Will you marry me?

It depends (on the business cycle)

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Abstract: [1]

This paper studies the relationship between the business cycle and the marriage rate, using a panel data of 30 European countries for 1991 to 2018. Our results point to a pro-cyclical behavior of marriage rates, which holds after controlling for country-level observed and unobserved characteristics. We detect possible different responses of the marriage rate to the business cycle, after considering a wide range of country-level regulation affecting couples (taxation, property division, informal relationship regulations, and reproduction). Our findings suggest an important role of the cost/gain of marriage versus cohabitation/singlehood. Supplemental analysis reveals gender differences in the relationship between the business cycle and the marriage rate, depending on the previous legal marital status of the individuals. We provide additional evidence on the consequences of the pro-cyclical response of marriage rate by exploring variations in the stock of married/unmarried individuals. Results show a clear negative association between the business cycle and the stock of married individuals, but no negative response is found for the stock of those living as unmarried couples.

Keywords: Marriage, unemployment, business cycle.

JEL: J12, J64.

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1. Introduction

The possible existence of a relationship between the economic cycle and marriage remains an open area of research. The existing research analyzing the impact of business cycle dynamics on marriage mainly focuses on the U.S., finding a pro-cyclical behavior, which means that economic downturns are associated with decreasing marriage rates (Baghestani and Malcolm 2014; Schaller 2013). Less work has been done in considering a different geographical setting. For example, Hashimoto and Kondo (2012) analyze the case of Japan. They find that the unemployment rate is negatively, but weakly, correlated with marriage of women in Japan. Ariizumi et al. (2015) study this relationship for Canada, finding similar results to those for the US. González-Val and Marcén (2018a) also find a pro-cyclical behavior 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 behavior. Although all these findings provide empirical evidence for a possible pro-cyclical behavior of marriage rates, to our knowledge, there is no research exploring this issue for a panel of European countries that includes the first great economic crises of the 21st century. Our first contribution to the literature lies in studying the impact of business cycle dynamics on the marriage rate, using macro-data for a panel of European countries, covering a long period of 28 years.[2]

From a theoretical point of view, the possible association between the business cycle and the marriage rate is not clear. 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. Under this approach, a positive relationship between male job losses and the likelihood of remaining single would be expected. At the aggregate level, we would expect a negative association between economic recession (characterized by increases in unemployment rates, uncertainty, decreases in GDP…) and marriage rates, since, 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. Marriage may also be viewed as insurance in case of poor economic conditions: in the face of a shock affecting the economy, marriage

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[2] 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.

allows for the sharing of the risk associated with a job loss, and provides a coordinated response in terms of labor 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 behavior of marriage rates. The possible relationship between marriage and the business cycle can also depend on the existence of alternative ways to live as a couple. The gains/costs of entering a marriage can be compared to those of living as an unmarried couple. By simply considering the costs of getting married, it is possible to surmise that under an economic crisis living as an unmarried couple is more attractive than choosing to get married. At the aggregate level, this should imply a pro-cyclical behavior of the marriage rate. Alternatively, if welfare systems protect more marriage than unmarried couples by way of, for example, family allowances, non-married individuals (single and those living together as unmarried couples) can opt for getting married during economic downturns (pointing to a counter-cyclical behavior of the inflow of marriages). Because of all these opposing perspectives, at least theoretically, the relationship between business cycle dynamics and marriage rates is still not clear.

We focus on the European case, since European countries present certain characteristics of the evolution of marriage rates – and associated legislation – that make them an interesting context that has scarcely been exploited by researchers. 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 1,000 inhabitants. This rate has decreased by almost 30% in Europe in that period of time (Eurostat data); individuals in Europe have increasingly chosen the option of living as unmarried couples (Lappegård et al. 2018). In this setting, it is possible to wonder whether the response of individuals in terms of the marriage decision to the business cycle has changed because of the extensive acceptance of cohabitation. European countries are also characterized by having different legal settings regulating life as a couple, which allows us to study possible heterogeneous responses of the marriage rates to the business cycle.

In our main empirical analysis, we use data on the CMR from 30 European countries, from 1991 to 2018, to determine the relationship between the business cycle and marriage rates. We use the national unemployment rate to capture the evolution of the business cycle, which is the most commonly-adapted strategy (Ahn and Mira 2002;

Bellido and Marcén 2019; González-Val and Marcén 2017; 2018a; Kravdal 2002; Schaller 2013). Our results suggest the existence of a negative association between the unemployment rate and the CMR, pointing to a pro-cyclical behavior of marriage in Europe. Specifically, our main estimates show that an increase of one-percentage-point in the national unemployment rate implies 0.048 fewer marriages per 1,000 of population, which represents 0.94% of the average CMR for the sample period and the countries included in our analysis. Using data for the US, Schaller (2013) determines that an increase of one-percentage point in the unemployment rate is linked to a 1.5% decrease in the marriage rate. Focusing on Spain for the period 1998-2013, González-Val and Marcén (2018a) determine that a one-percentage point increase in the unemployment rate implies 0.03 fewer marriages per 1,000 individuals, which represents almost 1% of the marriage rate in Spain. This result is very close to that obtained in our sample of 30 European countries.

We do not only use the contemporaneous unemployment rate to capture the dynamics 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 analyze 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 in prior studies) by allowing for lags of one and two years duration. Additionally, because of the difficulty of properly capturing its fluctuations, we also include in our analysis other measures of the business cycle, such as per capita GDP, part-time employment indicators, and the long-term unemployment rate. 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 option for reasons independent of the business cycle, or changes in family laws and policies, measured through certain family-policy variables (length of paid maternity/paternity leave and the difference between male and female median wages, among others).

