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Will you marry me?  
It depends (on the business cycle)

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This paper studies the effect of the business cycle on the marriage rate, using a panel data of 30 European countries covering 1991 to 2013. We find a negative effect of the business cycle on the marriage rate, pointing to the pro-cyclical behaviour of marriage decisions, which holds after controlling for country-level specific characteristics and family law, and after taking possible endogeneity problems into account. We also analyse this issue considering a wide range of country-level regulations affecting couples (taxation, property division, and reproduction, among others). Supplemental analysis reveals gender differences in the impact of the business cycle on the marital decision, depending on the previous legal marital status of the individuals.

**Keywords:** Marriage, unemployment, business cycle.

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## 1. Introduction

During the last 25 years, the number of couples deciding to get married has dramatically decreased in Europe. This is observed by simply looking at the crude marriage rate (CMR), that is, the ratio of the number of marriages during the year to the average population in that year expressed per 1000 inhabitants. This has decreased by almost 30% in Europe in that period of time (Eurostat data). The apparent decline in the importance of marriage is contrary to the literature, which suggests that marriage has not lost its symbolic value, which has remained high, or even increased (Cherlin 2004; Marcén and Morales 2017). So the question is: why do couples decide to marry, or not? Marriage can be considered an anachronistic institution by some individuals, while others may take into account its positive effects (see, for a discussion, Hawkins et al. 2002). Some studies indicate that married individuals experience greater levels of happiness than those who are widowed, divorced, or separated (Oguz et al. 2013), while others point to the health and financial benefits of marriage, as in Waite and Gallagher (2002).

This growing debate justifies the efforts of research to analyse the determinants of marriage. Stevenson and Wolfers (2007) review the literature that examines the effect of individual characteristics, such as race, gender, and educational level, on the choice of marital status. Outside-of-marriage options and legal factors can also affect the bargaining power in determining marital status decisions (Andaluz et al. 2017; Angrist 2002; Browning et al. 2014; Chiappori et al. 2002; Grossbard-Shechtman 1993; Negrusa and Oreffice 2010). Economic conditions (Ahituv and Lerman 2011; González-Val and Marcén 2017; 2018a), family laws (González-Val and Marcén 2012a; 2012b; 2017; 2018b; Stevenson and Wolfers 2007), parenthood (Bellido et al. 2016; Steele et al. 2005), welfare reforms (Bitler et al. 2004), demographic factors such as gender ratios or ethnicity (Angrist 2002; Bulcroft and Bulcroft 1993; Manning and Smock 2002) and even medical advances (Golding and Katz 2002; Marcén 2015), all appear to affect the transition into and out of marriage. We contribute to the existing literature by analysing the role of the business cycle in determining the evolution of marriage rates, within a framework of decreasing marriage rates coupled with different legal settings regulating life as a couple in Europe.

There is existing research analysing the impact of business cycle dynamics on marriage, but most of that has focused on the U.S., finding a pro-cyclical behaviour,

which means that economic downturns are associated with decreasing marriage rates (Baghestani and Malcolm 2014; Schaller 2013). Less work has been done considering a different geographical setting. For example, Ariizumi et al. (2015) study this relationship for Canada, finding similar results to those for the U.S. González-Val and Marcén (2018a) also find a pro-cyclical behaviour of the marriage rate when focusing on Spain. Using macro-data, Salamaliki (2017) finds that marriage rates are positively related to income and employment shocks in the case of Greece, showing, once again, a pro-cyclical behaviour. In our work, we extend this analysis by studying the impact of business cycle dynamics on the marriage rate, using macro-data for a panel of 30 European countries, covering the period 1991-2013.<sup>1</sup>

From a theoretical point of view, there are several ways to explore the possible association between the business cycle and the marriage rate. Becker's model of marriage (1973) determines that individuals decide to marry if their expected gains from remaining single fall short of their expected utility inside marriage. He focused on a specialization framework, with the husband acting as the breadwinner. With this approach, a positive relationship between male job losses and the likelihood of remaining single would be expected. At the macro level, according to Hoynes et al. (2012), the empirical evidence indicates a greater negative impact on male employment than on that of females in times of economic crisis. Then, we would expect a negative association between economic recession (characterized by increases in unemployment rates, uncertainty, decreases in the GDP...) and marriage rates. However, marriage may also be viewed as insurance in case of poor economic conditions: in the face of a shock affecting the economy, marriage allows for the sharing of the risk associated with a job loss, and to provide a coordinated response in terms of labour supply (Shore 2009; Stevenson and Wolfers 2007). According to this theory, the business cycle and the marriage rate should be positively associated, pointing to a counter-cyclical behaviour of marriage rates. It appears that, at least theoretically, the relationship between business cycle dynamics and marriage rates is not clear, suggesting the need for an empirical approach.

In our main empirical analysis, we use data on the CMR from 30 European countries, covering 1991 to 2013, to determine the effect of the business cycle on

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<sup>1</sup> Sorted alphabetically, the countries included in our analysis are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

marriage rates. For the business cycle, we use the national unemployment rate to capture its evolution, which is the most commonly-adapted strategy (Ahn and Mira 2002; Bellido and Marcén 2015; González-Val and Marcén 2017; 2018a; Kravdal 2002; Schaller 2013). Our results suggest the existence of a negative impact of the unemployment rate on the CMR, pointing to a pro-cyclical behaviour of marriage in Europe. Specifically, our main estimates show that an increase of one-percentage-point in the national unemployment rate implies 0.045 fewer marriages per 1,000 of population, which represents 0.87% of the average CMR for the sample period and the countries included in our analysis. Nevertheless, we do not only use the unemployment rate to capture the dynamics of the business cycle. Because of the difficulty of properly capturing its fluctuations, we also include in our analysis other measures of the business cycle, such as the per capita GDP, part-time employment indicators, and the long-term unemployment rate, among others. Our main conclusion remains unchanged. Our findings are maintained even after including controls for political and institutional changes. These factors include country-level characteristics that may affect the marriage options for reasons independent of the business cycle, or changes in family laws and policies, measured through several family-policy variables (length of paid maternity/paternity leave, the difference between male and female median wages, and employment gaps, among others).

In our work, we have collected information on a range of regulations concerning life as a couple, for each European country in our sample. This is important in our study, since there can be variations in the valuations that individuals give to each marital status, under different legal regimes. For example, the existence of joint taxation may introduce incentives to marry, regardless of business cycle fluctuations, due to the existence of tax benefits. We have information on taxation, matrimonial property regimes, rights for cohabiting couples, and regulations on medically-assisted reproduction, among others. The pro-cyclical behavior is still detected after considering all these alternatives.

Individuals can marry if they are single, widowed, or divorced. These three different marital conditions (singlehood, widowhood, and divorce) may involve different responses to the business cycle dynamics. Women who are widows can be less likely to remarry if this implies that they can lose their widow's pension, regardless of the business cycle. Then, their marital decision is highly conditioned by the widow's pension. This is less likely to occur in the case of men, since their widow's pensions are

more likely to be lower, and men are more economically independent than women. Similarly, in the case of divorced women, we would expect a low effect or even no effect of the business cycle changes on their marriage rates, since, as before, their marriage decision may depend on their alimony. If they decide to legally remarry, they can lose that financial support. Again, this is less likely to be seen in the case of men. Single individuals are more likely to be younger than other groups and so, under economic uncertainty, they can more easily postpone the decision to marry. To explore this issue, we consider a marriage rate separating the individuals by previous marital status at marriage. We would expect a greater impact of the business cycle variations for singles than for divorced or widowed individuals. This is, in fact, what we observe in our estimations, confirming the differential effect of unemployment rates on marriage depending on the previous marital status.

