

Taxation and marriage: Evidence from a natural experiment in France

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Abstract

In this paper, the 1995 French family-quotient reform is used to analyze the impact of the individual income tax upon marriage. One key feature of this reform resides in the withdrawal of fiscal allowances aimed at cohabiting couples with children. Using the difference-in-differences estimation approach, it appears the reform may have had wide-ranging and heterogeneous effects on the probability of marriage. Notably, it has increased by about 5 percentage points for young cohabitant couples with children, by about 9 percentage points for couples with more than one child, and by about 15 percentage points for couples made up of a less educated woman and a more educated man.

Keywords: Marriage Decision; Income Taxation; Natural Experiment.

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1 Introduction

A major issue regarding the structure of the tax system is whether progressive, marginal tax rates induce responsiveness in terms of individual behaviors. Let us consider the income tax in that respect: married couples with both an identical total income and number of dependents pay equal taxes regardless of whether the income is earned by one worker or by two, whereas the level of income taxation for cohabiting couples depends on the distribution of earnings in the household. In this context, people's attitudes concerning marriage are bound to be affected by progressive tax schedules. Indeed, marriage subsidies or penalties may well have an impact on the marriage decision, both on its probability and timing.¹ Marriage-related tax advantages and penalties may also affect the labor supply decisions made by married individuals. For example, consider a couple in which only one person (the "primary earner") is currently working (the "secondary earner" in the family is not working). Should that secondary earner start working, then the additional income would be taxed at the marginal tax rate faced by the household on their combined income –this tax rate being likely to be much higher than the one faced by an individual who is considered to be single.

There is a wealth of literature on the impact of the individual income tax upon labor supply decisions.² But less research has been conducted on the impact of the individual income tax upon marriage decisions. In this paper, we investigate the latter issue using a natural experiment in France. A key point of interest for this precise study is that marriage rates are notably low in France: in 1999, 4.9 per 1,000 inhabitants got married in that country³, compared to 5.3 per 1,000 in Spain, 5.1 per 1,000 in the United Kingdom and 8.4 per 1,000 in the United States. In France, the number of marriages per year has plummeted by roughly 25% over the last three decades, while the number of children born out of wedlock has been rising rapidly since the early 1970's, up to over 40% by the end of the 20th century. In fact, declining marriage rates, together with high and rising cohabitation rates can be observed through most of the OECD countries (particularly in Europe). Hence, with high

¹See among others Becker (1991), Sjoquist and Walker (1995), Alm and Whittington (1995b), Alm and Whittington (1995a), Alm and Whittington (1997), Alm and Whittington (1999), and Ellwood (2000).

²See for instance Fortin and Lacroix (2002) for a survey.

³Source: Eurostat.

cohabitation rates, even in the presence of children in these unions, marriage-related penalties may be thought to impact significantly the marriage decision (when many couples may initially be indifferent to the marriage versus cohabitation status).

Furthermore, the French law is moving towards less reliance on marriage certificates by changing its tax laws. For instance, in 1999, a civil pact of solidarity has been instituted by the government in order to draw less distinction based on marital status. In 2002, cohabitant couples bound by this civil contract were taxed as if they had a marriage certificate. The 1995 reform of the family-quotient system corresponds to a similar trend to adapt to changing family structure and to recognize unmarried couples who have children. Indeed, this tax reform essentially created a new category of tax filer, the one-parent family as opposed to cohabitant single with children. More precisely, the French family-quotient system is a splitting of the marital income: the quotient is calculated according to the family type and number of dependent persons. Before 1995, this system granted fiscal allowances to each single parent with children as defined for tax purposes. A key feature of the 1995 reform was that tax allowances aimed at cohabiting couples with children were withdrawn. A consequence of this reform is thus an increase in marriage bonuses: if two adults live in the same residence and one has children, the rules apply regardless of the nature of the relationship, so that they can't benefit from special tax allowances anymore, even if people bond in relationship involving non-biological children. A large effect of the reform on the marriage rate of previously cohabiting couples with children would thus reveal significant optimization behaviors.

In this paper, we will focus on the impact of taxation upon previously cohabiting couples getting married. For this purpose, we will consider the 1995 reform of the family-quotient system as a natural experiment. First, using tax return statistics, we find evidence that tax authorities have managed to track down cohabiting couples with children so that the percentage of taxed unmarried individuals with children increased just after the reform. However, these statistics also reveal that, in a second step, cohabiting couples probably chose to marry to avoid paying taxes. Second, using French employment surveys, we split the population between control and treatment groups. Our preferred strategy to identify the impact of taxation on marriage is to consider taxed or potentially taxed

cohabiting couples with children as the treatment group (those affected by the reform) and untaxed cohabiting couples with children as the control group (those not affected by the reform). By comparing marriage rates changes of these groups, we present direct evidence of wide-ranging effects on marriage decisions. Those results depart from previous empirical evidence, mainly based on US time series, that found marriage penalties only had modest effects, while it is in line with recent studies using micro data that report large and persistent effects upon marriage decisions.⁴

The paper is organized as follows. Section 2 presents a simple framework to analyze income taxation and marriage decisions in France. Section 3 provides a description of the data used in the empirical analysis as well as preliminary evidence on the impact of the 1995 reform. Section 4 introduces the statistical model. Main findings are reported in section 5. Finally, the paper points up conclusions in section 6.

2 Income taxation and marriage decisions

Let us consider a simple framework where a couple aims to minimize income tax. We suppose that the schedule of the income tax is a simple progressive schedule by brackets. In other words, we have an increasing and convex function T of total taxable income per fiscal unit so that the income tax is $I = NT\{Y/N\}$ where N is the number of fiscal units and Y is the family taxable income. In France, in a given household as defined for tax purposes, each spouse counts as one fiscal unit. The first and second children count as half a fiscal unit each, and the third and following ones count as one unit each. Some particularities of the individuals living in the household can entitle tax payers to extra units (handicap, widowhood, etc.). Then, note E the number of units given for the children in the family. The current income tax of the married couple is $I^M = (2 + E)T\{(Y_h + Y_w)/(2 + E)\}$ where Y_h is the husband's earnings and Y_w is the wife's earnings. When electing a separate taxation process for cohabiting couples and assigning children to the husband's tax declaration, the household pays $I^C = (1 + E)T\{Y_h/(1 + E)\} + T\{Y_w\}$. The term $(Y_h + Y_w)/(2 + E)$ is the combination of two terms, $Y_h/(1 + E)$ and Y_w , weighed by weights $1 - \mu$ and μ , with $\mu = 1/(2 + E)$. The convexity of

⁴See for instance the study by Baker, Hanna, and Kantarevic (2004) using Canadian data.

