Would you civil union me?

Did the reform of income taxation boost civil union in France?

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Abstract

Why, how and when couples get married? Maybe love is a key determinant but economic factors could also explain part of the decision to marry. The tax system is not marriage neutral in France, it has been found slightly significant in determining marriage decision (Buffeteau and Echevin, 2003). But in France, couples also have to decide how to get married. Indeed, the pacs was created in 1999. It is a new legal form of union, more flexible than marriage. As for the marriage, the tax system is not pacs-neutral. The taxation of pacsed partners changed in 2005. Before the reform, the amount of tax paid the year the pacs is contracted did not depend on the day it was contracted. After the reform, the amount of tax paid depends on the day the pacs is contracted. I study the reform of taxation of pacsed couples in 2005 using difference in difference methods on aggregated data on the number of pacs contracted by court in France. I propose an original method to disentangle incentive impact of the reform from the change in the seasonality of contracted pacs. I find that taxation have two different effects on pacs decision. First it has an increasing incentive impact: fiscal reasons did not motivate additional pacs right after the reform but it motivated 16-20% of pacs contracted in 2009. Second, it changes when couples contract a pacs: 5%-10% changed their pacs day to benefit more from the reform taxation. I don't find any significant impact of taxation on the decision to break up a pacs.

Keywords : civil union, taxation, marriage, pacs, difference in difference

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1 Introduction

Marriage markets have changed a lot since Becker's seminal theory of marriage (1973; 1981). Both in the US and in the Western Europe, the most notable changes are the increasing divorce rate and the decreasing marriage rate. These changes tend to show that marriage is no longer a cohabitation contract that goes without saying. Today, why and when couples get married is a choice.

In a classic cost/benefit framework, couples decide to marry if their utility when married is greater than when cohabiting. Therefore, an attractive taxation for married couples should marginally impacts the marriage rate: the more benefic the taxation of married couples, the higher the marriage rate. In the analysis of the marriage contracts proposed by Matouschek and Rasul (2008), an attractive taxation of married couples can be considered as an exogenous benefit given to married couples. They show that it should increase the marriage rate, through an increase of low quality couples' marriage. But if the cost of marriage is high, the elasticity of marriage to taxation could be low. Therefore, examining the link between marriage and taxation is an empirical question.

The empirical literature tends to support the idea that taxation slightly impacts marriage rates. Papers by Alm and Whittington (1995; 1999) show that if significant, the impact of taxation on marriage rate is small in the US. They use the heterogeneity of the 'marriage penalty' in the US to identify the effect. However, the variations of 'marriage penalty' are not very important, weakening the identification strategy. In France, Buffeteau and Echevin (2003) study the impact of the reform of taxation for cohabiting couples with children in 1995. They show that couples are sensitive to taxation: the probability of marriage has increased by about 5 points for young cohabitant couples with children.

Maybe couples do not react much to fiscal incentives because the cost of marriage are high compare to the fiscal benefit[1]. In particular, the symbolic cost of marriage is still high in France and the cost of divorce is still important. In that case, what would happen if marriage was less symbolic and divorce less costly? It would change the overall cost of marriage: by changing the balance between costs and benefits, it could change the incentive to react to the benefits of marriage.

In France, different-sex couples can choose between two kind of marital contracts. The pacs[2] was created the November 15^{th}, 1999. It aimed at giving same-sex couples a marital contract as same-sex couples can not marry in France. It was the consequence of one year of very tense debates. It was made as a median way between cohabitation and marriage. It gives more rights and duties to the partners than cohabitation but less than marriage (Waaldijk, 2005). Especially, one important

[1] There is no 'unilateral divorce' in France.

[2] Pacs stands for *Pacte Civil de Solidarité*, Civil Pact of Solidarity.

difference is that it is easier to break up a pacs than a marriage and that it is less symbolic: pacs are contracted at a court and marriage at the town hall. Other differences (debt, survivor's pension, adoption, citizenship) are summarized in table 1. Since it was created, the pacs had been popular among both different-sex and same-sex couples: the number of pacs contracted increased from 20,000 in 2000 to 172,000 in 2009[3] (excluding overseas *départements*). The pacs has been modified twice since it was created. Income taxation was different for pacsed partners compared to married partners, it has been reformed in 2004 and taxation of pacsed couples had been made similar to income taxation of married couples. In 2006, rights and duties of pacsed partners changed and the pacs became a more binding contract, although it is still not as binding as marriage is because it is easier to break than a marriage. The increasing number of pacs has been largely attributed to the benefic taxation of pacsed couples, although this idea has not been verified.

In France, the tax system takes into account the size of the household (including children) but tax units are defined by the matrimonial status. Cohabiting couples have to fill two separate tax returns, and pacsed and married can declare jointly their income so they fill only one tax return. This system of joint taxation of married/pacsed couples makes them pay less taxes, especially if the difference between the spouses' incomes is large. The year of the marriage/pacs, couples have to fill three tax returns: each spouse fills its own to declare the income earned before the marriage, and they jointly fill one for the incomes earned after the marriage. This system leads to large gain on taxes for couples, especially if they marry/pacs in the middle of the year. Therefore, it divides the year between an attractive part and an unattractive part to contract a pacs. The goal of the paper is to test the idea that taxation boosted pacs rates. For that purpose I analyze the 2005 reform of taxation of pacsed couples. Before 2005, pacsed partners could not directly jointly fill one tax return right after the pacs but they had to wait for three additional years before pooling their income for taxation issues. Married couples could jointly declare their income right after the marriage. After 2005, pacsed partners jointly declare their income right after the pacs. Therefore, the day of the pacs did not matter before the reform but it does after the reform. The same system is applied for the year the pacs is broken up. I analyze the impact of the reform in a difference-in-difference framework. I assume that the reform could have two different impacts: first, it increases the pacs rate, second some couples could delay their pacs from the unattractive part of the year to the attractive part. I show that a simple difference-in-difference approach, comparing the evolution of pacs rates during the attractive part of the year to the pacs rate contracting during the unattractive part of the

[3]The pacs is now so popular in France that the terminology has changed. A new verb was created "se pacser" that I translate into "to pacs", meaning "to contract a pacs". The verb "se pacser" appears now in the French dictionary *Larousse*.

year does not identify the effect of the reform. I propose an adaptation of the simple difference in difference approach that permits identifying the two impacts of the reform. My results suggest that the reform had a significant impact, 15-20% of the pacs contracted after 2005 can be attributed to the reform. However, I do not find any significant effect of taxation on the decision to break up a pacs.

The rest of the paper proceeds as follow. Section 2 explains the French system of income taxation for married and pacsed couples. Section 3 describes the data and some summary statistics. Section 4 presents the identification strategy, section 5 shows the estimates of the impact of the income tax reform on the number of pacs contracted and on the dissolution of pacs. Section 6 proposes an interpretation of the results and section 7 concludes.

2 Civil Union and the income tax system in France and the reform

2.1 The pacs: history and main changes

Demographic trends show that the use of marital institutions changed in France over the last decades.

With 3.97 marriage for 1000 inhabitants in 2007, the marriage rate in France is lower than the average marriage rate in OECD countries (5 in 2007) and much lower than in the United-States (7.31 in 2007). Couples tend to marry less and if they do, they marry older. In France, the marriage rate was about two times higher in 1970 with 7.75 per 1000 persons (OECD, 2010). Moreover, in 2008, the age at the first marriage in 29.7 for women and 31.6 for men. It was 26.7 and 28.6 in 1990. Then, marriage often occurs after a long period of cohabitation. In 2006, in France, 38% of men and women aged between 25 and 29 lived with their partner and are not married whereas 22% are married (INSEE, 2009). But describing marriage rates give a partial story of the marital strategies in France because marital institutions also changed.

One of the most important change in the institution of marriage in France was the creation of the pacs[4], a new legal form of union. It was inspired by other European countries. In 1987, Denmark paved the way to other countries by creating a new legal form of union, *the registered partnership*. Then, a lot of countries (mostly European) created registered partnerships or civil unions[5]. They targeted same-sex couples and their claim for legal recognition. As same-sex couples had become an important lobby, their legal recognition was highly demanded. But the report directed by Waaldijk (2005) shows that the rights given to partners by civil unions are very different from one country to another. Most countries decided to create a median way between marriage and cohabitation. In Netherlands or in Sweden, civil unions are very close to marriages. In France or in Belgium, at least when it was created, civil unions were very different from marriage. Three main features distinguish most of civil unions from marriages, whatever the country. First, partners are less committed because duties towards the other partner are weaker. Second, civil unions do not give as many benefits to partners as marriage do. Third, civil unions are easier to break. In most countries, civil unions are exclusively made for same-sex couples. The French system is quite different. As in the Netherlands or in Belgium, different-sex couples can contract a civil union, although pacs targeted same-sex couples when it was created. Therefore, it provided an alternative to the marriage for different-sex couples in a context of decrease in the use of marriage, even if it was not its main goal. During the years following its creation, the pacs turned to be successful, especially among different-sex couples. In France, from its creation in 1999 to the end of 2009, 697,779 pacs have been contracted. From 22,276

[4] *Pacte Civil de Solidarité*, Civil pact of solidarity

[5] Let's call civil unions all that new legal forms of unions.

pacs contracted in 2000 to 172,104 in 2009, the pacs turned to be very successful. In 2009, 40% of the unions celebrated were pacs. Different-sex couples have found a legal form that fits very well their need: the Ministry of Justice declared that in 2007 only 7% of new pacs were contracted by same-sex couples (Carrasco, 2007) and this proportion is still decreasing (INSEE, 2009). The increase of pacs compensates the decrease of the marriage rate: 6.71 unions (pacs+marriages) for 1000 persons were contracted in France in 2009 (5.5 in 2000).

The success of the pacs was unexpected. When the pacs was created, the political area was highly divided on the topic and nobody predicted such a success. The political issue was mostly giving a legal recognition to same-sex couples or not. The effect of such a contract on different-sex couples was not debated. In 1999, the pacs was creating and legal dispositions made it different from the marriage but still attractive enough to satisfy same-sex couples claims for recognition. It was made to give a legal recognition to couples but without the symbolic meaning of marriage. Except the symbolic meaning, there were three main differences between the marriage and the pacs. First, the pacs was not (and is still not) recognized as a matrimonial status. This leads to different access to social benefit such as alimonies or survivor's benefit. Second, married couples benefited more from the tax system than pacsed couples. Third, it was easier to break out a pacs than a marriage. However, the success of the pacs made it difficult to sustain some inequality of treatment between the different types of couples. Therefore, three reforms have made the pacs closer to the marriage. In 2005, the income taxation has been made similar for pacsed couples and married couples. This change results from the claim for equity between couples, as there was no reason why a pacsed couple would be taxed differently from a married couple. Before 2005, pacsed couples were taxed differently from married couples. Especially, couples benefited from an attractive taxation the year they got married but not the year they get pacsed (this system is explained below). The reform was announced in September 2004 and settled on the 1^{st} of January 2005. A more general reform was voted in June 2006 and was settled on January 2007. Its goal was to strengthen the commitment between pacsed partners. And in 2007, inheritance tax system was changed both for pacsed and married couples. They are now the same for both types of couple. Then, the 2005 reform coupled with the 2007 reform made the tax system similar for both married and pacsed couples. Taxation makes the pacs attractive, and the anti-pacs politicians pointed out that it was too benefic for a contract easy to break up as they feared tax evasion. The increasing number of pacs contracting raises questions. Which couples get pacsed? Why do they contract a pacs? Is the pacs a substitute to the marriage, a first step toward marriage or a substitute to cohabitation? But, it is difficult to explain the growing number of pacs because a very

few data are available on pacsed couples and pacsed couples are mostly unknown. Carrasco (2007) describes that they are as old as married couples and that despite they are easier to break, pacs are not more broken than marriages. Both the relationship between marriage, pacs and cohabitation and the reason to contract a pacs are difficult to understand because of the lack of data. The increasing success of the pacs has been read as tax-related (INSEE, 2009; Carrasco, 2007) although no study assess a link between taxation and the decision to contract a pacs.

2.2 The tax system of pacsed couples in France

Today, married and pacsed couples are taxed the same way in France. The next paragraph describe married couples but it is relevant for pacsed couples.

The income tax is a progressive tax calculated on the income earned within the year. First of all, a 10% relief is applied, then only 90% of the annual income is submitted to the income taxation. The amount of income up to a certain amount t_1 is taxed at a rate r_1, then the remaining money, up to a certain amount t_2 is taxed at rate r_2, etc... The amount $t_{i+1} - t_i$ is taxed at a rate r_i, with $r_{i+1} > r_i$. So, the income tax on the income I can be represented by f, a piecewise linear continuous and convex function.

A tax relief targets low-income households. If the amount of tax is less than an amount D, so if $f(I) < D$, the household does not pay exactly $f(I)$ but it benefits from a tax relief which is important if $f(I)$ is very low.