Moreover, the analysis is run after considering that the response of the marriage rate to variations in the business cycle may change depending on the age of individuals, since the economic constraints are not the same in the early twenties than later in the life of an individual. In the same line, since most individuals marry in their twenties, one may suggest that the youth unemployment rate better captures the effect of the business cycle on the decision to stay single or get married.<sup>2</sup> To address this issue, we explore the effect of youth unemployment rates on marriage rates. Our results suggest that the procyclical behaviour of marriage is maintained after using the youth unemployment rate to measure the evolution of the business cycle.

Since there can be a lapse of time between the decision to get married and when couples actually marry, we follow Schaller (2013) and Amato and Beattie (2011) (who analyse the effect of unemployment on divorce rates) to examine the lag in the impact of the unemployment rate on marriage rates. There is no consensus in the literature about the duration of this lag, so we proceed as prior studies have done, by allowing for lags of one and two years duration.

The remainder of this paper is organized as follows. Section 2 analyses the data used in the study. Section 3 describes our methodology. Section 4 shows our results, and several robustness checks. Section 5 considers the potential endogeneity concerns in the business cycle-marriage rates relationship, and Section 6 concludes.

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<sup>2</sup> The mean age at first marriage in the sample period for the countries included in the analysis is 27.4 for women and 30.0 for men, according to data from Eurostat.

## 2. Data

To implement our analysis, we use data for 30 European countries, covering the period from 1991 to 2013. As explained above, our variable of interest is the CMR, defined as “the ratio of the number of marriages during the year to the average population in that year, expressed per 1000 inhabitants”, which is a standard indicator used in the literature (González-Val and Marcén 2018a). In Figure 1, we can observe the temporal evolution of the CMR for all countries included in our study (data from Eurostat). We distinguish three main periods. From 1991 to 1996, the average CMR sharply decreases to a minimum of 5.2. From 1997 to 2007, this variable remains fairly stable, fluctuating slightly between the values 5 and 5.4. However, from 2007 onwards, we observe a sharp decline, with the lowest value being reached in 2013, at 4.5.

To measure business cycle fluctuations, we use the unemployment rate, defined as “the share of the labour force that is without work but available for and seeking employment”, by the International Labour Organization, the source of this data.<sup>3</sup> This rate incorporates variations in both labor demand and labor supply and is a common indicator of economic conditions, capturing not only the effects of individual job losses, but also variations in economic uncertainty (Schaller 2013).<sup>4</sup> In the same Figure 1, we show the evolution of the total unemployment rates. We can appreciate also three main periods in the pattern of behaviour of the total unemployment rate: from 1991 to 1994, the average European unemployment rate increases, exceeding 9.9%. From then until 2008, the rate exhibits a smooth negative trend, reaching values below 6%. In recent years, and coinciding with the severe economic/financial crisis suffered by Europe, the rate increases to above 10%.

Comparing the evolution of both variables, it is possible to suggest that the CMR shows a pro-cyclical behaviour: the unemployment rate and the CMR appear to move in an opposite way. However, it could also be a spurious relationship, so a detailed econometric analysis is needed to determine the relationship. At the country level, the relationship between the unemployment rate and the marriage rate is not so clear. In Table 1, we can observe the average CMR and the average unemployment rate for the

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<sup>3</sup> We have used data for unemployment rates from different sources, such as the Organization for Economic Co-operation and Development (OECD) and the National Estimates, finding no differences in the results.

<sup>4</sup> The unemployment rate as a proxy of the business cycle can also be problematic. According to Schaller (2013), this is the best indicator to capture the business cycle, although it presents some weaknesses: it can understate the magnitude of economic downturns by failing to incorporate discouraged workers.

period under analysis (1991-2013), ordered from highest to lowest ratios of unemployment. There are substantial differences, with average unemployment rate achieving values below 4% for countries such as Luxembourg, Switzerland, and Norway, and above 13% for Poland, Bulgaria, Slovak Republic, and Spain. Dissimilarities in the average CMR are also detected, although they are smaller than in the previous case. Regarding the relationship between both variables, it is not possible to deduce an association since those countries having high (or low) unemployment rates are not those having high (or low) marriage rates. We analyse this issue more closely below.

With respect to the concerns that the use of the CMR may generate, it is possible to argue that we are not considering the population who can marry. This is a common problem in the literature (González-Val and Marcén 2018a). We revisit this issue below. In addition, we re-estimate our main results using alternative measures for the marriage indicator: the number of marriages to the average population between 15 and 64, and to the average female (and male) population between 15 and 64. Results are very similar.

### 3. Methodology

From a theoretical point of view, the relationship between the business cycle and the CMR is ambiguous. Here, we propose an empirical approach to explore this issue, estimating the following equation:

$$Y_{it} = \alpha + \beta Unemp_{it} + \Pi' T_{it} + \varphi \eta_i + \varepsilon_{it} \quad (1)$$

where the dependent variable  $Y_{it}$  is the CMR of region  $i$  in year  $t$ , and  $Unemp_{it}$  is the unemployment rate of region  $i$  in year  $t$ .<sup>5</sup>  $\eta_i$  is a vector of country fixed effects (  $\sum_{i=1}^{n-1} Country_i$  ), picking up the effect of unobserved characteristics that vary at the country level.  $T_{it}$  is a matrix of time variables that incorporates: year fixed effects (  $\sum_{t=1}^{t-1} Year_t$  ), and country-specific linear time trends (  $\sum_{i=1}^{n-1} Country_i \cdot Time_t$  ) to control for evolving unobserved country attributes.<sup>6</sup>  $\varepsilon_{it}$  is the error term. The sign of the  $\beta$  coefficient could be positive (counter-cyclical response) or negative (pro-cyclical reaction).

<sup>5</sup> We use as main variable of interest the total unemployment rate, but also the total female and total male unemployment rates in alternative estimates. Results are quite similar.

<sup>6</sup> Country-specific quadratic time trends have also been included as a robustness check. Results do not change.



Our empirical analysis relies on the exogeneity of the evolution of national unemployment rates with respect to that of the marriage rates (González-Val and Marcén 2018a; Schaller 2013).<sup>7</sup> This strategy may generate some concerns, since the marital status (especially of women) may affect the probability of entering the labour market (Costa 2000; Fernández and Wong 2014a; 2014b), which may in turn impact the unemployment rate. However, it is not clear whether the increase (decrease) in female labour force participation is linked to an increase (decrease) in total unemployment (Schaller 2013). In any case, to mitigate such concerns, we also use the male unemployment rate as a proxy of the business cycle, since men are less likely to modify their participation in the labour market depending on their legal marital status. Additionally, we implement an Instrumental Variable Approach (we revisit this issue in Section 5). In any case, the use of the unemployment rate appears to be more appropriate than other income or unemployment variables, such as own wages, since it is less likely to be endogenous to marriage (Schaller 2013).