T thus implies that $T\{(Y_h + Y_w)/(2 + E)\} \leq (1 - \mu)T\{Y_h/(1 + E)\} + \mu T\{Y_w\}$. Hence $I^M \leq I^C$ in any case: there is a positive fiscal gain for the couple to be married. This gain is nil ($I^M = I^C$) when $Y_h = (1 + E)Y_w$, or, symmetrically, when $Y_w = (1 + E)Y_h$.

Hence, in this framework, married couples benefit more from the family- (or conjugal-) quotient system, all the more so when there is a big gap in earnings between the members of the couple. Now, in presence of children, tax calculation changes. For a couple with one child, the family-quotient system no longer favors the pattern of earnings discrepancy within the couple: if the couple gets married, the benefit is nil when the first earner's income is 50% higher than that of the secondary earner. For a couple with two children, marriage entails no financial gain when the first earner's income is twice as big as that of the secondary earner, etc..

For instance, simulating the income tax by integrating other special allowances (like the tax collection threshold or the "*décote*" rebate mechanism⁵), we find that a couple with two children whose annual income is roughly 30,000€ is penalized by the marriage status when the first earner earns twice as much as the secondary earner. The penalty makes up for 2% of the total income. On the other hand, the fiscal benefit of marriage for a one-earner couple without children with an annual income of 30,000€ amounts to 7% of the total income; this gain would nullify when the two earners earn the same.⁶ By comparison with the previous figures, Alm, Dickert-Conlin, and Whittington (1999) ranged marriage penalties and benefits for American citizens as a proportion of their disposable income –between a 4% penalty for a couple with one wage-earner and a 3% benefit for a two earners' family.

Consider now that cohabitants with children get an extra half fiscal unit, so that $I^C = (1.5 + E)T\{Y_h/(1.5 + E)\} + T\{Y_w\}$. Then, those couples are indifferent to marriage when $Y_h = (3 + 2E)Y_w$. If that condition does not hold anymore –i.e. if the extra half unit is withdrawn– then it would be to their advantage to be married. This is typically what happened in France in 1995 when the family-quotient system was reformed and the definition of the family-quotient changed: before 1995, that

⁵This mechanism was set up so that a minimum wage earner who is single may not be liable to the income tax. The rebate favors cohabiting couples since it is calculated in relation to the global household's income: hence, a minimum wage earner who is single can enjoy it, but not a married couple made up of two minimum wage earners.

⁶See Buffeteau and Echevin (2003) for more figures.

system granted one extra half unit to each single parent with children as defined for tax purposes. A couple with two children could thus be granted 4 family-quotient units if cohabiting (and each cohabitant single declares one child), but only 3 if married (see Table 1). Since the tax-related gain increased with the number of units in connection with the family-quotient, the pre-reform situation could entail substantial penalties for couples with children if they were married. The 1995 family-quotient reform withdrew this advantage by introducing the notion of one-parent family in the tax declaration. This measure thus made up for the penalty that married couples with children used to face, but nothing changed for married couples without children.

Whatever the number of children, this reform entails a rise of the income tax for cohabiting couples and a greater benefit in connection with the married status. For example, consider a couple with two children whose annual income amounts to 40,000€, the penalty resulting from the married status (estimated at 3% of the total income before the reform) were nullified by the reform. The income tax rises by about 1,000€ when this couple is not married, that is a near 50% rise.⁷ These theoretical results are slightly altered when taking into account some distinctive features of the French tax system.⁸

As a result, the simple framework presented above illustrates that cohabitation-related allowances may influence people's decision to not get married. A reform withdrawing such allowances may thus favor pro-marriage behaviors.⁹

⁷We assume for these calculations that cohabiting couples assign their children to one or the other of the parents' tax declaration so as to lessen the household's global taxation, which appears to be an acceptable proxy.

⁸Using a micro-simulation model, Echevin (2003) estimates the proportion of married couples who enjoy a tax benefit in France because of their marital status (averaging 1,080€ per year) at roughly 46%, while 22% of married couples are found to be penalized by marriage with an average 185€ penalty per year. By comparison, Feenberg and Rosen (1995) estimated that, in 1994, 52% of American couples paid an average marriage tax of \$1,244; 38% had an average marriage benefit of \$1,399. Alm and Whittington (1996) found with other data that 57% of married couples paid an average marriage penalty of \$1,200, and that 30% received an average marriage benefit of \$1,100. These figures show how low the marriage tax is in France (the average marriage tax in absolute value being one-sixth as great as the average marriage benefit, whereas in the United States the marriage tax and the marriage benefit were approximately equal in the 1990's). The proportion of couples who lose out because of their married status is thus more than twice as high in the United States as in France.

⁹Note that there are some reasons to believe that a reform going the opposite way (i.e. subsidizing marriage starting from neutrality instead of withdrawing marriage penalty) would have had the same effects. Indeed, in order to generalize the above result, we can simply consider that $Y_h = kY_w$, with k being the ratio of the husband's earnings to the wife's earnings. Then, adding some extra fiscal units when married (noted m) and when cohabiting (noted c), rewriting the neutrality condition and deriving according to k , we obtain a first-order condition $T'\{(1+k)Y_w/(2+E+m)\} - T'\{kY_w/(1+E+c)\} = 0$. So that the neutrality condition holds when $k = (1+E+c)/(1+m-c)$; then increasing

3 Data and preliminary evidences

In this section, we present data from various statistical sources which document the impact of the 1995 reform. In the perspective of section 2, we use, on the one hand, tax return statistics to show the increase of the percentage of households with a positive income tax among unmarried individuals just after the reform. We also find evidence that the number of newly taxed households has been limited by marriage strategies. On the other hand, we use employment surveys in order to complement this first set of evidence concerning the impact of the 1995 reform on marriage.

3.1 Fiscal trends

In 2002, out of 32 million tax units, 20 million consisted of single persons and 12 million of married couples.¹⁰ Among unmarried individuals, a third actually consisted of unregistered domestic partners¹¹ living together but reporting their income separately.

