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***Abstract*:**

The economic literature examining changes in divorce rates is not conclusive since legal reforms have been found to have permanent, transitory or no effect on divorce rates. This paper studies differences in divorce rates among 16 European countries from 1930 to 2006, by exploiting time-series analysis. We find that 37.5% of the divorce rate's series are stationary, so that any shock had a transitory effect. However, we also detect structural breaks in the average divorce rate for each country that are endogenously located very close to the year of the divorce law legislation (the same year or some years later).

***Keywords*:** Divorce rate, unit root, structural break.

***JEL*:** C12, C22, J12, J18, K36

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1. Introduction

There is extensive literature examining changes in divorce rates focusing on the effects of changes in divorce laws. However, empirical evidence is not conclusive since legal reforms that occurred from the 1970s in Europe and in the US have been found to have permanent, transitory or no effect on divorce rates. These results might somehow obscure the impact of law reforms on the trend of divorces in a framework in which legal changes have sparked many worries about their negative effects on women and on the long-term outcomes of children among researchers and policymakers.[1]

The tendency of the current legislation across European countries is to minimize the impacts of divorce on children and lone parents rather than using the legislation to discourage divorce, such as in the case of some states in the US (Ohio's divorce-law reform tries to make divorce less accessible). Nevertheless, as González and Viitanen (2008) note, the study of divorce rates and their relationship with divorce-law reforms is pertinent in the European context given the current consideration of the harmonization of divorce law within the EU (European Commission, 2005) and given that some countries continue reforming their divorce laws (for instance, Spain, France and some states of the US where reforms are making divorce more accessible).

It appears to be a trade-off between the divorce-rate trends and the divorce laws. However, 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

[1]The financial and psychological impact of divorce on lone parents and their children has generated considerable concern, the quality of life of a child is potentially going to deteriorate when her parents divorce relative to the situation in which parents stay together. Gruber (2004) studied the effect of unilateral reforms on children, finding evidence that adults who were exposed to unilateral divorce laws when they were children are less well educated, are more likely to have lower family incomes, tend to marry earlier but separate more often, and tend to suicide more. The economic losses of divorced women and children were analysed by Jarvis and Jenkins (1999) using British data. More work has been carried out on the effect of divorce laws on the labour force participation of women. Michael (1985) was the first to suggest that the increase in the labour force participation of women was caused by increases in divorce since the 1970s. He explained that divorced women are more likely to work. Peters (1986), who focuses on those women who try to insure against a divorce by working more during marriage, found that the labour force participation of women is greater in those no-fault states in US. Another work that concentrates on the study of married women is that developed by Parkman (1992), who suggested that the increase in labour force participation was mostly among married women since married women are concerned about their losses in human capital if they participate less in the labour force. Johnson and Skinner (1986), focusing on the trade-off between labour force participation and divorce rates, found that, although divorce increases the female labour supply before a divorce occurs, female labour supply does not increase the divorce rate.

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.

Most empirical research on the links between the divorce-law reforms and the rise in divorce rates has been focused on the US and Canada. As an exception, González and Viitanen (2008) extend Wolfers's analysis using European data by including the analysis of no-fault and unilateral reforms that occurred in some European countries from the 1970s. They also find a transitory response of the European divorce rate to unilateral reforms lasting between 5 and 8 years after the reform and a permanent effect of no-fault reforms on divorce rates, in such a way that these reforms account for about 0.6 divorces per 1,000 inhabitants of the increase in divorce rates in Europe from 1950 to 2003.[2]

From a theoretical point of view, the applicability of the Coase theorem to marital breakdown has been discussed. Becker et al. (1977) and Becker (1981) argue that divorce law may not affect the probability of marriage breakdown, since a change in divorce law only affects the property rights. Under mutual consent divorce, it is the party who wants to divorce who has to compensate the other spouse, in such a way that mutual consent gives considerable power to spouses who do not want a divorce. Under unilateral divorce, it is the party who wants to continue being married who has to compensate the spouse who wishes to leave. The unilateral system transfers the right to divorce to the spouse most wanting a divorce. This reassignment of property rights between spouses might not affect divorce rates under full transferability, perfect information and no transaction costs assumptions when the divorce law passes from a no-fault

[2] In the grounds of sociology (see Nakonezny et al., 1995; Glenn, 1999; and Rodgers et al., 1999) and law and economics literature (see Brinig and Buckley, 1998; Ellman, 2000; and Ellman and Lohr, 1998), mixed results have also been found. They have asserted for some decades that easier divorce laws have only a small effect on the divorce rates, with the exception of Brinig and Buckley (1998) who "provides the strongest evidence to date that no-fault divorce laws are associated with higher divorce levels".

system to a unilateral system. Becker et al. (1977) argue that, when parties are free to bargain, the only divorces that occur are efficient ones, that is, those in which the total value of the couple when they are single is greater that the joint value of the marriage. Thus, the change in the divorce law should have had no effect on the divorce rate. Nevertheless, when the transaction costs are quite high, it is possible that the spouse who wishes to continue to be married may be unable to compensate his partner and hence an inefficiently high divorce rate may be observed under unilateral divorce (see Allen, 2002). It is possible to find other situations in which inefficient divorce was produced; Zelder (1993) considers the existence of children as an example of a situation in which there is a difficult and costly bargain that might make the divorce inefficient. Children are considered as partly a public good since neither ex-spouse can be excluded from the utility derived from the child in the situation of divorce; they gain utility from being parents.

Other authors have also theoretically and empirically questioned whether the legal framework had a negligible influence on the propensity to divorce and have developed models, mainly in a marital bargaining framework, in which divorce laws can affect the divorce rate (Clark, 1999; Fella et al., 2004; Peters, 1986; Stevenson and Wolfers, 2006). In marriage, the most relevant threat point in a bargaining situation is being identified with divorce (Manser and Brown, 1980; McElroy and Horney, 1981) and hence the grounds for divorce, the rules under which property is divided at the time of divorce, and the financial and custodial arrangements at divorce affect the decisions taken in a marriage situation and so the propensity to divorce.[3]

Our paper contributes to the empirical literature on the effect of divorce laws on divorce rates. We study differences in divorce rates among 16 European countries spanning from 1930 to 2006. This paper extends the previous analyses offering insights into the impact of divorce-law changes on divorce rates by exploiting time-series analysis, a technique that has been ignored in most previous work.[4] Specifically, we analyse whether the divorce rate is a stationary time series and whether any shock, such as policy shocks, will disappear over time.

[3] For instance, unilateral divorce may reduce the compensation to the spouse who has made sacrifices for the benefit of the family and hence spouses have fewer incentives to specialize (see Parkman, 2002). It also discourages the search for a spouse, since marriage can be dissolved at low costs, which can produce an increase in inefficient marriages and so a rise in the probability of divorce.

[4] As an exception, we find the work of Marvell (1989), which was the first attempt to develop a complete time-series analysis of divorce rates across the US, finding that the major 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 on divorce rates.

The estimation methods used in this paper have several advantages over the dynamic analysis implemented by Wolfers (2006) and González and Viitanen (2008) or the cross-sectional analysis developed years previously. First, we may determine whether the shocks are permanent. Second, we may endogenously detect the existence of structural breaks, which allows us to detect the timing of the changes in the average divorce rates and to compare these breaks with the time in which divorce-law reforms occurred for each country separately. Third, an endogeneity problem can be present in the works, which follows the dynamic approach using all countries or states jointly in their estimations. The endogeneity problem comes from our concerns that changes in divorce rates can be caused by the earlier changes in divorce laws in other states or countries; as Allen (2002) notes, changes in the divorce rates could have appeared years before the change in the divorce law, which have not been captured in the dynamic approach. It is important to note that the liberalization of divorce laws took almost 15 years in the US and 20 years in Europe (excluding those reforms that occurred from the 1990s onwards). With our time-series analysis, we may also detect breaks in the divorce rates that occurred some years before the reforms. Prior to the liberalization of divorce laws, there was already important variation in divorce rates across Europe in the 1960s, so if a structural break is found some years before the new law and we do not detect any other change at the time or after the reform, it means that the new law has not had an impact on the average divorce rates, when the series is stationary.[5]

The remainder of the paper is organized as follows. Section 2 discusses the data and the parallel evolution of divorce-law reforms. Section 3 presents the econometric specification and the main results. The final section summarizes the results and concludes.

