Child Custody and Child Support vs.Unilateral Divorce in the US.

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Abstract:

There is extensive literature examining changes in divorce rates focusing on the effects of changes in divorce laws. Previous analysis omits reforms that introduced changes in divorce settlements. This might in somehow obscure the impact of unilateral reforms on divorce rates. In this paper, we extend on the previous analyses offering insights on the impact of unilateral divorce on divorce rates after controlling for several reforms of aspects of law relevant to divorce. We introduce both joint custody law reforms and Child Support Enforcement efforts. Our results suggest that those reforms play an important role in explaining the behaviour of divorce rate in the 1980s and 1990s. Supplemental analysis, developed by exploiting time-series analysis, also suggests that what is driving the evolution of the divorce rate in the 1980s and 1990s is a shock that had a negative effect on divorce. This seems to confirm that unilateral divorce reforms do not have a negative effect on divorce rate in the long run. After ten years of the implementation of unilateral reforms, what seem to conduct the evolution of divorce rates are those reforms on the laws that govern the aftermath of divorce.

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I.   Introduction

In an article of the American Economic Review, Justin Wolfers (2006) finds that divorce legal reforms that occurred from the 1960s and 1970s in US had transitory effect on divorce rates. Specifically, he claims that after a decade, no effect on divorce rate can be discerned as a result of the implementation of unilateral divorce reforms. Further, some of his estimates suggest that divorce rate eventually declined 15 years after reform. This evidence is considered as consistent with the Coasian assumption of efficient bargaining: in most of the cases, couples are able to efficiently bargain even under unilateral divorce laws. They can redistribute their wealth to stay married, since, as Wolfers concludes, transaction costs are unimportant, which makes easy the bargaining over rents in the marriage situation.

The analysis developed by Wolfers omits reforms that introduced changes in divorce settlements. There are two primary aspects of law relevant to divorce and both may affect divorce rate, see Fine and Fine (1994). First, there are laws that regulate how spouses get a divorce, and here are included those reforms analysed by Wolfers. Second, there are laws that govern the living arrangement in the subsequent periods after divorce, including such matters as spousal support, child support, and child custody, those are not studied by Wolfers but they may have significant incidence in the probability of divorce. Although, from a theoretical point of view, it can be suggested that those changes in divorce settlements have an ambiguous effect on divorce rate (see Nixon, 1997; Rasul, 2006; and Halla, 2009), previous empirical research found that both changes in the financial obligation of parents and the introduction of joint custody negatively affect the probability of divorce (see Nixon, 1997 and Brinig and Buckley, 1998b). Thus, it can be argued that what lead to an efficient bargaining are those changes in divorce settlements by reducing the frictions in a bargaining situation, which in turns may reduce the probability of divorce.[1]

The analysis of only one of those aspects of law relevant to divorce might in somehow obscure the impact of unilateral reforms on divorce rates. While most of the unilateral reforms already analysed by Wolfers increased the share of covered population from the late 1960s achieving the 50% of the population in the early 1970s, see Figure 1, a trend of reforms occurred in the area of post-divorce child custody and child support decisions in the US. The timing of both reforms differs in at least a decade in each state. Focusing on the adoption of joint custody regime in the US, Figure 1, it is clearly observed the decade gap between the rise in the incidence of unilateral divorce laws and the rise in the incidence of joint custody. Surprisingly, Wolfers observes that the effect of unilateral divorce law reform on divorce rate dissipated after a decade from the implementation of the unilateral divorce. Thus, the analysis developed by Wolfers may be confounding both effects. Empirically, it is unclear whether the dummy variables included by Wolfers to model the dynamic response of divorce are only capturing the adjustment path of divorce rates to unilateral divorce. Because dummy variables added by Wolfers may pick up not only the entire response of divorce rates to divorce law changes, but also the response of those divorce rates to changes in laws that govern the aftermath of divorce.

Initially, we attempted to replicate Wolfers's results but including the second and third waves of reforms that govern the aftermath of divorce. We introduce both joint custody law reforms and Child Support

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[1] The existence of children might generate situations in which are difficult and costly bargain, that might make the divorce inefficient, see Zelder (1993). However, the implementation of laws that govern the aftermath of divorce may help spouses to reduce their frictions.

Enforcement efforts in Wolfers's analysis. Our results suggest that those reforms play an important role in explaining the behaviour of divorce rate in the 1980s and 1990s. We find that the long-run effect of divorce law reforms on divorce rate observed be Wolfers was also capturing both unilateral reforms and changes in the aftermath of divorce.

Figure 1: Coverage and Timing of Reforms

Source: US Census Bureau, Population Estimates. See a similar figure in Leo (2008)

Then, we extend on the previous analyses offering insights on the impact of divorce law reforms on divorce rate by exploiting time-series analysis, a technique that has been ignored in most previous work.[2] Specifically, we analyse whether the divorce rate is a stationary time series and that any shock, such as policy shocks, will disappear over time.

The unit root analysis has a long tradition, and it has been used to study whether many social and economic variables are stationarity or non-stationarity. Nelson and Plosser (1982) argued that current shocks have a permanent effect on the long-run level of most macroeconomic and financial aggregates (real gross national product (GNP), nominal GNP, real per capita GNP, industrial production, employment, unemployment rate, GNP deflator, consumer prices, wages, real wages…) by using statistical techniques developed by Dickey and Fuller. Some years later, Perron (1989) carried out tests of the unit-root hypothesis against the alternative hypothesis of trend stationarity with a break in the trend occurring at the Great Crash of 1929 or at the 1973 oil-price shock with data from the Nelson-Plosser macroeconomic data series as well as a postwar quarterly real GNP series. Zivot and Andrews (1992) used the same data but considering an endogenous breaking point. Moreover, Ben-David and Papell

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[2] As exception, we find the work of Marvell (1989) which was the first attempt to develop a complete time-series analysis of divorce rates across US, finding that the mayor impact on divorce rates of the change to no-fault laws is delayed for a year. Ellman and Lohr (1998) used an intervention analysis, an ARIMA model is fitted to a time series spanning from 1960 to 1992 including as additional terms the changes in divorce laws. For the case of Europe, we find the works of van Poppel and de Beer (1993) for the Netherlands, and Smith (1997) for Britain. In both cases, they observe evidence of permanent legal effects in divorce rates.

(1997) examined the structure of postwar trade, testing for structural change in the import-GDP and export-GDP ratios for 48 countries. They tried to determine whether the evolution of trade shares has followed a stable process during the postwar period or, alternatively, whether –and when- the process has changed. In the field of international economics, there is a extended literature on purchasing power parity (PPP) using unit root tests and considering structural changes: Papell (1997), O'Connell (1998), Murray and Papell (2002), or Papell (2002). Recently, Davis and Weinstein (2002) examined the evolution of city growth in Japan testing for the presence of a unit root considering the Allied bombing of Japanese cities in WWII as a shock to relative city sizes. In the same way, Bosker et al. (2008) used unit root tests to analyze the evolution of the individual cities that make up the West-German city size distribution in the period 1925-1999.

To study whether or not this effect is permanent or not, our estimation methods have an advantage over the dynamic analysis implemented by Wolfers (2006) and González and Viitanen (2009) using European data. We may endogenously detect the existence of structural breaks, letting data "speak for itself", which allows us to determine the timing of the changes in the average of divorce rates and to compare these breaks with the time in which-law reforms occurred for each state separately.

Results suggest that what is driving the evolution of the divorce rate in the 1980s and 1990s is a shock that have a negative effect on divorce. This seems to confirm that unilateral divorce reforms do not have a negative effect on divorce rate in the long run. After ten years of the implementation of unilateral reforms, what seem to conduct the pattern of divorce rates are those reforms on the laws that govern the aftermath of divorce.

The paper is organized as follows. Section II discusses Wolfers's results and includes the analysis of changes in the laws that regulate the aftermath of divorce. Section III presents the time-series analysis of divorce rates. Section IV concludes.

II.   Replicating Wolfers

As mentioned, Wolfers (2006) tests the dynamic response of divorce rate to a change in the legal regime that is in force of how spouses divorce. To do that, Wolfers uses data on the divorce rate in each state ranging from 1956 to 1988, available in *Vital Statistics of the United States*. The divorce rate is defined as the annual divorces per thousand inhabitants in each state. He claims that with this sample he is able to determine the dynamic response of divorce to changes in divorce laws that occurred in the US from the late 1960s, once identified the pre-existing state-specific trends as follows. He estimates,

$$DR_{s,t} = \sum_{k \geq 1} \beta_k UD_{s,t,k} + \sum_s StateFE_s + \sum_t TimeFE_t + \left[\sum_s StateFE_s \cdot Time_t + \sum_s StateFE_s \cdot Time_t^2 \right] + \varepsilon_{s,t}$$

(1)

where the variable $UD_{s,t,k}$ is a dummy, sets equal to one when the state s has a unilateral divorce regime effective in year t for k periods. These dummy variables are supposed to capture the entire dynamic response of divorce to the new legal regime while the state-specific time trends identify pre-existing trends.

Panel A of Table 1 simply replicates Wolfers's results where equation (1) is estimated using population-weighted least squares. The specification in column 1 only includes state and year fixed effects, the dynamic estimates show that the positive effect following the adoption of unilateral divorce on divorce rates appears to fade over the subsequent decade. Then, as Wolfers observed, coefficients become statistically significant negative, and so, the switch from mutual consent to a unilateral system declines the divorce rate. Although, long-run estimates seem to be not quite robust, as Wolfers reflects, when more controls are added, the coefficients become less negative or even positive but statistically insignificant, see columns (2) and (3) which include state-specific time trends and quadratic state-specific time trends, respectively. All in all, Wolfers concludes that legal reforms that occurred in US have a transitory effect on divorce rate.

It is clearly observed a marked legislative reform trend and a take off of the divorce rates settled at the maximum levels in the twentieth century. However, the dynamic response after a little more than a decade, certainly, seems at odds. It is difficult to establish a clear causal link between the liberalization of divorce law and the fall on divorce rates since the 1980s, correlation does not automatically imply causation. A worrying feature of the estimates in Panel A in Table 1 is produced by the omission of controls for changes in divorce settlements which may decline the probability of divorce. Dummy variables added by Wolfers to model the dynamic response of divorce trace out the full adjustment path of divorce rates. However, the entire dynamic response may include not only the reaction of divorce rates to laws that regulate how to get a divorce which are part of the first wave of changes on law relevant to divorce, but also the response of those divorce rates to changes in laws that govern the aftermath of divorce. In this way, it captures the reaction to a second and a third wave of transforming aspects of law relevant to divorce which corresponds with the implementation of a joint custody regime and the child support enforcement, respectively.