## **4. Results**

### **4.1. Main results**

The results of the estimation of equation 1 are given in Table 2. In Columns (1) to (3) we use the total unemployment rate to measure the business cycle variations, finding a negative relationship between the unemployment rate and the CMR, irrespective of the inclusion of country and year fixed effects, and of linear and quadratic time trends.<sup>8</sup> Then, it appears that the CMR behaves in a pro-cyclical way. The same is detected when the CMR is measured in logarithm in Column (4). This simple redefinition of the marriage rate does not alter our findings. Focusing on Column (2), our results can be interpreted as follows: a one-percentage-point increase in the unemployment rate in a given country involves 0.045 fewer marriages per thousand inhabitants, which represents a drop of 0.87% in the average CMR.

The total unemployment rate is a good indicator of uncertainty in the job market, but the large variations in the average unemployment rate across European countries (see Table 1) could be inconvenient in capturing the evolution of the business cycle. For this reason, we include other standard indicators used to capture the evolution of the

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<sup>7</sup> We revisit this endogeneity issue in Section 5.

<sup>8</sup> In the rest of the analysis, we only include country-specific linear trends, although results are unchanged when adding quadratic trends.

business cycle in Table 3. Specifically, we use the per capita GDP, measured in constant 2005 U.S. \$ in logarithm in Column (1), a part-time employment indicator, defined as the percentage that part-time jobs represent in the total employment for individuals aged 20 to 64 in Column (2), the long-term unemployment rate in Column (3), and the unemployment rate after applying the Hodrick-Prescott filter (1997), which allows us to remove the cyclical variation component of a time series from raw data, in Column (4).<sup>9</sup> Regardless of the indicator introduced in the analysis, the CMR appears to show a pro-cyclical behaviour.<sup>10</sup>

Another potential problem with our previous estimates is the fact that we have explored the contemporaneous relationship between the business cycle and the marriage rate. We have information about when the marriages take place, through the CMR, but there can be a lapse of time between the decision to marry and when the marriage actually takes place. In this setting, the unemployment rate at the time of marriage may not be capturing the economic conditions under which the decision to marry took place. To examine this issue, we have included lagged unemployment rates in our analysis. According to Schaller (2013), it is not theoretically clear how many lags should be included in the analysis. In Table 4, we show the results after including lags for one and two periods. Column (1) includes our main estimate, Table 2, Column (2), for ease of comparison. The coefficient that picks up the effect of the unemployment rate lagged one period still shows the pro-cyclical behaviour of the CMR, although the magnitude of the impact is almost 25% lower, whereas the coefficient that captures the possible effect of the unemployment rate lagged two periods is not statistically significant, although it is negative. When we include in the same estimate the unemployment rate, and this rate lagged one and two periods, the CMR shows a pro-cyclical behaviour with respect to the contemporaneous unemployment rate, but when that rate is lagged two periods, both the CMR and the unemployment rate lagged two periods are positively related. These findings suggest that the decision to marry can be postponed under economic constraints, but not indefinitely.

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<sup>9</sup> We use the Ravn-Uhlig rule to determine the smoothing parameter, considering that we use annual data.

<sup>10</sup> Changes in the number of observations are due to the availability of information on those proxies of the business cycle dynamics.

## 4.2. Robustness checks

To check the consistency of previous results, we run several robustness checks. In Table 5, we introduce controls for several country-level socio-economic and demographic characteristics. A priori, this should not be a problem in our estimations, because we include country and year fixed effects, in addition to country-specific trends, to capture unobservable characteristics. However, even with those controls, it could be argued that the coefficient picking up the business cycle dynamics may be capturing the effect of those variables rather than (or in addition to) the impact of the business cycle. For example, if those countries having high divorce rates (which may indicate high marital instability and so a low value of marriage, decreasing the incentives to enter into new marriages (Alesina and Giuliano 2007), also have high unemployment rates, our estimates could be capturing the effect of the divorce rates instead of that of the business cycle. To test this issue, we introduce the Crude Divorce Rate of each country in Column (1). We observe that the pro-cyclical behaviour of the marriage rate is maintained even after controlling for the divorce rate, which has no effect on the CMR.

It could also be surmised that we are capturing cultural differences. If those countries having a culture of marrying younger, which may be related to a traditional social norm, and high marriage rates, are those having less severe economic recessions, then our estimations could be reflecting those cultural effects. To test this, we incorporate in our estimates the mean male and female age at first marriage, in Columns (2) and (3), respectively. Results show that the older the individual at first marriage, the greater the CMR. With respect to our variables of interest, the relationship between the total unemployment rate and the CMR remains unchanged in both cases.

In Columns (4) and (5), we add level-of-education variables for each country. While in the past more educated women were less likely to marry, more recent studies find that this trend has changed (Goldstein and Kenney 2001). In any case, the relation between the investment in own education and performance in the marriage market has been widely studied (Chiappori et al. 2009). If this is correlated with the unemployment rate, our estimates could be biased. We consider this issue by incorporating in our estimates the gross (and female) enrolment rate in tertiary education, in Columns (4) and (5), respectively. The reason for not including these ratios for primary and secondary education is that they are almost universal (or at least very high) for the European countries included in the analysis. Results still indicate the pro-cyclical behaviour of the CMR, in both cases.

Immigrants may have different attitudes and evaluations of the institution of marriage than natives, which has been studied for Sweden (Andersson et al. 2015) and the United Kingdom (Hannemann and Kulu 2015), and also a different behaviour in the labour market. In this setting, it can be hypothesized that the coefficients picking up the unemployment rate also include the effect of being an immigrant. A variable measuring the percentage of the immigrant population by country is introduced in Column (6). Results do not change. In Column (7), we include all these country-level characteristics simultaneously. It is comforting that the pro-cyclical behaviour of the marriage rate is maintained, with the magnitude of the impact of the business cycle being greater than that observed in our main estimate.

Our estimates could also be criticized because they do not consider certain important political and institutional changes experienced by some countries during the sample period. It can be argued that these changes are driving the negative behaviour of the marriage rate, rather than the business cycle. We address this issue by showing our estimates without the former state-socialist countries of Eastern and Central Europe, in Column (1) of Table 6, which share a common and unique experience of transition from “communism” to democracy and a market-oriented economy.<sup>11</sup> This must be tested, since the political and institutional instability of those changes could impact both the business cycle and the marriage decision. There are no variations in the response of the CMR to the business cycle proxy in the estimations.

In Column (2) of Table 6, we repeat our analysis after including a dummy variable that takes value 1 for the countries that suffered a process of independence during the 1990s (Czech Republic, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia), and 0 otherwise.<sup>12</sup> As before, if the uncertainty generated after this kind of political process affected the individual assessment regarding the legal marital status (Philipov and Dorbritz 2003), our results could be picking up this effect rather than the impact of the business cycle. After taking this into account, we do not observe substantial differences in our estimates.

During the period under consideration, some of the countries considered became members of the European Union.<sup>13</sup> We need to include this in the analysis for the same

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<sup>11</sup> Germany is also excluded from the analysis since its current territory was part of both former territories.

<sup>12</sup> Source: The World Factbook of the CIA.

<sup>13</sup> Fifteen countries joined the European Union during the sample period: in 1995 (Austria, Finland and Sweden), in 2004 (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovak Republic and Slovenia), and in 2007 (Bulgaria and Romania).

reasons of uncertainty as we have explained above. To do that, we introduce in our estimates a dummy variable that takes value 1 for the years in which the countries have been members of the E.U., and 0 otherwise. Thus, we ensure that our estimates are capturing the effect of the business cycle on the marriage rate, rather than the uncertainty produced by this institutional change. The results, shown in Table 6, Column (3), demonstrate the robustness of the pro-cyclical behaviour of the CMR, and the positive impact of being part of the E.U. on this rate.