2. Divorce rates and divorce laws

The longitudinal data on divorce rates include 16 European countries from 1930 to 2006. The data for the divorce rate are publicly available from UN Demographic Yearbooks. The United Nations Demographic Yearbooks contain regular series of a comprehensive collection of international demographic statistics, comparable within and among themselves, and relevant calculations of comparable rates prepared by the Statistical Office of the United Nations and published yearly from 1948.

[5] It is common to introduce some measure of economic performance in the estimations, such as female labour force participation of women, unemployment rates, or other demographic variables such us fertility rates. However, as Allen (2002) notes, "the no-fault law interacts with everything", which can produce problems of endogeneity since many of these measures of economic performance have not truly been exogenous. The number of divorces can increase in economic downturns but these divorces would not have occurred if the divorce-law reforms had not been implemented. Allen (2002) considers that the one-sixth of the rise in the divorce rate that Friedberg (1998) found "should be considered a lower bound". In our case, we do not introduce these demographic and economic characteristics so that what we might observe is the upper bound of the effect of divorce reforms.

Our variable of interest is the divorce rate for each European country, which is called the crude divorce rate in several issues of the Demographic Yearbook. The crude divorce rate is measured as the absolute number of divorces reported to have occurred in the time period and within the present geographic boundaries, per 1,000 persons estimated to be present in the area at the mid-point of the year in question, that is, the annual number of divorces per 1,000 mid-year population. The first longest time trend of divorce rates appeared in the Demographic Yearbook of 1958 in the Special Topics of the Demographic Yearbook Series: Marriage and Divorce Statistics, with data from 1930. We incorporate data for our sample from successive issues on marriage and divorce statistics (1958, 1968, 1976, 1982, and 1990) and from each Demographic Yearbook from 1990 to 2006. We have also utilized divorce rate data from Eurostat, which are also publicly available, to complete our dataset.

Crude divorce rate data do provide a simple measure of the level and changes in divorce. However, it is important to note that crude divorce rates might be affected by the distribution of the population and by the marital status structure of the populations to which they relate. The definitions used for divorce also present problems for international comparability. Divorce is defined only in terms of the law and custom of individual countries or areas, which vary from one country or area to another and as such are less amenable to universally applicable statistical definitions. To tackle the age–marital status structure differences, we could have utilized data on the total divorce rate. The total divorce rate includes the annual number of divorces per 1,000 mid-year married population. However, the time-series analysis might be less reliable due to the scarcity of data on the total divorce rate, only available from 1950 or later. Wolfers (2006) argues that the divorce rate might increase due to the greater accessibility of divorce with "reduced exit costs" that might lead to a lower number of marriages. On the other hand, a more accessible divorce might reduce the benefits of marriage and hence decrease the proportion of the married population by a decline in the number of new marriages. However, it would affect the stock of marriages very slowly. Additionally, the pattern of the total divorce rate is similar to the crude divorce rate from 1950 in each country and, given that we analyse each country independently, we favour the use of the crude divorce rate with a longer series, 77 observations in almost all countries (see Table 1), which can improve our results and can be comparable with previous studies.

Figure 1 shows the temporal evolution of the divorce rate by country. Our sample begins in a transitional period in the history of divorce between both World Wars, characterized by a relative stability in divorce rates. In most of the Western European countries, the divorce rates, annual divorces per 1,000 inhabitants,

rose after the First World War. For instance, the pre-war divorce rate was more than doubled by 1920 in Germany and the divorce rate was triple the pre-war divorce rate, achieving 0.9 divorces per 1,000 inhabitants in 1920, in England (see Philips, 1991).

After the post-war period, a decline in divorces occurred in 1929 but it did not continue in Europe in the 1930s. The divorce rate shows a stationary pattern in Austria, Belgium, Finland, France, Luxembourg, the Netherlands, Norway, Portugal, and the United Kingdom, and an increasing smooth pattern in Denmark, Iceland, Sweden, and Switzerland during the first half of the 1930s. It seems that the economic climate of economic depression from 1929 did not have a long-term effect on the divorce rate in Europe in the period considered. It would be expected that the divorce rate would decline from 1929 since the economic difficulties due to the increase in unemployment produced an increase in the financial dependence that could make divorce less accessible. However, in the US, where women's employment considerably decreased in the economic depression from 1929, about 66% of US divorces were requested by women (see Philips, 1991).

An increase in the number of divorces is a general pattern observed in post-war periods. It also occurred after the Second World War, when the post-war period showed levels of divorce rates much higher than they had been before the war throughout the European countries. This might be produced by a decrease in the population after the wartime. However, in both post-war periods, the number of divorces settled at levels dramatically higher than before the war. Divorces peaked around the mid–late 1940s, 1946–1949. These high divorce rates were not reached until the 1970s or even the 1980s in most countries.[6] The increasing trend after the Second World War that is observed in the belligerent countries is also observed in other countries that did not participate in this war. For instance, in Switzerland, the divorce rate increased considerably until 1947. It is interesting to note that this increase in the divorce rate of the non-belligerent countries is not comparable to the dramatic increase in the war participants.

The divorce boom that occurred after the Second World War dissipated in the 1950s when divorce rates stabilized. However, the divorce rates from this decade, the 1950s, were considerably greater than those of the 1930s. These patterns of divorce might be influenced by the legal reforms that occurred in the late 1930s and 1940s.

[6] Philips (1988) enumerates the main factors that could produce the divorce boom after both wars, such as the weakening of marriages under wartime conditions, the increase in war marriages, the separation imposed by the war, and the wartime adultery, but the divorce boom could also be part of changes in attitudes: divorce was becoming more acceptable.

It was in the interwar period that divorce-law reforms occurred in some European countries, which mainly consisted of added fault grounds.[7] In England, it was in 1937 that the grounds for divorce were explicitly extended beyond adultery; they also incorporated fault cases and a restriction to prevent hasty divorces. This reform took effect in 1938, but it is difficult to measure its effects because of the interruption of the Second World War and the posterior divorce boom in the post-war period. In 1938, there was also a divorce reform in Scotland, but in the same way as in England, it was also a limited fault grounds extension (see Doroghi, 1955).

In Portugal, the liberal divorce law was introduced in 1910. In the 1930s, there were some attempts to abolish divorce, but it was not until the 1940s that couples had to renounce the right to divorce and in 1942 that divorce was limited to a fault ground, adultery (see Philips, 1991). This produced a decline in the number of divorces. However, in 1944, when the divorce law was liberalized, the divorce rates settled at the levels of the 1930s, but Catholics were not allowed to divorce until some decades later. In France, reforms took place in the 1920s and the 1930s to make divorce more accessible. However, in 1938, divorce law was reformed in France to limit the grounds for divorce. Like other countries that participated in the Second World War, the effect of this change in the law is difficult to measure because of the interruption of the war and the post-war divorce boom.

The reform in divorce law in Germany took place in 1938. This law, like other policies adopted in Nazi Germany, had racial goals. To this extent, the National Socialist divorce law provided for fault and no-fault divorce after a period of separation (see Doroghi, 1955). This reform took effect in 1939; however, there are no data on the number of divorces of the wartime period, 1941–46, which makes it impossible to measure the effect of this reform in the long-term and the wartime effect on the divorce rate. The time-series analysis we implement in this paper does not allow us to include any break in the sample, so we select our sample to include data from 1947 for Germany. After the Second World War, we considered West Germany and East Germany jointly, but we have to note that these two areas adopted different divorce laws when they replaced the National Socialist divorce law of 1938. The National Socialist reform also affected Austria since this country was incorporated into Germany in this period. Before 1938, Catholics were denied access to divorce in Austria; the Nazi divorce law extended to all the population, which could produce a considerable increase in the divorce rate, reaching the maximum divorce rate in Europe of 1.24 annual divorces per 1,000 inhabitants in 1939.