Using cross section data from income tax return statistics, we draw the changes in the percentage of taxed households.¹² As shown in Figure 1, half of the population is taxed in France and this figure is quite stable throughout the period considered. Splitting tax units into different groups, according to marital status and to the presence of children in the household, we show that the percentage of taxed households among unmarried individuals with children (either cohabitant or single¹³) sharply rose between 1994 and 1995 from 32.3% to 39.3%. Keeping in mind that taxes are collected in the year after income has been earned, these figures can be interpreted as revealing the impact of the 1995/96

m generates neutrality for couples' earnings corresponding to a lower ratio *k* and will increase marriage benefits for those above.

¹⁰Calculations performed on a representative sample of 500,000 income tax returns for 2002. Source: French National Revenue Service (DGI).

¹¹The proportion of tax units consisting of partners in registered civil unions (PACS), who are dealt with the same way as married couples for income tax purposes, is not believed to exceed 0.1%.

¹²These annual tabulations were first used for economic studies purposes in France by Piketty (1999) (see also Piketty (1998) for a more extended version of this work) in order to exploit a number of changes in the family-quotient system that were implemented during the 1980's–1990's. Piketty (1999) produced some tax return data showing that the number of single taxpayers benefiting from one full unit for their first child declined sharply after the 1995 reform. This *per se* should not be interpreted in terms of marriage behavior; what it shows is that tax authorities have managed to track down cohabiting couples, to tell them apart from truly single parents.

¹³Note that the distinction between both types of households as defined for tax purposes can't be made on the basis of tax return statistics before 1995.

reform on income taxation. Other groups didn't register such an increase in the percentage of taxed households.

Another interesting result drawn from the tax return statistics is the increase in the percentage of married couples with children among untaxed married couples. According to Figure 2 this population had increased by about 4.5 percentage points two years after the reform. One possible explanation for this delay is that, though the reform had an immediate impact on marriage in 1996, couples may not have had time to split their income in an optimal way right away. Indeed, a distinctive characteristic of the French income tax system is that marriage allows optimal declared income splitting when it is effective approximately in the middle of the year, so that the three tax declarations (one for each cohabitant during the first period of the year and one for the married couple over the other period of the year) can minimize taxes. Furthermore, income declarations that only concern one period of the year are recorded in tax return statistics just like other declarations; so that could be another reason why no change can be observed in 1996 concerning tax return statistics.

Nevertheless, analyzing Figure 1 again, a slight decrease in the percentage of unmarried and taxed tax units with children can be observed the year following the reform, though the gap between the percentage of taxed married couples with children and the common trend can be detected only in 1997.

3.2 Selecting control and treatment groups

3.2.1 Using employment surveys

Income tax return statistics can hardly be used on their own to observe cohabitant couples over time or to estimate their marriage rates. Hence, other data sources should be used in order to estimate the marriage trends of previously cohabiting couples. For instance, studying demographic data clearly shows that the rate of marriages which legitimate children born out of wedlock¹⁴ has increased more sharply after the 1995 reform (see Figure 3). The sudden break in trend clearly shows that marriage

¹⁴Note that children are automatically legitimated when born in wedlock, but not out of wedlock, although the proportion of children acknowledged by their father either automatically in the marriage or by registration at birth has been very stable over the century, at around 95%.

rate were impacted right around the time of the reform (the marriage rate rose by about 5 percentage points between 1995 and 1996). However, in order to measure more precisely the impact of the reform, we would need to tell taxed from untaxed couples in the sample. For that purpose, the data used in the analysis are drawn from the French employment survey (FES). During the 1990's, approximately 70,000 households were surveyed every year over three consecutive years. Information on marital status, age, education, family composition as well as earnings and labor market involvement are available (see Table 2). Furthermore, the survey has a panel structure that can be used to study the dynamics of marriage. Indeed, one third of the households is replaced every year so that three years of the family's history can be tracked. For the purpose of our analysis, we first rule out households whose head or cohabitant is either over 60 years old, or a student or self-employed person. Secondly, we keep individuals that were cohabitants one year, and either unmarried or married the subsequent year.

3.2.2 Estimating the fiscal status of cohabiting couples

Using data available in the employment survey on individual earnings as well as on the number of dependent children in the household, we construct a dummy variable whose value is 1 if the household is taxed and 0 otherwise. To do so, we suppose that unmarried individuals declare children in order to minimize the overall household income tax. Figure 4 then reports trends of the percentage of taxed couples or potentially taxed couples among cohabitant couples with or without children in the 1990's. Potentially taxed cohabitant couples with children are couples who would have been taxed if they didn't benefit from the one extra half fiscal unit for single parents. It is clearly shown that the reform has increased the percentage of taxed individuals with children (by about 15 percentage points) as previously noticed with income tax statistics, whereas the percentage of taxed individuals without children has practically not changed during that period.

Using matched employment survey-tax return data sets available in France since 1996 enables us to check the accuracy of those figures. With these 1996-2000 data sets, our predictions for the fiscal status of cohabiting couples can be compared with their tax declarations. As a result, our predictions

prove to be accurate for almost three quarters of the couples (75% among taxed cohabiting couples and 70% among untaxed cohabiting couples). Such differences can be accounted for in a few ways. First, earnings are used to predict the fiscal status of couples, and other income sources may have to be taken into account. However, when predicting the income tax from the household's taxable income as it is reported in tax declarations, significant gaps still appear between the predicted and the reported income taxes for 20% of cohabiting couples with children. Secondly, an alternative explanation may reside in optimization errors stemming from various sources of inefficiency (non-cooperation, lack of information, etc.) or simply from the presence of 'natural' children in reconstituted families; in that case, children cannot be allocated to one of their parents unless they are related to them biologically. Additional information provided by the French Family Survey matched with the French 1990 Census data show that almost 20% of cohabiting couples with children were faced with this dilemma.

According to our predictions, 58% of cohabiting couples should be taxed, while 62% actually are when checking their tax declarations. Non-optimization behaviors and other unobservable constraints for the couples may account for this slight gap: under certain circumstances, individuals don't have the ability to minimize their income tax. In particular, as the data do not inform us on biological links between adults and children, we were not able to correct for this potential bias in our estimates. Should this approximation have important consequences for our study? We don't think so since some of the cohabiting couples that we classified as non taxpayers erroneously might not be affected by the 1995 tax reform. Indeed, for instance, it may not be more beneficial after the reform to get married for couples with children who are biologically linked to the secondary earner in the family. The reason is that when these cohabiting couples are taxed because the primary earner is taxed, whereas the secondary earner is not, with or without tax allowances, no change in their fiscal status should be observed as an extra half tax unit is of no significance to them. For such couples, the reform doesn't change the neutrality condition regarding marriage. In the context of a quasi-experimental design such as the one we describe subsequently, those couples should thus be classified in the control group –composed of the couples whose income tax does not change with the reform.