Our second contribution to the literature is that we have collected information on a range of regulations concerning life as a couple, for each European country in our

sample.[3] This deep research work on the country-specific family law framework 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. We find a more pronounced negative response of marriage to the business cycle fluctuations for those countries without joint taxation, with community of acquisition property regimes, without informal relationship regulation, and with medically-assisted reproduction (MAR) in marriage. This result points to the coordinated response in terms of taxation as a gain in marriage versus cohabitation/singlehood, but also to the possible costs of divorce generated by a non-separated property regime, as important factors driving the marriage response of individuals to business cycle fluctuations. The equality between marriage/cohabitation regulations reduces the negative association of marriage to the business cycle because individuals may be indifferent to one another. However, in terms of reproduction, we observe the opposite, since the negative response is more pronounced in those countries that allow access to MAR for both married/unmarried individuals than in those countries allowing such access only for married couples. This may simply indicate that couples having difficulties having children must get married, even under economic difficulties, in those countries not allowing access to MAR for unmarried couples.[4]

There is also a gap in the literature on the relationship between the business cycle and the marriage rate by previous marital status. Since individuals can legally marry if they are single, widowed, or divorced, these three different marital conditions (singlehood, widowhood, and divorce) may involve different responses to 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 men are more economically independent than women. Similarly, in the case of divorced women, we would expect a low effect or even no

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[3] Information collected from Busardò et al. 2014; Comission on European Family Law (Available at http://ceflonline.net/country-reports-by-jurisdiction/); and the Ministry for Social Dialogue Consumer Affairs and Civil Liberties of Malta (info. on Cohabitation Law).

[4] This is not a minor issue, since the percentage of couples who resort to medical treatments related to infertility and assisted reproductive technology has dramatically increased (Kocourkova et al. 2014; Leridon and Slama 2008).

effect of changes in the business cycle on their marriage rates, since, as before, their marriage may affect their alimony. If they decide to legally remarry, they could 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 their marriage. Our third contribution to the literature is the exploration of this issue. We redefine the marriage rate, separating individuals by previous marital status at marriage. We would expect a greater impact of business cycle variations for singles than for divorced or widowed individuals, especially for women. This is, in fact, what we observe in our estimations, confirming the differential association between unemployment rates and marriage depending on the previous marital status.

Although in our analysis we are considering as a main indicator of marriage the marriage rate (flow variable), it is possible to argue that the business cycle evolution can have an impact on the stock of marriages. The analysis of this issue is our fourth contribution to the literature. Our findings in this paper point to the pro-cyclical behavior of the marriage rate (annual number of marriages per 1,000 individuals). In this setting, the stock of marriages (individuals who are married per year) should increase during periods of economic boom and decrease during crises. However, we should not forget the evolution of the divorce rate. González-Val and Marcén (2017) find that a one-percentage-point increase in the unemployment rate involves almost 0.025 fewer divorces per thousand inhabitants, from European data for a similar period of time to that presented here. Then, the decrease in the number of marriages (0.048) that we detect in our empirical analysis is compensated for, at least in part, by a decrease in the number of divorces. Considering those opposite movements, the effect of the business cycle on the stock of marriages appears to be an empirical issue. Our results suggest a decrease in the stock of marriages during economic downturns, pointing to a dominance of the drop in the inflow marriages over the decrease in the outflow marriages in divorce. This may also have implications for the stock of individuals living in a couple as unmarried partners. It can be hypothesized that those individuals who do not get married because of economic constraints during an economic crisis choose to live as unmarried couples. In this framework, we would expect a counter-cyclical response of the stock of unmarried couples. Our estimations of the potential relationship between unemployment and unmarried individuals are not statistically significant, although they are positive (counter-cyclical), but this should be

taken with caution because of the scarcity of reliable data on the stock of unmarried couples.

The remainder of this paper is organized as follows. Section 2 analyzes the data used in the study. Section 3 describes our methodology. Section 4 presents our results, and several robustness checks. Section 5 considers the endogeneity concerns in the business cycle-marriage rates relationship. Section 6 focuses on an examination of the marriage stock. Section 7 studies the relationship between cohabitation and business cycle dynamics, and Section 8 concludes.

2. Data

To implement our analysis, we use data for 30 European countries, for the period from 1991 to 2018. As explained above, our variable of interest is the CMR, which is a standard indicator used in the literature (González-Val and Marcén 2018a).[5] In Figure 1, we can observe the temporal evolution of the CMR for all countries included in our study (data from Eurostat). We distinguish four 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 of 5 and 5.4. However, from 2007 to 2013 we observe a sharp decline, with the lowest value being reached in 2013, at 4.5. Then, it increases until the last year in our sample, reaching the value of 4.96 in 2018.

To measure business cycle fluctuations, we use the unemployment rate, defined as "the share of the labor force that is without work but available for and seeking employment", by the International Labor Organization, the source of this data.[6] 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).[7] In the same Figure 1, we show the evolution of the total unemployment rates. It is observed four main periods in the pattern of behavior of the total unemployment rate: from 1991 to 1994, the average European unemployment rate increases. From then until 2008, the rate exhibits a

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[5] As we have defined above, the CMR is the ratio of the number of marriages during the year to the average population in that year, expressed per 1,000 inhabitants.

[6] 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.

[7] 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.

smoothly negative trend, reaching values below 6%. In recent years, and coinciding with the severe economic/financial crisis in Europe, the rate increases to above 10%. From then, we can see a smooth decline up to the year 2018, when the value is 6.3%.

Comparing the evolution of both variables, it is possible to suggest that the CMR shows a pro-cyclical behavior: the unemployment rate and the CMR appear to move in opposite directions. However, this could be spurious, so a detailed econometric analysis is needed to determine the specifics of 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 period under analysis (1991-2018), ordered from highest to lowest ratios of unemployment. There are substantial differences, with the average unemployment rate achieving values below 4% for countries such as Iceland and Switzerland, and above 13% for the Slovak Republic, Greece, 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 analyze 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 ages 15 and 64, to the average female (and male) population between 15 and 64, and per 1,000 single women. 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:

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

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.[8] η_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.[9] ε_{it} is the error term. The sign of the β coefficient could be positive (counter-cyclical response) or negative (pro-cyclical reaction).