[7] Faults mostly consisted of adultery, desertion, and cruelty.

After the stable 1950s characterized by stable divorce rates greater than in the pre-war period, a steady increase in divorce rates is observed from the late 1960s. After that, the 1970s display the most rapid sustained growth in the divorce rate level across Europe, although not all individual countries conform to the same pattern, which can be due to differences in the implementation of divorce laws.

Between the late 1960s and the mid 1980s, divorce laws were reformed. The timing of the main reforms in no-fault and unilateral divorce, which occurred in the countries analysed from 1970, was summarized by González and Viitanen (2008) (see Table 2). It is common to associate the parallel process of liberalizing divorce laws that lowered the barriers to divorce that occurred across several European countries with the dramatic increase in divorce rates from the 1970s. This liberalization consisted of reforms to no-fault or to unilateral systems. Under no-fault laws, a couple may divorce for any reason, normally the "irretrievable" breakdown of the marriage or irreconcilable differences; they do not attribute blame to any party in a couple but mutual consent is usually necessary.[8]

Sweden adopted a divorce law much more liberal than that of other European countries. In 1973, Swedish law introduced unilateral divorce replacing a mixed fault and separation system. This law took effect in 1974, when the divorce rate passed from 2 in 1973 to 3.33 in 1974. Under the unilateral system, divorce required the consent of only one person, without any specified period of living apart, that is, one can instigate a divorce without the consent of the other spouse. In some countries, evidence that the couple had lived apart for a specified period was needed as a requisite to divorce on the request of either of the spouses, in a separation system. Friedberg (1998) explains the difficulty in categorizing this situation, the separation system, as no-fault or unilateral divorce since the unilateral divorce was not introduced explicitly but was possible after a period of separation.

For Italy, Spain, and Ireland, divorce was banned until 1970, 1981, and 1996, respectively. We cannot include Spain and Ireland in our analysis since we do not have enough data to implement our methodology and the results could not be robust. Italy approved divorce law in 1970; some years later, in 1975, no-fault divorce was introduced in its legislation, following the trend existing in other European countries. However, the divorce rate does not considerably increase until the late 1980s after the reforms that were approved in the 1980s and 1990s in Italy. In the case of another southern European country,

[8] No-fault divorce was not an innovation of the 20th century. In 1792, divorce law in France provided for no-fault divorce: "incompatibility of temperament or by mutual consent".

Portugal, divorce was not allowed for Catholic marriages until 1975, but divorce rate data for this country are available from 1930.

Six countries passed no-fault divorce in the 1970s, ten permitted divorce when a couple had lived apart for a specified period allowing unilateral divorce after separation to be considered as proof of the irretrievable breakdown of the marriage in the 1970s and 1980s (two allowed this ground in 1993 and another one in 2000), and another two recognized unilateral divorce, the right to divorce at the request of either spouse, from the 1970s.

3. Methodology and results

We clearly observe a marked legislative uniformity trend and a take-off of the divorce rates settled at the maximum levels in the twentieth century. However, it is difficult to establish a clear causal link between the liberalization of divorce law and the widespread rising divorce rates since the late 1960s: correlation does not automatically imply causation. Additionally, causation may not be unidirectional since the increase in the divorce rates can also provide a stimulus to divorce-law reforms. Divorce rates rose following liberalization in some countries, such as Sweden, Denmark, and the UK, countries that had introduced reforms in their legislation. However, a different picture is shown for Germany and Finland, where the divorce rate considerably increased in the years prior to the reform.

Moreover, the timing of the divorce-law reforms differs by more than 20 years among some countries. This gap can produce a different impact on the divorce rate of each country when similar law reforms occur in different periods. As an example, we take the case of 2 Scandinavian countries, Sweden and Finland: a similar reform was approved in both countries, 14 years apart. With respect to the possible impact on the divorce rates, it is observed that the rise in the divorce rate of both countries from the late 1960s presents differences. In both countries, the divorce rates in the 1950s and 1960s were about 1 and in 1992 both present divorce rates of about 2.5, but the pattern of the divorce-rate series in between is different. In the case of Sweden, the rise in the divorce rate was produced in one step that coincides with a period in which the divorce law was reformed, but the increase in the divorce rate of Finland was produced in two steps, the first one in the late 1960s and the second one in the late 1980s when the unilateral reform was introduced. It seems that the impact of the divorce reform on the average divorce rate is different since the divorce reform took place in different periods.

Additionally, the changes in divorce rates that appeared years before the change in the divorce law are not captured in the dynamic approach used in previous works. This might affect their measure of the impact of the divorce-law reforms since they do not consider the existence of previous breaks in the series that would clearly produce an upward bias of their estimations. Focusing on the Finnish case, by simply comparing the average divorce rate from 1950 to 1987, 1.42, and from 1970 to 1987, 1.95, with the average divorce rate from 1988 onwards, 2.62, it is possible to observe that the jump between the average between 1950–1987 and 1988–2006 is considerably greater than that between 1970–1987 and 1988–2006. Therefore, the floor from which the unilateral reform produces an increase in the divorce rate is considerably different if a break is found in the period from 1950 to 1987. When this break is not taken into account, the results obtained are clearly biased.

The bias in the previous studies can go in the opposite direction, a downward bias of the estimation, if the short series used in the dynamic approach is ignored, since this series began in a period really close to the 1960s in which divorce rates started to rise considerably in almost all countries. By repeating the previous analysis with other countries, Luxembourg or the Netherlands, it is observed that the jump between the average divorce rate between 1950 and the year prior to the reform with the average of the post-reform period is considerably smaller than that between the average divorce rate from 1930 to the previous year of the reform and the average of the post-reform period. Therefore, the cut of the divorce-rate series in 1950 can generate a downward bias of the estimations of the impact of the divorce laws.

The changes in divorce rates in the years or even a decade prior to the reform can be caused by the earlier changes in divorce laws in other countries; as Allen (2002) notes, it generates problems of endogeneity when all the countries are considered jointly in the analysis. Three countries changed their divorce laws from the 1990s; Norway, Iceland, and Switzerland. They did not change their grounds for divorce during the 1960s and 1970s, the period of divorce-law liberalization, but the divorce rates for them increased in tandem with those in countries experiencing divorce-law reforms (see Graham-Siegenthaler, 1995, for an analysis of the Switzerland case). Some researchers consider that the rise in the divorce rates of these three countries does not reflect an influence of the liberalization process in their neighbouring countries, rather, no role of the changes in the divorce laws in the divorce rates (see Goode, 1993).

It should also be noted that a large variation of reforms takes place during several years in some countries.[9] The laws relating to divorce are dominated by political considerations to a greater degree than any other part of civil law. Although rules of civil law are subject to legislative modification only slowly and at long intervals, the laws of divorce, especially in those European countries, are an exception.

There are also differences in the laws that were implemented; for instance, they differ in the separation requirements from the ten years needed in Belgium from 1975 to the two years required in the Netherlands from 1971. Those reforms that consist of a unilateral divorce after a period of separation might produce different impacts or even no impacts on the rise in the divorce rate. As an example, we have the case of Austria (see Simotta, 1995): divorce by mutual agreement was passed in this country in 1978 after a six-month separation, and divorce without consent was made available after six years of living apart. Even with the unilateral system available after a period of separation, most of the Austrian couples, 90%, file for divorce using the six-month separation requirement, which reflects a small effect on the divorce rates for divorce without consent because of the large separation requirements.