Let g be the amount paid by the household. Therefore,

$$g(I) = \begin{cases} \max\left(f(I) - \frac{D-f(I)}{2}, 0\right) & \text{if } f(I) \leq D \\ f(I) & \text{if } f(I) > D \end{cases}$$

The fiscal administration considers tax units, which size s depend on the matrimonial status and the number of children. For a single, the size is equal to $(1 + k)$, with k a function of the number of kids. For a married couple, the size is equal to $(2 + k)$. For example, a married couple without children has a size $s = 2$, with one child the size is $s = 2.5$. An unmarried couple is considered as two tax units. If they have children, they have to divide children and put them in different tax units or put them all in the same tax unit. A married couple with children is considered as a single tax unit. The total amount of tax paid for a tax unit of size s is $s \times g(I/s)$. This fiscal system is called *quotient familial* (family ratio).

When they are not married, the two partners have to fill one tax return each. So they pay

$$g^{(C)}(I) = s_m g(I_m/s_m) + s_f g(I_f/s_f)$$

where I_m (resp. I_f) denotes the male's (resp. female's) income and s_m (resp. s_f) the size of the male tax unit. s_m and s_f depends on how children are split between the two tax returns. When they are married, the two spouses have to fill only one tax return instead of two. They pay two times what someone earning the average income would have paid. Therefore, they pay

$$g^{(M)}(I) = s \times g(\frac{I_m + I_f}{s})$$

. Because of the convexity of f, $f^{(C)} \geq f^{(M)}$ (the proof is given by Buffeteau and Echevin (2003)). However, Legendre and Thibault (2007) explain that it could be sometimes more interesting to stay in cohabitation because of the tax relief, which introduces non-linearities in the tax system for low income. So, $f^{(C)} \geq f^{(M)}$ does not necessarily implies $g^{(C)} \geq g^{(M)}$ for low incomes. Therefore, marriage is not tax attractive for all couples. But as general matter the more different incomes are, the more couples benefit from being married. An interested reader should report to Buffeteau and Echevin (2003), Legendre and Thibault (2007) or Amar and Guérin (2007) for further explanations on that point. A particular fiscal arrangement the year of marriage sharply decreases the amount of tax paid. The decrease is so large that it benefits to all couples, even for low income households for whom marriage is not tax-benefic. So, low income couples benefit from being married the first year of marriage, but not after. The rest of households benefit for marriage, but the benefit is larger the first year of marriage.

The year they marry, the partners have to fill three tax returns, each partner fills his own tax return for the amount of income earned from the 1^{st} of January to the marriage day and they fill a common tax return for the income earned from the marriage day to the 31^{st} of December. If they get married after a period of (t*100)% of the year, they have to pay an amount of tax of:

$$g^{(YM)}(I) = \underbrace{s_m \times g(t * I_m/s_m) + s_f \times g(t * I_f/s_f)}_{=B(t)} + \underbrace{s \times g\Big(\frac{(1-t)(I_m + I_f)}{s}\Big)}_{=A(t)}$$

with $s = (s_m + s_f)$ in most cases. As the rates are not changed when incomes are earned on a few months, the partners can minimize the amount of taxes by choosing the optimal marriage day. Indeed, $B(t)$ is increasing with t while $A(t)$ is decreasing with t. Then, the amount of income taxes to

be paid for the year of the wedding depends on the difference of incomes between the partners and on the wedding day. Most of the time, the minimizing date occurs during the second or the third quarter of the year. Figure 1 shows examples of the amount of taxes paid by five couples depending on the day they marry. The greater the difference of income between the spouse, the closer the optimal day to the beginning of the 2^{nd} quarter: even if they still pay taxes, the couples for whom one spouse earns 40,000 euros a year and the other one does not work and the couple with incomes 30,000 and 10,000 save more taxes marrying during the second quarter. Lower income households do not pay taxes at all marrying during the third quarter. Using real data, it is possible to compute for each couple which day (or days) is (are) the optimal one(s) for them. Notice that because of the tax relief for low income, lot of couples could have no tax at all to pay for the year of marriage. They could have the choice between a large number of optimal day. Using the Labor Force Survey of 2005, it is possible to know for each couple of the survey if they are married or not, the number of children they have and the wage each member of the couple earns. I compute for each unmarried couple with at least one employed partner the amount of tax that they would pay if they decide to get married, for each day of the year[6]. I can therefore simulate which day would be the optimal one for each couple, and how much they save compare to a normal married year. First of all, 80% can pay no tax at all for that year choosing the optimal day. Figure 2 gives the distribution of the optimal days among the population of unmarried couples, depending on the number of children they have. The figure clearly shows that for most couples, the optimal day occurs during the 2^{nd} or the 3^{rd} quarter. Simulations of paid taxes on the Labor French Survey 2005 in table 2 show that 29% of unmarried couples would not benefit from the fiscal arrangement the year the pacs is contracted because they don't pay taxes. But 60% of unmarried couples would saved more than 95% on what they should pay for a normal year. Among them, almost all couples would not pay any taxes at all (the average rate of saved money is 99.9%). Richer couples are not able to pay no tax at all, but they can still largely benefit from the fiscal arrangement.

Before 2005, pacsed partners had a different tax system. Especially, they did not benefit from the fiscal arrangements the year of pacs as married couples did. The pacsed partners had to wait for the third year after they contracted their pacs in order to pool incomes and to fill one tax return for the incomes earned during the whole year. And then, they were taxed the same way as married couples. As a consequence, the date of pacs did not have any effect on the amount of tax paid neither the year the pacs was contracted nor three years later, when they pooled their income. Since 2005, pacsed couples have to fill three tax returns for the year of the pacs, exactly as married couples do.

[6]The computation does not take into account *Prime Pour l'Emploi*, a tax credit settled in 2001.

The reform reduces significantly the amount of taxes paid for the year of the pacs. If the incomes of partners are significantly different, it leads to reduce the amount paid the two years after the pacs. After, the amount of taxes paid is the same before and after the reform.

Most of the time, couples marry and celebrate their marriage the same day. So, as the partners have many factors to deal with when deciding the date for marriage, it is hard to believe that couples choose the date of the marriage in order to minimize the amount of taxes paid. On the contrary, a pacs is not as celebrated as a marriage. If it is celebrated, the celebration is not organized the day the pacs is contracted because as the pacs is contracted in a court, it is contracted during the week, without any witness (Rault, 2009). Then it is possible to choose the optimal date to contract the pacs and to celebrate it later. As there are not so many factors that could determine the pacs day as for marriage, I believe that couples are able to choose the date in order to minimize the amount of tax paid.

2.3 The 2005 reform of the pacs

The reform makes the pacs more attractive to couples, because it can lead to pay less taxes the year of the pacs. Moreover, breaking a pacs was easy and costless[7], then the commitment induces by a pacs was not very strong. However, if the pacs was broken during the same year or during the following year, the effect on the income tax was canceled. Notice that when a pacs is broken at least two years after it was contracted, the partners have to fill three tax returns for the income earned the year of the dissolution, one for the couple for the period from 1^{st} of January to the dissolution day and one for each partner from the dissolution day to the end of the year. A letter is sufficient to break a pacs[8], which makes it easy and fast to break. Then, the partners have the opportunity to pay less taxes the year the pacs is broken by choosing the optimal date.

Thus, under the assumption that if couples answer to the incentive induced by the reform, the answer is optimal, four effects should be observed. First, as the pacs is made more attractive, more pacs should be contracted after 2005. Second, couples tend to get pacsed during the second or the third quarter. Third, couples do not break their pacs during the same year or during the following year. Fourth, couples who break their pacs do it during the second or the third quarter.

Notice that the reform also changed the amount of income taxes paid for the next two years of the pacs year, compared to the amount of income taxes paid by partners that had pacsed before the

[7] It has changed in 2006. It is still easy to break a pacs but the reform of the pacs of 2006 made the commitment between partners stronger and it gives the partners the right to court his partner for the damages induced by the dissolution.

[8] A letter is sufficient if both the partners agree on the dissolution. If only one partner wants to dissolve a pacs, he has to send a letter through a lawyer.

reform. Three years after the year of the pacs, the income taxation is the same after and before the reform. Therefore, a positive impact of the reform on the number of pacs contracted means that short-term issues are taken into account in the decision to pacs. The last interesting point is that in 2005 nothing changed for the pacs except the income taxation. The legislation of divorce has also changed in 2005, making the divorce easier. It could change the opportunity cost of being pacsed. However, this change is not as important as the unilateral divorce in the US and the impact of unilateral divorce on marriage rates is not clear (Friedberg, 1998; Wolfers, 2006; Lee and Solon, 2011). If any, the impact of an easier divorce of marriage rates is not immediate (Wolfers, 2006). Moreover, I estimate the impact of the reform of the pacs on the change in the seasonality of the pacs. It is not clear that the change is the divorce law would change the seasonality of the pacs. Therefore, this is unlikely to bias my results.

3 Data and preliminary evidences

3.1 Available Data

A pacs is not contracted at the town hall as marriages but at the closest court from the place where at least one partner lives. Then, data belong to the Department of Justice. Micro data have been highly protected for a long time. The legislator feared for homophobia and violence towards pacsed people. Therefore, they decided to protect couples by registering pacsed couples on a secret file that was not available, even for statisticians from the Department of Justice and by preventing national surveys from asking couples if they were pacsed or not. Therefore, the main surveys in France, such as the Labor Force Survey, do not include any information about pacs. Because of the growing number of pacs, the protection disappeared in 2005 but micro data are still not available, except for statisticians from the Department of Justice. That is why some descriptive figures on pacsed couples are available thanks to Carrasco (2007). But, only aggregated data are available, which make it impossible to know crucial information, such as the incomes of the partners.

As a consequence, all the information we have is the number of pacs contracted and broken up in each court, for each quarter. There are 462 courts in France (20 in Paris, so it makes 443 when Paris is aggregated). Then I consider 10 years, i.e. 40 quarters. Therefore I have 18480 observations (17720 when Paris is aggregated).

Controls are constructed using census data, at the town level. Towns are then gathered into courts. Therefore, the geographical unit is the smallest unit on which the pacs rate can be computed.

3.2 Demographic trends

Three mains demographic trends are interesting. The marriage rate decreased since 1980, except for some short period of time. Since it was created in 1999, the number of pacs contracted by year increased a lot leading to an increasing overall union rate.

The number of pacs contracted has increased a lot since it was created (see table 3). 22,108 pacs were contracted in 2000, the first complete year of the pacs, and 172,104 were contracted in 2009. In 2000, approximately 284,000 marriages were celebrated, and 254,000 in 2009. Therefore, the total number of unions increased in France over the last decade.

However, the proportion of pacs couples in the population remains small, because it is still a

recent form of union. The fiscal statistics[9] indicates that in 2009, over 100 persons filling their fiscal form, 1.6 is filled by a pacsed person, 50.8 by a married couple, 29.4 by a single, 10.1 by divorced individual and 8.1 by a widow.

The increase in the number of pacs and the decrease in the number of marriage is wide spread in France. As table 3 shows, the pacs rate per 1000 persons aged 15-59 years old has increased in all courts: the mean pacs rate has increased from 0.5 in 2000 (with a standard deviation of 0.22) to 3.4 in 2008 (with a standard deviation of 0.89).

Figure 5 illustrates the decrease of the marriage rate and the increase of the overall number of unions. The marriage rate for 1000 persons aged 15-59 decreased in all courts: it was 10.0 (sd of 2.70) in 1980 and it is 6.2 (sd 0.81) in 2009. The decrease of the marriage rate is mostly explained by a huge decrease in the marriage rate for 1000 15-29 persons (the male age is taken as a reference for the age of the couple) from 20.8 in 1981 to 7.2 in 2009. It was not compensated by the increase in the marriage rate for 1000 persons aged 30 to 44 years old from 5.0 in 1981 to 9.0 in 2009 nor by the increase in the marriage rate for 1000 persons aged 45 to 59 years old from 1.2 in 1981 to 2.9 in 2008. The marriage rate is still higher than the pacs rate, although they tend to be closer. Defining unions as the sum of pacs and marriages contracted in each court, the union rate per 1000 persons aged 15 to 59 years old in 2009 is greater to what it was in 1981: it was equal to 10.0 in 1981, it is equal to 10.3 in 2009 but it was equal to 7.5 when the pacs was created in 1999.

As expected, the seasonality of the pacs series changed after the reform. Figure 3 shows that the pacs rate increased for each quarter, but the seasonality was completely reversed after the reform. The number of pacs contracted during the first quarter decreased right after the reform. This could be explained by a schedule impact: some couples decided to contract a pacs but instead of doing it immediately they wait for three (or more) months in order to benefit from the newly attractive tax system.

Dissolution rates follow another pattern. The dissolution rate is computed as the number of dissolution per 1000 pacsed couples. Table 4 shows that after a large increase during the first years the dissolution rate tended to become stable. But this evolution is difficult to interpret. Indeed, the large increase in the pacs rate changes the population of pacsed couples over the time. Therefore, the proportion of newly pacsed couples tend to increase, making difficult the interpretation of the stability of the pacs rate. Nevertheless, if couples change their separation behavior for fiscal reasons,

[9] Déclarations Nationales d'Impôt sur le Revenu,
http://www2.impots.gouv.fr/documentation/statistiques/2042_nat/Impot_sur_le_revenu.htm

the seasonality of pacs rate should change after the reform. Therefore, I will not comment much on the level of dissolution but on the seasonality of separation.

4 The estimation strategy

4.1 Limits of a difference in difference model

The identification strategy takes advantage of the taxation system. Indeed, the way the *quotient familial* is implemented introduces a distinction between two parts of the year: the attractive part and the unattractive part for taxation matters. The attractive part is composed of the 2nd and the 3rd quarters (spring and summer) and the unattractive part is composed of the 1st and the 4th quarter (autumn and winter).