The adoption of the Euro as a common currency in many European countries during the sample period can also affect our estimations.<sup>14</sup> If the adoption of the common currency, and its differential effects on prices at the country level, has an effect on the personal assessment of the legal marital status, our previous results may be confounding this effect with that of the business cycle (Rogers 2001). To tackle this issue, we introduce a dummy variable that takes value 1 for the years in which each country has the Euro as common currency, and 0 otherwise. Results are shown in Table 6, Column (4). Again, the unemployment rate and the CMR appear to be negatively related, pointing to a pro-cyclical behaviour. In Column (5), we include all controls. Results buttress the robustness of our estimates, reinforcing the idea of the pro-cyclical behaviour of marriage rates, irrespective of the sample used, and of the controls for political and institutional changes introduced in the analysis.

To provide further empirical evidence in favour of our findings, we test their robustness by including different measures for wage levels and the family policies implemented in the countries of our sample, since these policies can affect the formation and dissolution of families (Hantrias and Letablier 2014). The variables considered can capture dissimilarities across countries in female labor force participation and in how women behave in a more (or less) traditional way, which may produce different marriage responses to the business cycle dynamics. We include the employment gender gap (defined as male minus female full-time equivalent employment to population ratio) in Column (1); the length of paid maternity and paternity leave in Columns (2) and (3), respectively; the proportion of female legislators, senior officials and managers, as percentage of total individuals, in Column (4); the gross school enrollment gender parity index in tertiary education in Column (5); and the difference between male and female

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<sup>14</sup> Eighteen countries adopted the common currency during the sample period: in 1999 (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain), in 2001 (Greece), in 2007 (Bulgaria and Slovenia), in 2008 (Cyprus and Malta), in 2009 (Slovak Republic), and in 2011 (Estonia).

median wages, divided by male median wages, in Column (6). In all cases, there is a negative and statistically significant effect of the total unemployment rate on the CMR, with the magnitude being close to that found in our main estimate.<sup>15</sup>

### **4.3. Country-level regulation on the couple's life: an extensive compilation**

Until this subsection, we have analyzed the possible impact that the business cycle, measured through the unemployment rate, has on the CMR, but without considering the country regulations affecting certain aspects of the life of the couple. This regulation may create incentives that make the institution of marriage more (or less) attractive, and can therefore affect the CMR. We have made an effort to collect information on several laws that introduce incentives related to marriage, and show this information in Table 8.

After a careful examination, we can group the laws in three categories: those that affect the economic side of the life of the couple, related to taxation (see Columns (1) and (2) of Table 8) and the matrimonial property regime (Column (3) of Table 8); those that regulate alternative types of relationships, different from formal marriage, their characteristics, and the rights of those involved (Columns (4) to (8) of Table 8); and those that affect medically-assisted reproduction, since children are an important outcome considered to be a “public good” for the couple (Friedberg and Stern 2003), and have been found to differentially affect the stability of marriage, and therefore its value as an institution (Bellido et al. 2016), in Columns (9) to (11) of Table 8.

The decision to marry can be affected by tax and property-division regulations within marriage. For this reason, we include in the analysis the possibilities of individual taxation, joint taxation, and both at the same time, using dummies in Columns (1) to (3) of Table 9, and several dummies for the different property division regimes in Column (4).<sup>16</sup> The CMR maintains its pro-cyclical behaviour in all cases. The possibility of joint taxation increases the CMR only when we do not control for the individual taxation option, as does the existence of a “separated property” regime

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<sup>15</sup> We do not have information for all countries, nor for the entire period. For this reason, the number of observations changes in Table 7.

<sup>16</sup> It is important to note that we cannot include country fixed effects in Columns (1), (3), (4), (9) and (10) due to multicollinearity problems. In those cases, our estimates include year fixed effects and the country-specific linear trend. The alternative approach that allows us to maintain the country fixed effects by estimating separately the sample for those countries with the law in force, on the one hand, and without the law, on the other hand, presents a problem: the lack of observations for some cases. For example, the estimate for the countries without the individual taxation possibility only counts with 91 observations. Column (2) allows for country fixed effects because, as stated in Table 8, Czech Republic approved joint taxation for the period 2005 – 2007.

regulating matrimonial property with respect to the “participation of acquisitions” regime (the omitted variable) (Union Internationale du Notariat Latin 2005).

In Columns (5) to (8), we consider the regulation that affects non-formal relationships, since the rights of those not legally married can affect the CMR. Column (5) includes a dummy variable that takes value 1 in those countries where there exists a registered partnership law for heterosexual couples, and 0 otherwise; Column (6) includes a dummy variable for those countries in which there is some kind of protection for extra-marital cohabitation; Column (7) introduces a dummy variable that takes value 1 if there are inheritance rights for non-registered partnership in the country, and 0 otherwise; and finally, in Column (8) we include a dummy that takes value 1 if there is some kind of regulation (but not a specific law) for informal relationships, and 0 otherwise. It is reassuring that the negative and statistically-significant impact of the unemployment rate on the CMR prevails in all cases.

Regulation of medically-assisted reproduction can be important since couples resorting to such measures tend to be older and access to assisted reproduction in some countries depends on whether couples are married.<sup>17</sup> This is considered in Columns (9) and (10). The CMR is not affected by the existence of medically-assisted reproduction, while the effect of the business cycle on the CMR is maintained. In Column (10), we control for the conditions under which medically-assisted reproduction is allowed, with the reference being those countries in which private centers have no more restrictions than public ones. Once more, we find no differences with respect to the pro-cyclical behaviour of the CMR. Even after considering the heterogeneous regulations that affect certain aspects of the life of the couple, our results show a negative and statistically-significant impact of the unemployment rate, the proxy of the business cycle, on the CMR.

#### **4.4. The importance of the marital status at the time of marriage**

As already suggested, the impact of business cycle dynamics on the probability of getting married may depend on the marital status of individuals. Single individuals tend to marry for the first time at a younger age than the divorced and the widowed, which may result in a lower capacity to face the economic costs involved in a wedding during an economic downturn. Divorcees must afford child-support and alimony (normally

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<sup>17</sup> The mean age at first birth has risen from 26.2 in 1995 to 28.9 in OECD countries, an increase of more than 2.5 years in only one decade.

men), or may receive that support (normally women), which can be a determinant in their remarriage decision during an economic recession (McManus and DiPrete 2001). Similarly, widows receive pensions that can affect their marriage decision if they lose that economic support when remarrying.

In Table 10, we show the results for the impact of the business cycle on marriage rates for men and women, separately, since their incentives may differ depending on their previous legal marital status at the time of marriage. We use as dependent variable the ratio of the number of men (women) married and previously divorced in Columns (1) and (4), previously single (never married before) in Columns (2) and (5), and previously widowed in Columns (3) and (6), to the total male (female) population in that legal marital status, expressed per 1000 individuals.<sup>18</sup> Results indicate that the business cycle has a negative effect on the male marriage rate, regardless of the previous marital status, with the greater impact being for those previously divorced and single. This may be explained by the difficulties of divorced men to remarry under economic downturns if they have to maintain their previous children and ex-spouses. The effect is lower (in absolute value) in the case of men who were previously widowed since, as we have explained above, their pensions are more likely to be lower than those of women. In the case of women, the marriages only show a pro-cyclical behaviour for those who have never been married before, with no statistical significance for divorced and widowed women. This finding may point to the importance of the pensions that women receive in their marriage decision, regardless of business cycle fluctuations.