3.2.3 Splitting the population between control and treatment groups

Employment survey data sets enable us to draw marriage rates –defined as the percentage of cohabitant couples in a given year who get married during the following year– for different groups of individuals. We split the population into various groups: first, those with children who were "taxed", including people who would have been taxed if they hadn't benefited from the extra half fiscal unit dedicated to single parents with children (potentially taxed couples), so that individuals in this group are typically those concerned by the reform (treatment group T); second, those without children who were taxed (control group C1); third, those with children who weren't taxed (control group C2), and finally those without children who weren't taxed (control group C3).

In practice, the use of those various control groups can be a problem as they could be affected by the 1995 reform. First, cohabiting couples without children can be taken as control groups (groups C1 and C3), and they may plan to have children in the future. Hence, on the one hand, with the withdrawal of the marriage tax penalty for a couple with children in mind, they might choose to get married right away. On the other hand, the reform may have an impact on their fertility schedule. People may indeed prorate their decision to have children in connection with the withdrawal of fiscal allowances. Hence, control group and treatment group memberships may be altered in response to the reform. This is why unmarried couples without children (especially when they are taxed) cannot be used as a reliable control group for a difference-in-differences estimation here. As their marriage or fertility behaviors may be affected by the reform, the estimates would probably be biased downward.

Secondly, a more accurate control group is the group of untaxed unmarried couples with children (group C2). It is indeed not directly affected by the 1995 reform. What is more, comparing taxed (or potentially taxed) individuals with children and untaxed individuals with children should also control for the potential impact of the reform upon fertility –since individuals won't move from the control group to the treatment group even in presence of fertility response to the reform.

Finally, Figure 4 shows that the percentage of taxed or potentially taxed households among cohabiting couples with children (dashed line) has changed over the period considered. However, it appears that this trend is insensitive to the family-quotient reform and evolves in the same direction as the one

concerning the cohabiting couples without children.

3.3 Preliminary evidences

Figures 5 and 6 illustrate the effect of the 1995 reform. The hypothesis is that people became untaxed or reduced their income tax through marriage after the reform. The prima facie evidence supports this, as the gap in marriage rates between taxed and untaxed status is larger after 95-96. Furthermore, the gap in marriage rates is larger for younger age groups and for less educated couples. This is intuitively explainable since, on the one hand, some of the younger cohabitant couples may have delayed their decision to get married and, with the withdrawal of the marriage penalty, it would be much to their advantage over their life span to get married now, more than it would be to older couples. On the other hand, although marriage-related fiscal gains should be lower for less educated cohabitant couples in comparison with more educated ones, other characteristics associated with lower educated groups – such as having more children– may influence their decision. And indeed, having more children seems to enhance the effect of the reform: in particular, having two children or more before the reform granted the couple one extra fiscal unit, whereas having one child only granted one extra half fiscal unit. As the marriage penalty increases with the number of extra fiscal units, withdrawing those fiscal allowances should have more impact on the marriage decision of couples with more children. Finally, as expected, the bigger the gap between spouses' earnings, the greater the impact of the reform.

4 Statistical model

The difference-in-differences estimates of the impact of the 1995 fiscal reform upon marriage-related behaviors as well as standard errors for these estimates are derived from regressions conducted on individuals within treatment and control groups over several years preceding and following the reform.

Formally, the population of unmarried individuals is divided into two groups: the control group includes untaxed couples with children before they get married or not (they were unmarried in $t - 1$ and either unmarried or married in t), and the treatment group includes those with children before

they got married, either taxed or potentially taxed if they didn't benefit from the one extra half fiscal unit for single parents (group T). Assume that individual i experiences marriage at t if:

$$m_i^*(t) = \alpha + \alpha_T \mathbf{1}[i \in T] + \alpha_R \mathbf{1}[t \in R] + \alpha_{TR} \mathbf{1}[i \in T] \mathbf{1}[t \in R] + z_i(t)\beta + \mathbf{1}[i \in T]z_i(t)\beta_T + \epsilon_i(t) > 0.$$

In this equation, $m_i^*(t)$ is a latent variable for the decision to get married and $\mathbf{1}[i \in T]$ is a dummy variable equal to one when the individual is taxed (or potentially taxed), that is when she/he belongs to the treatment group. $\mathbf{1}[t \in R]$ is a dummy variable for the post-reform period. The parameters α and α_T measure the control and treatment groups' invariant specific effects. The parameter α_R allows for a post-reform shift in the marriage rate that is common to both treatment and control groups. Furthermore, the impact of the reform on the marriage-related behavior of the treatment group, which is given by α_{TR} , is provided by the parameter associated with the interaction term between the post-reform and the treatment group dummy variables, $\mathbf{1}[i \in T] \mathbf{1}[t \in R]$. We thus suppose that the reform has no effect on the control groups. This parameter can be interpreted as a change in the post-reform marriage rate of the treatment group –and controlling for the explanatory variables included in the vector $z_i(t)$. Since the individuals in the treatment group can differ from those in the control groups in terms of age or education, $z_i(t)$ includes age and its square, as well as education and its square as covariates. The education variable is the number of completed years of schooling. The parameters β and β_T allow for the specific effects of the independent variables upon the control and treatment groups. Other factors not considered in the analysis are supposed to affect both groups similarly. The $\epsilon_i(t)$'s is an i.i.d. random variable with zero mean reflecting individual unobserved heterogeneity.

According to standard economic theory, the marriage rate is expected to rise with an increase in marriage subsidies (or a decrease in out of wedlock cohabitation subsidies). Therefore, parameter α_{TR} in the previous equation should be positive. However, one consequence of the fiscal reform considered is that "truly" single parents may have delayed their choice to cohabit and then to marry. That represents one possible negative effect of the reform upon marriage, though it is not formally assessed in this paper. Incentives to evade or avoid taxes could also be impacted by the reform.