The identification strategy lies on the idea that couples getting pacsed because of the reform are going to contract their pacs during the attractive part of the year. Without the reform, the number of pacs contracted during the attractive part of the year would have evolved the same way as the number of pacs contracted during the unattractive part of the year. Therefore, comparing the evolution of the number of pacs contracted during the attractive part of the year to the evolution of the number of pacs contracted during the unattractive part of the year gives the total impact of the reform. The estimation of the total impact of the reform could be easily implemented by a difference-in-difference strategy using the quarters of the unattractive part of the year as a control group and the quarters of the attractive part of the year as a treated group.

The difference in difference estimator gives the incentive impact of the reform if the control groups is unaffected by the reform. In that case and under the common trend assumption, it gives what the evolution of the number of pacs during the affected part of the year would have been without the reform. However, this method only gives the total impact of the reform, which is composed of two effects here. First, the reform could have a direct and positive impact on the number of pacs contracted. Second, the reform could have an indirect impact: couples that would have contracted a pacs anyway are now more likely to do so during the attractive part of the year. Let's call this impact the "schedule impact". In that case, the number of pacs contracted during the unattractive part of the year is lower than what it should be. In other words, the unattractive part of the year suffers from negative externalities from the other part of the year and the stable unit treatment assumption defined by Joshua D. Angrist and Rubin (1996) does not hold. Therefore, the difference in difference estimator estimates the total impact of the reform, including the schedule impact. It is not possible to disentangle the direct impact of the reform from the schedule impact of the reform unless one assumption is added.

To illustrate the problem of externalities, let y_{iqT} be the rate of pacs contracted in the court i,

during the quarter q of the year T. Years are recoded in order to begin with the 4th quarter and to end with the 3rd quarter. The recoding makes sense because:

(a) the pacs was created in the 4th quarter 1999

(b) the reform was announced just before the beginning of the first quarter 2004. As, it was an unexpected reform, couples were not able to delay their pacs in order to benefit from the reform before the 4^{th} quarter of 2004.

y_{iqT} is written as:

$$y_{iqT} = \alpha_0 + \alpha_T + \alpha_{iq} + \delta_{qT} + u_{iqT}$$

where α_T is the year fixed-effect, α_{iq} is a combined fixed effect for courts and quarters and δ_{qT} are a combined fixed effect of year and quarters. The impact of the reform of the pacs rate is given by the evolution of the δ_{qT}s. The δs are composed of the direct and the schedule impact. On the one hand, assume that the direct impact of the reform is an increase with β_T of the pacs rate in year T during the attractive part of the year. On the other hand, let γ_T represents the schedule impact: it increases the pacs rate during the attractive part and decreases the pacs rate during the unattractive part of the year. The attractive part of the year is divided into two quarters: let p_{1T} (resp. p_{2T}) be the part of the direct impact β_T (resp. schedule impact γ_T) of the reform contracted during the 2^{nd} quarter. The unattractive part is also divided into two quarters: let p_{0T} be the proportion of couples delaying their pacs that would have contracted their pacs during the 1^{st} quarter. Therefore, the δ_{qT} are:

$$\delta_{qT} = \begin{cases} -p_{0T}\gamma_T, & \text{if q=1} \\ p_{1T}\beta_T + p_{2T}\gamma_T, & \text{if q=2} \\ (1-p_{1T})\beta_T + (1-p_{2T})\gamma_T, & \text{if q=3} \\ -(1-p_{0T})\gamma_T, & \text{if q=4} \end{cases}$$

The δ_{qT} represents 5 parameters and there are only 4 equations. There are clearly too much parameters and the estimation of such a model is infeasible.

As we are interested in the β_Ts, the γ_Ts and the α_Ts, the pacs rate can be written as y_{isT} where s indicates the semester. $s = 1$ for the unattractive part of the year and $s = 2$ for the attractive part of the year. $y_{iT,s=1} = y_{iT,q=1} + y_{iT,q=4}$ is the pacs rate for the unattractive part of the year and $y_{iT,s=2} = y_{iT,q=2} + y_{iT,q=3}$ is the pacs rate for the attractive part of the year.

$$y_{isT} = 2\alpha_0 + 2\alpha_T + \alpha_{is} + \delta_{sT} + u_{isT} \tag{1}$$

where

$$\delta_{sT} = \begin{cases} -\gamma_T, & \text{if s=1;} \\ \beta_T + \gamma_T, & \text{if s=2;} \end{cases}$$

A difference-in-difference estimation would give an estimation of $\alpha_T - \gamma_T$ as the year effect and $\beta_T + 2\gamma_T$ as the impact of the reform. Therefore, it tends to underestimate the year fixed effect and to overestimate the incentive impact of the reform.

4.2 The estimated model

The usual way to get rid off externalities consists in using two control groups and to compute a difference in difference in difference (DDD) estimator. One control group (C1) is affected by the reform and loose γ_T pacs, but the other (C2) is not affected. The treated group (T) receive the direct impact of the reform and the delaying pacs ($\beta_T + \gamma_T$ pacs). Comparing T and C2 identifies $\beta_T + \gamma_T$, comparing C2 and C1 identifies γ_T and the comparison of the differences identifies β_T.

Unfortunately, I cannot distinguish two control groups in the pacs case, but the DDD estimator could be extended in the case in which there are two controls group that are not affected with the same intensity by the reform. Taking advantage of the variation between the control groups does not permit a point identification of the incentive impact of the reform, but it gives bounds for to the incentive impact of the reform.

I consider two controls group: the fourth and the first quarter of the year. Both quarters are untreated, because they are part of the unattractive part of the year. But both of them can suffer from negative externalities: some couples are likely to delay their pacs to wait for a more attractive part of the year to contract their pacs. But both quarters are not likely to be affected the same way: if couples have a preference for the present large enough, it might be more difficult to delay a pacs from the fourth quarter to the next spring/summer than from the first quarter to the next spring.

In order to disentangle the direct impact of the reform from the schedule impact, I recode the time windows q in a variable t such as, $t = 0$ for the fourth quarter, $t = 1$ for the first one and $t = 2$ for the sum of the second and the third quarters. Then:

$$y_{itT} = \alpha_0 + \alpha_T + \alpha_{it} + \delta_{tT} + u_{itT} \tag{2}$$

with

$$\delta_{tT} = \begin{cases} -(1-p_T)\gamma_T, & \text{if t=0;} \\ -p_T\gamma_T, & \text{if t=1;} \\ \alpha_0 + \alpha_T + \beta_T + \gamma_T, & \text{if t=2;} \end{cases}$$

p_T is the proportion of delaying pacs that would have contracted their pacs during the first quarter, have they not delay their pacs. The closer p_T from 1/2, the more similar the two controls group are. The extreme case, $p_T = 1/2$ prevents from identifying γ_T, because the difference between the two controls group is 0. On the contrary, $p_T = 1$ and $p_T = 0$ corresponds to the DDD estimator.

The differences in difference estimation gives an estimation of the β_Ts, the γ_Ts and the α_Ts that depends on the value of p_T. Indeed, the estimated equation is:

$$y_{itT} = \alpha_0 + \alpha_{it} + a_{0T} + a_{1T} + a_{2T} + u_{itT} \tag{3}$$

with the α_{iT}s are court crossed with period of the year fixed effect, the a_{0T}s are year fixed effects, the a_{1T}s (resp. the a_{2T}s) are year fixed effects crossed with a dummy for $t = 1$ (resp. $t = 2$) and

$$\begin{cases} a_{0T} &= \alpha_T - (1-p_T)\gamma_T \\ a_{1T} &= (1-2p_T)\gamma_T \\ a_{2T} &= \alpha_T + \beta_T + (2-p_T)\gamma_T \end{cases}$$

Then, for a given p:

$$\begin{cases} \alpha_T(p_T) &= a_{0T} + \frac{1-p_T}{1-2p_T} a_{1T} \\ \gamma_T(p_T) &= \frac{1}{1-2p_T} a_{1T} \\ \beta_T(p_T) &= a_{2T} - a_{0T} - (1 + \frac{2}{1-2p_T}) a_{1T} \end{cases}$$

Therefore, the identification of the bounds requires some conditions on the parameters: if $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} \geq 0 \ \forall T \geq 0$ or if $a_{1T} > 0$ and $a_{2T} - a_{0T} - 3a_{1T} \geq 0 \ \forall T \geq 0$ then it is possible to identify an upper and a lower bounds to the β_T and the γ_T (see the proof in section B.2). These conditions are easily verified in the data. The estimation of informative bounds requires two assumptions. The first assumption simply states that $\beta_T \geq 0$ and $\gamma_T \geq 0, \forall T \geq T_0$. This assumption is not very strong as it stipulates that the reform has been indeed incentive and it did not discourage couples to contract the pacs during the attractive part of the year. Moreover, it indicates that delaying pacs are going from the unattractive part of the year to the attractive part of the year. This assumption is likely to be unverified is some couples prefer waiting for the unattractive part of the year to signal

that their pacs is not a tax induced pacs. It is also unverified if the reform implied an important increase in the number of pacs, leading to overburden courts and a crowing out effect. Although this story can not be rejected, it is very unlikely to affect the courts the first year after the reform. Indeed, the impact of the reform, albeit strong, is not likely to be strong enough to induce a large crowding out effect. After some years, the court may adjust their labor force to take this increase into account. The second required assumption is that p, the proportion of delaying couples that would have pacs during the first semester is constant over time. A change in this proportion could be justify by a relative change of the composition of couples willing to get pacsed during the fourth quarter compared to couples willing to get pacsed during the first quarter. As the reform of taxation is the only reform of the pacs that might change the seasonal composition of pacsed population, this assumption is not very strong.

If $p \in]1/2, +\infty[$, the bounds are given by:

$$\begin{cases} \alpha_T(p) \in [\alpha_T(1); \alpha_T(p^*)] \\ \gamma_T(p) \in [\gamma_T(1); \gamma_T(p^*)] \\ \beta_T(p) \in [\beta_T(p^*); \beta_T(1)] \end{cases}$$

5 The results

5.1 Effect on the pacs rate

All estimations presented above are based on difference in difference estimation. Therefore, the standard errors might be biased downward in case of autocorrelation of the error terms, as explained in Bertrand, Duflo, and Mullainathan (2004). As a consequence, all standard errors are clustered at the court level.

The explained variable is the pacs rate for 1000 persons aged 15-59. Although the age of pacsed spouses is unknown, I assume that most pacs are contracted by partners less than 60 years old. This assumption seems reasonable since (a) Carrasco (2007) showed that pacsed couples are similar than couples getting married for the first time and (b) only 2.3% in 2000 and 4.7% in 2009 of marriages were contracted by partners more than 60. This rate seems more intuitive than the classic raw rate for 1000 persons.

First I estimate the difference in difference model, given by the equation 1. Results are given by the table 5. Column (1) and (2) give results without introducing fixed effect. The introduction of controls variables does not change the point estimate of year effects and year× sem.2 fixed effects, but the point estimate of the constant. It means that adding controls does not necessarily improve the estimation because these controls don't add any relevant information. My favorite estimation is given in column (3). It introduces some court × sem.2 fixed effects. The impact of the reform is given by the evolution of the year×sem.2 fixed effects. Before 2005, the point estimates for the coefficients for year×sem.2 variables are very low, although they are significant for early years. It means that the second semesters in 2001 and 2002 could have been slightly different from the second semester in 2000. But the main evolution occurs after 2005: after 2005, the coefficients start increasing a lot. It reveals a systematic change in the seasonality right after the reform of the pacs. However, as explained in the previous section, this estimation can result from the incentive effect of the pacs and from the delaying effect of the pacs.

Then, I estimate the model described by equation 3 in order to define bounds for the impact of the reform. As a robustness check, I construct another explained variable: the pacs rate for 1000 couples. However, this variable is likely to have high measurement errors because couples are not well measured in France. Indeed, until the last census, people were not asked if they were single or not. Therefore, the number of couples was approximated by the number of married couples before 2006. For each explained variables, I also test the robustness of the results using different specifications: including crossed court-period of the year fixed effects compared to period of the year fixed effects

or including time varying variables as controls regarding the socio-economic environment, although these controls have not been found having a good explanatory power for the difference in difference estimation.

Results of the regression for the number of pacs contracted are given by the tables 6 and 7. The parameters are not interesting *per se* even if they are directly interpretable. They are interesting as they permits verifying if the necessary conditions are verified or not. My results are robust across specifications using both pacs rates. So I construct the results of the estimation of the structural parameters only for the full specification, i.e. the pacs rate per 15-59 years old persons, including controls and court crossed with period of the year fixed effects.

For each specification, the last column indicates if the required conditions $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} > 0, \forall T \geq T_0$ are verified (as I suspect $p > 1/2$). Here, they are clearly verified for all year after the reform. Therefore, it is possible to find a p such as $1 \geq p > 1/2$, in order to construct the upper and lower bounds to the direct and the schedule impacts of the reform. The $p^* = 0.853$ is the lowest p such as $\gamma_T(p) > 0$ and $\beta_T(p) > 0$ for all years after the reform. The structural parameters $\alpha_T(p) > 0$, $\gamma_T(p) > 0$ and $\beta_T(p) > 0$ are estimated using the system B.2.