A. Joint Custody Regime

Why does a reform in custody law matter in the analysis of divorce rate? The move from a sole custody regime to a setting with the possibility of joint custody means a backward step to a regime in which mutual consent is necessary. Under a sole-custody regime, women have traditionally been the responsible for the child, whereas under a joint custody regime, decisions affecting the child must be made jointly by parents, requiring discussion and collaboration between them, see Bartlett and Stack (1991). [3] This necessity of cooperation and mutual consent may be counteracting the reassignment of property generated by the approval of the unilateral divorce regime.[4] Although, the unilateral regime transfers the right to

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[3] We discern neither between various forms of joint custody such as "Joint legal custody" (both parents share the right and the obligation of making major decisions about their child's upbringing in issues such as religion, health and education) and "Joint physical custody" (the child spends a significant amount of time with each parent), nor between the way in which parents achieve joint custody (parental agreement or may be awarded by a judge). We consider any kind of joint custody statute approve in the period considered.

[4] We do not aim at studying how gender disparities introduced by the new law reforms affect the evolution of the divorce rate. It is important to note that, though, laws that regulate how to get a divorce are gender neutral; however, the traditional sole-custody regime could be distorting this neutrality by increasing the power of the custodian parent, normally the mother, creating a "winner/loser" situation, Folberg (1991). Under sole-custody regime it is the man who has to compensate his spouse to stay married to see their child if it is the woman who wants to divorce. When the party who wants to divorce is the man, he also has to compensate his wife to be able to be with his child, and so, for men it is costly to get a divorce under both unilateral divorce and sole-custody regime. The implementation of a joint custody regime may correct this biased by increasing men's rights. In this way, the expected utility at divorce increases for men, who had not been traditionally the responsible for the child, and decreases for women, see Elkin

divorce to the spouse most wanting a divorce, and as consequence it is the party who wants to continue married who has to compensate the spouse who wishes to leave, under the joint custody regime the requirement of mutual consent produces a change of direction of the compensation; it is the spouse who wants to divorce who has to compensate the other party to mutual consent in the custodial of their child even if disparities in the value placed by the parties on custody exist.[5] In Coasian terms, both reforms consist on reassignments of property rights between spouses which should not affect divorce rate under full transferability, perfect information and no transaction costs assumptions. However, what is observed by simply comparing the evolution of the divorce rate across states and the changes in laws related to divorce questions the applicability of the Coase theorem to the marital dissolution.

Figure 2:
Unilateral Divorce (U.D.)& Joint Custody Regime (J.C.)
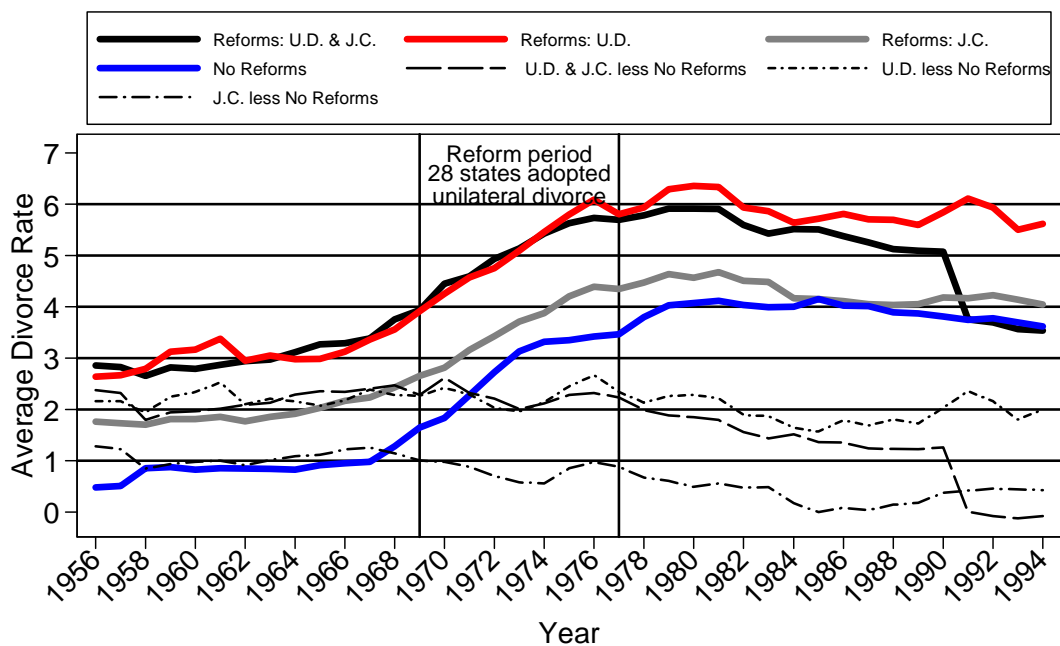
Note: Joint Custody Regime from 1957-1988

While between 1968 and 1977, 28 states passed to a unilateral system, from 1979 what swept the US was the introduction of a joint custody regime, Folberg (1991). In 1988, approximately thirty-seven states had some form of joint custody statute.[6] This second wave of reforms seems to affect the divorce rate of those

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(1991). In this setting, it is the husband, if he wants to divorce, who does not have to compensate his wife for having his child with him and for his wife is going to be more costly to stay married. On the other hand, if it is the wife who wants to divorce, she is not going to receive any compensation from her partner to be part of the parenting, she will have to compensate him to mutual consent in the custodial of their child. Even these women may benefit from the consequences of joint custody depending on their goals (be more independent or pursue educational or professional interests), and, of course, depending upon their particular situations of dependency which also will affect their expected utility at divorce, see Elkin (1991).

[5] In fact, the greater is the bargaining advantage given to the party who values the custody less highly the more difficult the mutual consent. As a result, women who are considered more risk-adverse than men about custody of their children will sacrifice their own financial rights and even those of their children, in negotiations at divorce in order to preserve maximum custody of their children, see Bartlett and Stack (1991).

[6] In 1957, North Carolina was the first state in passing a statute allowing for the joint custody of children after dissolution of the marriage if it was in the best interest of the child. Twenty-two years later, California declared a

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states that also had introduced a unilateral reform as can be seen in Figure 2. This figure represents the evolution of the average divorce rate across states that introduced both unilateral divorce and (the possibility of) joint custody (24 states), those which passed unilateral reforms (7 states), those with only a joint custody reform (14 states), and those states which did not change either divorce laws which regulate how to get a divorce or custody law reforms (6 states).[7] The long-dashed and short-dashed lines show the evolution of the difference in the average divorce rate between those states that introduced any reform with those which do not passed any reform. These lines allow a comparison of the different evolution of average divorce rate by states which approved different aspects of law relevant to divorce. If anything, it is clearly observed that the decline in the average divorce rate occurs in those states that introduced both reforms, unilateral and joint custody regime, and so, it seems that child custody law reform has neutralized the effect of unilateral divorced on divorce rates. On the other hand, those states that only passed unilateral reforms maintain higher divorce rates since at least the mid-1950s, around 2 divorces per 1,000 inhabitants per year more in average, until the mid-1990s with respect to those states that did not passed any reform. This simple comparison suggests that the dynamic response of divorce that is proposed by Wolfers may be confounding the reaction to the changes in custody law with a reverse response of divorce rates to the adoption of unilateral divorce laws.

The switch in custody law also seems to reduce the divorce rate of those states that only passed a joint custody regime with respect to divorce rate of those states which do not introduce any reform, see Figure 2. Empirically, this may affect the estimates of the trend made by Wolfers which confuse the decline in the average divorce rate produced by the introduction of a new custody regime with a negative trend in the evolution of the divorce rate of those states that do not introduced unilateral divorce. From a theoretical point of view, this fall in the divorce rate of those states that only introduced custody reforms may be due to an increased in the cost of divorce. As Morrow (1991) remarks, when parents shared physical custody in divorce, total costs are further increased since some of the major expenses are duplicated, which in turns decreases the probability of divorce. However, the joint custody regime may also reduce the costs incurred in the sole custody regime because sole custody resolutions tend to exacerbate parental differences and cause predictable post-divorce disputes which clearly generate greater costs of divorce, see Halla and Hölzl (2007) and Folberg (1991). On the other hand, the probability of divorce should also decline when investment in child quality increases, with the benefits from child quality being marriage-specific investments. This increase in child quality may be due to a change in spouses' investment incentives as a result of the introduction of a joint custody regime, see Rasul (2006). But, ultimately, whether joint custody regime affects divorce rate is an empirical question which has received hardly any attention among researches. The first attempt to test this relationship was accomplished by Brinig and Buckley (1998) who found a negative effect of joint-custody laws on divorce rates. This result has been rebutted, more recently, by Halla (2009). He does not find convincing evidence that the joint custody regime significantly affect divorce rates by adding a set of dummies for joint custody law à la Wolfers:

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public policy of encouraging parents to continue to share their parenting rights and responsibilities after divorce. Many of the statutes that were approved later were inspired by the early California legislation (Jacob, 1988).
[7] Unilateral divorce laws are coded from Wolfers (2006), joint custody regime are from Leo (2008) and Folberg (1991).

$$DR_{s,t} = \sum_{k\geq1} \beta_k UD_{s,t,k} + \sum_{r\geq1} \alpha_r JC_{s,t,r} + \sum_s StateFE_s + \sum_t TimeFE_t + \varepsilon_{s,t}. \qquad (2)$$

Rather than on the dynamic response of divorce rates to the introduction of joint custody regime, $JC_{s,t,r}$, in what we are interested in is the adjustment path of divorce rates to unilateral divorce once the change in custody law has been controlled. Panel B of Table 1 shows results running equation (2) on the same unbalanced panel of divorce rates than that used when we run equation (1). The sign of the dynamic effects of divorce law reforms on divorce rates is consistent with previous findings in all three specifications. But, the magnitudes of the dynamic responses considerably differ from those obtain in Wolfers' analysis. Concretely, the decline of divorce rates due to the unilateral divorce reform is softened in specifications (1) and (2), when it is added state and year fixed effects and state-specific time trends, respectively. In addition, the conclusion that reforms have no significant effect after a decade is not quite robust when the dynamic response to custody law reforms is included. After controlling for quadratic state-specific time trends, it is observed that the long-run effects are positive and statistically significant. Therefore, those results generate doubts about what is capturing by the dummy variables included by Wolfers in Panel A of Table 1. It seems that they are picking up the response of divorce rates to both divorce law changes and changes in laws that govern the aftermath of divorce.