Consequently, any analysis of the data should allow us to study all the regional differences separately. A time-series analysis allows us to observe whether the effects of the policy shocks were transitory or permanent, studying each European country individually and endogenously determines the changes in the average divorce rates that are the result of structural breaks, to observe whether these breaks coincide with the divorce-law reforms.

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

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

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 (1) is a random walk with drift (Brockwell and Davis, 1991). When $\rho = 1$, the process in equation (1) is referred to as a unit root process (see Banerjee et al., 1993; Gujarati, 1995; and Hamilton, 1994). In this case, the

[9] As an example, in Belgium, reforms occurred in 1962, 1967, 1969, 1972, 1974, and 1975 (Philips, 1991), which makes it more difficult to determine the effect of these reforms on the divorce rate.

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 (1):

$$\Delta DR_{it} = \alpha + \gamma DR_{it-1} + \sum_{i=1}^{k} \left(c_i \Delta DR_{it-1} \right) + \varepsilon_{it}, \qquad (2)$$

where $\Delta DR_{it} = DR_{it} - DR_{it-1}$, $\gamma = (\rho - 1)$, and k is the number of lags that 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 country i's divorce rate follows a random walk. We estimate equation (2) by applying Augmented Dickey–Fuller tests to all of the countries in our sample. Table 3 shows the results of the individual country unit root tests, which are at odds with the notion of divorce rates being stationary over time. The null hypothesis of a unit root in the divorce rate is not rejected for any country in the sample.

For completeness, we have considered the countries jointly in a panel, and Table 3 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 test 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. Finally, parallel to Im et al. (2003), the 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). The null hypothesis assumes

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

that all series are non-stationary, and analogous to Im et al.'s (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 countries 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 Im–Pesaran–Shin test on the other hand rejects the unit root null at the 5% level (it does not reject it at the 1% level), and Pesaran's test shows that, when controlling for cross-sectional dependence, the null hypothesis is not rejected at the 5% level. The evidence in favour of a unit root in the divorce rate is weaker if all the countries are considered in an unbalanced panel, although the null hypothesis is not rejected at the 1% level.

However, in the previous analysis, we are not taking into account the possible structural break that changes in divorce laws might produce. Perron (1989) argues that, in the presence of a structural break, the standard ADF tests are biased towards the non-rejection 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 that 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 for modelling 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.

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:

$$\overline{DR}_{it} = \rho_i \overline{DR}_{it-1} + u_{it}, \qquad (3)$$

where u_{it} is the random error term and $\overline{DR}_{it}$ 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:

$$DR_{it} = \mu + d_i DU_t + \eta_{it}, \qquad (4)$$

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 (4) and estimates the autoregressive parameter ρ_i in the "second stage" (3).

The results of applying the AO model to test for a unit root in the divorce rates in European countries under the null versus stationary divorce rate around a possibly shifting mean under the alternative are also summarized in Table 3. 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 43.75% of the countries in our sample.

Even more striking is the fact that, for the majority of the countries 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 4 displays the results by country of the break test of Perron and Vogelsang (1992). The Netherlands, France, and the United Kingdom changed to no-fault divorce and unilateral divorce after a certain separation period in 1971, 1976, and 1971, respectively. A structural break is observed in the divorce rate series of these countries some years later, in 1974, 1978, and 1973, respectively. The same pattern is observed in the case of Denmark's divorce rate series, in which the structural break is detected two years later than the divorce-law reform. The gap between the year in which the law took effect and the year in which the break is observed might be produced by separation requirements to be able to divorce (see Table 2). However, considerable differences exist in the period of separation among those four countries, which do not exactly correspond with the gap observed between the implementation of the reform and the structural break. In the case of Germany, the structural break is observed one year before the change in the law (unilateral divorce was not introduced explicitly, as in the previous countries: it was possible after three years of separation), when a "dip-followed-by-peak" pattern is seen in Germany's divorce rate series, in 1976.[11] The exception to the proximity between the reform and the break is seen in Iceland's divorce rate, a stationary time series where the break was observed in 1966, 27 years before the change in divorce law was passed. This break is endogenously detected in a period in which the divorce rate began to take off from the stable 1950s in almost all countries around Europe.

[11] This pattern can also be seen in some US states (Arizona, California, Utah, Montana, Wyoming, Kansas, Texas, Pennsylvania, Maine, and Connecticut) and in Canada, where a decline in the divorce rate was followed by a peak in the next year (see Ellman and Lohr, 1998).

In the countries' series in which a null hypothesis of a unit root is not rejected, the timing of the structural break is found in the year in which the divorce law changed, when unilateral divorce was possible after a specified separation, as in the case of Luxembourg, or some years later as in the case of Austria, in 1979. 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. For the majority of the countries, by simply plotting the divorce rates for different European countries over time, we observe divorce rate series showing a double change in the mean. A steady rise of divorce rates in the 1930s was interrupted by an acceleration of divorces during and after the Second World War. Divorce rates either stabilized or even declined a little during the 1950s. The same pattern was repeated from the 1960s: a steady rise was followed by acceleration close to the year in which the divorce laws were reformed. After that, the divorce rates either stabilized or even increased a little during the 1990s.

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, (4) changes to:

$$DR_{it} = \mu + d_{1i} DU_{1t} + d_{2i} DU_{2t} + \eta_{it}, \qquad (5)$$

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 3, indicate that the percentage of unit root rejected at the 10% level is lower than that in the case of the one-break test, 37.5%, although some of the countries in which the unit root is rejected have changed.[12] Table 5 displays the results by country of the two-break test of Clemente–Montañés–Reyes (1998), and Figures 2 and 3 display the series and the differenced series with the breakpoints detected.

The timing of the first structural break for stationary series is found in the wartime and post-war period for some belligerent countries and some countries under the yoke of belligerent countries. The break is situated in wartime for Denmark and France, in 1943 and 1942, respectively. In 1948, a break is found in

[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.

a stationary series, the United Kingdom, but differently from the previous series, the break is located at the beginning of a stable pattern that characterized the 1950s; the same occurs for the case of Sweden in which the break is found in 1946.

The second structural break is (endogenously) found to be in the year in which the one structural break was detected for France and the United Kingdom, both being stationary series, some years later than the year of change to a no-fault and to a non-explicit unilateral divorce. The same occurs in the case of Denmark, a stationary series after introducing a double structural break, in which the break is detected two years later than a divorce-law reform. For these three countries, a stationary divorce rate is observed after the second structural break stabilized at greater levels than in the years prior to the reform. In Belgium's series, the date of change to a non-explicit unilateral divorce, which requires 10 years of separation, coincides with the first structural change.

The stationary Sweden series is observed as similar to France's or Denmark's plot, but in this case, the second structural break is located three years before the approval of the unilateral reform in 1974. As Peters (1992) argues, "high divorce rates are correlated with the adoption of new laws but are not necessarily caused by those laws". Although legal reform might have been responsible for acceleration in the same year in which the law reform was passed or some years later, depending on the separation requirements, an underlying trend of increase was in place when the laws were reformed. That is reflected in the structural breaks that our analysis detects prior to the reforms, as in the cases of the divorce rate series of Germany and Sweden. The second structural break is (endogenously) found to be in the year in which the one structural break was found in the German series, one year before the implementation of the non-explicit unilateral divorce.

For non-stationary countries, structural breaks are found in the late 1930s and in the 1940s for Iceland and Austria. In Austria, the structural break is found two years later than the National Socialist Reform in 1938. In Iceland's series, the break is found in 1943.

The date of change to a separation system coincides with the second structural change in the case of Luxembourg (a non-stationary series). A break also takes place one year later than the introduction of a separation system for Austria, after the approval of a non-explicit unilateral divorce, and Portugal, after a no-fault reform that includes the possibility of unilateral divorce after three years of separation; in both cases, an increasing pattern of the divorce rate is observed after the break. Greece changed to a no-fault

divorce in 1979 and to a separation system in 1983; in the middle, between both reforms, a structural break is detected.