Both analyses for men and women reveal an important effect of the unemployment rate on the marriage rate of those previously single. Since, as we have mentioned, those individuals tend to be younger than other groups, the age of these individuals as well as the economic conditions for young people may play an important role in their marital decisions. In the Appendix, we replicate our results (Table 2) and the analysis by previous marital status (Table 10), but using the youth unemployment rate, defined as “the share of the labour force aged 15-24 without work but available for and seeking employment”, to identify the business cycle. Results are shown in Tables A1 and A2 in the Appendix. The youth unemployment rate may represent more faithfully the economic constraints of young people in each country. We use the CMR as dependent

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<sup>18</sup> Data come from the U.N. Statistics Division and Eurostat. Data on men and women by previous marital status (divorced, single, and widowed) have been linearly completed by the authors to avoid gaps, except for those countries to which it has not been possible to apply this technique. Results without the linear interpolation are maintained.



variable in Columns (1), (2), and (3), and the CMR measured in logarithm in Column (4) of Table A1. We find very similar results: a pro-cyclical behaviour of the CMR, with the magnitude of the impact of the business cycle being about half of that found in our baseline estimate. This result is not surprising, since the mean youth unemployment rate is more than double the mean unemployment rate for the countries and the period under consideration (18.1 against 8.41), and both rates behave similarly, as can be seen in Figure 1. Table A2 of the Appendix shows the impact of the business cycle measured by the youth unemployment rate on the CMR by previous marital status. Once again, results are very similar to those shown in Table 10 using the total unemployment rate. Conclusions drawn from this result are similar to those presented above.

In the same line, we can redefine the CMR to study the impact of the business cycle on the CMR by age of women. As stated before, individuals may prefer to bear children within the institution of marriage rather than outside it, to reinforce marital stability. In this framework, younger women have more options to postpone the decision to marry than older women, in the case of economic downturns, for biological reasons. Figure 2 shows the results for women aged 20-29, 30-39, 40-49 and 50-59. The CMR shows a pro-cyclical and statistically-significant behaviour for women under 40, regardless of the use of the total and the youth unemployment rate to measure business cycle dynamics. As expected, the coefficients capturing the effect for older women are not statistically significant.

## **5. Endogeneity Concerns**

The main purpose of this study is to analyse the impact of business cycle dynamics, measured through the unemployment rate, on the CMR. However, marital status (especially of women) may affect participation in the labour market, and thus, the unemployment rate (Van der Klaauw 1996). Since husbands have traditionally taken on the role of breadwinners, married women may have fewer incentives to increase their participation in the labour market, especially if the husband is employed. Thus, women are more likely to modify their participation in the labour market depending on their marital status. To tackle this issue, we repeat our previous estimates but using the male unemployment rate to identify the business cycle. In this setting, we avoid (at least part of) the endogeneity concerns that may arise. Results are shown in Column (1) of Table 11, and are quite similar to those obtained before, both in the sign of the impact, maintaining the pro-cyclical behaviour of marriage, and in its magnitude. In Column

(2), we use the employment-to-population ratio, which is less sensitive to variations in the labour force participation rate, for reasons related to marital status, finding again the pro-cyclical behaviour of CMR.

To mitigate any remaining concern related to the potential endogeneity in the business cycle dynamics-marriage rate relationship, we develop an Instrumental Variable Approach, following the strategy proposed by Dehejia and Lleras-Muney (2004), according to which the lagged unemployment rate is used as an instrument for the current unemployment rate. Results are shown in Columns (3) and (4). As can be observed, the pro-cyclical behaviour of the CMR is maintained, even after considering the potential endogeneity in the relation between the unemployment rate and marital status. Moreover, as could be expected, the unemployment rate in year  $t-1$  has a positive and significant impact on the unemployment rate in year  $t$ . After all these analyses, our main conclusion does not change: the CMR shows a pro-cyclical behaviour, which gives us confidence in our results.

## **6. Conclusion**

In this paper, we study the relationship between the business cycle and the marriage rate. From a theoretical point of view, the relationship is not clear. On the one hand, if during an economic downturn the available resources are scarce and the potential benefits from marriage decrease, the marriage rate should show a pro-cyclical behaviour. On the other hand, as the institution of marriage may be viewed as insurance in case of negative economic conditions, unemployment and marriage should be positively associated, so showing a counter-cyclical relation.

We use a panel data of 30 European countries spanning the period from 1991 to 2013 to address this issue, and consider the unemployment rate as the proxy of business cycle fluctuations. Our findings show a pro-cyclical behaviour of marriage rates in Europe, as other authors have found for other countries, such as Spain (González-Val and Marcén 2018a). However, when we analyse this issue by the existing legal marital status at the time of marriage, we find differences in the case of women: the business cycle has a negative impact on the marriage rate only for those who had never been married before, and we find no evidence of this effect for those who were previously divorced or widowed.

The negative impact of the unemployment rate on the marriage rate is observed even after including controls for the institutional, geographical, and political changes experienced by some countries; for country-level characteristics that may have an effect on the marriage rate; for the different magnitudes of the family policies implemented by each government; and for the heterogeneous regulations of certain aspects of the life of the couple. This result is in line with the theoretical approach, suggesting that poor economic conditions, and/or the lower economic expectations derived from this situation, imply lower probabilities of engaging in marriage.

Regarding the magnitude of the impact, our main estimate determines that when the unemployment rate increases by one-percentage-point, the CMR decreases by about 0.045, representing a fall of almost 1%. Moreover, when we consider the possibility that it is not only the contemporaneous unemployment rate that impacts the marriage rate, we find that the negative impact of the current unemployment rate turns positive two years later, suggesting that individuals postpone the decision to marry in poor economic conditions.

When we consider alternative indicators for the business cycle, the main conclusion remains: the marriage rate shows a pro-cyclical behaviour. We also examine the potential endogeneity concerns, since women especially are more likely to modify their labour market participation depending on their legal marital status. With this purpose, we develop an Instrumental Variable Approach, according to which the pro-cyclical behaviour of marriage rate holds.

Our findings suggest that higher unemployment rates normally linked to a severe economic crisis can dissuade couples from marrying, or at least, can make them postpone their decision. The negative impact of the unemployment rate on the marriage rate appears to be quite robust.