Since custody law reforms took place in many states but not in all states that introduced unilateral divorce law reforms, if the effect on divorce rate of unilateral reform was reversed as time goes by and the second wave of reforms were caused a decrease in divorce rates, then we might expect that the decline in divorce rate after the adoption of unilateral divorce law reform will be higher in absolute value for those states that only introduced unilateral reforms. The negative effect of unilateral reforms should not be particularly strong for those states which passed joint custody reform, in part due to the downward correction in the level of divorce rate produced by the joint custody laws. To formalize ideas, consider the following equation:

$$DR_{s,t} = \sum_{k\geq1} \beta_k UD_{s,t,k} + \sum_{r\geq1} \alpha_r JC_{s,t,r} + \sum_{k\geq1}\sum_{r\geq1} \gamma_{k,r} UD_{s,t,k} * JC_{s,t,r} + \sum_s StateFE_s + \sum_t TimeFE_t + \varepsilon_{s,t}$$
$$(3)$$

where $DR_{s,t}$ is the divorce rate in state s in year t, $UD_{s,t,k}$ represents a series of binary variables equal to one if a state has passed unilateral divorce k years ago in year t and $JC_{s,t,r}$ is a dummy equals to one when a state has introduced joint custody regime r years ago in year t. If the impact of the introduction of a unilateral divorce system has a transitory effect on divorce rates, we may expect that the rise in the divorce rate produced by the adoption of unilateral divorce should be inverted, so β_k in the subsequent periods after the adoption of divorce rate should be positive but then it should turn to be negative.

For those states affected by both waves of reforms, the increase in divorce rate following unilateral divorce reform might be reversed due to the interruption of joint custody reforms which requires mutual consent; we expect α_r to be negative after the approval of joint custody laws, at least until reverting the positive effect of the unilateral reform on divorce rate. In fact, we should expect $\beta_k + \gamma_{k,r}$, which is capturing the dynamic effect of unilateral reforms for those states that introduced both unilateral and custody reform, not to turn to be negative since the effect of the unilateral reform can be cancelled by the joint custody regime.

Table 2 presents regression results of the β_k coefficients in equation (3), but the full set of control variables and the dynamic effects of joint custody laws are included in the models. As can be seen, all three specifications suggest that divorce rate rose after the approval of unilateral divorce laws. Then, the dynamic response after a decade is quite similar to that described by Wolfers (2006) in specifications (1) and (2); the effect of introduction of unilateral divorce was reversed over the ensuing decade.

An attractive feature of this approach is that it can speak to some of the potential sources of bias in Wolfers's dynamic analysis. By comparing estimates in Table 2 with those in Panel A of Table 1 is observed that the exclusion of controls for the adoption of joint custody laws leads to a greater decline in the divorce rate level than that observed when the impact of this reform is taken into consideration. This biased in the estimates of Wolfers is exacerbated when we jointly consider the dynamic response of divorce rates to unilateral reforms, see Panel B of Table 1. As expected, the decline in the divorce rate is greater for those states that did not introduce joint custody laws.

However, when controls for state-specific quadratic trends are added, the rise in divorce rate following the implementation of unilateral reform is persistent. The specification in column 3 of Table 2 shows that the long-run effects are positive and statistically significant, suggesting that unilateral reform has a permanent effect on divorce rate. The same is seen in the specification (3) in Panel B of Table 1, although the impact is greater for those which just introduced unilateral divorce systems. As mentioned above, the introduction of joint custody laws reduced the level of divorce rate due to the necessity of mutual consent. Again, our results generate doubts about what is being picked up by the model implemented by Wolfers to analyse the dynamic response of divorce to unilateral reforms.

Ultimately, it is difficult to interpret the differences between our estimates and Wolfers's results because the divorce rate includes a sub-population which is not affected by the joint custody reform. Divorce rate includes both couples with children and couples without children, however, the necessity of mutual consent required by the joint custody reform is only limited to couples with minors. This is problematic since the behaviour of the sub-population not affected by custody law reform could be driving our results instead of a fall in the divorce rate of those couples with minors. It is certainly difficult, if not impossible, for researchers to test the effect of the changes in divorce law reforms on all the states considered in the analysis due to the scarcity of data. The detailed information on the number of divorces by number of children involved is publicly available in the *Vital Statistics of the United States* for each state belonging to the divorce-registration area (DRA) until 1990. Figure 3 separately shows the evolution of the average divorce rate for couples with and without children at the time of divorce for those states that implemented only unilateral divorce, only joint custody reforms and both reforms.[8] Clearly, it is observed higher divorce rates for couples with children and that there is not a decreasing trend in the divorce rate of couples without children in the period from the late 1980s when joint custody law was adopted for the majority of the states, see Figure 1. In addition, the evolution of the difference between the average divorce rate of couples with and without children, see long-dashed and short-dashed lines, has maintained quite similar for all three kinds of reforms at least from the 1960s. As expected, what decreased was the divorce rate of couples with children in those states that introduced both a unilateral divorce system and a

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[8] The number of states substantially varied from 18 states in 1960 to 32 states in 1990, for 18 states there are no data available and in the case of 15 states some observations are missing.

joint custody law, after the introduction of the new custody system, with respect to the divorce rate of couples with children in those states that only introduced unilateral divorce reforms. Therefore, this suggests that our results operate through a change in the divorce rate of couples with children in those states that introduced joint custody laws as opposed to a decreasing trend in the divorce rate of those childless couples or differential distribution of divorces among couples with and without children across states that implemented different divorce law reforms.

Figure 3:
Average Divorce Rate: Couples with and without Children
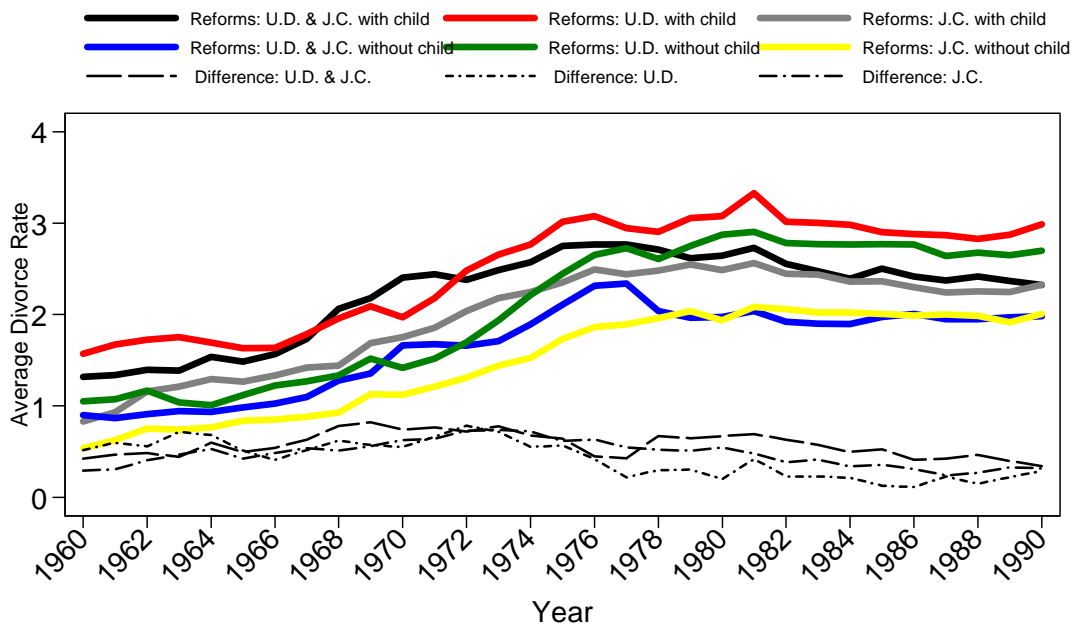
Note: Joint Custody Regime from 1957-1988

To probe this further, we reran equation (1) and equation (3) using as dependent variable the divorce rate among childless couples and among couples with children, using data for all states belonging to the divorce-registration area (DRA). In these regressions, we would expect there to be no effect of custody law reforms on the divorce rates of childless couples and so, no variation in the dynamic response of divorce rates to unilateral divorce, since joint custody reform would not be an issue if the couple were to divorce. Instead, we would observe differences in the unilateral reform effect over time when divorce rate of couples with children is considered as dependent variable. Figure 4 shows the results graphically. As predicted, it is detected differences in the coefficients capturing the response of divorce rate to unilateral reform with that being remarkable when quadratic state-specific time trends are added. For the case of childless couples, coefficients slightly differ when joint custody reforms are included, but again, by including quadratic state-specific time trends those differences are almost insignificant. Because we would not expect joint custody reform to have any effect on divorce rates of childless couples, the differences with respect to that prediction observed in Figure 4 suggest that the coefficients capturing the effect of the unilateral reform might be picking up second-order effects due to introduction of joint custody, Halla (2009). The change in the custody law may produce two different effects. Immediately, it can produce a decrease of the divorces since there are fewer opportunities outside marriage to find

someone to remarriage after divorce due to the increase in married population. Further, an increase in married population implies an increase in the population at risk of divorce, and so, the divorce rate is more likely to rise. In figure 4, an increase in the coefficients of the unilateral reform is observed when controlling for the joint custody reforms in the period that custody reforms were implemented, with this being ten years later than the approval of unilateral reforms. This might confirm that those coefficients might be capturing second-order effects of joint custody on marriage rather than only the unilateral reforms. Then, what is detected is a decrease of the effect of unilateral reform when joint custody laws are added. Again, this can be due to the fact that the coefficients capturing the effect of unilateral divorce increase when no control for the joint custody reforms is included since they were picking up the increase in the divorce rates due to the implementation of joint custody reforms.