Some years before the implementation of the reforms, divorce rates also increased in some countries from the 1960s in those non-stationary series. This pattern is observed in Finland, the Netherlands, Iceland, and Norway, in which structural breaks are detected in 1968, 1969, 1969, and 1970, respectively. For the Netherlands, an increasing trend was in place when the divorce laws were reformed in 1971. A second structural break is found in 1977, which might be a consequence of the reform that took effect in 1971 but in this case the specified separation period that could produce the impact of the reform is only two years and hence the gap between the reform and the structural break is considerable. After 1977, the series maintained a stable pattern; the divorce rate was greater than that of the previous periods. In Finland, where the law reform took effect in 1988, the second structural break was located in 1990, but another change in the divorce rate mean is previously observed after the increasing pattern from the 1960s, in 1968. The divorce rate was maintained as stable from 1990 in Finland but it was considerably greater than that of the previous decades.

Divorce-law reforms in the separation system also occurred in 1993 in Norway and Iceland, and later in Switzerland, in 2000. In our analysis, including double structural breaks, the null hypothesis of a unit root in the divorce rate is only rejected for the third one. Therefore, for the case of Norway and Iceland, policy shocks have a permanent effect on the sample although a break has not been detected close to the date of change of the reforms earlier noted due to the proximity of the end of the sample.

In the case of non-stationary series, a steady increase is observed in the divorce rate from the late 1960s with a clear acceleration in the years before and after policy shocks. However, in most countries, after the 1980s, stabilized levels of divorce rates are shown, which are higher than those in previous years. On the other hand, for stationary series, what is observed is a quick acceleration of the divorce rate, mainly in the years after policy shocks, and stabilized levels of the divorce rate two years later than the date of the reform.

Other structural breaks have been detected from the 1980s, which might not be related to the changes in the grounds of divorce (fault to no-fault divorce or no-fault to unilateral divorce) (see Dutoit et al., 2000). In these years, many countries made divorce easier, such as Belgium, where changes in the specified separation period necessary as proof of breakdown were introduced. In Belgium, the separation period needed to divorce was reduced from ten to five years in 1983. Six years later, in 1989, a structural break

is detected in our analysis, and it seems that the gap between the approval of the reform and the structural break might be produced by the specified separation period. Italy approved subsequent reforms to make divorce more accessible in the 1980s and 1990s; in both decades, structural breaks are located in 1984 and 1997. Although divorce can have effects on the children, the laws do not address these concerns systematically. In some countries, law reforms enforce child support transfers settling up after divorce and the provision of child-care subsidies in this period, such as in the case of Luxembourg. The structural breaks are detected in the same year in which the reform took effect in the case of Norway, in 1982, and Luxembourg, where reforms took place in 1993, 1997, and 1998, when the structural break is found. Another country that made divorce easier in the late 1990s was Portugal, but in this case the structural break is situated some years earlier than the reform, in 1993.

The magnitude of the change in the average divorce rate (measured by the structural break dummy coefficients d_1 and d_2) ranges from 0.33 to 1.93 divorces per 1,000 a year when the structural break is detected in the year in which the divorce-law reform became effective or two or three years later, which corresponds with the series of Greece and the UK (see Table 5). These two countries introduced no-fault systems two years earlier than the year in which the break is detected. It is interesting to note that the divorce-law reforms took place with a difference of nine years. The United Kingdom's reform also introduced the separation system, in line with other European countries, such as France. In this country, the estimated effect amounts to 1 divorce per 1,000 a year. In line with Greece, the reform took place in the late 1970s in France.

The estimated effect of the breaks that coincide with unilateral reforms is sizeable, to add up to 0.6 in 1990 for the Finnish case and 1.16 in 1971 for the Swedish series. For Sweden's divorce rate, the break is located some years earlier than the reform, which makes the comparison with the Finnish divorce rate more difficult. Nevertheless, the difference of the impact is considerable in this case, in which similar law reforms were implemented in different periods. This different impact may be produced by the existence of another structural break in the divorce-rate series of Finland in 1968. As we have expected, the sizeable effect is lower when the series present breaks in the 1960s, which might be the result of a change of attitude towards divorce because of the influence of the reforms that occurred in other countries.

The average changes that do not coincide at the time of a change in the grounds for divorce are considerably smaller, as in the cases of Iceland, Norway, and Switzerland. The same occurs in the case of

breaks that coincide with reforms introduced in several European countries in the 1980s and 1990s, as in the case of Luxembourg.

In summary, the analysis shows considerable differences across countries and across time. Focusing on the distribution of all structural breaks over time (see Figure 4), we observe that, for those countries in which the law changes in the late 1970s or in the early 1980s, the effect on the divorce rate is considerably smaller than the impact of the breaks that were located in the early 1970s, about 1 or lower than 1, with the exception of Luxembourg. The average effect on the divorce rate of structural breaks that were found in the 1940s is considerably lower than 1, with the exception of the structural break found in 1940 in Austria's series, which coincides with the implementation of the divorce law that comes from Germany. Therefore, the time-series analysis suggests that the changes in the average divorce rate have an inverted U-shape since the size of the effect is lower in the 1940s, increases in the late 1960s, achieves a peak in the 1970s, and then decreases in the 1980s and 1990s.

4. Conclusions

This paper studies 16 European divorce rate time series from 1930 to 2006, to analyse the extent to which the impact of divorce-law reforms that took place in this period have had a permanent or transitory effect on the divorce rate by examining each country separately.

By simply plotting the divorce-rates series, it is observed that, in the long-term, the divorce rates do not go back to the divorce rate prior to the policy shock. However, there is significant variation in the evolution of divorce rates and laws across European countries and it is difficult to establish that the liberalization of divorce legislation across Europe is mainly responsible for the rising divorce rates since the 1970s. The changes in the divorce rates reflect changing behavioural patterns and so the legal reforms are the result of the social norms of the time. On the other hand, the divorce laws also establish the threat points that couples bargain under, so that the laws do change behaviour and they do influence the probability of divorce.

We find that 37.5% of the divorce rate's series are stationary, so that any shock had a transitory effect on these series when we introduce the possibility of the existence of two structural breaks in the series. More surprising is the fact that those breaks are endogenously located in the year or some years later than the law reform becoming effective. The possibility to detect structural breaks endogenously also allows us to

find changes in the divorce rate that took effect years before the reform, with this being important to the analysis of the magnitude of the change in the divorce rate when we later examine the years in which the divorce law was approved. We find that changes in the grounds for divorce produce the greatest effect on the average divorce rate but these impacts change over the period considered. The changes in the average divorce rate have an inverted U-shape with a peak in the 1970s when we observe structural breaks over time.

These results extend the previous works on the effect of divorce legislation on divorce rates. In line with González and Viitanen (2008), we find that the change from fault to no-fault divorce generates the greater change in the divorce rate. However, we also show that considerable differences exist among European countries and across time, depending on the period of implementation of law reforms.

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Tables

Table 1.- Descriptive statistics of the sample

Country	Mean	Stand. Dev.	Max.	Min.	Period	Years
Austria	1.47	0.68	2.56	0.09	1930-2006	77
Belgium	1.23	0.95	3.45	0.22	1930-2006	77
Denmark	1.95	0.74	2.95	0.65	1930-2006	77
Finland	1.51	0.83	2.89	0.31	1930-2006	77
France	1.17	0.63	2.50	0.28	1930-2006	77
Germany[1]	1.54	0.62	2.60	0.61	1947-2006	60
Greece	0.57	0.30	1.30	0.17	1958-2006	49
Iceland	1.22	0.64	2.18	0.24	1930-2006	77
Italy	0.45	0.20	0.80	0.19	1971-2006	36
Luxembourg	1.02	0.80	2.50	0.03	1930-2006	77
Netherlands	1.17	0.74	2.36	0.33	1930-2006	77
Norway	1.22	0.77	2.54	0.29	1930-2006	77
Portugal	0.56	0.66	2.30	0.04	1930-2006	77
Sweden	1.62	0.79	3.33	0.36	1930-2006	77
Switzerland	1.35	0.64	2.91	0.67	1930-2006	77
United Kingdom	1.51	1.15	3.08	0.08	1930-2006	77

Source: UN Demographic Yearbooks and Eurostat.