With this empirical analysis, we obtain the association between the business cycle and the CMR. However, we cannot talk in terms of causality, since the marital status (especially of women) may affect the probability of participating in the labor market (Costa 2000; Fernández and Wong 2014a; 2014b), which may in turn impact the unemployment rate. In order to mitigate this issue, we repeat the analysis using the male unemployment rate as a proxy of the business cycle, since men are less likely to modify their participation in the labor market, depending on their legal marital status, as in Schaller (2013). We revisit this issue in Section 5.

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.[10] 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).[11] This simple redefinition of the marriage rate does not alter our findings, nor does the redefinition used in Columns (5) and (6), where we use the number of marriages per 1,000 single women, and

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[8] 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.

[9] Country-specific quadratic time trends have also been included as a robustness check. Results do not change.

[10] In the rest of the analysis, we only include country-specific linear trends, although results are unchanged when adding quadratic trends.

[11] We replicate every estimate using the CMR in logarithm as dependent variable, and conclusions do not change.

measured in logarithm. Results still show the pro-cyclical behavior of marriages.[12] Focusing on Column (2), our results can be interpreted as follows: a one-percentage-point increase in the unemployment rate in a given country is related to 0.048 fewer marriages per thousand inhabitants, which represents a drop of 0.94% 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 less than ideal in capturing the evolution of the business cycle. For this reason, we include other standard indicators used to capture the evolution of the business cycle in Table 3. Specifically, we use per capita GDP, measured in constant 2010 US $ in logarithm in Column (1), a part-time employment indicator, defined as the percentage of part-time jobs in the total employment of 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 trend of a time series from raw data, in Column (4).[13] Regardless of the indicator used, the CMR appears to show a pro-cyclical behavior.[14]

We also re-run all the estimations, after detrending the variables of interest (unemployment rate and CMR), to consider only the correlation between the cyclical components of those variables, and the pro-cyclical behavior of the CMR is maintained.[15] We estimate the correlation between the CMR and the variation between periods of the unemployment rate, to overcome concerns about the large variations in the average unemployment rate across European countries, and we can observe the pro-cyclical behavior of CMR. Results are shown in Table A1 in the Appendix.

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 happens. 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

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[12] We replicate every estimate using this estimator (that considers the population "at risk" of getting married), and conclusions do not change. However, since we lose almost 49% of the observations, we use the CMR as our main marriage indicator.

[13] We use the Ravn-Uhlig rule to determine the smoothing parameter, considering that we use annual data.

[14] Changes in the number of observations are due to the availability of information on those proxies of the business cycle dynamics.

[15] We do not show the estimations for the cyclical components of both variables of interest because of space constraints, but results are available upon request.

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 relationship to the unemployment rate lagged one period still shows the pro-cyclical behavior of the CMR, although the magnitude is 27% lower, whereas the coefficient that captures the possible association with the unemployment rate lagged two periods is not statistically significant. When we include in the same estimate the unemployment rate, and this rate lagged one and two periods, the CMR shows a pro-cyclical behavior with respect to the contemporaneous unemployment rate, but when that rate is lagged one and two periods, we find no statistically significant relationship with the CMR, which may point to the importance of the contemporaneous CMR rather than the lagged unemployment rates.

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 that can vary at the country level and/or over time. However, even with those controls, it could be argued that the coefficient picking up business cycle dynamics may be capturing the effect of those variables rather than (or in addition to) the association with the business cycle. For example, if those countries with 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 relationship to the divorce rates, rather than to 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 behavior 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 with a culture of marrying younger (which may be related to traditional social norms) 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. Although these controls are highly correlated with the marriage rate in panel data, increasing the endogeneity concerns already mentioned, we include them to increase the robustness of our results. 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 relationship between 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 behavior of the CMR, in both cases.

Immigrants may have attitudes and evaluations of the institution of marriage that differ from natives, which has been studied for Sweden (Andersson et al. 2015) and the United Kingdom (Hannemann and Kulu 2015), and a different behavior in the labor 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 reassuring that the pro-cyclical behavior of the marriage rate is maintained, with the magnitude of the relationship between the business cycle and the CMR 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 behavior 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.[16] This must be tested, since the political and institutional instability of those changes could impact both the business cycle and the CMR. There are no variations in the correlation between the CMR and 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 experienced a process of independence during the 1990s (Czech Republic, Estonia, Latvia, Lithuania, Slovak Republic, and Slovenia), and 0 otherwise.[17] As before, if the uncertainty generated after this kind of political process affected the assessment regarding the legal marital status (Philipov and Dorbritz 2003), our results could be picking up this effect, rather than the relationship with 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.[18] We need to include this in the analysis for the same reasons of uncertainty as explained above. To do so, we introduce 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 association of the business cycle with the marriage rate, rather than with the uncertainty produced by this institutional change. The results, shown in Table 6, Column (3), demonstrate the robustness of the pro-cyclical behavior of the CMR, and the positive impact of being part of the E.U.

The adoption of the Euro as a common currency in many European countries during the sample period can also affect our estimations.[19] If the adoption of the common currency, and its differential effects on prices at the country level, has an effect on the 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,

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[16] Germany is also excluded from the analysis, since its current territory was part of both former territories.

[17] Source: The World Factbook of the CIA.

[18] 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).

[19] 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).

pointing to a pro-cyclical behavior. In Column (5), we include all controls. Results buttress the robustness of our estimates, reinforcing the idea of the pro-cyclical behavior of marriage rates, irrespective of the sample used, and of the controls for political and institutional changes introduced in the analysis.