5 Results

5.1 Estimating heterogenous effects of the reform on marriage

Following the main lines of our strategy as described in the previous section, table 3 presents difference-in-differences estimates concerning the impact of the marriage-related reform for different categories of couples. Our findings are as follows.

The marginal effects of the reform on the probability of marriage are presented in the first column. The treatment group includes taxed (or potentially taxed if tax allowances to single parents were canceled) cohabitant couples with children who were unmarried in $t - 1$ and either unmarried or married in t . The control group includes untaxed cohabitant couples. Other variables (age, age squared, education, education squared, for both spouses, a constant variable, the number of children, and all those variables crossed with the post reform dummy) are added to the regressions but are not reported in the tables.

Various groups of couples are considered according to spouses' age, education or the number of children. As a result, we show that, overall, the marginal effect of the reform on the marriage of cohabiting couples with children is estimated at around 3 percentage points.

We then turn to the estimation of the impact of the reform on marriage for different groups. We find a negative and significant marginal effect of around 5 percentage points for younger couples (less than 40 years old) but no effect for older ones (40 years old and over). Among younger couples, we find a large and significant effect of around 15 percentage points when the woman has less than 12 years of schooling and the man has at least 12 years of schooling. Education, and thus earnings discrepancies may indeed increase the marriage bonus for those couples. Furthermore, young cohabitant couples with 2 children or more –the marginal effect of the reform being of around 9 percentage points– seem to have been more reactive to the reform than couples with only one child.

In order to check for the robustness of these results, we run an ordinary least square version of the difference-in-differences regression in which the dependent variable is the dummy related to whether the couple gets married or not. Indeed, the identification of the probit model is dependent on the

assumed functional form for the error term. The functional form may thus impact the identification of the effect on marriage. Table 3 then reports OLS estimates for the effect of the reform on marriage for various types of households. As a result, we find very comparable estimates to the ones obtained from the probit model.

5.2 Tax evasion

As shown further up, the percentage of taxed households among unmarried individuals with children sharply rose in the year of the reform. Though previous results corroborate the idea that tax authorities have managed to track down cohabiting couples, as opposed to true single parents, some may still have managed to avoid the tax.

Using matched employment survey-tax return data sets, it is possible to check whether one part of the story has been overlooked, and how significant this may be. Figure 7 shows that the percentage of ‘falsely’ one-parent families (those who were declared as isolated parents with children though actually cohabiting) amounts to 3% to 4% of overall cohabiting individuals with children after the reform. Those figures are lower than the percentage of cohabitants that were getting married because of the reform, though it can’t be considered as totally marginal. Note also that those ‘false’ one-parent families were more numerous among divorced or widowed cohabitants with children (around 10%) since it is likely that those people were less enticed to marry ‘again’. Moreover, the percentage of ‘false’ one-parent families among cohabitants with children increased until 1998 and then decreased slightly.

6 Conclusion

This paper aims to exploit the 1995 reform in the French tax code to estimate the impact of financial incentives on the probability of marriage of previously cohabiting couples with children. The 1995 reform basically raised the amount of taxes paid by cohabiting couples with children (all the more so for couples with unequal earnings), without affecting the amount of taxes paid either by cohabiting

couples without children, or by married couples (with or without children). Therefore, the prediction is simply that marriage rates should suddenly increase after 1995 for cohabiting couples with children (all the more so for couples with unequal earnings), and not for cohabiting couples without children.

The identification strategy used is straightforward. Unmarried couples with children who were taxed (or potentially taxed if they didn't benefit from tax allowances) are defined as the treatment group, whereas unmarried couples with children who were not taxed are defined as the control group. First, using the panel structure of the French employment survey, we find a neat increase in the marriage rate differential between treatment and control groups, especially for younger couples (under 40 years old). Second, turning to probit estimates for marriage and adding several controls, we find that the probability of marriage has increased by about 5 percentage points for young cohabitant couples with children, and by about 9 to 15 percentage points when focusing on those with 2 children or more or on those made up of a less educated woman and a higher-educated man. The effect of the reform thus proves to be large and robust for those couples.

Hence, this paper illustrates how tax policy can impact household decisions through measures targeted at specific groups of people –married or unmarried couples. In particular, the family-based and progressive tax system appears to be non neutral in terms of marriage behaviors. Marriage was indeed a good means for the French tax payers to lower their income tax. Tax evasion should not be underestimated either. As a consequence, the impact of a change in marginal tax rates upon labor supply were probably lowered. The impact of the reform on fertility should also be considered as being of second order, though it may appear in the longer run. However, as few empirical studies have found so far that tax incentives had an impact on fertility in France, further works should focus on this other crucial dimension of family formation.

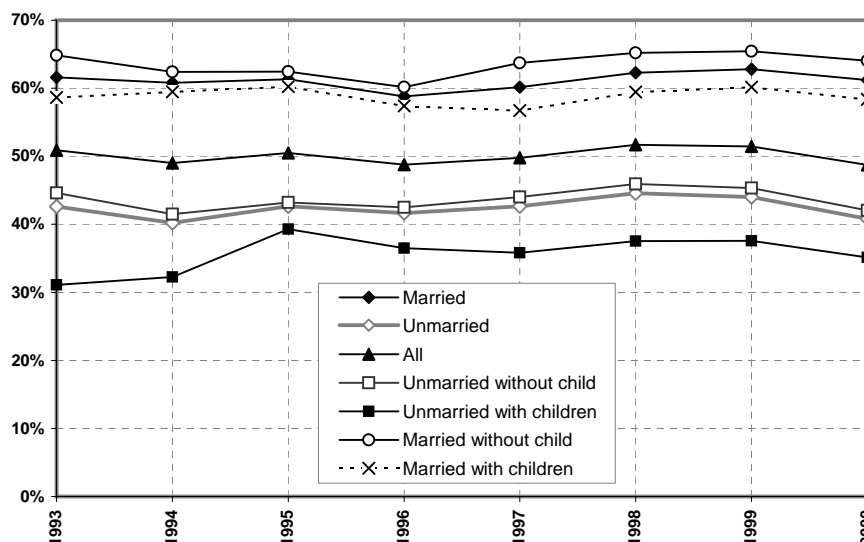
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Table 1: Family-quotient units before and after the 1995 reform