The estimated upper and lower bounds of the reform are given in table 10 and plotted in figures 6. The direct impact of the reform increased over time: it is very close to zero in 2005, but it raised with 0.23-0.33 points the average pacs rate per 15-59 persons in a court in 2006. In 2009, fiscal incentive resulted in an increase with 0.65-0.85 points in the pacs rate. The schedule impact of the reform stayed constant after the reform. The pacs rate during the unattractive part of the year decreased with 0.16-0.23 point each year, leading to an increase with 0.16-0.23 point each year during the attractive part of the year. This two effects comes in addition to the natural increase in the pacs rate. The average pacs rate remained stable during the first two years compare to the average pacs rate in 2000. It increased with 0.04 points in 2003, until 0.69-0.73 in 2009.

Table 11 presents the proportion of the pacs rate that can be attributed to the reform. The direct impact of the reform increased the average pacs rate by 13%-20% in 2006 until 16%-21% in 2009. The schedule impacts represents around 7%-10% of the pacs rate in 2006 and 6%-8% in 2009.

The counterfactual of the average pacs rate without the reform is given by figures 7. The figures clearly show that the pacs rate would have been lower without the reform, but it would have increased anyway. Therefore, fiscal incentives only explain part of the total increase of pacs rates in France. The overall increase of the pacs rate would have been more equally distributed over quarters.

5.2 Effects on dissolutions

As the pacs is quite easy to break, couples could adjust their decision to break up their pacs to the tax system in order to benefit from its effects the year they break up.

There are four different ways to break up a pacs. First, if partners agree on the dissolution, they can send a letter to the court to break up the pacs. This is a mutual consent breaking. Second, if partners do not agree, a pacs can be unilaterally broken up: the leaving partner has to write a letter to the court and to the other partner through a lawyer to announce its decision. Third, a pacs is automatically broken when the couple get married in which case partners do not have to send any letter to the court. Fourth, the pacs is automatically broken if one of the partners dies. As for the marriage, the surviving partner does not need to write a letter to the court. In all cases but marriage, partners benefit from the three tax returns system. As death is not a choice, I only study breaking reasons that imply that partners fill three tax returns.

A simple letter is sufficient to break up a pacs: the schedule could be manipulated by couples. I study the impact of the reform on dissolution rates using the same framework as the contracted pacs rate. Indeed, the expected impacts of the reform, if any, should be similar. As for the year the pacs is contracted, couples face the same tax system (but inverted) the year the pacs is broken up. The couple has to fill three tax returns: they pool their incomes for the first part of the year until the day the pacs is broken and they have to fill two tax return for the part of the year after the pacs is broken. Therefore, they could benefit from the same attractive taxation. If couples are sensitive to that incentive, two impacts are expected: (1) an increase in the number of broken pacs, (2) more pacs should be broken during the attractive part of the year, resulting from an incentive effect and a schedule effect. As for the contracted pacs, bounds of the direct and the schedule effect could be identified if the conditions $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} > 0, \forall T \geq T_0$ or $a_{1T} > 0$ and $a_{2T} - a_{0T} - 3a_{1T} > 0, \forall T \geq T_0$ are verified.

An increase in the number of dissolutions could be observed right after the reform, because the tax system gives an incentive to break up the pacs to all pacsed couples. But the increase should be more accurate after 2007. The increase in the number of pacs because of the direct impact of the reform on contracted pacs could change the composition of pacsed couples. Especially, couples sensitive to taxation are now pacsed and they could also be sensitive to incentives to break up their pacs. But they have to remain pacsed the year following their pacs to benefit from the attractive tax system. So if they decide to break up their pacs for tax benefit, they should do it two years later. Therefore, an increase of the dissolution rate could be observe after 2007.

I consider two definitions of dissolution rates: (1) the number of dissolution for 1000 pacs (con-

tracted at least 6 months before), (2) the number of dissolution for 1000 persons aged 15-59 years old. However, none of them is easily interpretable. The number of dissolutions for 1000 pacs takes into account the at-risk population, i.e. the pacsed couples. However, the large increase in the pacs rate, especially after 2005, change the composition of the pacsed population. It makes the ratio difficult to interpret as it considers all pacs as similarly affected by the risk of separation. Moreover, the seasonality increase the number of pacs differently over the year, adding couples unlikely to break up. The ratio is computed for 1000 pacs contracted at least 6 months before in order to take into account population more likely to break up. The number of dissolution for 1000 persons aged 15-59 years old does not take into account the at-risk population. It just rescales the number of population to take into account differences in the size of the courts.

The difference in difference estimation is given in table 8. For clarity reasons, I only show results without controls as controls do not affect the results. Considering the rate of broken pacs for 1000 persons, the affected semester tends to be always different from the unaffected semester. This is no longer the case when considering the rate of broken pacs for 1000 pacs, especially when court×sem. fixed effects are added (column (4)). It shows that the rate of broken pacs is unaffected by the reform. The rate of dissolution for 1000 pacs seems affected by the reform when court×sem. fixed effects are not added. Excluding court×sem. increases the point estimate which could explain that it becomes significant. The rate of broken pacs for 1000 persons shows that the second semester has always been different from the first, but the point estimate increase suddenly in 2005 from 0.0167 to 0.333. Surprisingly, it decreases in 2007 from 0.0323 to 0.0253. This change could be attributed to a change in the composition of the population of pacsed partners after 2005. As this impact could be attributed to couples delaying the day they break up the pacs or to the incentive impact of the reform, I estimate the model given in 3, in order to identify bounds to both effects.

The results of the estimation are given by the table 9. The results are more difficult to interpret than results on the contracted pacs because the sign of a_{1T} is not constant after the reform. It means that couples were less likely to break up their pacs during the first quarter than during the fourth quarter from 2005 to 2007, and this is reversed in 2008 and 2009. The coefficients a_{1T} are not (or slightly) significant from 2007 to 2009. It denotes that the first and the fourth quarter are statistically different. As the identification of bounds requires some variations between the two quarters, it is not possible to identify bounds on the two potential effects of the reform in the case of broken pacs.

The difference in difference estimation tends to show that if any, the impact of taxation on the decision to break up a pacs is small. The second estimation shows that it is not possible to disentangle the incentive impact from the schedule impact of the reform on broken pacs.

6 Interpretation

The different evolutions of the distinct effects of the reform can be explained by the information issues. During its first years, the pacs was still a new contract and it was thought same-sex couples targeted. The pacs rate did not increase much because couples were not aware that it was an interesting form of registered partnership. But as couples acquired information about the contract, the pacs rate started to grow naturally. When the reform was settled in 2005, most couples did not know that the pacs became more attractive in terms of taxation. Therefore, they did not answer the incentive right after the reform. But as information relative to taxation of pacsed couples spread out after the reform, explaining why more couples want to benefit from it as time goes by. In the same time, couples that decide to contract a pacs for reasons distinct from taxation acquired information about the pacs. Then they could react directly to the incentive. This kind of couples is a stable part of the population, explaining why the schedule impact of the reform did not increase over time.

The attractive tax system for broken couples after the reform did not increase the dissolution rates and couples did not adjust the schedule of dissolution to benefit from it. Was this result unexpected? Not really, given that the benefit from the tax system has evaluated as the couple level. But at the spouse level it is not necessarily attractive, unless spouses transfer income to each other. Contracting/breaking up a pacs is attractive when spouses pool their income or at least if they can easily transfer income from the richer to the poorer one. Getting pacs is part of the construction of the couple: so they can easily pool their income. But breaking a pacs in order to benefit from the tax system require some *ex post* transfers that are less easily done by a breaking couple. Couples do not take advantage of the tax incentive the year they break up: it tends to show that couples do not do *ex post* transfers. So, even if this would be benefic at the couple level, they do not pool their income once they decide to break up their pacs. Of course, this system could be used as tax evasion means[10]. In that case, fake couples could contract a pacs and break up the pacs every other year in order to optimize the tax they have to pay. This result tends to show that if this kind of behavior exists, it is to marginal to be observed in the data.

[10] This possibility was raised by the deputy Charles de Courson since the pacs was created. In 2010, the tax system has been amended. During the debate, he said "When we were talking about the creation of the pacs, I raised the problem saying that I would write in the classifies in *Le Nouvel Obs*: 'Single looks for female student without income to contract a six months pacs in order to share fiscal benefit'. Because the mecanism allows to pacs every January 1^{st} and to unpacs every July 1^{st}. This risk of embezzlement of this civil goal led to the adoption of an amendment imposing a minimal duration of 3 years before having the fiscal benefit. But alas, our majority [UMP - right party, majority in France since 2002] got rid off this clause contrary to my opinion. Now we witness the beginning of the embezzlement of the law." - From debates on "Projet de loi de finances pour 2011 : Articles de la deuxième partie"

7 Conclusion

A costs/benefits analysis of marital behavior predicts that an attractive taxation of married couples should increase marriage rates. Although taxation is not marriage-neutral in many countries, taxation has not been found to have a clear and significant impact on marriage rates. In some Western Europe countries, couples can either get married or contract an other form of marital contract. In France, this contract is called pacs. I show that taxation does impact the decision to contract a pacs in France and that 16-20% of pacs contracted in 2009 can be attributed to an attractive tax system.

The identification strategy relies on a difference in difference method. The tax system changed for pacsed partners in 2005. Before 2005, the date the pacs was contracted did not change the amount of income taxation paid for that year. After 2005, the date of the pacs impacts the amount of tax paid. It is now more attractive to contract a pacs, especially if it is contracted during the attractive part of the year. I distinguish two types of reaction to the reform: the incentive impact (couples getting pacsed because of the tax incentive) and the schedule impact (couples that would have contracted a pacs without the reform but change the day they contract it in order to benefit from the tax system). I show that the schedule impact stays stable and it represents 0.15-0.30 points of the average pacs rate in the courts. The incentive impacts was very small right after the reform, but it increased over time and it represents 0.65-0.85 points of the average pacs rates (i.e. 16-20% of the total mean pacs rate). I do not find any impact of income taxation on the decision to break up the pacs.

The paper shows that although marriage behaviors are not closely related to tax incentive, pacs behaviors are sensitive to attractive taxation. However, the relationship between pacs and tax is not as close to what politics feared. Indeed, deputies feared that pacs could favor tax evasion. I show that there is no evidence that the dissolution of pacs has been favored by the tax system. The tax system the year of the pacs/marriage has been changed in 2010 (starting in 2011): since 2011, couples do not benefit from the tax system presented in the paper. There were several reasons invoked to justify the reform, among which the idea that pacs favored tax evasion.

The paper questions the link between pacs and marriage: why are these couples getting pacsed rather than marriage? It tends to show that the reason explaining a pacs can be different from the reason explaining a marriage. The lack of microdata prevents from studying carefully the link between marriage and civil union. This is left for further research, as soon as better data are available.

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A Legal features of marital status

Table 1: Legal features of marital status in France

	Cohabitation	Pacs	Marriage
Income taxation	Separate	• Before 2005: separate during 3 years, common after • After 2005: common since the day the pacs is contracted	Common since the day the marriage is contracted
Inheritance	• Surviving partner has to be declared in the testimony • High tax rates: after a 1564eur allowance, tax rate of 60%	• Surviving partner has to be declared in the testimony • Since 2007: No tax • Before 2007: marginal tax rate of 40% until 15000eur, 50% after	• Surviving partner automatically inherits from the spouse • Since 2007: No tax • Before 2007: Taxed, but lower rates than pacsed partners
Assets sharing	No asset sharing, unless bought together	• Since 2006: By default, the contract separates assets. But the type of contracts can be changed. • Before 2006: Depends on the contract when the pacs is contracted.	By default, the contract separate assets bought before the marriage, but assets bought after the marriage are common (communauté de biens réduite aux acquêts). But the type of contracts can be changed (for separate or community of all assets.
Debts	No solidarity	Solidarity of debts linked to everyday life and housing	Solidarity of debts (but protection of the housing)
Adoption	No legal adoption by the partners (but one can adopt on its own)	No legal adoption by the partners (but one can adopt on its own)	Legal adoption authorized
Social protection	No common coverage	Common coverage allowed	Common coverage allowed
Survivor's pension	No	No	Yes
Citizenship	No citizenship	No citizenship, but being pacsed can be a relevant piece	Citizenship after 4 years
Break up	Unilateral or common. No cost, but no alimony nor damages pension	Unilateral or common. No great costs: letter to the court. But no alimony, possibility of damages pension	Common. Divorce costs (obligation to be dissolved by a judge). Possibility of alimonies and damages pension

Legal features at the end of 2009

B Identification strategy

B.1 Link between the parameters from the structural equation and the reduced form equation

$$y_{itT} = \alpha_0 + \alpha_T + \alpha_{it} + \delta_{tT} + u_{itT} \tag{4}$$

with

$$\delta_{tT} = \begin{cases} -(1-p)\gamma_T, & \text{if t=0;} \\ -p\gamma_T, & \text{if t=1;} \\ \alpha_0 + \alpha_T + \beta_T + \gamma_T, & \text{if t=2;} \end{cases}$$

Then

$$\begin{aligned} y_{itT} &= \alpha_0 + \alpha_T + \alpha_{it} - (1-p)\gamma_T \mathbb{1}\{t=0\} - p\gamma_T \mathbb{1}\{t=1\} + (\alpha_0 + \alpha_T + \beta_T + \gamma_T)\mathbb{1}\{t=2\} + u_{itT} \\ &= \alpha_0 + \alpha_{it} + \underbrace{[\alpha_T - (1-p)\gamma_T]}_{a_{0T}} + \underbrace{[(1-2p)\gamma_T]\mathbb{1}\{t=1\}}_{a_{1T}} \\ &+ \underbrace{\alpha_0 \mathbb{1}\{t=2\}}_{\text{in the fixed effect}} + \underbrace{[\alpha_T + \beta_T + (2-p)\gamma_T]\mathbb{1}\{t=2\}}_{a_{2T}} + u_{itT} \\ &= \alpha_0 + \alpha_{it} + a_{0T} + a_{1T} + a_{2T} + u_{itT} \end{aligned}$$

B.2 Upper and lower bounds of $\alpha_T(p)$, $\gamma_T(p)$ and $\beta_T(p)$

Let α_T, γ_T and β_T be functions of p_T such as:

$$\begin{cases} \alpha_T(p_T) &= a_{0T} + \frac{1-p_T}{1-2p_T} a_{1T} \\ \gamma_T(p_T) &= \frac{1}{1-2p_T} a_{1T} \\ \beta_T(p_T) &= a_{2T} - a_{0T} - (1 + \frac{2}{1-2p_T}) a_{1T} \end{cases}$$

α_T, γ_T and β_T are monotonous functions of p_T. In particular, the derivative of γ_T is of the same sign as a_{1T} and the derivative of β_T is of the opposite sign as a_{1T}.