Figure 4:
Response of Divorce Rate to Divorce Law Reform
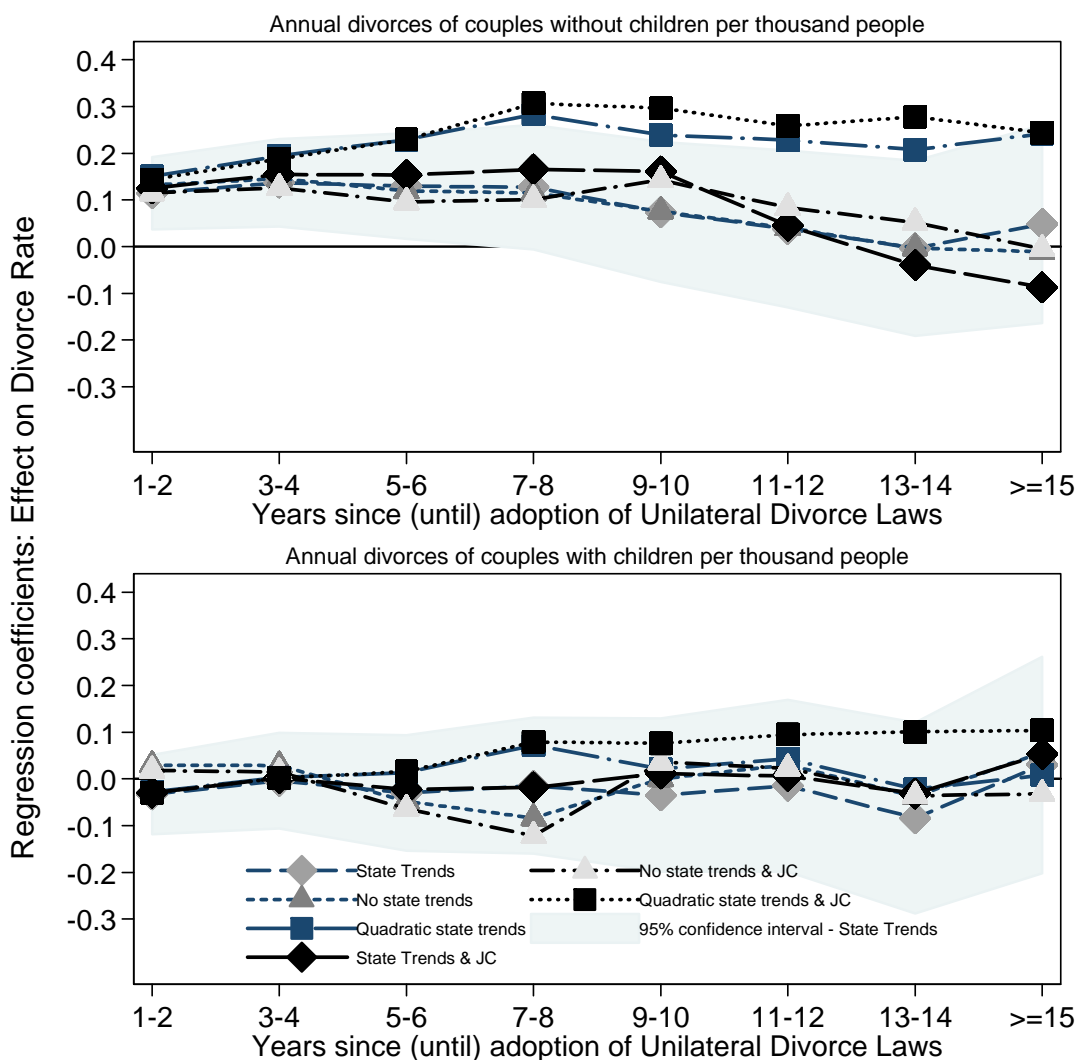
The decline in the divorce rate of those states that introduced joint custody laws can also be attributed to other factors such as a decline in the number of children in married-couple families or an increase in the age of individuals that divorce since older individuals are less likely to have young children. Figure 5 uses

data from the *Vital Statistics of the United Stated* to show that the number of children that involved in divorce slightly declined in the 1980s, coinciding with the period of implementation of joint custody laws. Although this can be produced by a decrease in the number of children, the fact that the rate of children involved in divorce per 1,000 children under 18 years of age is also slightly declining from 1981 may reinforce our hypothesis that what is declining is the number of divorces of couples with children.

Figure 5:
Number of divorces and children involved in divorces
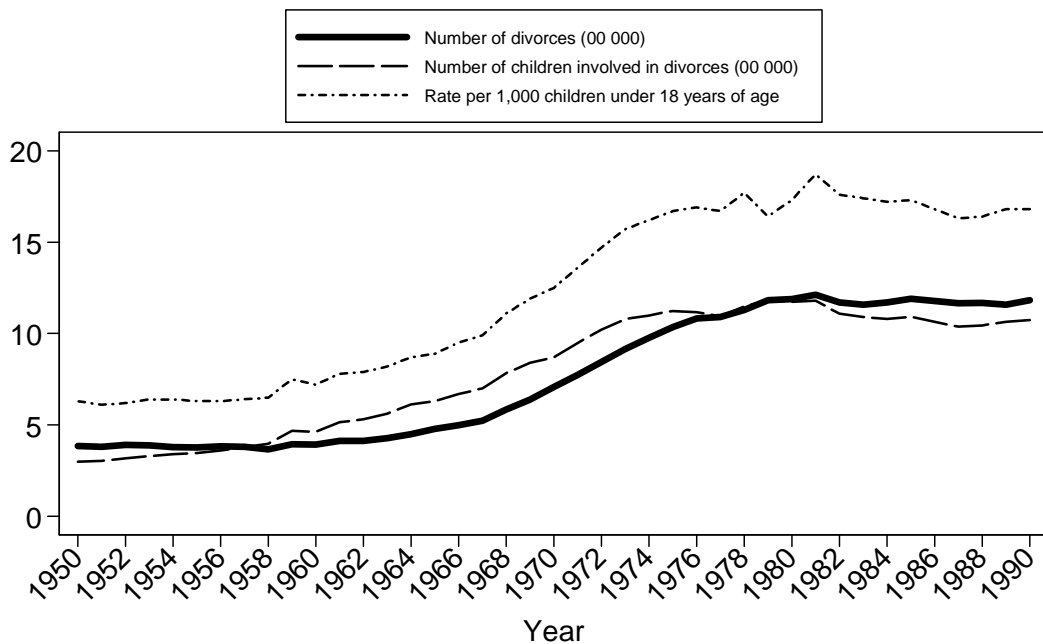
Source: Monthly Vital Statistics Report Vol. 43, No. 9.

Interpretation of the results presented in this section may also be difficult because there could be other determinants of divorce which may vary by state, but have little to do with the changes in divorce laws. Other determinants of divorce that have been suggested are the economic status of women (Bedard and Deschênes, 2005), unemployment rates (Jensen and Smith, 1990), female labour force participation rates (Johnson and Skinner, 1986; Trent and South, 1989; Allen 1998), gender differences in family roles (Kalmijn et al., 2004), sex ratios (Trent and South, 1989), public transfers and tax laws (Dickert-Colin, 1999; Tjøtta and Vaage, 2008), property distribution within marriage (Gray, 1998), household income (Becker et al., 1977), religiosity (Lehrer and Chiswick, 2003) , fertility rates (Becker et al., 1977; Peters, 1986), age at marriage (Becker et al., 1977; Lehrer, 2008), premarital childbearing (White, 1990), unexpected economic shocks (Weiss and Willis, 1997; Ermisch and Böheim, 2001), premarital cohabitation (Lillard et al., 1995), and the distribution of age, education and race of the population (Becker et al., 1977; Peters 1986). Not controlling for these demographic and economic characteristics would be problematic if factors associated with a rising divorce rate are more likely in states that did not introduce divorce reforms, and might lead to a bias in the estimates as the dynamic response to changes in divorce laws might be capturing differences in the evolution of these characteristics by state, rather than the effect of the reforms. As Wolfers, we prefer not to use them to make our results comparable with his analysis, of course, the inclusion of these omitted factors may bias the estimates of the dynamic response

to divorce law reforms if they are correlated with the divorce law reforms. For instance, changes in divorce laws have been found to affect marriage rates (Halla, 2009), which affect the population at risk of divorce and to reduce fertility rates (Drewianka, 2008). The introduction of measures of economic performance in the estimations such as female labour force participation of women and female earnings, or other demographic variables such as fertility rates may also produce problems of endogeneity since many of this measure of economic performance have not truly been exogenous, Allen (2002). Causality between divorce rate and these variables may run in both directions (Becker, 1981); as an example, Ressler and Waters (2000) found that the divorce rate may be influenced and may influence female earnings.

B. CHILD SUPPORT ENFORCEMENT

The analysis presented in the previous subsection has left out the third wave of transforming aspects of law relevant to divorce that occurs in the late 1970s and 1980s in the US. The main object of those reforms was enforcing support obligations to prevent poverty among children and to reduce welfare costs, see Nixon (1997) and Heim (2003). This law created a separate division, the federal Office of Child Support Enforcement (OCSE), to oversee the operation of a Child Support Enforcement program and required each state to establish a Child Support Enforcement agency to be responsible for child support enforcement. Subsequent reforms in 1984 and The Family Support Act in 1988 made several important changes to the child support programs.

The incorporation of these reforms is important since in the period considered in this research there was more than one child involved in each divorce until 1976, and almost one child onwards, see Figure 5. Additionally, although changes in joint custody laws can affect probability of divorce, in 1990 almost three-fourths of the divorces in 1990 with children involved, the wife was awarded custody of the children. Joint custody was the second most common arrangement, 16 percent, see the *Monthly Vital Statistics Report* in 1990. The percent of children living with one parent were living with their mother and this fact did not considerable change in the period considered, see Figure 6. In this setting, it seems that changes in the financial obligation of non-custodial parents, child support, might also play a role in divorce.

From a theoretical point of view, the effect of the increase in the child support on the probability of divorce is ambiguous. For men, normally the absent parent, it raises the expected financial responsibility in divorce, and so, it increases the divorce costs, which declines his probability of divorce. Unlike, for women, those in charge of children in divorce, the raise in child support increases the mothers' expected income outside marriage which reduces the mothers' cost of divorce making more likely the divorce situation. Thus, two opposite effects might be operating.

Although federal laws establish the guidelines under which each state CSE agency must operate, and so, all CSE agencies must works in the same way, there is considerable variation in the manner in which the laws are administered since child support enforcement efforts are executed by state authorities, Heim (2003). Thus, the introduction of the legislative history of reforms that enforce child support might be failed in accounting for the effects of these reforms on divorce rates since by using this strategy of identification we are not measuring the effectiveness of the application of those reforms. This is relevant in the analysis of the response of divorce rates to divorce law reforms when less restrictive divorce laws

are associated with greater state interest in child support enforcement. Couples that live in states that passed joint custody law or that they cannot unilaterally divorce might fail less in their child support obligations due to the necessity of mutual consent. Therefore, those states that only introduced unilateral reform would need to be stricter in putting child support enforcement into effect to achieve their objective of reducing child poverty and welfare costs.