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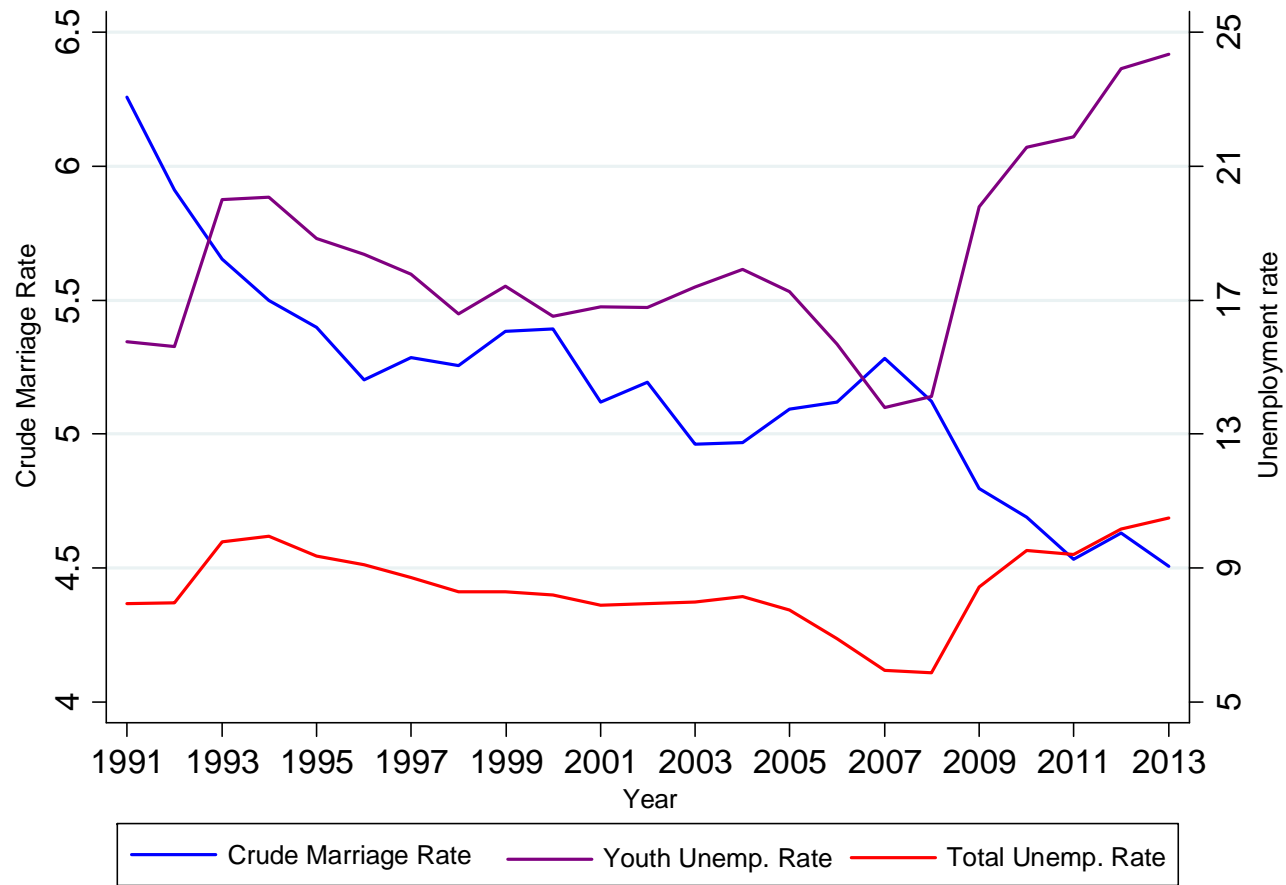
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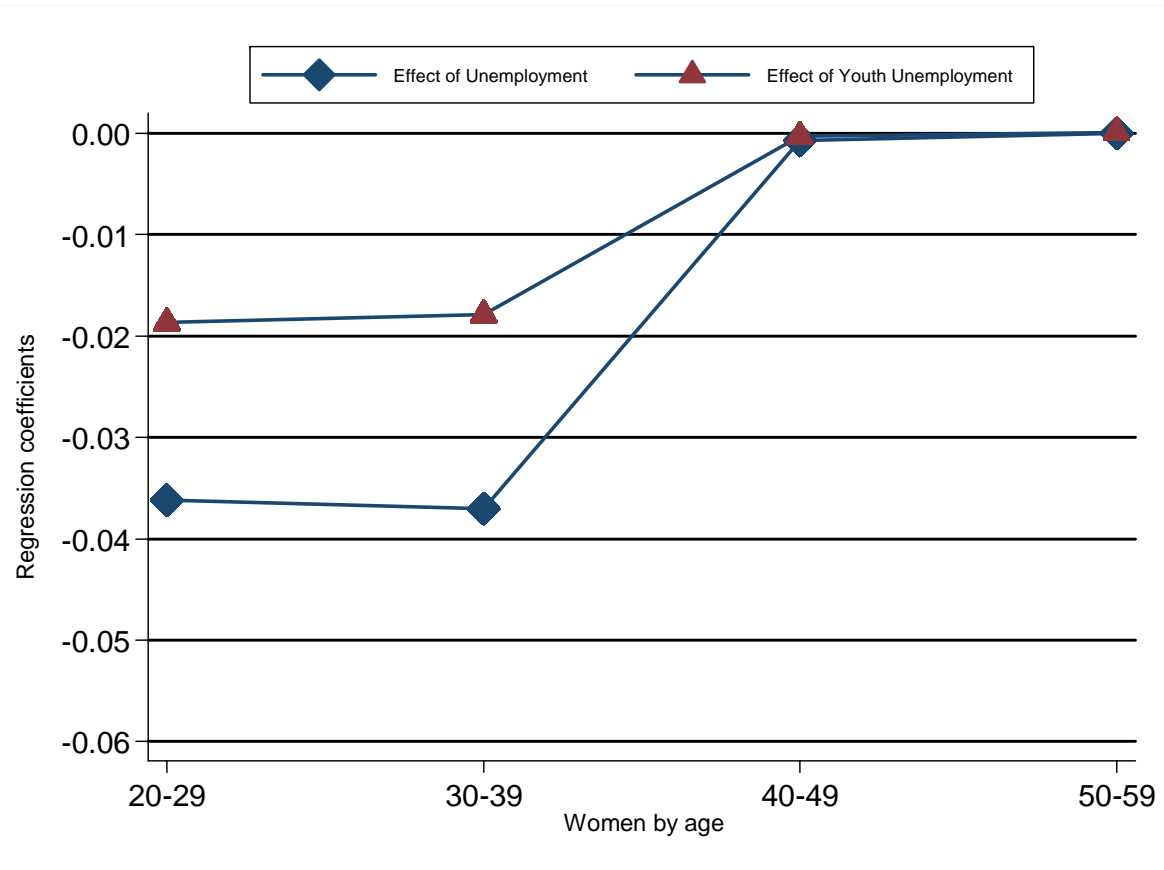
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**Figure 1.- Crude Marriage Rate, Youth, and Total Unemployment Rates**  
 (Period: 1991 - 2013)



**Figure 2.- Response of Crude Marriage Rate by Age of Women**  
(Period: 1991 - 2013)



Notes: Coefficients on total and youth unemployment are statistically significant at the 1% level for women under 40 years old. Those capturing the effect for women older than this are not statistically significant. The number of observations is 605, 605, 603, and 588 for women between 20-29, 30-39, 40-49, and 50-59, respectively. Robust standard errors clustered by country. All regressions are weighted by country population. Controls for country and year fixed effects as well as country-specific linear time trends are added to all those specifications.