Moreover:

$$\begin{cases} \gamma_T(0) = a_{1T} \\ \gamma_T(1) = -a_{1T} \\ \lim_{p_T \to 1/2^-} \gamma_T(p_T) = sgn(a_{1T})\infty \\ \lim_{p_T \to 1/2^+} \gamma_T(p_T) = -sgn(a_{1T})\infty \end{cases}$$

Therefore, γ_T has the same sign on $]-\infty; 1/2[$ and the opposite sign on $]1/2; +\infty[$. As a consequence, γ_T is always positive either on $]-\infty; 1/2[$ or on $]1/2; +\infty[$, depending on the sign of a_{1T}.

Similarly:

$$\begin{cases} \beta_T(0) = a_{2T} - a_{0T} - 3a_{1T} \\ \beta_T(1) = a_{2T} - a_{0T} + a_{1T} \\ \lim_{p \to 1/2^-} \beta_T(p_T) = -sgn(a_{1T})\infty \\ \lim_{p \to 1/2^+} \gamma_T(p_T) = sgn(a_{1T})\infty \end{cases}$$

If $a_{1T} > 0$, $\beta_T(p_T) \geq 0$:

- $\forall p_T \in [0, \underline{p}] \cup]1/2, +\infty[$ if $a_{2T} - a_{0T} - 3a_{1T} \geq 0$
- $\forall p_T \in]1/2, \overline{p}[$ if $a_{2T} - a_{0T} + a_{1T} \geq 0$

If $a_{1T} < 0$, $\beta_T(p_T) \geq 0$:

- $\forall p_T \in]-\infty, 1/2[\cup [\overline{p}, 1]$ if $a_{2T} - a_{0T} + a_{1T} \geq 0$
- $\forall p_T \in]\underline{p}, 1/2[$ if $a_{2T} - a_{0T} - 3a_{1T} \geq 0$

As a consequence, the conditions $\beta_T(p_T) \geq 0$ and $\gamma_T(p_T) \geq 0$ are jointly verified:

1. if $a_{1T} > 0$ and $a_{2T} - a_{0T} - 3a_{1T} \geq 0$: $\beta_T(p_T) \geq 0$ and $\gamma_T(p_T) \geq 0$ $\forall p_T \in [0, \overline{p_T}]$, with $\beta_T(\underline{p}) = 0$.
2. if $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} \geq 0$: $\beta_T(p_T) \geq 0$ and $\gamma_T(p_T) \geq 0$ $\forall p_T \in [\underline{p_T}, 1]$, with $\beta_T(\overline{p}) = 0$.

Depending on the sign of a_{1T}, the sets $[0, \overline{p}]$ and $[\underline{p}, 1]$ define lower and upper bounds to α_T, β_T and γ_T.

However, by construction, the lower bound for β_T is always zero and is not informative. But if the sign of a_{1T} remains constant and the conditions are verified for all T then it is possible to define a unique p^* such as $\beta_T(p^*) \geq 0$ and $\gamma_T(p^*) \geq 0$. If $a_{1T} > 0$, $p^* = min\{\overline{p_T}; T \geq T_0\}$ and if $a_{1T} < 0$, $p^* = max\{\overline{p_T}; T \geq T_0\}$.

To sum up, the important conditions for the identification of bounds to β_T and to γ_T are:

- either $a_{1T} > 0$ and $a_{2T} - a_{0T} - 3a_{1T} \geq 0 \; \forall T \geq 0 \Rightarrow p^* = min\{\overline{p_T}; T \geq T_0\}$
- or $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} \geq 0 \; \forall T \geq 0 \Rightarrow p^* = max\{\overline{p_T}; T \geq T_0\}$

As a consequence, it is not possible to identify bounds such as $\beta_T \geq 0$ and to $\gamma_T \geq 0$ if $a_{1T} > 0$ and $a_{2T} - a_{0T} - 3a_{1T} < 0$ or if $a_{1T} < 0$ and $a_{2T} - a_{0T} + a_{1T} < 0$. It means that it is not possible to find a p that ensure that $\beta_T \geq 0$ and to $\gamma_T \geq 0$ at the same time, meaning that the reform has unexpected impacts on the outcome.

C The tax system in France

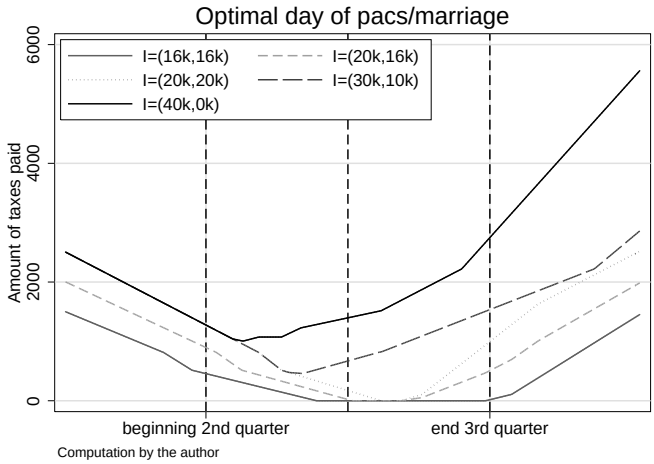


Figure 1: Optimal day - simulation

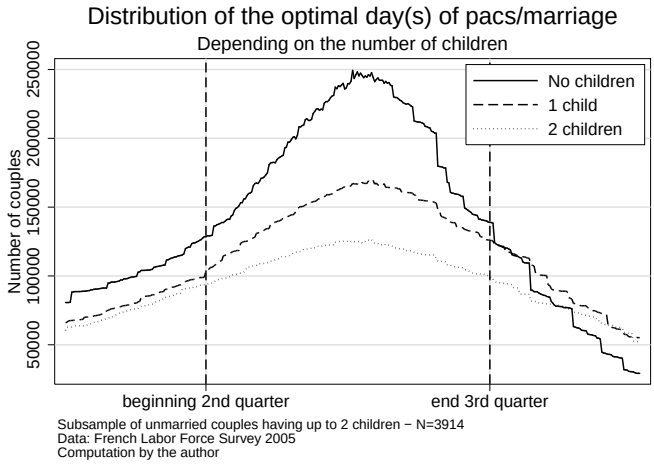


Figure 2: Optimal day - on LFS 2005

Table 2: Simulation of the effect of getting pacsed at the optimal day on taxes

Ratio of taxes saved	Mean ratio	Mean taxes saved	Income	Proportion of couples
0%	0	14.44	9370	.29
>0 and $\leq 80\%$	66.0	4347	66184	.06
>80 and $\leq 95\%$	88.4	3029	47156	.05
$>95\%$	99.9	885.6	27565	.60

Ratio of taxes saved and taxes saved computed compare to a married couple, for a normal year. Lecture: There are 6% of couples that would save between 0 and 80% of taxes compare to normal year of marriage. Among them, the average ratio of saved taxes is 66%, which represents an average 4347 amount of taxes saved. The average annual income of such couples is 66184.

D Descriptive statistics

Table 3: Evolution of the pacs rate for 1000 persones aged 15-59

year	Mean	Stan.Dev.	Min	Max
2000	.50	.22	.04	1.65
2001	.45	.20	0	1.21
2002	.52	.23	.08	1.34
2003	.66	.27	.10	1.62
2004	.83	.36	.15	3.24
2005	1.36	.47	.19	3.29
2006	1.70	.56	.33	3.72
2007	2.20	.67	.36	4.36
2008	3.42	.90	.61	5.80
2009	4.05	1.11	.14	6.65

N=443

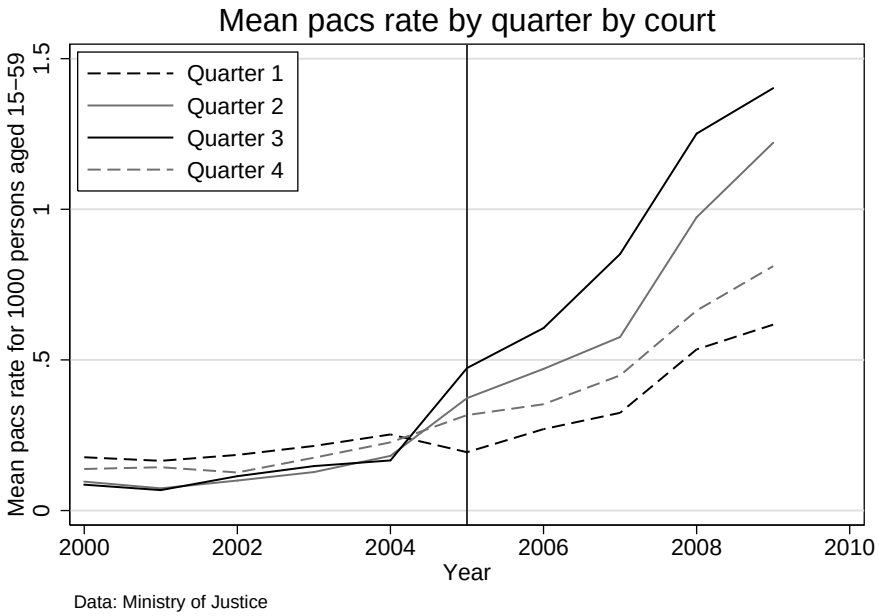
Lecture: In 2000, 0.5 pacs per 1000 persons aged 15-59 years old have been contracted by court. The minimum rate is 0.04 and the maximum is 1.65.

Table 4: Evolution of the rate of dissolution of pacs for 1000 pacs

year	Mean	Stan.Dev.	Min	Max
2000	.020	.046	0	.5
2001	.037	.039	0	.25
2002	.046	.039	0	.278
2003	.051	.032	0	.175
2004	.056	.031	0	.238
2005	.051	.026	0	.235
2006	.039	.017	0	.118
2007	.035	.017	0	.179
2008	.028	.011	0	.073
2009	.027	.009	0	.058

N=443. The denominator is the number of pacs contracted in the court before and during the year considered.

Lecture: In 2000, for 1000 pacs contracted (in stock) in the court, 0.2 have been broken up by court. The minimum rate is 0 and the maximum rate is 0.5 per 1000.