Figure 6: Percentage of children ages 0–17 by presence of parents in the household
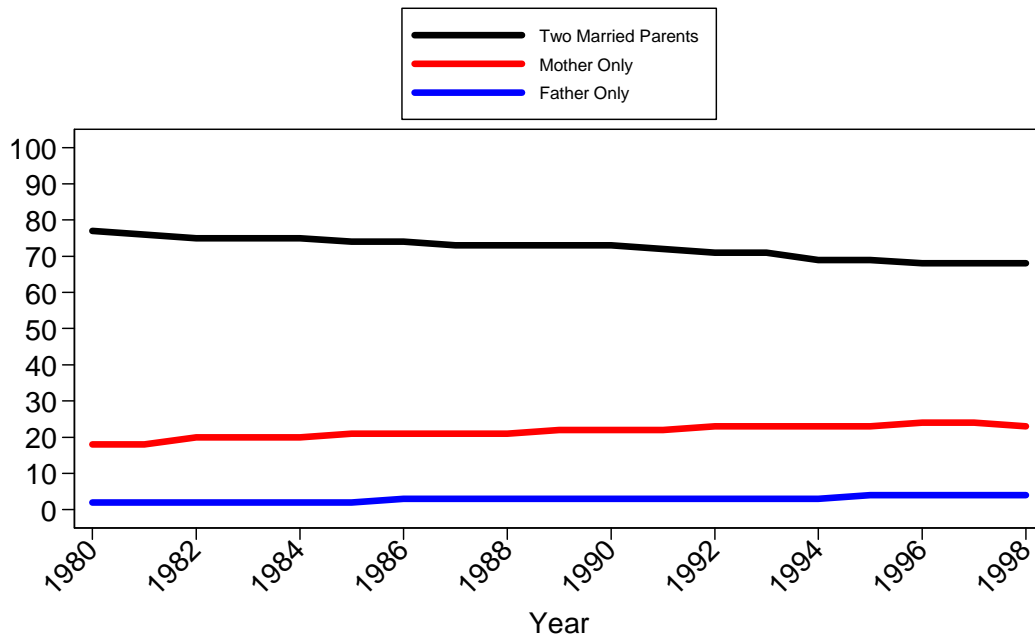
Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements

It is possible that what is being captured by the long-run effects of divorce law reform on divorce rates is the application of Child Support Enforcement programs. To pick up the effect of CSE on divorce, we run equation (3) by including several measured of CSE efforts. We use state-level administrative data provided by the Office of Child Support Enforcement. The status of the application of the child support enforcement in all states considered in the analysis is reported yearly from fiscal year 1977 by the OCSE.[9] Four different variables are used to represent the effectiveness of the child support enforcement program. As Nixon (1997) and Heim (2003) done, we analyse the effect of enforcing child support orders and increasing collections by using the *collection rate* variable, defined as the percent of CSE cases in which a collection was made by obligation, and by including the *average collections*, calculated as the dollars collected per CSE case divided by state per capita GDP. Following Heim (2003), we have also included two more variables to control for differential effect of the child support enforcement policies may have. We use a *paternity rate* measured as the number of paternities established in a given year per one thousand inhabitants and a *location rate* defined as the number of absent parents located in a given year

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[9] We use data from the second annual report to the Congress on the Child Support Enforcement program for the period October l–1976 to September 30–1977. Data from the first annual report is not included in the analysis since it differs in the period covered, from January 4–1975 to June 30–1976. For the same reason, we do not include data from the special supplementa1 report which was issued to cover the period July 1 to September 30–1976.

per one thousand inhabitants. A higher value of any of these variables represents more effective child support enforcement.

Summary statistics are presented in Table 3, where population-weighted sample means of the CSE variables by divorce law regime are included. The average state that introduced joint custody has slightly greater percent of CSE cases collected and slightly greater average collections than the average state that passed any other divorce law. In average, those states which implemented joint custody make higher child support enforcement efforts. The same pattern is also observed for both paternity rate and location rate.

Table 4 presents estimates of the dynamic effect of unilateral divorce reforms when we capture the effect of CSE on divorce by using the collection rate, Columns (1)-(3), and the average collections, Columns (4)-(6), separately. As can be seen in Table 4, results do not differ to that observe when we just introduced controls for custody reforms in all the specifications, see Table 2. The dynamic response of divorce rates to unilateral reform after a decade is quite similar to that observed by Wolfers (2006) in specifications (1) and (2), when we introduced collection rate, and in specifications (3) and (4), after controlling for average collections. The effect of introduction of unilateral divorce was reversed over the subsequent decade. However, when controls for state-specific quadratic trends, the rise in divorce rate following the introduction of unilateral divorce reform is not transitory.

An alternative strategy to capture the effect of the Child Support Enforcement efforts consists on individually consider the effect of the child support reinforcement by divorce law regime. As explained above, we would expect to observe differences in the impact of the CSE by divorce law regime due to differences in the requirement of mutual consent.

Results in Table 5 suggest that the distinction between CSE efforts by divorce law reform is empirically important for our purposes. Although the sign on the long-run effect of the unilateral divorce reform does not turn to be positive in all the coefficients of interest albeit those are not statistically significant, it seems that what is driving the divorce rate behaviour after 10 years of the introduction of unilateral divorce are those changes in divorce laws that govern the aftermath of divorce after the inclusion of state and year fixed effects and state-specific time trends, see Columns (1), (2), (4) and (5).

We have also looked at the effect of other CSE policies, paternity rate and location rate, on the divorce rate to check whether our results are maintained when we extend CSE variables. The inclusion of the four variables used to measure the Child Support Enforcement efforts together in the same specification is possible since those variables are not highly correlated, see Table 6. As can be seen in Table 7, our results are quite consistent.

Further, we rerun all the regressions presented in this research by using a longer panel with data on divorce rate from 1956 to 1998. Table 8 shows results on the dynamic effect of divorce law reform excluding controls for custody law reforms and child support enforcement policies in Columns (1) to (3) and including that controls in Columns (4) to (6). Our results are quite robust. Therefore, the long-run effect of unilateral divorce on divorce rate observed by Wolfers (2006) seems to be capturing the effect of the aspects that regulate the aftermath of divorce.

III. A time-series Analysis of Divorce Rates

Up until this point, we have examined whether the long-run effects of unilateral reforms on divorce rates observed by Wolfers not only pick up the entire response of divorce rates to divorce law changes but also

the reforms in relevant aspects of the aftermath of divorce. In this section, we use an alternative methodology, a time-series analysis, which allows us to observe whether the effects of the policy shocks were transitory or permanent studying each state individually. We can also endogenously determine the changes in the average of the divorce rates, which are the result of structural breaks, to observe if these breaks coincide with any of the reforms of the law relevant to divorce.

This econometric technique has been used to track the evolution of economic and social variables subject to public and legal interventions like the unemployment rate (Mitchell, 1993; Papell et al., 2000) or the rate of crime (Narayan et al., 2005), and to study the effect of policy interventions: Boston Gun Project (Piehl et al., 2003) or Public Interest Litigation in India (Rathinam and Raja, 2008).

Suppose the time-series model for the divorce rate in the state i (DR_i) as an $AR(1)$ process:

$$DR_{it} = \alpha + \rho DR_{it-1} + \varepsilon_{it}, \qquad (4)$$

where α and ρ are parameters and ε_{it} is the perturbation term. If $-1 < \rho < 1$ then the divorce rate is a stationary time series and any shock will dissipate over time (a stochastic process is said to be stationary if its mean and variance are time-independent and if the covariance between any two periods depends only on the lag and not on the actual time at which the covariance is calculated). If, however, $\rho = 1$, then the divorce rate is a non-stationary time series, and the stochastic process modelled by equation (4) is a random walk with drift (Brockwell and Davis, 1991). When $\rho = 1$, the process in equation (4) is referred to as a unit root process (see Banerjee et al., 1993; Hamilton, 1994; and Gujarati, 1995). In this case, the random shocks, such as policy shocks, have permanent effects on the long-run level of the divorce rate, the fluctuations are not transitory.

The commonly used method to test for the presence of unit roots is the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979, 1981). The ADF test is carried out by estimating an equation with DR_{it-1} subtracted from both sides of equation (4):

$$\Delta DR_{it} = \alpha + \gamma DR_{it-1} + \sum_{i=1}^{k} \left(c_i \Delta DR_{it-1} \right) + \varepsilon_{it}, \qquad (5)$$

where $\Delta DR_{it} = DR_{it} - DR_{it-1}$, $\gamma = (\rho - 1)$, and k is the number of lags which are added to the model to ensure that the residuals, ε_t, are Gaussian White Noises[10]. The null and alternative hypotheses are, respectively, $H_0 : \gamma = 0$, $H_A : \gamma < 0$.

If γ is found to be significantly smaller than 0, the divorce rate is stationary around α and any shock will not have a lasting effect. If on the other hand γ is found to be equal to 0 then all shocks are permanent and state i's divorce rate follows a random walk. We estimate equation (5) applying Augmented Dickey Fuller tests to all of the US states. Table 9 shows the results of the individual state unit root tests. Using critical values from MacKinnon (1991), we find that the null of a unit root cannot be rejected for the majority of the states.

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[10] This means ε_t has zero mean and constant variance that is uncorrelated with ε_s for $t \neq s$.

For completeness, we have considered the states jointly in a panel, and Table 9 also gives the outcome of three different panel unit root tests. The first is the Levin et al. (2002) test, which tests the null of all series having a unit root versus the alternative of all series being stationary with the same autoregressive parameter. The second is the later developed by Im et al. (2003) which tests the null of a unit root in all series versus the alternative of some of the series being stationary (with a potentially varying autoregressive parameter) and some of the series being non-stationary. Hereby the latter test is thus somewhat less restrictive under the alternative. And finally, parallel to Im et al. (2003), Pesaran (2007) test for unit roots in heterogenous panels with cross-section dependence is calculated. To eliminate the cross dependence, the standard DF (or ADF) regressions are augmented with the cross section averages of lagged levels and first-differences of the individual series (CADF statistics). Null hypothesis assumes that all series are non-stationary, and analogous to Im et al. (2003) test, Pesaran's CADF is consistent under the alternative that only a fraction of the series are stationary. Moreover, the generalization of the test to unbalanced panels can be made, allowing us to test the null hypothesis using all the states of the sample.

The Levin–Lin–Chu panel unit root test does not reject the null hypothesis of a unit root even at the 10% level; the same is suggested by the Im–Pesaran–Shin test which does not reject the unit root null at the 10% level. Pesaran's test shows that, when controlling for cross-sectional dependence, the null hypothesis is rejected at the 1% level. The evidence in favour of a unit root in the divorce rate is weaker if all the states are considered in an unbalanced panel.