**Table 1.- Average CMR and Unemployment Rate by Country**  
(Countries ordered by unemployment rate)

Country	Crude Marriage Rate (1991-2013)	Unemployment Rate (1991-2013)
Spain	4.68	17.06
Slovak Republic	5.09	14.08
Bulgaria	4.05	13.37
Poland	5.57	13.13
Lithuania	6.17	12.83
Latvia	5.12	12.6
Greece	5.2	11.39
France	4.46	10.02
Finland	5.1	9.97
Italy	4.52	9.62
Ireland	4.79	9.44
Estonia	4.53	9.23
Hungary	4.46	8.74
Germany	4.94	8.07
Belgium	4.49	8.01
Sweden	4.52	7.44
Portugal	5.32	7.42
Romania	6.58	7.13
United Kingdom	5.16	6.97
Malta	6.28	6.83
Slovenia	3.6	6.81
Denmark	6.35	6.17
Czech Republic	5.27	6.16
Cyprus	9.42	5.63
Netherlands	4.84	4.7
Austria	4.83	4.16
Iceland	5.16	4.06
Norway	5	4
Switzerland	5.59	3.6
Luxembourg	4.6	3.59
Europe	5.19	8.41

Sources: Unemployment rates data come from the World Development Indicators (The World Bank). Unemployment refers to the share of the labor force that is without work but available for and seeking employment (International Labour Organization estimations). Crude Marriage Rate data come from Eurostat, defined as the ratio of the number of marriages during the year to the average population in that year. The value is expressed per 1000 inhabitants.

**Table 2: Crude Marriage Rate Models**  
(Baseline Estimates)

	(1)	(2)	(3)	(4)
Unemployment Rate	-0.035** (0.016)	-0.045*** (0.010)	-0.038** (0.018)	-0.010*** (0.002)
Country fixed effects	N	Y	Y	Y
Year fixed effects	N	Y	Y	Y
Country x Time	N	Y	Y	Y
Country x Time <sup>2</sup>	N	N	Y	N
Observations	680	680	680	680
R <sup>2</sup>	0.031	0.852	0.890	0.880

Notes: Dependent variable: CMR in Columns (1), (2), and (3), and the CMR in logarithm in Column (4). Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 3.- Crude Marriage Rate Models**  
(Alternative Measures for the Business Cycle)

	(1)	(2)	(3)	(4)
Log GDP pc	3.545*** (0.695)			
Total Part-time		-0.152** (0.070)		
Long unempl. Rate			-0.065*** (0.017)	
Unemployment Rate Hodrick-Prescott filter				-0.098** (0.039)
Contry fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N
Observations	653	390	600	680
R <sup>2</sup>	0.875	0.878	0.855	0.842

Notes: Dependent variable: CMR in all Columns. Robust standard errors clustered by country. All regressions weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 4.- Crude Marriage Rate Models**  
(Lags for Unemployment included)

	(1)	(2)	(3)	(4)
Unemployment rate	-0.045*** (0.010)			-0.059*** (0.012)
Unemployment rate t-1		-0.034*** (0.012)		-0.020 (0.023)
Unemployment rate t-2			-0.014 (0.014)	0.051** (0.019)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N
Observations	680	650	620	620
R <sup>2</sup>	0.852	0.846	0.842	0.866

Notes: Dependent variable: CMR in all Columns. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 5.- Crude Marriage Rate Models**  
(Country-Level characteristics considered)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unemployment rate	-0.046*** (0.009)	-0.049*** (0.009)	-0.049*** (0.010)	-0.039*** (0.010)	-0.037*** (0.009)	-0.061*** (0.018)	-0.062*** (0.021)
Crude Divorce Rate	-0.044 (0.217)						-0.273** (0.099)
Male mean age first marriage		0.248* (0.142)					0.047 (0.096)
Female mean age first marriage			0.251* (0.136)				0.066 (0.068)
Gross enrol. Ratio: tertiary				0.015 (0.011)			0.084 (0.050)
Female Gross enrol. Ratio: tertiary					0.007 (0.009)		-0.067 (0.041)
Percentage immigrant pop.						-0.015 (0.014)	0.017 (0.011)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N	N	N	N
Observations	648	595	596	641	628	407	326
R <sup>2</sup>	0.847	0.860	0.860	0.859	0.862	0.913	0.920

Notes: Dependent variable: CMR in all Columns. Controls included are CDR in Column (1); the mean male and female age at first marriage in Columns (2) and (3), respectively; the school (female) gross enrollment ratio in tertiary education in Columns (4) and (5); and the percentage of immigrants in Column (6). In Column (7) we include all controls simultaneously. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 6.- Crude Marriage Rate Models**  
(Political, Geographical and Institutional changes considered)

	(1)	(2)	(3)	(4)	(5)
Unemployment rate	-0.031** (0.014)	0.045*** (0.010)	0.043*** (0.010)	0.044*** (0.012)	0.044*** (0.012)
Independence process		1.184*** (0.026)			0.894*** (0.131)
EU member			0.430** (0.194)		0.436** (0.194)
Adopted Euro				0.050 (0.195)	-0.025 (0.209)
Country fixed effects	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N	N
Observations	427	680	680	680	680
R <sup>2</sup>	0.888	0.852	0.857	0.852	0.857

Notes: Dependent variable: CMR in all Columns. Column (1) shows the estimates without those countries considered as ex-socialist republics (Germany is excluded from the analysis). Columns (2) and (3) include a dummy for those countries that are EU members and that adopted the Euro as their currency, respectively. Column (4) includes all controls simultaneously. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 7.- Crude Marriage Rate Models Controlling for Family Policies**  
(Country-Level family policies considered)

	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment rate	-0.062*** (0.014)	-0.048*** (0.008)	-0.048*** (0.009)	-0.057*** (0.010)	-0.037*** (0.010)	-0.086** (0.032)
Gender gap in employment	0.042*** (0.014)					
Length of paid maternity leave		0.0002 (0.003)				
Length of paid paternity leave			-0.007 (0.006)			
Female % of responsibility				-0.002 (0.014)		
Gender parity index (enrol.)					-0.455 (0.644)	
Gender wage gap						0.029 (0.018)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N	N	N
Observations	498	500	500	540	628	244
R <sup>2</sup>	0.882	0.874	0.875	0.869	0.862	0.920

Notes: Dependent variable: CMR in all Columns. Controls included are the gender gap (male-minus-female) in the full-time equivalent employment-to-population ratio in Column (1); the length of paid maternity and parental leave available to mothers (parents) in weeks in Columns (2) and (3), respectively; the female legislators, senior officials and managers as percentage of total in Column (4); the gross school enrollment gender parity index in tertiary education (GPI) in Column (5); and the difference between male and female median wages divided by male median wages in Column (6). Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 8.- Regulations Affecting Life as a Couple**  
(Period: 1991 - 2013)