Note: [1]Germany including GDR.

Table 2.- Divorce law reforms from 1970

Country	(1) No-fault	(2) Unilateral, nofault
Austria	.	1978 (6)
Belgium	.	1975 (10), 1983 (5) 2000 (2)
Denmark	.	1970 (3), 1989 (2)
Finland	.	1988 (0)
France	1976	1976 (6)
Germany	.	1977 (3)
Greece	1979	1983 (4)
Iceland	.	1993 (2)
Italy	1975	No
Luxembourg	.	1979 (3)
Netherlands	1971	1971 (2)
Norway	.	1993 (2)
Portugal	1976	1976 (3)
Sweden	.	1974 (0)
Switzerland	.	2000 (4)
United Kingdom[1]	1971	1971 (5)

Source: González and Viitanen (2008).

Notes: Column 1 shows the year when no-fault grounds for divorce were introduced from the 1970s. No-fault grounds for a divorce include irretrievable breakdown, irreconcilable differences, and/or incompatibility. Column 2 shows the year when unilateral or non-explicit unilateral divorce was allowed from the 1970s. Unilateral divorce does not require mutual consent and can be granted at the request of either spouse. The dates correspond to the year when a certain reform was implemented, which is often the year after the legislation was passed. The length of the specified separation period in years is in parenthesis and means that unilateral divorce was not introduced explicitly, but was in fact possible after a certain separation period, which served as proof of irretrievable breakdown of the marriage.
[1]The divorce law for Scotland post-dates that of England and Wales by five years.

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Table 3.- Results of unit root tests on divorce rates

A: Country specific tests			
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%	0.00%	12.50%	12.50%
5%	0.00%	43.75%	18.75%
10%	0.00%	43.75%	37.50%

B: Panel tests (p=1)	Balanced panel[1]	Unbalanced panel[2]
	Test-statistic (p-value)	Test-statistic (p-value)
Levin–Lin–Chu (2002)	-0.94662 (0.1719)	
Im–Pesaran–Shin (2003)	-1.988 (0.023)	
Pesaran (2007)	-1.329 (0.092)	-1.861 (0.031)

Notes: The null hypothesis is in all cases a unit root in the divorce rate. Following the suggestion by Ng and Perron (1995), we chose 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 tests, respectively.

[1] Excluding Germany, Greece, and Italy.

[2] Including all countries.

Table 4.- Results of unit root tests on divorce rates by country: one structural break test

Country	d_1	$(\hat{\rho}-1)$	Structural Break Year
Austria	1.04865***	-0.167	1979
Belgium	1.80242***	-0.077	1996
Denmark	1.30622***	-0.283**	1972
Finland	1.47677***	-0.151	1975
France	1.17906***	-0.340***	1978
Germany	0.83457***	-0.333***	1976
Greece	0.51521***	-0.239	1996
Iceland	1.16039***	-0.333**	1966
Italy	0.32726***	-0.332	1993
Luxembourg	1.55066***	-0.252	1979
Netherlands	1.41294***	-0.328**	1974
Norway	1.47264***	-0.173	1982
Portugal	1.47106***	-0.134	1993
Sweden	1.42242***	-0.287**	1969
Switzerland	1.1428***	-0.291	1973
United Kingdom	2.16492***	-0.287**	1973

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 5.- Results of unit root tests on divorce rates by country: double structural break test

Country	d_1	d_2	$(\hat{\rho}-1)$	First Structural Break Year	Second Structural Break Year
Austria	1.03855***	0.82017***	-0.495	1940	1979
Belgium	1.14391***	1.06912***	-0.497*	1975	1989
Denmark	0.72623***	1.06978***	-0.559**	1943	1972
Finland	1.24115***	0.59594***	-0.274	1968	1990
France	0.35489***	1.0849***	-0.446*	1942	1978
Germany	0.47493***	0.47045***	-0.349	1969	1976
Greece	0.33292***	0.31033***	-0.564	1981	1996
Iceland	0.41527***	1.03548***	-0.62	1943	1969
Italy	0.1922***	0.25034***	-0.648	1984	1997
Luxembourg	1.41351***	0.46289***	-0.308	1979	1998
Netherlands	0.745***	0.78332***	-0.418	1969	1977
Norway	0.85443***	0.81167***	-0.307	1970	1982
Portugal	0.72414***	0.91664***	-0.407	1978	1993
Sweden	0.66193***	1.16103***	-0.715***	1946	1971
Switzerland	0.82341***	0.62***	-0.745***	1973	1989
United Kingdom	0.53848***	1.93239***	-0.501*	1948	1973

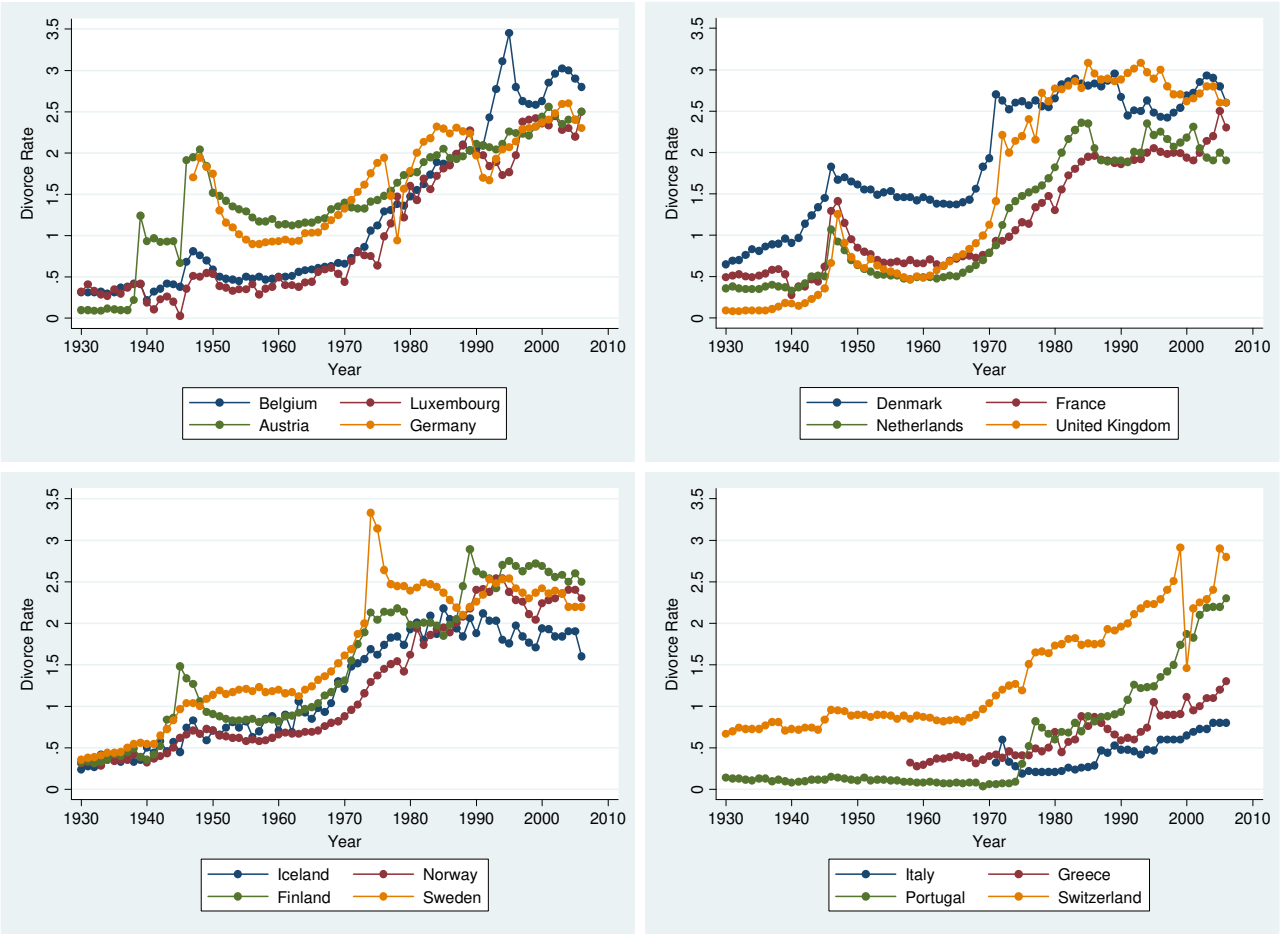
Notes: Two-break test of Clemente–Montañés–Reyes (1998), AO model.

