-2,03; -1,44]
Income					0,00015	0,00003	0,000	[0,00007;0,00022]
_cons	36,69	5,62e-15	0.000	[36,69;36,69]	36,22	0,292	0,000	[35,65; 36,80]
σ_{α_i}	10,11				8,87			
σ_{ε_i}	5,72				5,70			
ρ_{α}	0,75				**0,70**			

Test de Hausman				
Variables	**Coefficient**		**Diference**	**Sqrt (diag(v_b_v_B))**
	(b) fe	**(B) re**	**(b-B)**	**S.E.**
Time effect	-0,53	-0,50	-0.03	0.19
ATT	**0.04**	**-0.13**	**0.17**	**0.29**

B = consistent under H_0 obteined by the regression; B = inconsistent under H_a but efficient under H_0 .

H_0 diference non systematic in the coefficient.

$\chi^2(2) = 2,27 \quad p - value = 0,32$ **Don't reject the H_0**

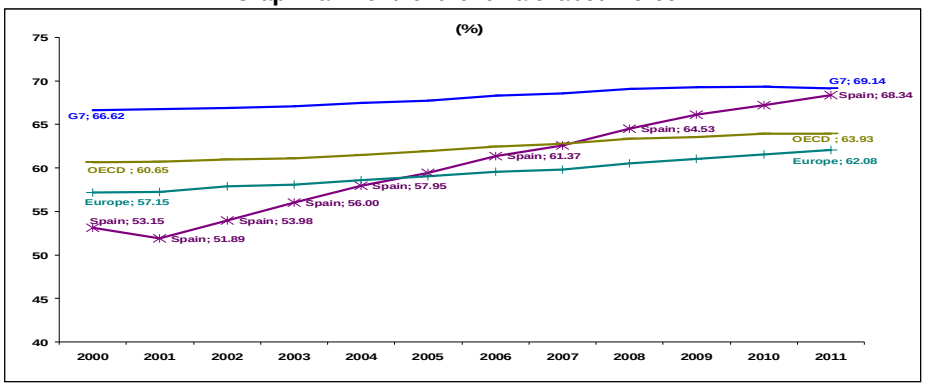
Tabla 16a.-ATT estimate by Kernel *matching method*

Treatment Group obs.	Control Group obs.	ATT
17.514	20.478	**0.002**

Tabla 17a.- ATT results, as method

	DiD	Regression (OLS_vce)		Panel Data		Matching
	EU-SILC 2007-2010	Ec. (2)	Ec.(3)	Fixed Effects	Random Effects	Kernel
ATT	0,57	0,07	0,21	0,045	0,042	0,002

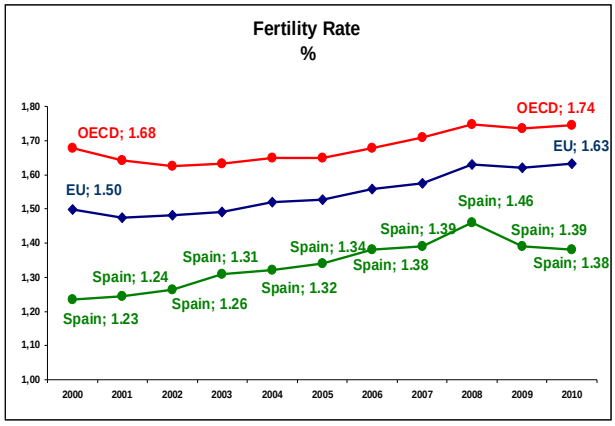
Graph 1a: Trend of the female labour force[13]



Source: OECD.

[13] Female labour force or female active population. Those who are qualified as employed or unemployed.

Graph 2a: Fertility rate and Female employment rate.



Source: OECD.