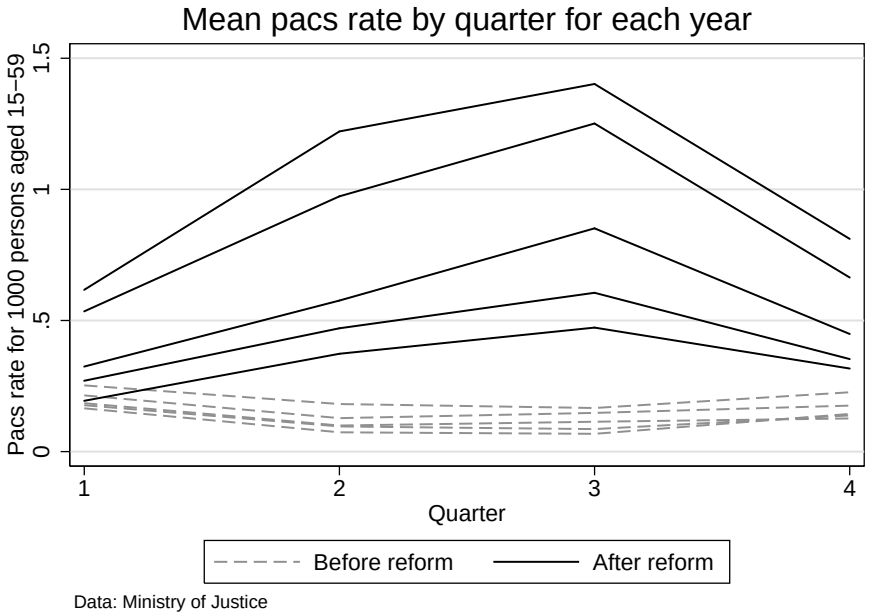
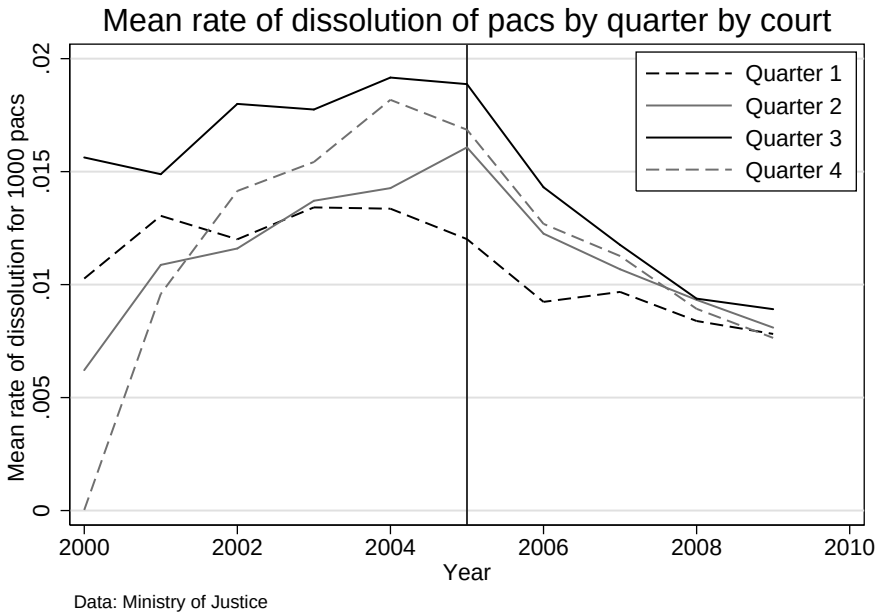


Figure 3: Pacs rates



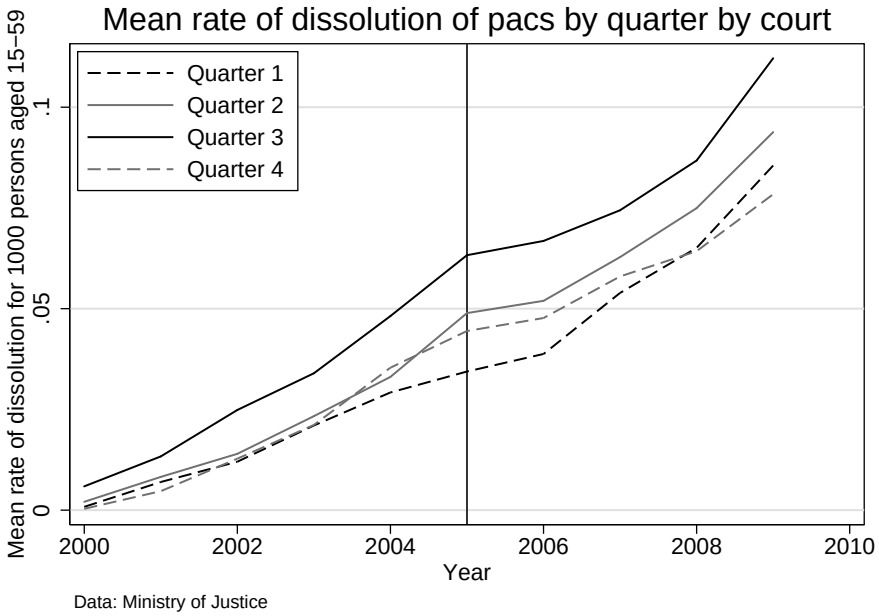


Figure 4: Rate of dissolution

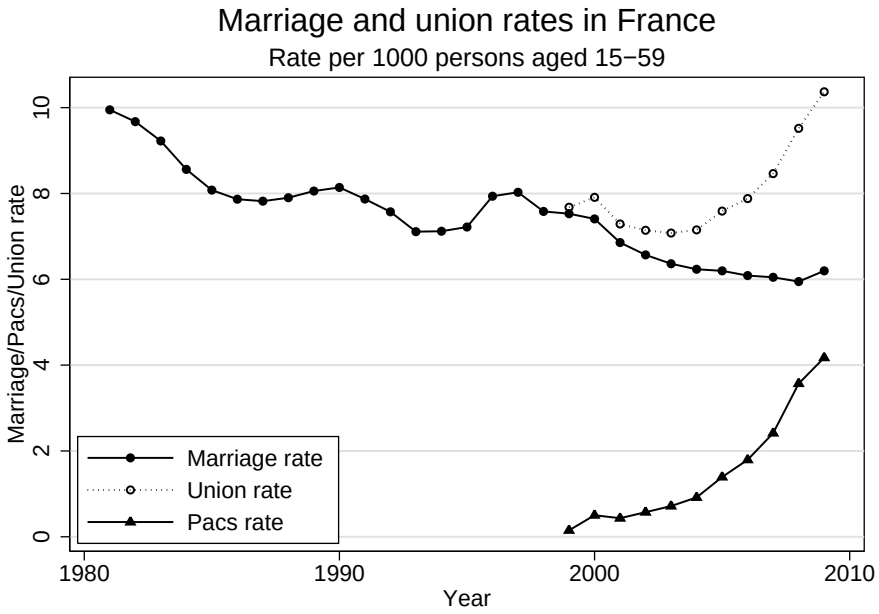


Figure 5: Rate of marriage/unions (for 1000 persons aged 15-59)

E Results

Table 5: Difference in difference estimation

	(1)		(2)		(3)		(4)	
	Pacs for 1000 people aged 15-59				Pacs for 1000 couples			
Year 2001	.06***	(6.6e-03)	.06***	(6.8e-03)	-6.2e-03	(7.1e-03)	-3.6e-03	(.014)
Year 2002	.063***	(7.0e-03)	.062***	(7.3e-03)	-3.8e-03	(7.5e-03)	1.3e-03	(.024)
Year 2003	.141***	(8.1e-03)	.141***	(8.6e-03)	.075***	(8.6e-03)	.083**	(.035)
Year 2004	.231***	(.012)	.23***	(.012)	.164***	(.012)	.174***	(.047)
Year 2005	.262***	(8.8e-03)	.261***	(9.9e-03)	.195***	(8.8e-03)	.208***	(.057)
Year 2006	.374***	(9.7e-03)	.373***	(.012)	.308***	(9.7e-03)	.323***	(.068)
Year 2007	.524***	(.011)	.523***	(.014)	.458***	(.012)	.475***	(.079)
Year 2008	.95***	(.015)	.949***	(.017)	.883***	(.015)	.904***	(.09)
Year 2009	1.18***	(.02)	1.18***	(.022)	1.11***	(.02)	1.14***	(.1)
Sem.2 × Year 2001	-.167***	(7.8e-03)	-.167***	(8.3e-03)	-.034***	(8.1e-03)	-.034***	(8.1e-03)
Sem.2 × Year 2002	-.098***	(9.0e-03)	-.098***	(9.1e-03)	.036***	(9.0e-03)	.035***	(9.0e-03)
Sem. 2 × Year 2003	-.115***	(.01)	-.115***	(9.9e-03)	.019*	(9.5e-03)	.019*	(9.5e-03)
Sem. 2 × Year 2004	-.131***	(.014)	-.131***	(.014)	1.9e-03	(.013)	1.9e-03	(.013)
Sem. 2 × Year 2005	.336***	(.018)	.336***	(.016)	.469***	(.014)	.469***	(.014)
Sem. 2 × Year 2006	.453***	(.021)	.453***	(.019)	.586***	(.016)	.586***	(.016)
Sem. 2 × Year 2007	.655***	(.026)	.655***	(.025)	.788***	(.021)	.788***	(.021)
Sem. 2 × Year 2008	1.03***	(.035)	1.03***	(.034)	1.16***	(.028)	1.16***	(.028)
Sem. 2 × Year 2009	1.2***	(.044)	1.2***	(.043)	1.33***	(.037)	1.33***	(.037)
Constant	.248***	(4.8e-03)	.35	(.305)	.248***	(8.0e-03)	-4.16**	(1.65)
Fixed effect	No		No		Yes		Yes	
Controls	No		Yes		No		Yes	
Observations	8860		8860		8860		8860	
R^2	0.801		0.813		0.872		0.875	

Standard errors in parentheses. Standard errors are clustered at the court level.
* p<0.1, ** p<0.05, *** p<0.01

Table 6: Regression results - pacs rate for 1000 persons ages 15-59

Spe	Year	a_{0T}		a_{1T}		a_{2T}		Condition	Sign a_{1T}	Controls	Fix. Eff.
1	2001	.0075	(.0087)	-.0177 ***	(.0066)	-.0461 ***	(.0065)	-	F		
1	2002	-.0081	(.0156)	.0192 ***	(.0064)	.0432 ***	(.007)	+	F		
1	2003	.0426 *	(.0224)	.0001	(.0067)	.056 ***	(.0071)	+	F		
1	2004	.0953 ***	(.03)	-.0127	(.0103)	.0775 ***	(.01)	-	F		
1	2005	.1874 ***	(.0362)	-.162 ***	(.0087)	.4852 ***	(.0131)	-	T	N	N
1	2006	.2252 ***	(.0434)	-.1216 ***	(.0081)	.6791 ***	(.0152)	-	T		
1	2007	.3225 ***	(.0499)	-.1632 ***	(.0086)	.9349 ***	(.0201)	-	T		
1	2008	.5396 ***	(.0571)	-.1681 ***	(.0108)	1.5167 ***	(.027)	-	T		
1	2009	.6885 ***	(.0638)	-.2332 ***	(.0143)	1.7677 ***	(.0361)	-	T		
2	2001	.0058	(.0048)	-.0177 ***	(.0066)	-.0461 ***	(.0065)	-	F		
2	2002	-.0116 **	(.0047)	.0193 ***	(.0064)	.0433 ***	(.0069)	+	F		
2	2003	.0374 ***	(.0053)	.0001	(.0067)	.056 ***	(.0071)	+	F		
2	2004	.0884 ***	(.0079)	-.0126	(.0103)	.0776 ***	(.01)	-	F		
2	2005	.1788 ***	(.0068)	-.1619 ***	(.0087)	.4853 ***	(.013)	-	T	N	Y
2	2006	.2149 ***	(.0069)	-.1216 ***	(.0081)	.6792 ***	(.0152)	-	T		
2	2007	.3106 ***	(.0076)	-.1631 ***	(.0087)	.935 ***	(.0201)	-	T		
2	2008	.526 ***	(.0096)	-.168 ***	(.0108)	1.5168 ***	(.027)	-	T		
2	2009	.6732 ***	(.0132)	-.2331 ***	(.0143)	1.7678 ***	(.0361)	-	T		
3	2001	.0057	(.0049)	-.0177 ***	(.0066)	-.0461 ***	(.0065)	-	F		
3	2002	-.0118 **	(.0052)	.0193 ***	(.0064)	.0433 ***	(.0069)	+	F		
3	2003	.037 ***	(.006)	.0001	(.0067)	.056 ***	(.0071)	+	F		
3	2004	.0879 ***	(.0087)	-.0126	(.0103)	.0776 ***	(.01)	-	F		
3	2005	.1782 ***	(.0083)	-.1619 ***	(.0087)	.4853 ***	(.013)	-	T	Y	N
3	2006	.2142 ***	(.0091)	-.1215 ***	(.0081)	.6792 ***	(.0152)	-	T		
3	2007	.3098 ***	(.0107)	-.1631 ***	(.0087)	.9351 ***	(.0201)	-	T		
3	2008	.5251 ***	(.0126)	-.1679 ***	(.0108)	1.5168 ***	(.027)	-	T		
3	2009	.6722 ***	(.0165)	-.233 ***	(.0143)	1.7678 ***	(.0361)	-	T		
4	2001	.0058	(.0048)	-.0177 ***	(.0066)	-.0461 ***	(.0065)	-	F		
4	2002	-.0116 **	(.0047)	.0193 ***	(.0064)	.0433 ***	(.0069)	+	F		
4	2003	.0374 ***	(.0053)	.0001	(.0067)	.056 ***	(.0071)	+	F		
4	2004	.0884 ***	(.0079)	-.0126	(.0103)	.0776 ***	(.01)	-	F		
4	2005	.1788 ***	(.0068)	-.1619 ***	(.0087)	.4853 ***	(.0131)	-	T	Y	N
4	2006	.2149 ***	(.0069)	-.1216 ***	(.0081)	.6792 ***	(.0152)	-	T		
4	2007	.3106 ***	(.0076)	-.1631 ***	(.0087)	.935 ***	(.0201)	-	T		
4	2008	.526 ***	(.0096)	-.168 ***	(.0108)	1.5168 ***	(.027)	-	T		
4	2009	.6732 ***	(.0132)	-.2331***	(.0143)	1.7678***	(.0361)	-	T		

When $a_{1T} < 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} + a_{1T} \geq 0$ is verified and to "F" (false) otherwise.
When $a_{1T} > 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} - 3a_{1T} \geq 0$ is verified and to "F" (false) otherwise.
Controls include: the rate of households for 1000 inhabitants (as a proxy for household size), the rate of owners, the rate of unemployment, the rate of active adults.
Standard errors are clustered at the court level