Additionally, we have analyzed whether our results are maintained for different subsamples of countries. We have separated the countries following a geographical criterion, since close countries can be considered more similar in terms of living together (as married or unmarried couples) culture, and other aspects (Marcén and Morales 2019). With this purpose, we follow the United Nations publication "Standard Country of Area Codes for Statistical Use", which is now commonly referred to as the M49 standard, and that separates Europe into four regions (Eastern Europe, Northern Europe, Western Europe, and Southern Europe). Results are shown in Table 10. We again find the pro-cyclical behavior of the CMR for all the regions, except for Eastern Europe (Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovak Republic), for which the estimated coefficient is negative although not statistically significant. Note that the availability of information is quite scarce for this group of Eastern European countries (the number of observations is smaller than that for other groups), so it could be that those estimations were imprecisely measured. In any case, it is also true that the coefficient is quite close to 0, which may point to a non-relationship between the unemployment rate and the marriage rate.

Since according to Figure 1 we can distinguish four sub-periods in our sample: (1991-1994, 1995-2007, 2008-2013, and 2014-2018), we have checked our analysis for each of these sub-periods. Once again, results display a pro-cyclical behavior of the CMR for the sub-periods 2 (1995-2007) and 3 (2008-2013). We find no statistically significant relationship for sub-periods 1 (1991-1994) and 4 (2014-2018), but in both cases coefficients are negative and not quite close to 0, which may indicate a precision problem in the estimations as a consequence of the scarcity of data in both sub-periods for several of the countries/years considered in the analysis. This should be taken with caution. Results are shown in Table 11. It is reassuring that none of our estimates point to a possible counter-cyclical response of the marriage rates to the business cycle.

To provide further empirical evidence in favor of our findings, we test their robustness by including different measures for country level characteristics and family policies, since they can affect the formation and dissolution of families (Hantrias and Letabiler 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 differentially affect the relationship between the marriage rate and the business cycle dynamics. We include in Table 7 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); the difference between male and female median wages, divided by male median wages, in Column (6); the strictness of employment protection rates developed by the OECD in Column (7); and a dummy variable that takes value 1 for those countries where there is no statutory minimum wage (Iceland, Norway, Switzerland, Denmark, Italy, Cyprus, Austria, Finland, Sweden and Germany up to 2014), and 0 for those countries where this minimum wage is set, in addition to a variable for the difference in the minimum wage with respect to the previous year (this variable takes value 0 for those countries in which the previous dummy variable takes value 1) using data from Eurostat in Column (8). In all cases, there is a negative and statistically significant relationship between the total unemployment rate and the CMR, with the magnitude being close to that found in our main estimate.[20]

4.3. Country-level regulation on the couple´s life: an extensive compilation

Until this subsection, we have analyzed the possible association of the business cycle, measured through the unemployment rate and 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 relevant laws that introduce incentives related to marriage, and show this information in Table 8.

After a careful examination, we 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 (Column (4) of

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[20] We do not have information for all countries, nor for the entire period. For this reason, the number of observations changes in Table 7.

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), Column (5) of Table 8.

The differences in those legal frameworks allow us to study possible heterogeneous effects. To do that, we include in each estimate the unemployment rate, the variable(s) regulating certain aspects of the life as a couple, and their interaction terms. Results are presented in Table 9. We find a more pronounced negative response of marriage to the business cycle fluctuations for those countries without joint taxation, see Column (1). This may point to the coordinated response in terms of taxation as a gain in marriage versus cohabitation/singlehood during economic crisis. The possible costs of divorce generated by a non-separated property regime also appear to be an important factor driving the marriage response of individuals to business cycle fluctuations. As before, the response is greater (in absolute value) for those countries without a separation property regime, see Column (2). In Column (3), we see that the equality between marriage/cohabitation regulations reduces the negative association between marriage and the business cycle because individuals may be indifferent to them. Having regulations for informal relationships decreases (in absolute value) the response of the marriage rate to business cycle fluctuations. In any case, it is reassuring that the negative and statistically-significant association of the unemployment rate and the CMR prevails.

Regulation of medically-assisted reproduction (MAR) can also be important, since couples resorting to such measures tend to be older and the access to assisted reproduction in some countries depends on whether couples are married. This is considered in Column (4). Here, we find that a negative response is more pronounced in those countries that allow access to MAR for both married/unmarried individuals, than in those countries allowing access only to married couples. A possible explanation for this finding is that couples with difficulties having children need to get married, even under economic difficulties, in those countries not having access to MAR as unmarried couples, which may mitigate the negative response of the marriage rate to business cycle fluctuations.

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

As already suggested, the relationship between business cycle dynamics and 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 reduced capacity to face the economic costs of a wedding during an economic downturn. Divorcees must be able to afford child-support and alimony (normally men), or may receive that support (normally women), which can be a determinant in their probability of remarrying during an economic recession (McManus and DiPrete 2001). Similarly, widows receive pensions that they may lose when remarrying.

In Table 12, we show the results for the relationship of the business cycle to 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 1,000 individuals.[21] Results indicate that the business cycle is positively correlated with the male marriage rate, regardless of previous marital status, with the greater association being for those previously divorced, and single. This can be explained by the difficulties of divorced men to remarry under economic downturns if they have to maintain their children from a previous marriage 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 widower pensions are more likely to be lower than those of women. In the case of women, the marriages show a pro-cyclical behavior for those who have never been married before and, to a much lesser extent, those who were divorced, with no statistical significance for widows. This finding may point to the importance of the pensions that women receive, regardless of business cycle fluctuations.