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

Structural Break Year dummy variable coefficients d_i: significant at the ***1% level, **5% level, *10% level.

Figures

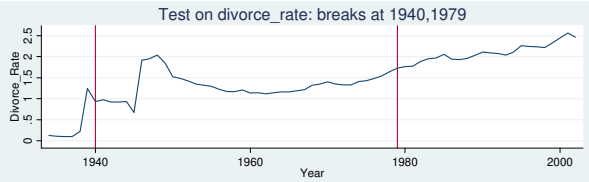
Figure 1.- Divorce rate by country

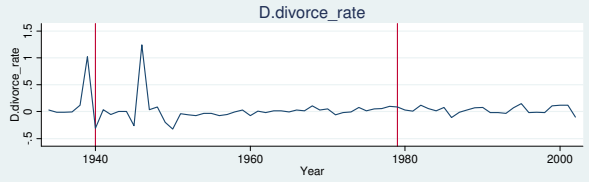


Source: UN Demographic Yearbooks and Eurostat.

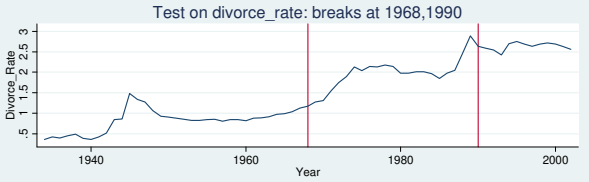
Figure 2.- Countries with a unit root in the divorce rate: double structural break test

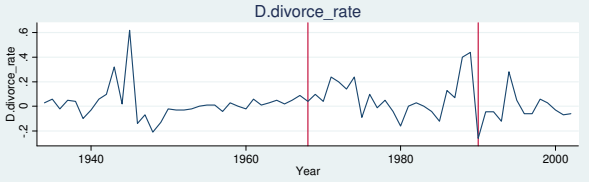
Austria



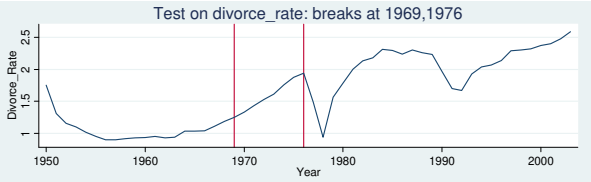


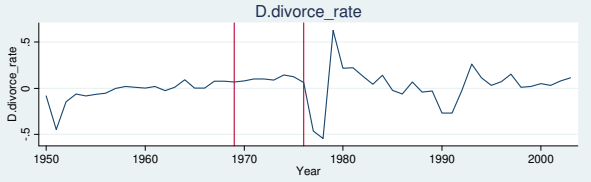
Finland



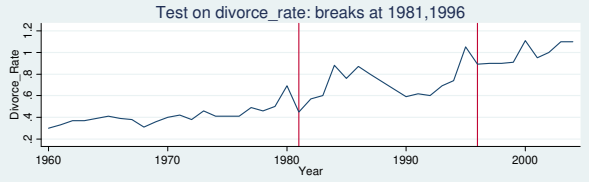


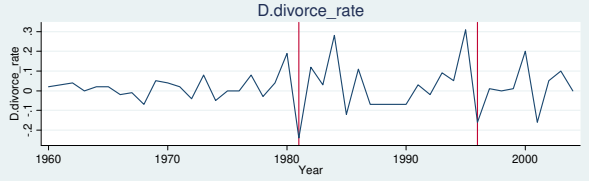
Germany



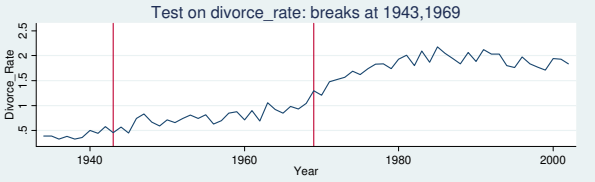


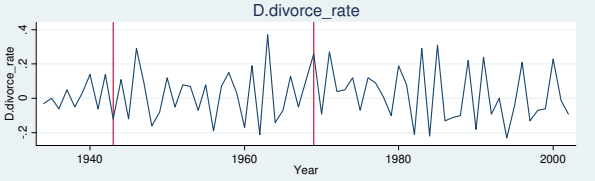
Greece





Iceland





Italy

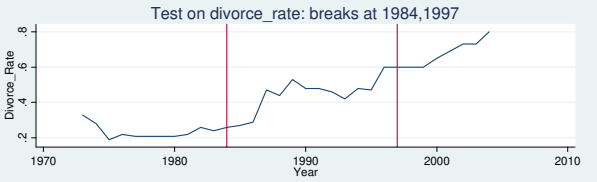
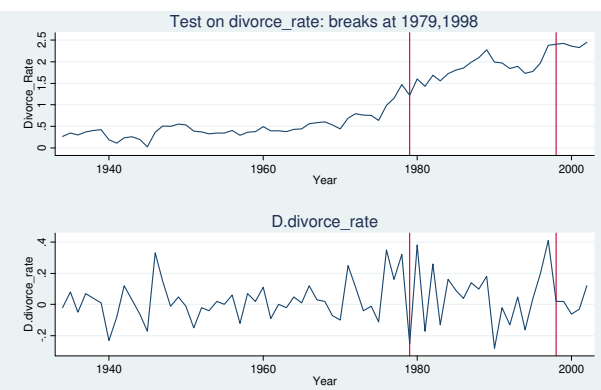
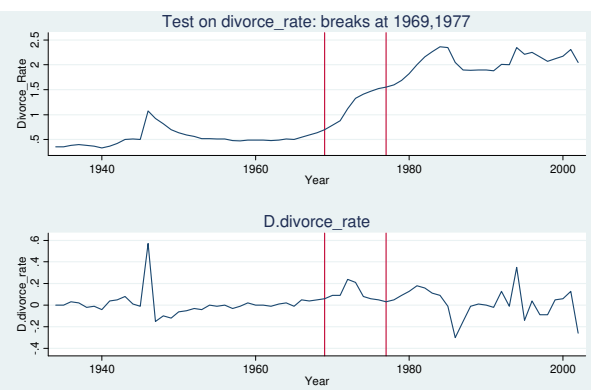


Figure 2.- (cont.)