Country	(1) Individual taxation	(2) Joint taxation	(3) Matrimonial prop. regime	(4) Partnership law	(5) Protection for unregist. cohabitations	(6) Inheritance for unregist. cohabitations	(7) Mutually support	(8) Informal regulation	(9) Access to MAR	(10) Reimbursement for MAR	(11) Restrictive access to MAR
Austria	Y	N	Particip. acq.	N	N	N	N	Y	Y	Y	Y
Belgium	Y	Y	Com. acq.	1995-2013	N	N	N	Y	N	N	N
Bulgaria	Y	N	Com. acq.	N	N	N	N	1998-2013	N	N	Y
Cyprus	Y	N	Separat. propr.	N	N	N	N	N			No criteria
Czech Republic	Y	2005-2007	Com. acq.	N	N	N	N	N	Y	Y	Y
Denmark	Y	N	Def. com. acq.	N	Y	2006-2013	N	Y	N	N	N
Estonia	Y	Y	Com. acq.	N	N	N	N	2000-2013	N	N	Y
Finland	Y	N	Def. com. acq.	N	2011-2013	N	N	Y	Y	Y	N
France	N	Y	Com. acq.	1999-2013	Y	N	N	1999-2013	Y	Y	Y
Germany	Y	Y	Particip. acq.	N	N	N	N	Y	N	Y	Y
Greece	Y	Y	Particip. acq.	2008-2013	N	N	N	Y	Y	Y	Y
Hungary	Y	N	Com. acq.	N	N	N	Y	Y	Y	Y	Y
Iceland	Y	Y	Def. com. acq.	Y	N	N	N	Y	Y		
Ireland	Y	Y	Separat. propr.	N	2010-2013	N	2010-2013	2010-2013	N	N	Only private
Italy	Y	N	Com. acq.	N	N	N	N	Y	Y	Y	
Latvia	Y	N	Com. acq.	N	N	N	N	2012-2013			No criteria
Liechtenstein											N
Lithuania	Y	N	Com. acq.	2001-2013	N	N	N	2001-2013			No criteria
Luxembourg	N	Y	Com. acq.	2004-2013	N	N	N	Y	N	N	Only public
Malta	Y	N	Com. acq.	N	N	N	N	N			No criteria
Netherlands	Y	N	Def. com. acq.	1998-2013	Y	N	N	Y	N	N	Only public
Norway	Y	Y	Def. com. acq.	N	Y	2008-2013	N	Y	Y		
Poland	Y	Y	Com. acq.	N	N	N	N	N			No criteria
Portugal	N	Y	Com. acq.	N	N	N	N	1999-2013	Y	Y	N
Romania	Y	N	Com. acq.	N	N	N	N	Y		N	No criteria
Slovak Republic	Y	N	Com. acq.	N	N	N	N	N			No criteria
Slovenia	Y	N	Com. acq.	N	Y	Y	Y	Y	Y	Y	Only public
Spain	Y	Y	Com. acq.	1998-2013	N	N	N	Y	N	Y	N
Sweden	Y	N	Def. com. acq.	1995-2009	2003-2013	N	N	Y	Y	Y	N
Switzerland	N	Y	Particip. acq.	N	N	N	N	1996-2013	Y		
United Kingdom	Y	N	Separat. propr.	N	N	N	N	Y	N	Y	N

Notes: Y implies validity throughout the period; N implies no validity during the period. MAR is the acronym for Medically Assisted Reproduction.

**Table 9.- Crude Marriage Rate Models**  
(Country-Level policies affecting the life of the couples considered)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Unemployment rate	-0.048*** (0.015)	-0.045*** (0.010)	-0.047*** (0.013)	-0.058*** (0.017)	-0.042*** (0.011)	-0.045*** (0.010)	-0.045*** (0.010)	-0.045*** (0.009)	-0.044** (0.017)	-0.044** (0.017)
Individual taxation	0.272 (0.415)		0.225 (0.410)							
Joint taxation		0.352*** (0.100)	-0.085 (0.231)							
Common acquisition				0.355 (0.240)						
Separate property				0.483*** (0.105)						
Deferred com. prop.				-0.583 (0.436)						
Partner law heterosexuals					0.194 (0.181)					
Protection extra-marital						0.003 (0.292)				
Inheritance partner							-0.253 (0.464)			
Informal relation								0.335* (0.190)		
Access to MAR									-0.242 (0.253)	
Restrictive access MAR										-0.563** (0.258)
Only private										-1.085*** (0.236)
Only public										-1.296*** (0.264)
No criteria										0.376 (0.449)
Observations	680	680	680	680	680	680	680	680	519	590
R <sup>2</sup>	0.689	0.853	0.689	0.715	0.853	0.852	0.852	0.854	0.715	0.713

Notes: Dependent variable: CMR in all Columns. Columns (2), (5), (6), (7), and (8) include country fixed effects. All Columns include year fixed effects, and linear trend. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.



**Table 10: Married by Previous Marital Status Per 1000**  
(Columns (1) – (3): Men; Columns (4) – (6): Women)

	Men	Men	Men	Women	Women	Women
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment Rate	-0.475*	-0.257**	-0.162***	-0.177	-0.319**	-0.027
	(0.258)	(0.111)	(0.027)	(0.159)	(0.134)	(0.019)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N	N	N
Observations	337	353	307	322	353	309
R <sup>2</sup>	0.975	0.917	0.959	0.938	0.924	0.498

Notes: Dependent variable: Ratio of the number of men (women) married and previously divorced to the total male (female) divorced population, per 1000 in Columns (1) and (4), respectively. Ratio of the number of men (women) married and previously single to the total male (female) single population, per 1000 in Column (2) and (5), respectively. Ratio of the number of men (women) married and previously widowed to the total male (female) widowed population, per 1000 in Column (3) and (6), respectively. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table 11.- Crude Marriage Rate Models**  
(Endogeneity concerns)

	(1)	(2)	(3)	(4)
			IV Approach	First Stage
Male unempl. Rate	-0.044***			
	(0.009)			
Empl. Population ratio		0.043**		
		(0.020)		
Unemployment rate			-0.068***	
			(0.013)	
Unemployment rate [t-1]				0.833***
				(0.025)
Contry fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N
Observations	680	607	650	650
R <sup>2</sup>	0.853	0.847		

Notes: Dependent variable: CMR in all Columns. Robust standard errors clustered by country. All regressions weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

## APPENDIX

**Table A1.- Crude Marriage Rate and Youth Unemployment Rates**  
(Replication of Baseline Estimates)

	(1)	(2)	(3)	(4)
Youth Unemployment rate	-0.018** (0.007)	-0.023*** (0.005)	-0.019* (0.010)	-0.005*** (0.001)
Country fixed effects	N	Y	Y	Y
Year fixed effects	N	Y	Y	Y
Country x Time	N	Y	Y	Y
Country x Time <sup>2</sup>	N	N	Y	N
Observations	680	680	680	680
R <sup>2</sup>	0.051	0.852	0.890	0.881

Notes: Dependent variable: CMR in Columns (1), (2), and (3), and the CMR in logarithm in Column (4). Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.

**Table A2: Married by Previous Marital Status Per 1000**  
(Columns (1) – (3): Men; Columns (4) – (6): Women)

	Men (1)	Men (2)	Men (3)	Women (4)	Women (5)	Women (6)
Youth Unemployment Rate	-0.274** (0.106)	-0.105* (0.059)	-0.058*** (0.013)	-0.128* (0.066)	-0.125* (0.073)	-0.016 (0.012)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y	Y
Country x Time <sup>2</sup>	N	N	N	N	N	N
Observations	337	353	307	322	353	309
R <sup>2</sup>	0.975	0.915	0.956	0.939	0.922	0.498

Notes: Dependent variable: Ratio of the number of men (women) married and previously divorced to the total male (female) divorced population, per 1000 in Columns (1) and (4), respectively. Ratio of the number of men (women) married and previously single to the total male (female) single population, per 1000 in Columns (2) and (5), respectively. Ratio of the number of men (women) married and previously widowed to the total male (female) widowed population, per 1000 in Column (3) and (6), respectively. Robust standard errors clustered by country. All regressions are weighted by country population. \*\*\*Significant at the 1% level, \*\*significant at the 5% level, \*significant at the 10% level.