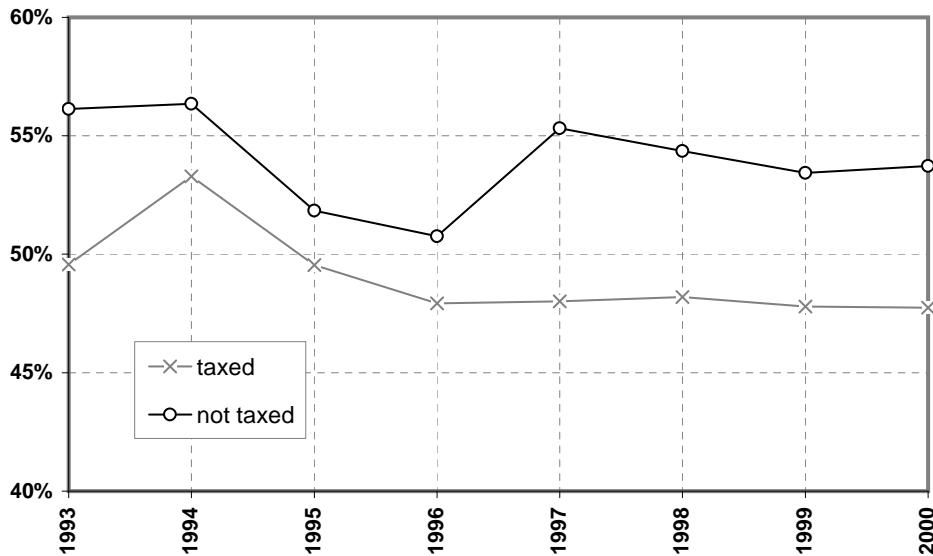
Number of children in charge	Married couple	Single		
		Cohabitant single		Isolated single
		Before the reform	After the reform	
Without child	2	1	1	1
One child	2.5	2	1.5	2
Two children	3	2.5	2	2.5
Three children	4	3.5	3	3.5
Four children	5	4.5	4	4.5

Figure 1: Percentage of taxed households



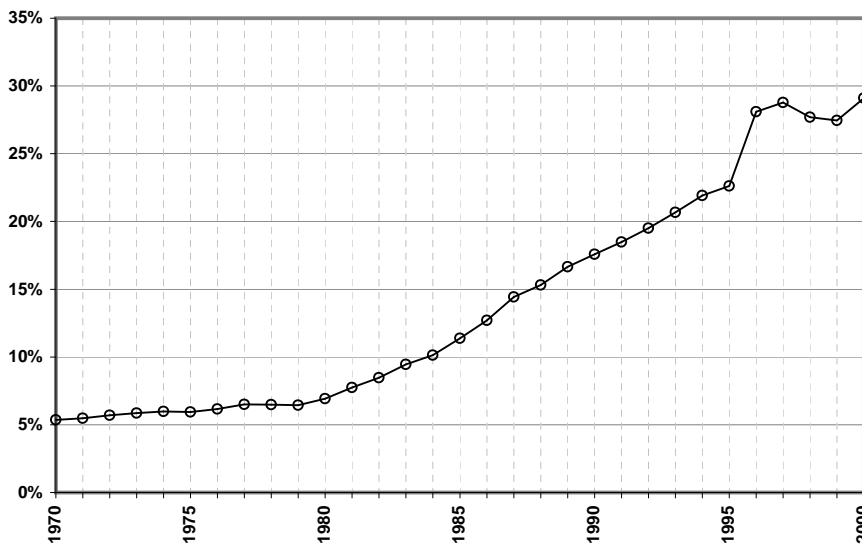
Sources: Authors' own computations using DGI sample. **Notes:** The percentage of taxed households has been computed for different groups of people using French Revenue Service (DGI) micro-data files (so called DGI sample) that have been extracted from the exhaustive population of income tax return from 1993 to 2000. Tax return data show that the percentage of taxed unmarried individuals (either cohabitants or singles) with children has increased sharply between 1994 and 1995 by about 7 points.

Figure 2: Percentage of households with children among married couples



Sources: Authors' own computations using DGI sample. **Notes:** Tax returns statistics show that the percentage of untaxed married couples with children among the untaxed married couples increased between 1996 and 1997 from 50.8% to 55.3%, whereas the percentage of taxed married couples with children among the taxed married couples did not. This illustrates how those people have possibly escaped taxation by marrying.

Figure 3: Marriage rate legitimating children



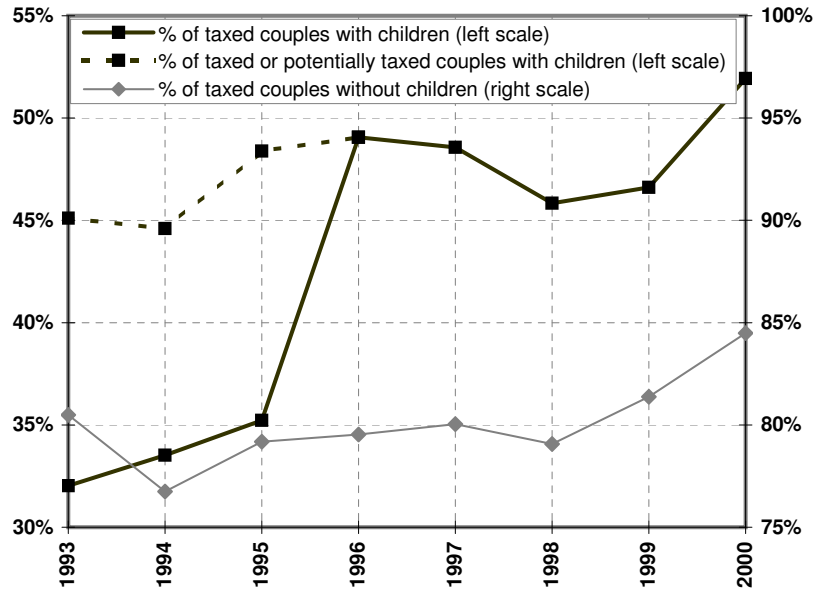
Sources: Demographic database. **Notes:** The marriage rate legitimating children is the ratio of the number of marriages legitimating children on the total number of marriages. Between 1995 and 1996, that rate passed from 22.6% to 28.1% that can be explained by an increase of more than 35% of the number of marriages legitimating children, that were around 21,000 marriages more.