Both analyses for men and women reveal an important correlation between the unemployment rate and the marriage rate of those previously single. Since those individuals tend to be younger than other groups, the age of these individuals, as well as

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[21] 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.

the economic conditions for young people may play an important role. In the Appendix, we replicate our baseline results (Table 2) and the analysis by previous marital status (Table 12), but using the youth unemployment rate, defined as "the share of the labor force aged 15-24 without work but available for and seeking employment", to identify the business cycle. Results are shown in Tables A2 and A3 in the Appendix. The youth unemployment rate may represent more faithfully the economic constraints of the young in each country. We use the CMR as dependent variable in Columns (1), (2), and (3), and the CMR measured in logarithm in Column (4) of Table A2. We find very similar results: a pro-cyclical behavior of the CMR, with the magnitude of the association between the business cycle and the CMR 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 (18.3 against 8.36), and both rates behave similarly, as can be seen in Figure 1. Table A3 of the Appendix shows this relationship of the business cycle measured by the youth unemployment rate to the CMR by previous marital status. Once again, results are very similar to those shown in Table 12 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 examine the connection between the business cycle and the CMR by age of women. As stated earlier, 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 do 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 behavior 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 analyze the link between business cycle dynamics, measured through the unemployment rate, and the CMR. Up to this point, we do not address the issue in terms of causality since endogeneity concerns may arise (Van der Klaauw 1996). As Schaller (2013) explains, women are more likely to modify their participation in the labor market, depending on their marital status or expected marital

status. This can affect the unemployment rate in two ways; first, by affecting the total number of individuals participating in the labor market (denominator of the unemployment rate); and second, by affecting the number of individuals who are unemployed, since those women who expect to get married may abandon the labor market if they are unemployed (which has an impact on both the denominator and the numerator of the unemployment rate).

We develop a double strategy to mitigate the endogeneity issue. Since men are less exposed to changes in their participation in the labor market as a consequence of their marital status, 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 the female unemployment rate may present. Results are shown in Column (1) of Table 13, and are quite similar to those obtained earlier, both in the sign of the relationship, maintaining the pro-cyclical behavior of marriage, and in its magnitude. In Column (2), we use the employment-to-population ratio, which is also less sensitive to variations in the labor force participation rate, for reasons related to marital status, finding again the pro-cyclical behavior of CMR. Following these analyses, our main conclusion does not change: the CMR exhibits a pro-cyclical behavior, which gives us confidence in our results.

6. The Stock of Marriages

In all the previous analysis, we have considered the relationship between the business cycle and the CMR, which is a flow variable, since it measures the annual number of marriages per 1,000 inhabitants. By only focusing on the population who enter marriage every year, and given that our results point to a pro-cyclical behavior of the CMR, we would expect a decrease in the number of individuals who are married (stock of marriages) as a consequence of the economic crisis. However, this quick conclusion omits how the business cycle affects those who divorce.[22] For the European case, and using a European sample quite similar to that presented here, González-Val and Marcén (2017) show empirical evidence of a pro-cyclical behavior of divorce rates. In the European setting, an economic crisis may decrease the number of new marriages, but it

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[22] Of course, in the literature we can find other papers that study other determinants of the transition into and out of marriage, such as 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 (Goldin and Katz 2002; Marcén 2015). All appear to affect the transition into and out of marriage.

can also decrease the number of divorces. Then, the decrease in divorces may compensate for, at least in part, the decrease in the number of new marriages.

To test this issue, we create the stock of marriages variable, defined as the married population on 1 January, per 1,000 population. Results are presented in Column (1) of Table 14. We find a negative and statistically significant relationship between the business cycle and the stock of marriages. It should be noted that we could not find information for all countries considered in the previous analysis, so it could be said that our findings are driven by this change in the sample. To mitigate this concern, we have maintained the same observations (countries and years), but using as dependent variable the CMR, and our estimation still points to the pro-cyclical behavior of that variable, in Column (2) of Table 14. With respect to the stock of marriages, the decrease in the number of divorces does not compensate for the decrease in the inflow of marriages during economic downturns. Those who are married prefer not to divorce during an economic crisis (González-Val and Marcén 2017), but those who are not legally married prefer not to get married in those same circumstances, to a greater extent.

7. Cohabitation

Unfortunately, the analysis of the relationship between cohabitation formation (inflow of unmarried couples) and the business cycle cannot be carried out, since there is no reliable data that covers an extensive number of countries during several years. Since the data on unmarried couples is scarce, most of the literature considers the analysis of children born outside wedlock, for a snapshot of how extended is the cohabitation phenomenon in European countries (Kalmijn 2007). Then, those analyses focus on the evolution of the stock of unmarried couples. There are considerable variations across countries; for example, in France, six out of ten babies were born outside wedlock in 2016, while in Greece that figure was below 10% (the European mean for outside-marriage live births was 43% that year, according to Eurostat).[23] As already mentioned in the introduction section, in recent decades many European countries have experienced a disconnection between formal marriages and the fact of being in a stable and durable romantic relation (Lappegård et al. 2018). Then, our previous findings could have implications for the stock of unmarried individuals. It is possible to argue that those individuals who do not get married because of economic constraints choose to

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[23] Data for each country can be consulted at: https://ec.europa.eu/eurostat/fr/web/products-eurostat-news/-/DDN-20180809-1?inheritRedirect=true&redirect=%2Feurostat%2Ffr%2Fhome

live as unmarried couples. Thus, we would expect a counter-cyclical response of the stock of unmarried couples.

As far as we know, there is no macro data on the stock of unmarried couples, so we have used the European Social Survey (ESS), as in Kalmijn (2007) and Soons and Kalmijn (2009). This survey is collected every coupled-year from 2002 to 2018, in different subsets of countries, and includes the question "Are you currently living with a partner?" (from 2002 to 2010), and "Which one of the descriptions on this card describes your relationship to the person you live with (husband/wife/partner)?" (from 2012 to 2018). Given this change in the questionnaire, we considered every "Yes" response to the former one, and every "Living with my partner - not legally and legally recognized" response to the latter, as individuals cohabiting with their partner, and so involved in a romantic relationship other than formal marriage. Due to the scarcity of data, we repeat the analysis with the cohabitation, both interpolated and not, for odd years between 2002 and 2018. Results are shown in Table 15. We find a positive but not statistically significant relationship between the unemployment rate and the cohabitation. Unlike what we found with the stock of married individuals, we do find no evidence in favor of a pro-cyclical behavior of the stock of individuals living as unmarried couples.