In the previous analysis, we are not taken into account the possible structural break that changes in divorce laws might produce. This is problematic since, as Perron (1989) argues, in the presence of a structural break, the standard ADF tests are biased towards the nonrejection of the null hypothesis. The estimator of the autoregressive parameter goes asymptotically to values close to 1 when the variable is generated by a variate stationary model in which the effect of a structural break is present. In finite samples, the unit root tests are not able to reject the unit root null hypothesis in such cases. In order to avoid this type of problem, some statistics have been developed which work correctly in a structural break framework. We will apply the following unit root test suggested by Perron and Vogelsang (1992), following the additive outlier (AO) model, which allows for a sudden change in mean (crash model). The AO model is appropriate to model a sudden one-time change (the change is assumed to take effect instantaneously), which is clearly the case when considering the change in divorce law legislation. [11]

The AO model allows for a one-time break in the mean of the series ρ_i (endogenously determined by the data) and is based on the estimate of ρ_i in the following regression:

$$D\overline{R}_{it} = \rho_i D\overline{R}_{it-1} + u_{it}, \qquad (6)$$

where u_{it} is the random error term and $D\overline{R}_{it}$ are the residuals of a regression that projects DR_{it} on the deterministic component, i.e. a mean that is allowed to shift at time T_b. More formally:

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[11] It is conceivable that a policy change may have very different short-run and long-run effects, see Wolfers (2006), what may induce a graduate change in the divorce rates. To tackle this and at least from a robustness perspective, we also used the IO model. Our results are quite consistent, although some of the structural breaks are detected some years later than those determined by using the AO model.

$$DR_{it} = \mu + d_i DU_t + \eta_{it}, \qquad (7)$$

where $DU_t = 1$ if $t > T_b$ and 0 otherwise. Estimating ρ_i in this way controls for the possible one-time shift in the deterministic mean in the 'first stage' of the procedure (7) and estimates the autoregressive parameter ρ_i in the 'second stage' (6).

The results of applying the AO model to test for a unit root in the divorce rates in the US under the null versus stationary divorce rate around a possibly shifting mean under the alternative are also summarized in Table 9. The effect of taking into account the possible shocks deriving from changes in divorce laws is quite substantial. At a 5% confidence level, the unit root null hypothesis is rejected in favour of a stationary divorce rate with a one-time break for 30% of the states in our sample. For the majority of the states that are stationary, the timing of the break is (endogenously) found to be more than one year later than the year in which the divorce law changed. Table 10 displays the results of the break test of Perron and Vogelsang (1992) by state.

We should nevertheless bear in mind that some variables do not show just one break; rather, it is common for them to exhibit the presence of multiple breaks. Clemente et al. (1998) extended the results of Perron and Vogelsang (1992) to the case where the variable exhibits a double change in the mean. Then, (7) changes to:

$$DR_{it} = \mu + d_{1i} DU_{1t} + d_{2i} DU_{2t} + \eta_{it}, \qquad (8)$$

where $DU_{it} = 1$ if $t > TB_i$ $(i = 1,2)$ and 0 otherwise. TB_1 and TB_2 are the time periods when the mean is being modified. For the sake of simplicity, we suppose that $TB_i = \lambda_i T$ $(i = 1,2)$, with $0 < \lambda_i < 1$, and also that $\lambda_2 > \lambda_1$.

The results of the double structural break test, shown in Table 9, indicate that the percentage of unit root rejected at the 10% level is lower than that in the case of the one-break test, 10%, although some of the states in which the unit root is rejected have changed.[12]

Table 11 displays the results by state of the two-break test of Clemente–Montañés–Reyes (1998). The timing of the first structural break for stationary series is found to be in the year in which the one structural break or two or three years later or earlier. This coincides with the period in which unilateral divorce law was passed. It is important to note that a break is also found in the case of those states that did not pass any divorce law reform, although the magnitude of the change in the average divorce law is

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[12] The double structural break test of Clemente–Montañés–Reyes (1998) can lead to conclusions that are in marked contrast to those obtained when using the ADF test or the Perron and Vogelsang (1992) statistics. This serves to emphasize the importance of the correct determination of the number of breaks when characterizing the time series properties of the variables.

considerable lower for those states that did not make any reform. The second break is almost always detected in the late 1970s and 1980s. When this break is found in the 1980s and early 1990s, the sign of the effect on the average change in the divorce rate is negative. We have also repeated this analysis with a longer divorce rate series from 1950 to 2007, see Appendix, and our results are quite robust. These suggest that what is driving the evolution of the divorce rate in the 1980s and 1990s is a shock that have a negative effect on divorce. This seems to confirm that unilateral divorce reforms do not have a negative effect on divorce rate in the long run. After ten years of the implementation of unilateral reforms, what seem to conduct the pattern of divorce rates are those reforms on the laws that govern the aftermath of divorce.

IV.   Conclusions

There is extensive literature examining changes in divorce rates focusing on the effects of changes in divorce laws. It appears to be a trade-off between the divorce-rate trends and the divorce laws. However, empirical evidence is not conclusive since legal reforms that occurred from the 1970s in the US have been found to have permanent, transitory or no effect on divorce rates.

If the empirical evidence consistently rejected the hypothesis that the changes in divorce law had a significant impact, then the design of the divorce law would matter much less.

Jacob (1988, p. 162) explains that divorce-law reforms in the US made no difference to divorce rates. Peters (1986, 1992), using cross-sectional data, finds that changes in divorce laws do not affect marital stability, and more recently a similar finding appears in the study of Gray (1998). These results are rebutted first by Allen (1992), who finds a causal relation between law regime and divorce rates also using cross-sectional data, and then by Friedberg (1998), who presents a state-based panel analysis to account for the endogeneity concerns that are expressed in earlier papers. She finds that divorce-law reforms, which occurred from the 1970s onward, account for about one-sixth of the rise in the divorce rate during the 1970s and 1980s.

Ultimately, however, the issue is not how large the effect is, but whether or not this effect is permanent or not, as Smith (2002) notes. In the last years, other significant studies have continued to look at the effect of divorce laws on divorce rates but focusing on the analysis of the lasting or not-lasting effect of divorce-law reforms. Wolfers (2006) replicates Friedberg's work with a longer panel using data from the 1950s to the 1990s to study whether the unilateral reforms that occurred from the 1970s in the US have a permanent or transitory effect on the divorce rate by accounting for the dynamic effects of changes in divorce laws. He finds that the unilateral system has a transitory effect on divorce rates that lasts for 15 years after the unilateral reform took place.

However, previous analysis omits reforms that introduced changes in divorce settlements. This might in somehow obscure the impact of unilateral reforms on divorce rates. In this paper, we extend on the previous analyses offering insights on the impact of unilateral divorce on divorce rates after controlling for several reforms of aspects of laws relevant to divorce. We introduce both joint custody law reforms and Child Support Enforcement efforts in Wolfers's analysis. Our results suggest that those reforms play an important role in explaining the behaviour of divorce rate in the 1980s and 1990s. We find that the long-run effect of divorce law reforms on divorce rate observed by Wolfers seems to be capturing both unilateral reforms and changes in the aftermath of divorce.

Supplemental analysis, developed by exploiting time-series analysis, also suggests that what is driving the evolution of the divorce rate in the 1980s and 1990s is a shock that have a negative effect on divorce. This seems to confirm that unilateral divorce reforms do not have a negative effect on divorce rate in the long run. After ten years of the implementation of unilateral reforms, what seem to conduct the pattern of divorce rates are those reforms on the laws that govern the aftermath of divorce.

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Table 1- WOLFERS' RESULTS AND DYNAMIC EFFECTS OF ADOPTING JOINT CUSTODY LAWS

(Dependent variable: Annual divorces per 1,000 inhabitants)

	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends
Panel A			
First 2 years	0.267***	0.342***	0.302***
	(0.085)	(0.062)	(0.054)
Years 3-4	0.210**	0.319***	0.289***
	(0.085)	(0.070)	(0.065)
Years 5-6	0.164*	0.300***	0.291***
	(0.085)	(0.077)	(0.079)
Years 7-8	0.158*	0.322***	0.351***
	(0.084)	(0.084)	(0.097)
Years 9-10	-0.121	0.081	0.161
	(0.084)	(0.091)	(0.117)
Years 11-12	-0.324***	-0.102	0.047
	(0.083)	(0.099)	(0.142)
Years 13-14	-0.461***	-0.202*	0.031
	(0.084)	(0.107)	(0.167)
Years 15	-0.507***	-0.210*	0.251
Onwards	(0.080)	(0.119)	(0.205)
Controls			
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
State * time	No	Yes	Yes
State * timesq	No	No	Yes
Adjusted R2	0.935	0.975	0.984
Sample	1956-88, n=1631 state-years		
Panel B			
First 2 years	0.273***	0.331***	0.324***
	(0.084)	(0.062)	(0.054)
Years 3-4	0.219***	0.306***	0.338***
	(0.084)	(0.070)	(0.066)
Years 5-6	0.174**	0.286***	0.376***
	(0.084)	(0.077)	(0.082)
Years 7-8	0.170**	0.310***	0.480***
	(0.083)	(0.084)	(0.101)
Years 9-10	-0.088	0.082	0.340***
	(0.083)	(0.091)	(0.125)
Years 11-12	-0.208**	-0.062	0.277*
	(0.084)	(0.099)	(0.152)
Years 13-14	-0.321***	-0.168	0.269
	(0.086)	(0.107)	(0.181)
Years 15	-0.298***	-0.176	0.503**
Onwards	(0.088)	(0.120)	(0.219)
Controls			
Years Joint Custody	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
State * time	No	Yes	Yes
State * timesq	No	No	Yes
Adjusted R2	0.937	0.976	0.985
Sample	1956-88, n=1631 state-years		

Note: Estimated using state population weights. Standard errors in parentheses.

Sources: Divorce rate date coded by Wolfers (2006) form Vital Statistics. Divorce laws coded form Wolfers' www.nber.org/~ jwolfers. Population weights downloaded from . www.nber.org/~ jwolfers.

Table 2- DYNAMIC EFFECTS OF UNILATERAL REFORM FOR THOSE STATES THAT ONLY PASSED THAT REFORM
(*Dependent variable: Annual divorces per 1,000 inhabitants*)

	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends
First 2 years	0.274***	0.324***	0.352***
	(0.084)	(0.062)	(0.056)
Years 3-4	0.221***	0.296***	0.387***
	(0.085)	(0.070)	(0.070)
Years 5-6	0.177**	0.270***	0.449***
	(0.084)	(0.077)	(0.090)
Years 7-8	0.174**	0.283***	0.578***
	(0.086)	(0.085)	(0.113)
Years 9-10	-0.060	0.035	0.457***
	(0.093)	(0.096)	(0.139)
Years 11-12	-0.277**	-0.131	0.468***
	(0.118)	(0.113)	(0.172)
Years 13-14	-0.471***	-0.279**	0.511**
	(0.148)	(0.133)	(0.211)
Years 15	-0.246*	-0.009	0.918***
Onwards	(0.147)	(0.139)	(0.264)
Controls			
Years Joint Custody	Yes	Yes	Yes
Years JC*Years UD	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
State * time	No	Yes	Yes
State * timesq	No	No	Yes
Adjusted R2	0.937	0.976	0.985
Sample	1956-88, n=1631 state-years		

Note: Estimated using state population weights. Standard errors in parentheses.
Sources: Divorce rate date coded by Wolfers (2006) form Vital Statistics. Divorce laws coded form Wolfers' www.nber.org/~ jwolfers. Population weights downloaded from . www.nber.org/~ jwolfers.