Table 7: Regression results - pacs rate for 1000 couples

Spe	Year	a_{0T}		a_{1T}		a_{2T}		Sign a_{1T}	Condition	Controls	Fix. Eff.
1	2001	.0952 ***	(.022)	-.0438 ***	(.0153)	-.1114 ***	(.0151)	-	F		
1	2002	.1358 ***	(.0406)	.0455 ***	(.0148)	.1011 ***	(.0162)	+	F		
1	2003	.3327 ***	(.0592)	.0017	(.0152)	.1356 ***	(.0166)	+	F		
1	2004	.5357 ***	(.0792)	-.0309	(.023)	.1859 ***	(.0224)	-	F	N	N
1	2005	.833 ***	(.0967)	-.3915 ***	(.0206)	1.1753 ***	(.0347)	-	F		
1	2006	1.0013 ***	(.1171)	-.2982 ***	(.0197)	1.6451 ***	(.0411)	-	T		
1	2007	1.3059 ***	(.1339)	-.3949 ***	(.0206)	2.261 ***	(.0541)	-	T		
1	2008	1.8997 ***	(.1546)	-.418 ***	(.0261)	3.6302 ***	(.0711)	-	T		
1	2009	2.3269 ***	(.1715)	-.5709 ***	(.0347)	4.2418 ***	(.0927)	-	T		
2	2001	.0127	(.0111)	-.0429 ***	(.0153)	-.1104 ***	(.0151)	-	F		
2	2002	-.0282 **	(.0113)	.0473 ***	(.0148)	.103 ***	(.0161)	+	F		
2	2003	.088 ***	(.0123)	.0044	(.0152)	.1383 ***	(.0166)	+	F		
2	2004	.2111 ***	(.0181)	-.0275	(.0229)	.1894 ***	(.0224)	-	F	N	Y
2	2005	.4294 ***	(.0165)	-.3872 ***	(.0206)	1.1796 ***	(.0348)	-	T		
2	2006	.5196 ***	(.0171)	-.2931 ***	(.0196)	1.6501 ***	(.0411)	-	T		
2	2007	.7467 ***	(.0187)	-.3891 ***	(.0206)	2.2668 ***	(.0542)	-	T		
2	2008	1.2638 ***	(.0247)	-.4115 ***	(.0259)	3.6367 ***	(.0712)	-	T		
2	2009	1.615 ***	(.0337)	-.5638 ***	(.0346)	4.249 ***	(.0928)	-	T		
3	2001	.0201 *	(.0116)	-.043 ***	(.0153)	-.1105 ***	(.0151)	-	F		
3	2002	-.0134	(.013)	.0472 ***	(.0148)	.1028 ***	(.0162)	+	F		
3	2003	.11 ***	(.0149)	.0042	(.0152)	.1381 ***	(.0166)	+	F		
3	2004	.2404 ***	(.021)	-.0277	(.023)	.1891 ***	(.0224)	-	F		
3	2005	.4659 ***	(.0211)	-.3875 ***	(.0206)	1.1793 ***	(.0348)	-	T	Y	N
3	2006	.5632 ***	(.0236)	-.2935 ***	(.0196)	1.6497 ***	(.0411)	-	T		
3	2007	.7973 ***	(.0274)	-.3895 ***	(.0207)	2.2664 ***	(.0542)	-	T		
3	2008	1.3214 ***	(.0328)	-.412 ***	(.026)	3.6362 ***	(.0712)	-	T		
3	2009	1.6796 ***	(.0426)	-.5643 ***	(.0346)	4.2484 ***	(.0928)	-	T		
4	2001	.0127	(.0111)	-.0429 ***	(.0153)	-.1104 ***	(.0151)	-	F		
4	2002	-.0282 **	(.0113)	.0473 ***	(.0148)	.103 ***	(.0161)	+	F		
4	2003	.088 ***	(.0123)	.0044	(.0152)	.1383 ***	(.0166)	+	F		
4	2004	.2111 ***	(.0181)	-.0275	(.0229)	.1894 ***	(.0224)	-	F		
4	2005	.4294 ***	(.0165)	-.3872 ***	(.0206)	1.1796 ***	(.0348)	-	T	Y	Y
4	2006	.5196 ***	(.0171)	-.2931 ***	(.0196)	1.6501 ***	(.0411)	-	T		
4	2007	.7467 ***	(.0187)	-.3891 ***	(.0206)	2.2668 ***	(.0542)	-	T		
4	2008	1.2638 ***	(.0247)	-.4115 ***	(.0259)	3.6367 ***	(.0712)	-	T		
4	2009	1.615***	(.0337)	-.5638***	(.0346)	4.249***	(.0928)	-	T		

When $a_{1T} < 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} + a_{1T} \geq 0$ is verified and to "F" (false) otherwise.
When $a_{1T} > 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} - 3a_{1T} \geq 0$ is verified and to "F" (false) otherwise.
Controls include: the rate of households for 1000 inhabitants (as a proxy for household size), the rate of owners, the rate of unemployment, the rate of active adults.
Standard errors are clustered at the court level

Table 8: Difference in difference estimation on broken up pacs

	(1)		(2)		(3)		(4)	
	Broken pacs for 1000 people aged 15-59				Broken pacs for 1000 pacs (stock)			
Year 2001	.00715***	(.000927)	.0106***	(.000981)				
Year 2002	.0202***	(.00136)	.0236***	(.00144)	.000626	(.0024)	.00109	(.00367)
Year 2003	.0376***	(.00181)	.041***	(.00197)	.00362*	(.00207)	.00408	(.00359)
Year 2004	.06***	(.00234)	.0634***	(.00256)	.0061***	(.00189)	.00656*	(.00362)
Year 2005	.0743***	(.00251)	.0777***	(.00272)	.00337*	(.00185)	.00383	(.00352)
Year 2006	.0819***	(.00261)	.0853***	(.00285)	-.00405**	(.00168)	-.00358	(.00338)
Year 2007	.107***	(.0031)	.111***	(.00333)	-.00509***	(.00173)	-.00462	(.00337)
Year 2008	.125***	(.00331)	.128***	(.00356)	-.00874***	(.00167)	-.00827**	(.00337)
Year 2009	.159***	(.00383)	.163***	(.00412)	-.0108***	(.00165)	-.0103***	(.00337)
Year 2001×Sem. 2	.00987***	(.00132)	.00306**	(.00154)				
Year 2002×Sem. 2	.014***	(.00223)	.00723***	(.00244)	.00342	(.00234)	.00275	(.00444)
Year 2003×Sem. 2	.0151***	(.00233)	.00833***	(.00253)	.00217	(.00175)	.00151	(.00436)
Year 2004×Sem. 2	.0167***	(.00272)	.00989***	(.00299)	.00184	(.0014)	.00117	(.00448)
Year 2005×Sem. 2	.0333***	(.00327)	.0265***	(.00349)	.00695***	(.00131)	.00629	(.00427)
Year 2006×Sem. 2	.0323***	(.00309)	.0255***	(.00333)	.00524***	(.000921)	.00458	(.00407)
Year 2007×Sem. 2	.0253***	(.00352)	.0185***	(.0037)	.00178**	(.000772)	.00111	(.00399)
Year 2008×Sem. 2	.0324***	(.00401)	.0256***	(.00423)	.00171***	(.000592)	.00104	(.00398)
Year 2009×Sem. 2	.042***	(.0044)	.0352***	(.0047)	.00187***	(.000479)	.0012	(.00399)
Constant	.00456***	(.00036)	.00456***	(.00163)	.0268***	(.00164)	.0267***	(.00161)
Observations	8860		8860		8415		8415	
R^2	0.487		0.594		0.037		0.040	
Fixed effect	N		Y		N		Y	

Standard errors in parentheses. Standard errors are clustered at the court level.
* p<0.1, ** p<0.05, *** p<0.01

Table 9: Regression results - broken up pacs

outcome	Year	a_{0T}		a_{1T}		a_{2T}		sign a_{1T}	condition	Fixed effects
	2001	0.004 ***	(0.001)	0.002 **	(0.001)	0.009 ***	(0.001)	+	F	1
	2002	0.012 ***	(0.001)	-0.001	(0.001)	0.018 ***	(0.002)	-	T	1
	2003	0.021 ***	(0.001)	-0.001	(0.002)	0.029 ***	(0.002)	-	T	1
Rate	2004	0.035 ***	(0.002)	-0.007 ***	(0.002)	0.038 ***	(0.003)	-	F	1
for 1000	2005	0.044 ***	(0.002)	-0.011 ***	(0.002)	0.060 ***	(0.003)	-	T	1
pacs	2006	0.047 ***	(0.002)	-0.009 ***	(0.002)	0.063 ***	(0.003)	-	T	1
	2007	0.058 ***	(0.002)	-0.005 *	(0.003)	0.072 ***	(0.004)	-	T	1
	2008	0.064 ***	(0.002)	0.000	(0.003)	0.090 ***	(0.004)	+	T	1
	2009	0.078 ***	(0.002)	0.007 **	(0.003)	0.120 ***	(0.004)	+	T	1
	2001	-9.306 ***	(2.773)	3.455	(2.948)	17.396 ***	(1.955)	+	T	0
	2002	-4.752 *	(2.808)	-2.140	(1.507)	16.669 ***	(1.871)	-	T	0
	2003	-3.470	(2.685)	-2.010 *	(1.210)	17.133 ***	(1.480)	-	T	0
Rate	2004	-0.719	(2.576)	-4.818 ***	(1.130)	16.529 ***	(1.292)	-	T	0
for 1000	2005	-2.041	(2.556)	-4.842 ***	(0.893)	20.234 ***	(1.204)	-	T	0
pacs	2006	-6.208 **	(2.509)	-3.452 ***	(0.656)	15.278 ***	(0.864)	-	T	0
	2007	-7.629 ***	(2.541)	-1.590 ***	(0.587)	12.192 ***	(0.746)	-	T	0
	2008	-9.969 ***	(2.508)	-0.538	(0.424)	10.815 ***	(0.504)	-	T	0
	2009	-11.255 ***	(2.505)	0.176	(0.323)	10.245 ***	(0.434)	+	T	0
	2001	0.004 ***	(0.001)	0.002 *	(0.001)	0.009 ***	(0.001)	+	F	1
	2002	0.012 ***	(0.001)	-0.001	(0.001)	0.018 ***	(0.002)	-	T	1
Rate	2003	0.021 ***	(0.001)	-0.001	(0.002)	0.029 ***	(0.002)	-	T	1
for 1000	2004	0.035 ***	(0.002)	-0.007 ***	(0.002)	0.038 ***	(0.003)	-	F	1
persons	2005	0.044 ***	(0.002)	-0.011 ***	(0.002)	0.060 ***	(0.003)	-	T	1
15-59 y.o.	2006	0.047 ***	(0.002)	-0.009 ***	(0.002)	0.063 ***	(0.003)	-	T	1
	2007	0.058 ***	(0.002)	-0.005 *	(0.003)	0.072 ***	(0.004)	-	T	1
	2008	0.064 ***	(0.002)	0.000	(0.003)	0.090 ***	(0.004)	+	T	1
	2009	0.078 ***	(0.002)	0.007 **	(0.003)	0.120 ***	(0.004)	+	T	1
	2001	0.002 ***	(0.001)	0.002 **	(0.001)	0.017 ***	(0.001)	+	T	0
	2002	0.010 ***	(0.001)	-0.001	(0.001)	0.026 ***	(0.002)	-	T	0
Rate	2003	0.018 ***	(0.001)	0.000	(0.002)	0.036 ***	(0.002)	-	T	0
for 1000	2004	0.032 ***	(0.002)	-0.006 ***	(0.002)	0.046 ***	(0.003)	-	T	0
persons	2005	0.041 ***	(0.002)	-0.010 ***	(0.002)	0.068 ***	(0.003)	-	T	0
15-59 y.o.	2006	0.045 ***	(0.002)	-0.009 ***	(0.002)	0.071 ***	(0.003)	-	T	0
	2007	0.055 ***	(0.002)	-0.004	(0.003)	0.079 ***	(0.004)	-	T	0
	2008	0.061 ***	(0.002)	0.001	(0.003)	0.097 ***	(0.004)	+	T	0
	2009	0.075 ***	(0.002)	0.007 **	(0.003)	0.128 ***	(0.004)	+	T	0

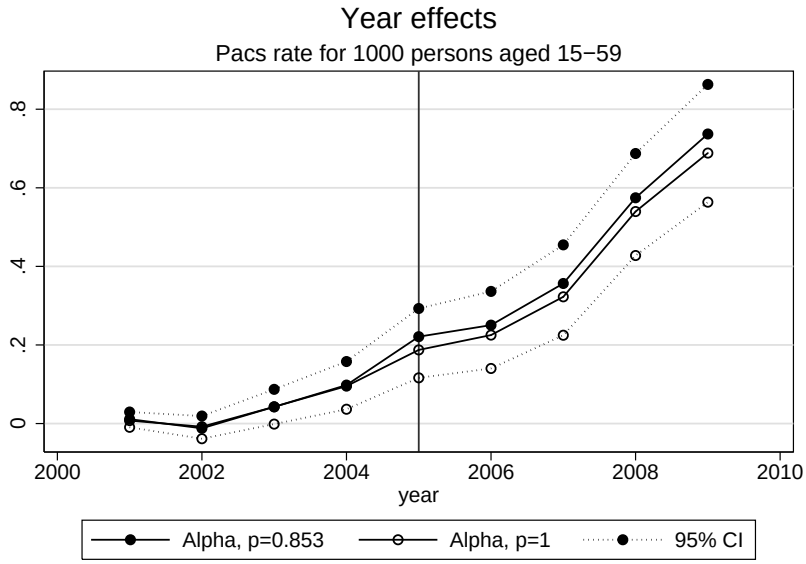
When $a_{1T} < 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} + a_{1T} \geq 0$ is verified and to "F" (false) otherwise.
When $a_{1T} > 0$, condition is equal to "T" (true) if the condition $a_{2T} - a_{2T} - 3a_{1T} \geq 0$ is verified and to "F" (false) otherwise.