Table 2: Descriptive statistics (mean values) – cohabitant couples

	1993	1994	1995	1996	1997	1998	1999	2000
Age (women)	31.2	31.6	31.9	32.1	32.0	32.5	32.8	32.8
Age (men)	33.0	33.4	33.5	33.7	33.9	34.2	34.5	34.8
Years of schooling (women)	18.5	18.7	18.8	19.0	19.0	19.1	19.3	19.4
Years of schooling (men)	18.1	18.4	18.4	18.5	18.5	18.6	18.8	18.9
Employment rate (women)	0.655	0.659	0.654	0.658	0.659	0.648	0.672	0.698
Employment rate (men)	0.822	0.808	0.826	0.817	0.827	0.833	0.836	0.863
Monthly earnings (women)*	871.9	832.1	1024.9	1053.1	1020.6	986.4	987.9	976.3
Monthly earnings (men)*	1221.6	1286.3	1319.2	1306.1	1518.8	1214.0	1254.6	1270.9
Ratio min/max earnings	0.408	0.356	0.392	0.395	0.404	0.399	0.416	0.431
Total monthly earnings	1676.7	1793.8	1827.1	1839.2	2186.9	1750.0	1786.9	1869.1
Children before marriage	0.432	0.438	0.447	0.467	0.480	0.490	0.490	0.492
Number of children**	1.678	1.673	1.608	1.627	1.671	1.681	1.679	1.669
Get married	0.556	0.623	0.630	0.655	0.599	0.608	0.542	0.588
Taxed	0.652	0.627	0.654	0.653	0.649	0.628	0.643	0.685
N	3112	3532	3404	3451	3467	3644	3716	3760

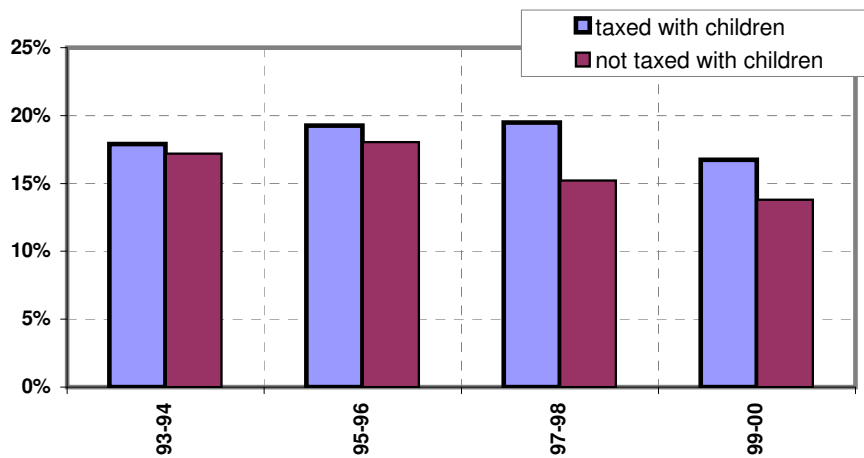
Sources: Authors' own computations using FES. **Notes:** *Employed persons only. In euros. **Among couples with children.

Figure 4: Percentage of taxed (or potentially taxed) couples among cohabiting couples



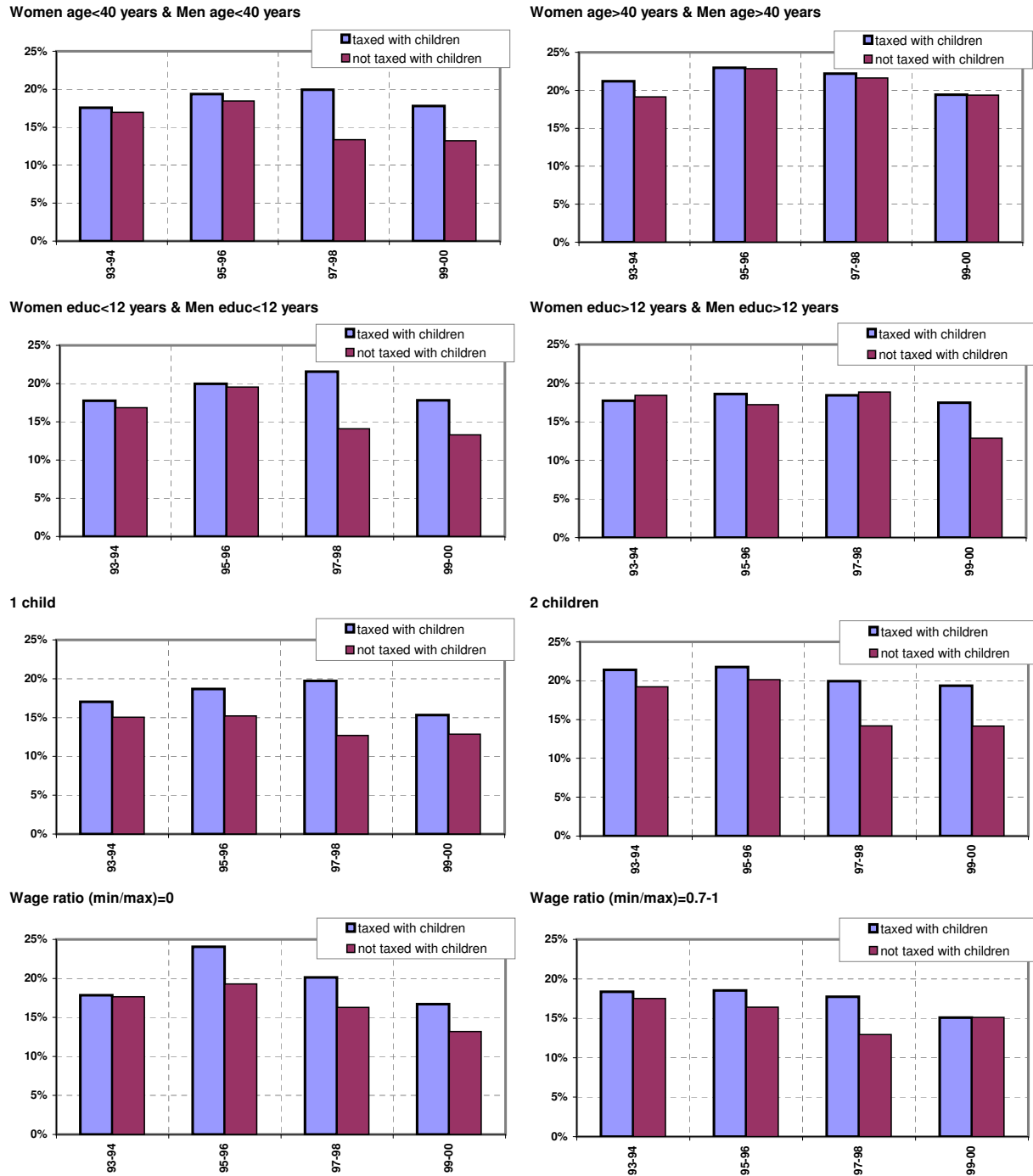
Sources: Authors' own computations using FES. **Notes:** Dummy variable whose value is 1 if taxed and 0 otherwise is constructed using data available on household earnings and the number of dependent children in the household. Potentially taxed cohabitant couples with children are couples who would have been taxed if they didn't benefit from the one extra half fiscal unit for single parents.