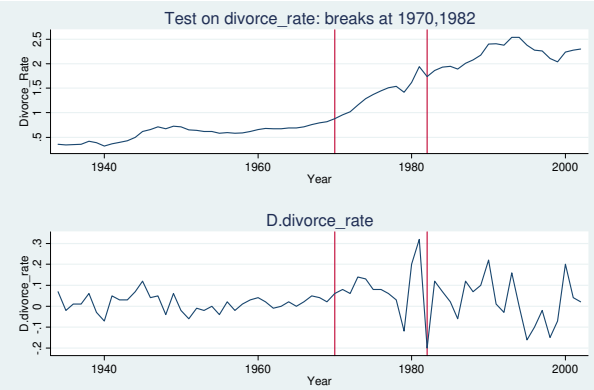
Luxembourg



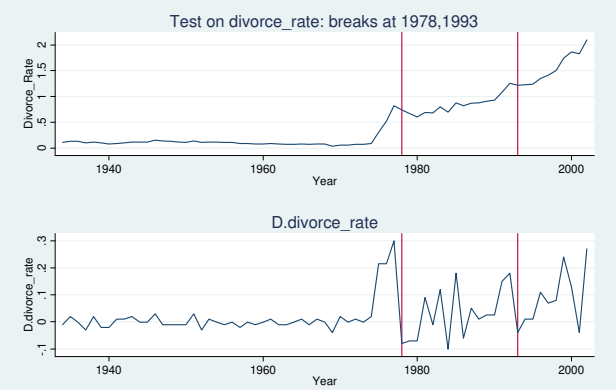
Netherlands



Norway

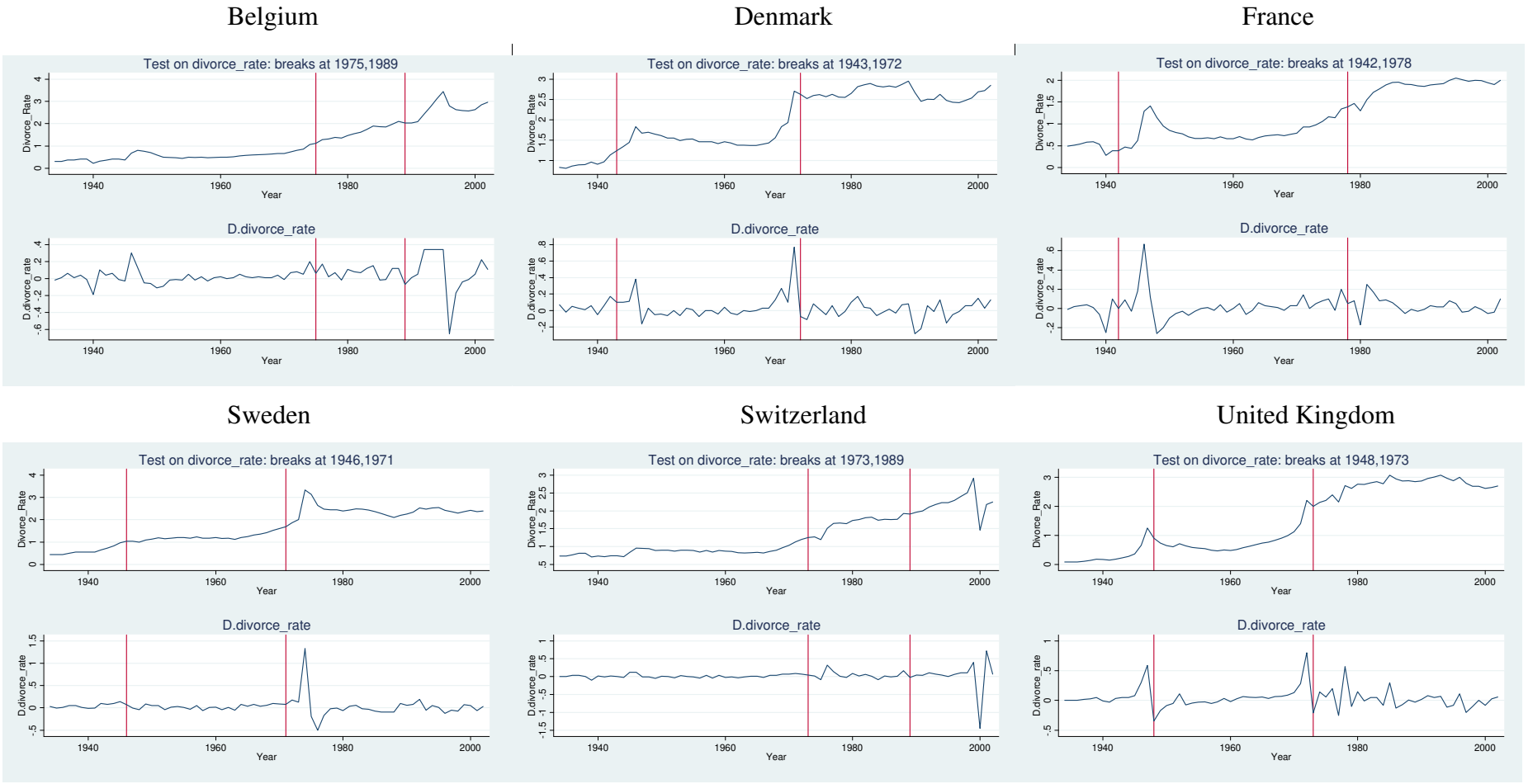


Portugal



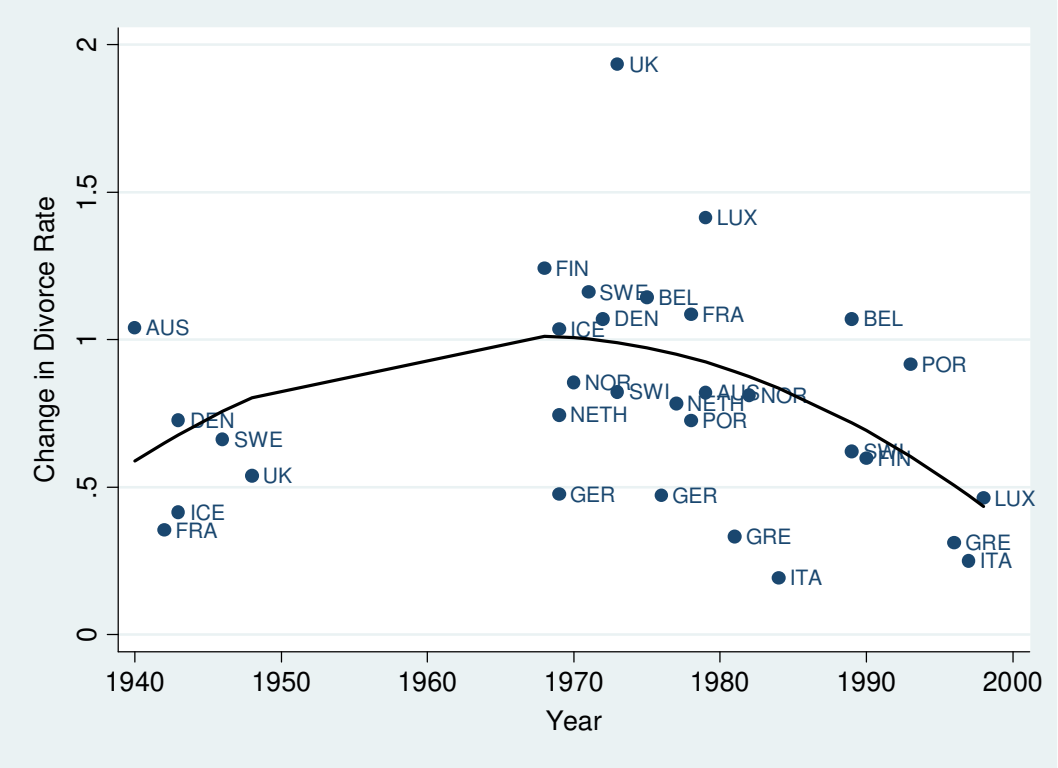
Note: Series and the differenced series, with the breakpoints detected.

Figure 3.- Stationary countries in the divorce rate (unit root rejected): double structural break test



Note: Series and the differenced series, with the breakpoints detected.

Figure 4.- Change in the mean of the divorce rates (structural breaks detected) by year



Note: Curve fitted as $y = ax^2 + bx + c$.