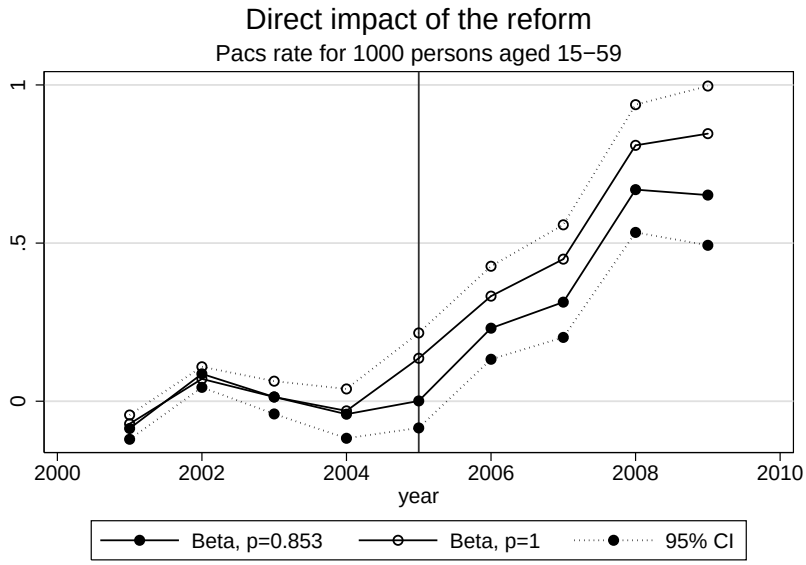
Table 10: Regression results - estimation of the γ_T, β_T and the α_T

year	$\gamma_T(\underline{p})$	$sd(\gamma_T(\underline{p}))$	$\gamma_T(1)$	$sd(\gamma_T(1))$	$\alpha_T(\underline{p})$	$sd(\alpha_T(\underline{p}))$	$\alpha_T(1)$	$sd(\alpha_T(1))$	$\beta_T(1)$	$sd(\beta_T(1))$	$\beta_T(\underline{p})$	$sd(\beta_T(\underline{p}))$
Explained variable: pacs rate for 1000 persons aged 15-59. Specification included court fixed effect and controls												
$\underline{p} = 0.853$												
2001	.0251 ***	(0.000)	.0177 ***	(.0066)	.0112	(.0081)	.0075	(.0087)	-.0861 ***	(.0144)	-.0714 ***	(.0142)
2002	-.0273 ***	(0.000)	-.0192 ***	(.0064)	-.0121	(.0151)	-.0081	(.0156)	.0866 ***	(.0199)	.0706 ***	(.0196)
2003	-.0001 ***	(0.000)	-.0001	(.0067)	.0426 *	(.0221)	.0426 *	(.0224)	.0135	(.0258)	.0134	(.0255)
2004	.018 ***	(0.000)	.0127	(.0103)	.0979 ***	(.0292)	.0953 ***	(.03)	-.041	(.035)	-.0304	(.0353)
2005	.2294 ***	(0.000)	.162 ***	(.0087)	.2211 ***	(.0357)	.1874 ***	(.0362)	.001	(.0395)	.1359 ***	(.0409)
2006	.1723 ***	(0.000)	.1216 ***	(.0081)	.2505 ***	(.0427)	.2252 ***	(.0434)	.231 ***	(.0474)	.3323 ***	(.0482)
2007	.2311 ***	(0.000)	.1632 ***	(.0086)	.3565 ***	(.0496)	.3225 ***	(.0499)	.3133 ***	(.0557)	.4492 ***	(.0554)
2008	.238 ***	(0.000)	.1681 ***	(.0108)	.5746 ***	(.0565)	.5396 ***	(.0571)	.6691 ***	(.0622)	.8091 ***	(.0656)
2009	.3303 ***	(0.000)	.2332 ***	(.0143)	.737 ***	(.0629)	.6885 ***	(.0638)	.6518 ***	(.0739)	.846 ***	(.0768)
Explained variable: pacs rate for 1000 couples. Specification included court fixed effect and controls												
$\underline{p} = 0.817$												
2001	.0691 ***	(0.000)	.0438 ***	(.0153)	.1078 ***	(.0207)	.0952 ***	(.022)	-.301 ***	(.0344)	-.2504 ***	(.0344)
2002	-.0718 ***	(0.000)	-.0455 ***	(.0148)	.1227 ***	(.0393)	.1358 ***	(.0406)	.0633	(.0486)	.0108	(.0494)
2003	-.0027 ***	(0.000)	-.0017	(.0152)	.3322 ***	(.0585)	.3327 ***	(.0592)	-.1933 ***	(.0654)	-.1953 ***	(.0655)
2004	.0488 ***	(0.000)	.0309	(.023)	.5446 ***	(.0776)	.5357 ***	(.0792)	-.4165 ***	(.0875)	-.3807 ***	(.0897)
2005	.6175 ***	(0.000)	.3915 ***	(.0206)	.946 ***	(.0957)	.833 ***	(.0967)	-.5012 ***	(.098)	-.0492	(.1075)
2006	.4703 ***	(0.000)	.2982 ***	(.0197)	1.0874 ***	(.115)	1.0013 ***	(.1171)	.0013	(.1207)	.3456 ***	(.1303)
2007	.6229 ***	(0.000)	.3949 ***	(.0206)	1.4199 ***	(.1331)	1.3059 ***	(.1339)	.1043	(.1368)	.5602 ***	(.148)
2008	.6593 ***	(0.000)	.418 ***	(.0261)	2.0203 ***	(.1521)	1.8997 ***	(.1546)	.8298 ***	(.154)	1.3125 ***	(.1775)
2009	.9005 ***	(0.000)	.5709 ***	(.0347)	2.4917 ***	(.1692)	2.3269 ***	(.1715)	.6848 ***	(.1819)	1.344 ***	(.2035)

Table 11: Estimated effect of the reform

	direct impact				Schedule impact			
	Lower bound		Upper bound		Lower bound		Upper bound	
Explained variable: pacs rate for 1000 persons aged 15-59								
2001	-.191 ***	(.032)	-.159 ***	(.032)	.039 ***	(.015)	.056 ***	(0.000)
2002	.165 ***	(.038)	.134 ***	(.037)	-.037 ***	(.012)	-.052 ***	(0.000)
2003	.02	(.039)	.02	(.038)	0	(.01)	0 ***	(0.000)
2004	-.05	(.042)	-.037	(.043)	.015	(.012)	.022 ***	(0.000)
2005	.001	(.029)	.1 ***	(.03)	.119 ***	(.006)	.169 ***	(0.000)
2006	.136 ***	(.028)	.196 ***	(.028)	.072 ***	(.005)	.101 ***	(0.000)
2007	.142 ***	(.025)	.204 ***	(.025)	.074 ***	(.004)	.105 ***	(0.000)
2008	.195 ***	(.018)	.236 ***	(.019)	.049 ***	(.003)	.07 ***	(0.000)
2009	.161 ***	(.018)	.209 ***	(.019)	.058 ***	(.004)	.082 ***	(0.000)
Explained variable: pacs rate for 1000 couples								
2001	-.68 ***	(.081)	-.632 ***	(.082)	.098 ***	(.034)	.123 ***	(0.000)
2002	-.066	(.105)	-.108	(.106)	-.085 ***	(.028)	-.106 ***	(0.000)
2003	-.444 ***	(.115)	-.445 ***	(.115)	-.001	(.023)	-.001 ***	(0.000)
2004	-.641 ***	(.122)	-.622 ***	(.126)	.039	(.028)	.049 ***	(0.000)
2005	-.301 ***	(.085)	-.158 *	(.093)	.29 ***	(.015)	.362 ***	(0.000)
2006	0	(.083)	.087	(.09)	.177 ***	(.012)	.22 ***	(0.000)
2007	.061	(.073)	.151 *	(.079)	.181 ***	(.009)	.225 ***	(0.000)
2008	.247 ***	(.051)	.307 ***	(.06)	.123 ***	(.008)	.153 ***	(0.000)
2009	.19 ***	(.052)	.26 ***	(.058)	.142 ***	(.009)	.177 ***	(0.000)





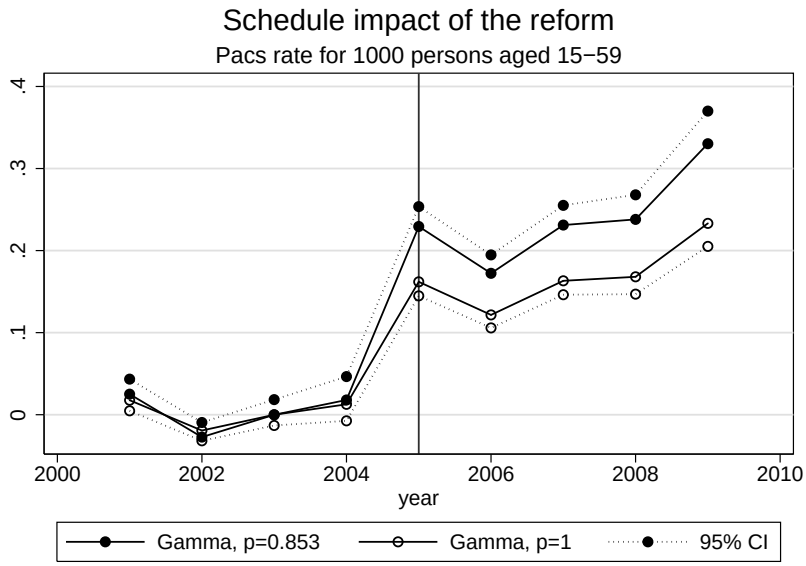


Figure 6: Estimated parameters: lower and upper bounds (pacs rate for 1000 persons aged 15-59)

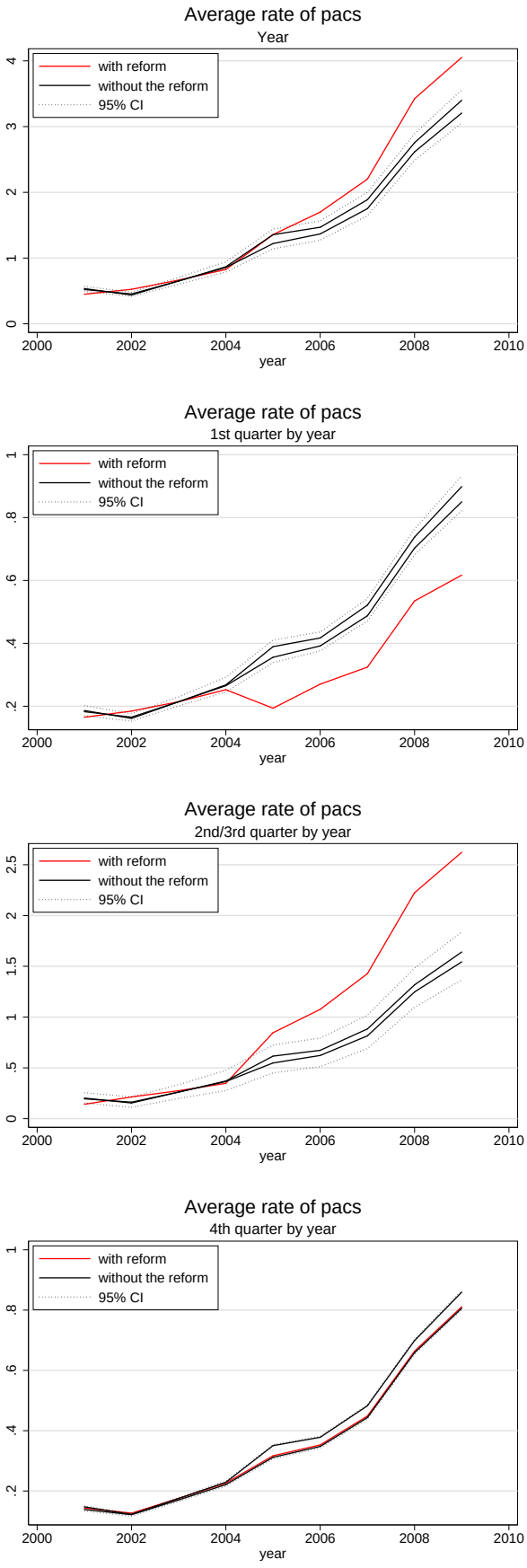


Figure 7: Estimated counterfactuals: lower and upper bounds (pacs rate for 1000 persons aged 15-59)