8. Conclusion

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

The negative association of the unemployment rate with the marriage rate is observed, even after including controls for the institutional, geographical, and political changes experienced by certain 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 regulations of certain aspects of the life of the couple. We observe heterogeneous responses of the marriage rate, depending on the taxation and property regime of couples, but also depending on the regulations of informal relationships and reproduction. When we consider alternative indicators for the business cycle, our main conclusion remains: the marriage rate exhibits a pro-cyclical behavior. We also examine this issue in terms of causality, to deal with the potential endogeneity concerns, since women, especially, are more likely to modify their labor market participation depending on their legal marital status, and the pro-cyclical behavior of the marriage rate holds.

Our results suggest that when the unemployment rate increases by one-percentage point, the CMR decreases by about 0.048, representing a fall of almost 1% in the average marriage rate for the period considered. This variation in the inflow of marriages is reflected in the stock of marriages. Besides the drop in the number of divorces as a consequence of the economic crisis, noted by González-Val and Marcén (2017) in Europe, the decrease in the number of marriages observed here may be driving the negative relationship between the stock of marriages and the business cycle. In the case of unmarried couples, no evidence of a pro-cyclical behavior is observed.

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Figure 1.- Crude Marriage Rate, Youth, and Total Unemployment Rates
(Period: 1991 - 2018)
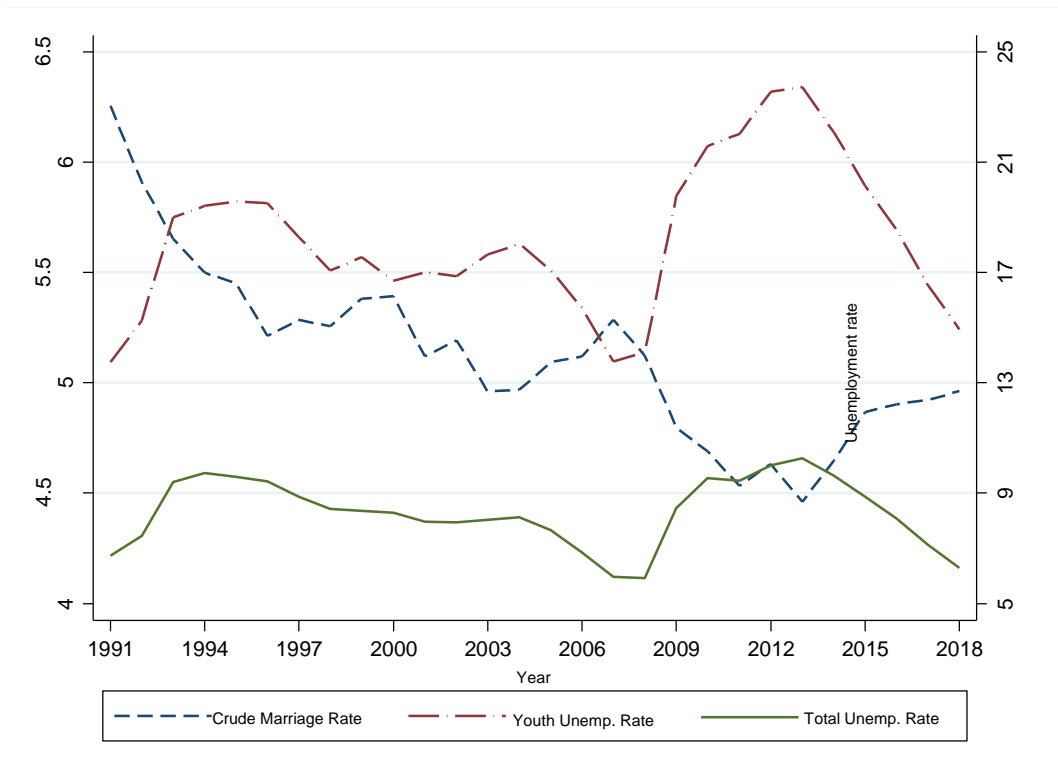
Figure 2.- Response of Crude Marriage Rate by Age of Women
(Period: 1991 - 2017)
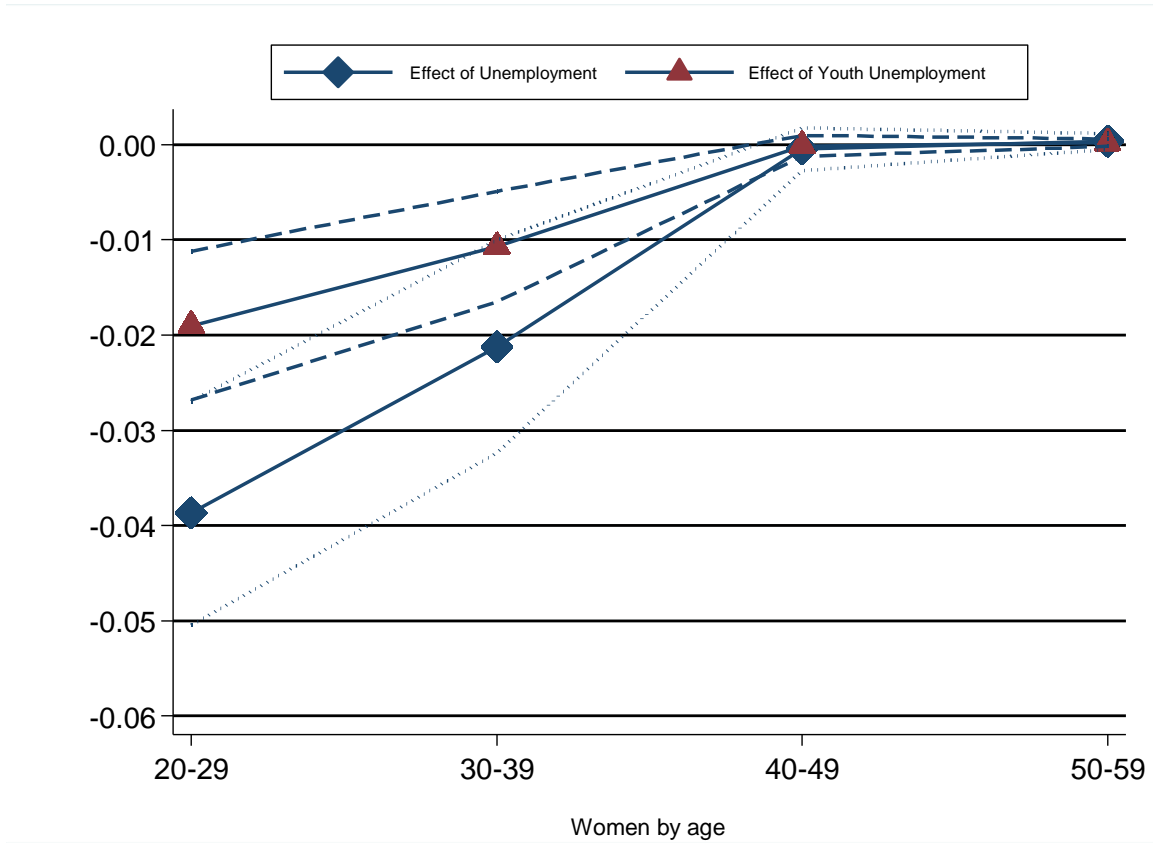
Notes: Coefficients on total and youth unemployment are statistically significant at the 1% level for women under 40 years old. Those capturing the effect for women older than this are not statistically significant. The number of observations is 694, 692, 692, and 678 for women between 20-29, 30-39, 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 (1991-2018)	Unemployment Rate (1991-2018)
Spain	4.49	17.26
Greece	5.13	13.51
Slovak Republic	5.15	13.37
Latvia	5.40	12.54
Poland	5.48	11.93
Bulgaria	4.01	11.52
Lithuania	6.39	11.12
Finland	5.00	10.31
Italy	4.29	9.96
France	4.46	9.84
Ireland	4.76	9.44
Estonia	4.60	8.75
Hungary	4.53	8.14
Portugal	4.94	7.97
Belgium	4.36	7.88
Germany	4.93	7.42
Sweden	4.67	7.28
Slovenia	3.53	7.09
Romania	6.61	6.85
United Kingdom	5.02	6.55
Cyprus	9.01	6.46
Malta	6.29	6.31
Denmark	6.16	6.11
Czech Republic	5.18	5.71
Netherlands	4.79	4.95
Austria	4.86	4.87
Norway	4.78	4.11
Luxembourg	4.35	4.01
Iceland	5.16	3.98
Switzerland	5.47	3.89
Europe	5.13	8.36