Table 3- CHILD SUPPORT ENFORCEMENT VARIABLES
(Means and Standard Deviations)

		Reforms			
	All	Unilateral Divorce	Joint Custody	UD & JC	No Reform
Collection Rate	15.602	15.008	15.167	16.422	15.503
	(9.677)	(13.742)	(7.806)	(7.720)	(8.203)
Average Collections	0.137	0.137	0.143	0.126	0.146
	(0.117)	(0.117)	(0.074)	(0.046)	(0.171)
Paternity Rate	0.861	0.564	1.286	0.879	0.865
	(0.587)	(0.561)	(0.632)	(0.459)	(0.559)
Location Rate	3.567	2.873	4.208	4.582	2.804
	(2.700)	(1.985)	(3.290)	(3.197)	(1.802)

Notes: Standard deviations in parentheses and population-weighted sample means.

Table 4- DYNAMIC EFFECTS OF UNILATERAL REFORM FOR THOSE STATES THAT
ONLY PASSED THAT REFORM AND CONTROLS FOR CSE VARIABLES.
(*Dependent variable: Annual divorces per 1,000 inhabitants*)

	(1) Basic specification	(2) State-specific	(3) State-specific	(4) Basic specification	(5) State-specific	(6) State-specific
		linear trends	quadratic trends		linear trends	quadratic trends
First 2 years	0.275***	0.324***	0.354***	0.273***	0.324***	0.352***
	(0.084)	(0.062)	(0.056)	(0.084)	(0.062)	(0.056)
Years 3-4	0.224***	0.295***	0.391***	0.220***	0.295***	0.387***
	(0.084)	(0.070)	(0.070)	(0.085)	(0.070)	(0.070)
Years 5-6	0.190**	0.269***	0.459***	0.172**	0.268***	0.449***
	(0.084)	(0.078)	(0.090)	(0.084)	(0.077)	(0.090)
Years 7-8	0.182**	0.281***	0.588***	0.175**	0.283***	0.578***
	(0.086)	(0.086)	(0.113)	(0.086)	(0.085)	(0.113)
Years 9-10	-0.059	0.034	0.467***	-0.062	0.034	0.457***
	(0.093)	(0.096)	(0.139)	(0.093)	(0.096)	(0.139)
Years 11-12	-0.290**	-0.131	0.475***	-0.278**	-0.132	0.468***
	(0.118)	(0.113)	(0.172)	(0.118)	(0.113)	(0.172)
Years 13-14	-0.492***	-0.278**	0.512**	-0.472***	-0.280**	0.511**
	(0.148)	(0.133)	(0.211)	(0.148)	(0.133)	(0.211)
Years 15 Onwards	-0.274*	-0.008	0.915***	-0.247*	-0.009	0.917***
	(0.148)	(0.139)	(0.264)	(0.148)	(0.139)	(0.264)
Collection Rate	-0.006**	0.000	-0.003*			
	(0.003)	(0.002)	(0.002)			
Average Collections				-0.171	-0.074	-0.010
				(0.186)	(0.120)	(0.099)
Years Joint Custody	Yes	Yes	Yes	Yes	Yes	Yes
Years JC*Years UD	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
State * time	No	Yes	Yes	No	Yes	Yes
State * timesq	No	No	Yes	No	No	Yes
Adjusted R2	0.938	0.976	0.985	0.937	0.976	0.985
Sample	1956-88, n=1631 state-years					

Note: Estimated using state population weights. Standard errors in parentheses.

Table 5- DYNAMIC EFFECTS OF UNILATERAL REFORM FOR THOSE STATES THAT ONLY PASSED THAT REFORM AND CONTROLS FOR CSE VARIABLES BY DIVORCE LAW REFORM

(Dependent variable: Annual divorces per 1,000 inhabitants)

	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends	(4) Basic specification	(5) State-specific linear trends	(6) State-specific quadratic trends
First 2 years	0.283***	0.323***	0.351***	0.282***	0.327***	0.347***
	(0.084)	(0.061)	(0.055)	(0.084)	(0.062)	(0.055)
Years 3-4	0.246***	0.303***	0.387***	0.245***	0.315***	0.386***
	(0.085)	(0.069)	(0.070)	(0.085)	(0.069)	(0.070)
Years 5-6	0.251***	0.312***	0.462***	0.223***	0.319***	0.459***
	(0.089)	(0.079)	(0.090)	(0.086)	(0.078)	(0.090)
Years 7-8	0.275***	0.348***	0.593***	0.293***	0.399***	0.622***
	(0.097)	(0.090)	(0.113)	(0.095)	(0.088)	(0.113)
Years 9-10	0.063	0.124	0.471***	0.066	0.164*	0.503***
	(0.110)	(0.103)	(0.140)	(0.103)	(0.099)	(0.139)
Years 11-12	-0.161	-0.058	0.460***	-0.153	-0.013	0.499***
	(0.132)	(0.119)	(0.172)	(0.125)	(0.115)	(0.171)
Years 13-14	-0.355**	-0.206	0.492**	-0.351**	-0.171	0.533**
	(0.161)	(0.138)	(0.211)	(0.152)	(0.134)	(0.210)
Years 15 Onwards	-0.148	0.032	0.874***	-0.143	0.106	0.945***
	(0.159)	(0.144)	(0.263)	(0.152)	(0.141)	(0.263)
CSE in states with:						
Unilateral Reform	-0.010***	-0.004*	-0.004**	-1.101***	-0.936***	-0.584***
	(0.003)	(0.002)	(0.002)	(0.338)	(0.218)	(0.181)
Joint Custody	0.012*	0.024***	0.010*	-0.059	0.274	0.189
	(0.007)	(0.006)	(0.006)	(0.636)	(0.429)	(0.359)
UD & JC	-0.016**	0.016***	0.011**	3.324***	-0.284	-0.148
	(0.007)	(0.005)	(0.005)	(1.048)	(0.719)	(0.606)
No Reform	-0.001	0.005	-0.001	-0.013	0.180	0.165
	(0.004)	(0.003)	(0.003)	(0.213)	(0.137)	(0.113)
Years Joint Custody Years	Yes	Yes	Yes	Yes	Yes	Yes
JC*Years UD	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
State * time	No	Yes	Yes	No	Yes	Yes
State * timesq	No	No	Yes	No	No	Yes
Adjusted R2	0.938	0.977	0.985	0.938	0.977	0.985
Sample	1956-88, n=1631 state-years					

Note: Columns 1, 2 and 3 include as CSE variable Collection Rate, Columns 4, 5 and 6 include as CSE variable Average Collections. Estimated using state population weights. Standard errors in parentheses.

Table 6-CORRELATION BETWEEN CSE VARIABLES

	Collection Rate	Average Collections	Paternity Rate	Location Rate
Collection Rate	1			
Average Collections	-0.0601	1		
Paternity Rate	0.1022	-0.0549	1	
Location Rate	0.0705	-0.0355	0.3565	1

Table 7- DYNAMIC EFFECTS OF UNILATERAL REFORM FOR THOSE STATES THAT ONLY PASSED THAT REFORM AND CONTROLS FOR ALL CSE VARIABLES BY DIVORCE LAW REFORM
(Dependent variable: Annual divorces per 1,000 inhabitants)

	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends	Cont.	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends
First 2 years	0.286***	0.323***	0.347***	Paternity Rate in states with:	°		
	(0.084)	(0.061)	(0.055)	Unilateral Reform	0.185*	-0.073	0.123
Years 3-4	0.259***	0.319***	0.386***		(0.105)	(0.091)	(0.095)
	(0.085)	(0.069)	(0.070)	Joint Custody	0.054	0.073	0.089
Years 5-6	0.262***	0.352***	0.465***		(0.102)	(0.072)	(0.066)
	(0.092)	(0.080)	(0.090)	UD & JC	0.095	-0.340***	0.019
Years 7-8	0.324***	0.456***	0.615***		(0.113)	(0.093)	(0.100)
	(0.106)	(0.093)	(0.114)	No Reform	0.093	0.095	0.062
Years 9-10	0.086	0.255**	0.477***		(0.094)	(0.069)	(0.059)
	(0.123)	(0.109)	(0.141)	Location Rate in states with:			
Years 11-12	-0.112	0.075	0.462***	Unilateral Reform	-0.004	0.006	-0.007
	(0.144)	(0.124)	(0.173)		(0.027)	(0.020)	(0.018)
Years 13-14	-0.334*	-0.080	0.486**	Joint Custody	-0.009	-0.021	-0.016
	(0.178)	(0.144)	(0.213)		(0.019)	(0.014)	(0.014)
Years 15	-0.241	0.219	0.828***	UD & JC	-0.026*	0.015	-0.024*
Onwards	(0.189)	(0.155)	(0.267)		(0.015)	(0.012)	(0.013)
Collection Rate in states with:				No Reform	0.005	0.003	0.002
Unilateral Reform	-0.009***	-0.002	-0.003*		(0.026)	(0.019)	(0.016)
	(0.003)	(0.002)	(0.002)	Years Joint Custody	Yes	Yes	Yes
Joint Custody	0.012*	0.024***	0.011*	Years JC*Years UD	Yes	Yes	Yes
	(0.007)	(0.006)	(0.006)	Year FE	Yes	Yes	Yes
UD & JC	-0.014**	0.020***	0.012**	State FE	Yes	Yes	Yes
	(0.007)	(0.006)	(0.005)	State * time	No	Yes	Yes
No Reform	-0.005	0.000	-0.003	State * timesq	No	No	Yes
	(0.005)	(0.003)	(0.003)				
Average Collections in states with:							
Unilateral Reform	-0.966***	-0.817***	-0.570***				
	(0.350)	(0.225)	(0.188)				

Joint Custody	-0.375	0.270	0.032			
	(0.712)	(0.459)	(0.393)			
UD & JC	3.392***	0.338	0.223			
	(1.093)	(0.731)	(0.632)			
No Reform	-0.061	0.169	0.154	Adjusted R2	0.939	0.978	0.985
	(0.216)	(0.138)	(0.115)	Sample	1956-88, n=1631 state-years		

Note: Estimated using state population weights. Standard errors in parentheses.