Figure 5: Marriage rate of cohabiting couples



Sources: Authors' own computations using FES. **Notes:** The marriage rate is the proportion of individuals who get married during the year among people who were cohabitant the previous year.

Figure 6: Marriage rate of cohabiting couples according to spouses' age, years of schooling, number of children and by earnings ratio



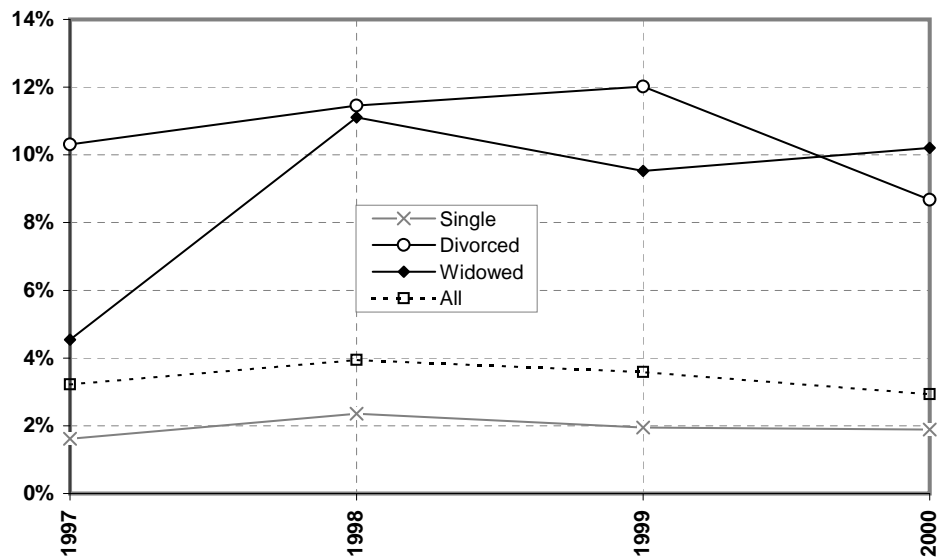
Sources: Authors' own computations using FES. **Notes:** The marriage rate is the proportion of individuals who get married during the year among people who were cohabitant the previous year.

Table 3: Probit and OLS regressions estimates of the impact of the reform

	Probit marginal effect	<i>PseudoR</i> ²	OLS coefficient	<i>R</i> ²	<i>Sample size</i>
Overall	.0327** <i>.0161</i>	.0065	.0319** <i>.0159</i>	.0065	11530
Age					
Both spouses < 40	.0495** <i>.0197</i>	.0088	.0473** <i>.0190</i>	.0085	7915
At least one spouse = 40	-.0043 <i>.0290</i>	.0120	-.0017 <i>.0297</i>	.0119	3615
Years of schooling					
Woman < 12 and Man < 12	.0604 <i>.0460</i>	.0157	.0381 <i>.0324</i>	.0156	3337
Woman < 12 and Man = 12	.1503** <i>.0650</i>	.0282	.0920** <i>.0467</i>	.0187	1496
Woman = 12 and Man < 12	.0148 <i>.0397</i>	.0251	-.0030 <i>.0342</i>	.1519	2479
Woman = 12 and Man = 12	.0385 <i>.0333</i>	.0152	.0300 <i>.0301</i>	.0100	4218
Number of children					
1 child	.0258 <i>.0251</i>	.0056	.0130 <i>.0214</i>	.0048	6127
More than 2 children	.0881** <i>.0365</i>	.0162	.0428* <i>.0262</i>	.0108	5403
<i>Among less than 40 years old cohabitants</i>					
Years of schooling					
Woman < 12 and Man < 12	.0604 <i>.0460</i>	.0157	.0567 <i>.0412</i>	.0144	2033
Woman < 12 and Man = 12	.1503** <i>.0650</i>	.0282	.1293** <i>.0565</i>	.0247	1031
Woman = 12 and Man < 12	.0148 <i>.0397</i>	.0251	.0159 <i>.0405</i>	.0255	1782
Woman = 12 and Man = 12	.0385 <i>.0333</i>	.0152	.0394 <i>.0339</i>	.0144	3069
Number of children					
1 child	.0258 <i>.0251</i>	.0056	.0229 <i>.0247</i>	.0049	4438
More than 2 children	.0881** <i>.0365</i>	.0162	.0837** <i>.0340</i>	.0164	3477

Sources: Authors' own computations using FES. **Notes:** Probit and OLS estimates of the effect of the reform are reported with standard error in italic that is robust to heteroscedasticity. Two levels of significativity are indicated: ** when significant at 5% level; * when significant at 10% level. Estimates concern cohabitant couples with children, under 60 years old, and neither students nor self-employed. Marriage variable is coded 1 if married, 0 otherwise. Tax variable is coded 1 if taxed or would be taxed if the couple didn't benefit from the extra half unit for dependent children, 0 otherwise. Other added variables not reported in the tables are Age, Age squared, Years of schooling, Years of schooling squared for each spouse, the number of children and all those variables crossed with the tax dummy.

Figure 7: Percentage of ‘falsely’ one-parent families among cohabitants with children



Sources: Authors’ own computations using matched employment survey-tax returns micro data files. **Notes:** ‘False’ one-parent families are individuals who were declared as isolated parents with children for tax purpose though actually cohabit with someone else. The percentage of ‘falsely’ one-parent families among cohabiting individuals with children is obtained from the comparison of the situation of the household as given in the employment survey and the situation of the household as defined for tax purpose.