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 Labor 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 1,000 inhabitants.

Table 2: Crude Marriage Rate Models
(Baseline Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
Unemp. Rate	-0.062***	-0.048***	-0.048***	-0.011***	-0.516***	-0.023***
	(0.016)	(0.011)	(0.013)	(0.002)	(0.141)	(0.005)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Country x Time	N	Y	Y	Y	Y	Y
Country x Time^2	N	N	Y	N	N	N
Observations	815	815	815	815	416	416
R^2	0.751	0.858	0.900	0.886	0.935	0.949

Notes: Dependent variable: CMR in Columns (1), (2), and (3), and the CMR in logarithm in Column (4). Number of marriages per 1,000 single women in Column (5), and measured in logarithm 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 3.- Crude Marriage Rate Models
(Alternative Measures for the Business Cycle)

	(1)	(2)	(3)	(4)
Log GDP pc	3.674***			
	(0.669)			
Total Part-time		-0.315***		
		(0.055)		
Long Unemp. Rate			-0.061***	
			(0.015)	
Unemp. Rate Hodrick-Prescott filter				-0.114***
				(0.033)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Observations	805	643	628	815
R^2	0.876	0.873	0.859	0.848

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	-0.048***			-0.051***
	(0.011)			(0.017)
Unemployment rate t-1		-0.035***		-0.026
		(0.012)		(0.032)
Unemployment rate t-2			-0.014	0.043
			(0.015)	(0.030)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Observations	815	785	755	755
R^2	0.858	0.851	0.847	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	-0.048***	-0.056***	-0.055***	-0.043***	-0.039***	-0.068***	-0.074***
	(0.010)	(0.012)	(0.012)	(0.008)	(0.007)	(0.020)	(0.021)
Crude Divorce Rate	-0.083						-0.223*
	(0.163)						(0.112)
Male mean age first marriage		0.332					-0.126
		(0.220)					(0.218)
Female mean age first marriage			0.349				0.394*
			(0.248)				(0.207)
Gross enrol. Ratio: tertiary				0.012			0.168*
				(0.010)			(0.091)
Female Gross enrol. Ratio: tertiary					0.007		-0.136*
					(0.008)		(0.070)
Percentage immigrant pop.						-0.014	0.004
						(0.014)	(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
Observations	761	675	678	742	717	522	389
R^2	0.857	0.864	0.864	0.866	0.868	0.913	0.929