Table 8- DYNAMIC EFFECTS OF UNILATERAL REFORM. Sample: 1956-1998.
(*Dependent variable: Annual divorces per 1,000 inhabitants*)

	(1) Basic specification	(2) State-specific linear trends	(3) State-specific quadratic trends	(4) Basic specification	(5) State-specific linear trends	(6) State-specific quadratic trends
First 2 years	0.274***	0.399***	0.294***	0.281***	0.315***	0.293***
	(0.096)	(0.065)	(0.053)	(0.094)	(0.066)	(0.054)
Years 3-4	0.223**	0.398***	0.272***	0.254***	0.308***	0.281***
	(0.096)	(0.071)	(0.058)	(0.095)	(0.073)	(0.062)
Years 5-6	0.180*	0.399***	0.263***	0.248**	0.327***	0.299***
	(0.095)	(0.076)	(0.063)	(0.100)	(0.082)	(0.073)
Years 7-8	0.179*	0.442***	0.306***	0.339***	0.444***	0.388***
	(0.095)	(0.082)	(0.068)	(0.113)	(0.094)	(0.086)
Years 9-10	-0.095	0.215**	0.095	0.122	0.286***	0.186*
	(0.094)	(0.087)	(0.073)	(0.127)	(0.106)	(0.100)
Years 11-12	-0.302***	0.065	-0.042	-0.097	0.113	0.075
	(0.093)	(0.094)	(0.078)	(0.149)	(0.120)	(0.114)
Years 13-14	-0.445***	-0.018	-0.091	-0.290	-0.039	-0.055
	(0.092)	(0.101)	(0.085)	(0.178)	(0.138)	(0.130)
Years 15	-0.576***	0.016	0.054	-0.033	0.254*	0.107
Onwards	(0.061)	(0.113)	(0.098)	(0.170)	(0.145)	(0.145)
By Divorce Law Regime:						
Collection Rate	No	No	No	Yes	Yes	Yes
Average Collections	No	No	No	Yes	Yes	Yes
Paternity Rate	No	No	No	Yes	Yes	Yes
Location Rate Controls:	No	No	No	Yes	Yes	Yes
Years Joint Custody	No	No	No	Yes	Yes	Yes
Years JC*Years UD	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
State * time	No	Yes	Yes	No	Yes	Yes
State * timesq	No	No	Yes	No	No	Yes

Adjusted R2	0.906	0.966	0.980	0.913	0.969	0.981
Sample			1956-98, n=2102 state-years			

Note: Estimated using state population weights. Standard errors in parentheses.

Table 9- RESULTS UNIT ROOT TESTS ON DIVORCE RATES. Sample: 1956-1998.

A: State specific tests[1]

Alternative hypothesis	Trend stationary	Trend stationary with one break	Trend stationary with two breaks
Significance level	% Unit root rejected	% Unit root rejected	% Unit root rejected
1%	2%	8%	2%
5%	4%	30%	6%
10%	8%	48%	10%

B: Panel tests (p=1)	Balanced panel[2]	Unbalanced panel[3]
	Test-statistic (p-value)	Test-statistic (p-value)
Levin–Lin–Chu (2002)	-1.109 (0.133)	
Im–Pesaran–Shin (2003)	-0.949 (0.171)	
Pesaran (2007)	-5.137 (0.000)	-5.676 (0.000)

Notes: The null hypothesis is in all cases a unit root in divorce rate. Following the suggestion in Ng and Perron (1995) we choose the optimal number of lagged growth rates to be included in the regression to control for autocorrelation using a 'general-to-specific procedure' based on the t-statistic. The maximum lag length to start off this procedure is set at 11. The panel test statistics are the t^*, the $W[\bar{t}]$, and the $Z[\bar{t}]$-statistic in case of the Levin–Lin–Chu, Im–Pesaran–Shin and Pesaran test respectively.

[1] Excluding Louisiana.
[2] Excluding California, Indiana, Kentucky, Louisiana, New York, and West Virginia.
[3] Including all states, except Louisiana.

Table 10- RESULTS UNIT ROOT TESTS ON DIVORCE RATES BY STATE, ONE STRUCTURAL BREAK TEST. Sample: 1956-1998.

State	d_1	$(\hat{\rho}-1)$	Structural Break Year
Alabama	2.15027***	-0.391*	1973
Alaska	2.90367***	-0.079	1971
Arizona	1.36532**	-0.197	1958
Arkansas	3.35513***	-0.676***	1968
California	1.97197***	-0.208	1966
Colorado	2.24497***	-0.344	1968
Connecticut	2.16467***	-0.361	1971
Delaware	2.91339***	-0.691***	1970
District of Columbia	2.47464***	-0.196	1967
Florida	1.70587***	-0.105	1973
Georgia	2.81440***	-0.409*	1970
Hawaii	2.42453***	-0.659**	1968
Idaho	2.02264***	-0.407*	1970
Illinois	1.46082***	-0.110	1960
Indiana	3.10658***	-0.476	1969
Iowa	1.74796***	-0.463*	1969
Kansas	2.28588***	-0.316	1971
Kentucky	2.16189***	-0.264	1976

Maine	2.15592***	-0.258	1971
Maryland	1.55846***	-0.351	1969
Massachusetts	1.44719***	-0.482*	1969
Michigan	1.93480***	-0.425**	1969
Minnesota	1.99516***	-0.477*	1970
Mississippi	2.40508***	-0.722***	1970
Missouri	2.01833***	-0.358	1970
Montana	1.40091***	-0.211**	1977
Nebraska	2.02833***	-0.510	1970
Nevada	-12.98665***	-0.217	1972
New Hampshire	2.59753***	-0.361	1970
New Jersey	2.27435***	-0.521*	1969
New Mexico	3.07653***	-0.232	1965
New York	2.63238***	-0.607**	1970
North Carolina	2.84530***	-0.564	1971
North Dakota	2.03803***	-0.474**	1971
Ohio	2.10924***	-0.274	1971
Oklahoma	2.03977***	-0.337	1969
Oregon	1.49943***	-0.146**	1976
Pennsylvania	1.75424***	-0.536**	1971
Rhode Island	2.16108***	-0.589	1972
South Carolina	2.49858***	-0.433**	1972
South Dakota	2.20330***	-0.446***	1972
Tennessee	3.31939***	-0.629	1969
Texas	1.84297***	-0.149*	1967
Utah	2.28857***	-0.371**	1968
Vermont	2.81538***	-0.560**	1970
Virginia	2.21250***	-0.514	1972
Washington	2.33676***	-0.295**	1965
West Virginia	2.64602***	-0.567*	1972
Wisconsin	1.99106***	-0.444	1972
Wyoming	2.74816***	-0.287	1968

Notes: One-break test of Perron and Vogelsang (1992), AO model.

$(\hat{\rho}-1)$: Ho: Unit root, rejected at ***1% level, **5% level, *10% level

Structural Break Year dummy variable coefficient d_1: Significant at the ***1% level, **5% level, *10% level

Table 11- RESULTS UNIT ROOT TESTS ON DIVORCE RATES BY STATE, DOUBLE STRUCTURAL BREAK TEST. Sample: 1956-1998.

State	d_1	d_2	$(\hat{\rho}-1)$	First Structural Break Year	Second Structural Break Year
Alabama	-0.4375	2.49398***	-0.520	1963	1971
Alaska	3.79375***	-2.18475***	-0.364	1971	1987
Arizona	1.84394***	-0.94008***	-0.830	1966	1990
Arkansas	2.44383***	1.05151***	-0.830	1968	1972
California	2.16389***	-0.75889***	-0.812	1967	1985
Colorado	2.58256***	-0.73365***	-0.551	1970	1983
Connecticut	2.36875***	-0.50092***	-0.583	1971	1987
Delaware	1.26515***	2.02442***	-0.877**	1966	1972
District of Columbia	3.10833***	-1.72640***	-0.484	1972	1984
Florida	2.47857***	-0.93868***	-0.714	1969	1987
Georgia	2.92139***	-0.74894**	-0.532	1970	1994
Hawaii	2.64545***	-0.44832***	-0.615	1970	1981
Idaho	0.58000**	1.82931***	-0.445	1960	1970
Illinois	1.83586***	-0.58762***	-0.492	1970	1987
Indiana	2.54434***	0.91786***	-0.565	1967	1974
Iowa	1.04359***	0.89426***	-0.487	1968	1974
Kansas	2.44514***	-0.47777**	-0.463	1971	1989
Kentucky	1.75631***	1.47941***	-0.656	1969	1986
Maine	2.44643***	-0.60337***	-0.395	1971	1985
Maryland	1.60338***	-0.48119***	-0.294	1974	1988
Massachusetts	1.53623***	-0.43038**	-0.601	1969	1992
Michigan	2.06538***	-0.23668*	-0.543	1969	1982
Minnesota	0.93167***	1.26659***	-0.718	1967	1972
Mississippi	0.98333***	1.63057***	-0.852	1967	1971
Missouri	0.97857***	1.34501***	-0.505	1965	1972
Montana	2.58333***	-0.85797***	-0.410	1971	1983

Nebraska	1.14103***	1.10916***	-0.741	1968	1974
Nevada	-11.36930***	-6.96305***	-0.453	1967	1986
New Hampshire	2.78000***	-0.39302**	-0.481	1970	1985
New Jersey	1.44048***	1.05141***	-0.715	1969	1975
New Mexico	4.19751***	-1.32845***	-0.671	1972	1983
New York	1.94769***	0.83353***	-0.704	1970	1975
North Carolina	1.52456***	1.85005***	-0.634	1966	1975
North Dakota	1.02418***	1.26871***	-0.725	1968	1975
Ohio	2.37083***	-0.47087***	-0.441	1971	1983
Oklahoma	2.26734***	-1.09993***	-0.699*	1969	1992
Oregon	2.63213***	-1.15445***	-0.397	1972	1985
Pennsylvania	0.91795***	1.03368***	-0.771	1968	1974
Rhode Island	0.89643***	1.43676***	-0.876*	1969	1973
South Carolina	1.65000***	1.20573***	-0.851	1969	1976
South Dakota	1.35714***	1.09909***	-1.228	1969	1976
Tennessee	1.46000***	2.18608***	-1.166***	1967	1972
Texas	2.16542***	-0.76067***	-0.426	1971	1986
Utah	2.32702***	-0.47881*	-0.496	1969	1993
Vermont	1.84667***	1.23291***	-1.035**	1970	1976
Virginia	1.41667***	1.00720***	-0.710	1970	1976
Washington	2.71696***	-0.93717***	-0.682	1969	1985
West Virginia	1.86000***	0.99347***	-0.680	1971	1976
Wisconsin	1.13095***	1.09343***	-0.689	1969	1975
Wyoming	3.04375***	-0.72803***	-0.396	1971	1983

Notes: Two-break test of Clemente-Montañés-Reyes (1998), AO model.

$(\hat{\rho}-1)$: Ho: Unit root, rejected at ***1% level, **5% level, *10% level

Structural Break Year dummy variables coefficients d_i: Significant at the ***1% level, **5% level, *10% level