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	-0.037***	-0.048***	-0.048***	-0.047***	-0.048***
	(0.011)	(0.011)	(0.010)	(0.012)	(0.012)
Independence process		-1.002***			-0.670***
		(0.029)			(0.150)
EU member			0.466*		0.463*
			(0.230)		(0.238)
Adopted Euro				0.066	0.033
				(0.228)	(0.234)
Country fixed effects	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y
Observations	508	815	815	815	815
R^2	0.902	0.858	0.862	0.858	0.862

Notes: Dependent variable: CMR in all Columns. Column (1) shows the estimates without those countries considered as ex-socialist republics (Bulgaria, Czech Republic, Estonia, Germany (only the East was considered socialist republics but we cannot divide this country in this dataset), Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia). Column (2) incorporates a dummy for the countries that suffered an independence process in the early 90´s. Columns (3) and (4) include a dummy for those countries that are EU members, and that adopted the Euro as their currency, respectively. Column (5) 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)	(7)	(8)
Unemployment rate	-0.068***	-0.047***	-0.046***	-0.048***	-0.040***	-0.082**	-0.046***	-0.071***
	(0.020)	(0.008)	(0.009)	(0.010)	(0.009)	(0.040)	(0.008)	(0.022)
Gender gap in employment	-0.016							
	(0.035)							
Duration paid maternity leave		-0.002						
		(0.006)						
Duration paid paternity leave			-0.005					
			(0.010)					
Female % of responsibility				0.013				
				(0.013)				
Gender parity index (enrol.)					-1.335			
					(0.873)			
Gender wage gap						0.029**		
						(0.012)		
Strictness empl. protection							-0.349***	
							(0.119)	
No min. wage								-0.145
								(0.104)
Diff in min. wage pps								0.0001
								(0.0001)
Country fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y	Y	Y	Y	Y
Observations	676	615	615	663	717	307	472	624
R^2	0.874	0.870	0.870	0.867	0.871	0.887	0.883	0.879

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 duration 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); the difference between male and female median wages divided by male median wages in Column (6); the strictness employment protection indicator in Column (7); and the existence of a minimum wage, and the difference in that minimum wage in Column (8). 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 - 2018)

Country	(1) Individual taxation	(2) Joint taxation	(3) Matrimonial prop. regime	(4) Informal regulation	(5) Access to MAR
Austria	Y	N	Particip. acq.	Y	Y
Belgium	Y	Y	Com. acq.	Y	N
Bulgaria	Y	N	Com. acq.	1998-2018	N
Cyprus	Y	N	Separat. propr.	N	
Czech Republic	Y	2005-2007	Com. acq.	N	Y
Denmark	Y	N	Def. com. acq.	Y	N
Estonia	Y	Y	Com. acq.	2000-2018	N
Finland	Y	N	Def. com. acq.	Y	Y
France	N	Y	Com. acq.	1999-2018	Y
Germany	Y	Y	Particip. acq.	Y	N
Greece	Y	Y	Particip. acq.	Y	Y
Hungary	Y	N	Com. acq.	Y	Y
Iceland	Y	Y	Def. com. acq.	Y	Y
Ireland	Y	Y	Separat. propr.	2010-2018	N
Italy	Y	N	Com. acq.	Y	Y
Latvia	Y	N	Com. acq.	2012-2018	
Lithuania	Y	N	Com. acq.	2001-2018	
Luxembourg	N	Y	Com. acq.	Y	N
Malta	Y	N	Com. acq.	2016-2018	
Netherlands	Y	N	Def. com. acq.	Y	N
Norway	Y	Y	Def. com. acq.	Y	Y
Poland	Y	Y	Com. acq.	N	
Portugal	N	Y	Com. acq.	1999-2018	Y
Romania	Y	N	Com. acq.	Y	
Slovak Republic	Y	N	Com. acq.	N	
Slovenia	Y	N	Com. acq.	Y	Y
Spain	Y	Y	Com. acq.	Y	N
Sweden	Y	N	Def. com. acq.	Y	Y
Switzerland	N	Y	Particip. acq.	1996-2018	Y
United Kingdom	Y	N	Separat. propr.	Y	N

Notes: Y implies validity throughout the period; N implies no validity during the period. MAR is the acronym for Medically Assisted Reproduction. Information collected from Busardò et al. (2014); Commission on European Family Law (Available at http://ceflonline.net/country-reports-by-jurisdiction/); National Legislations.

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

Regulation included:	Taxation R1: Individual R2: Joint	Property regime R1: Common R2: Separated R3: Deferred	Informal relationships	MAR
	(1)	(2)	(3)	(4)
Unemployment rate	-0.043***	-0.048**	-0.067***	-0.049***
	(0.008)	(0.023)	(0.022)	(0.008)
R1	-0.106	0.552***	-0.006	0.326***
	(0.169)	(0.100)	(0.291)	(0.078)
R1 * UR	-0.029	-0.003	0.024	-0.018
	(0.025)	(0.026)	(0.020)	(0.015)
R2	-0.370	5.967***		
	(0.327)	(0.105)		
R2 * UR	0.003	0.064		
	(0.030)	(0.050)		
R3		-0.152		
		(0.151)		
R3 * UR		-0.152		
		(0.151)		
Observations	815	815	815	619
R^2	0.859	0.860	0.860	0.899
F-test R1 R1+ R1 * UR=0	7.18	16.91	12.01	18.14
P-valor	0.0120	0.0003	0.0017	0.0003
F-test R2 R2+ R2 * UR=0	1.31	0.12		
P-valor	0.2623	0.7363		
F-test R3 R3+ R3 * UR=0		4.17		
P-valor		0.0504		

Notes: Dependent variable: CMR in all Columns. Regulation included by order of presentation: Taxation (Individual and joint taxation) in Column (1); matrimonial property regime (common acquisition, separated property, and Deferred common acquisition) in Column (2); informal relationships regulation in Column (3); access to medically assisted reproduction 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 10: Crude Marriage Rate Models
(Estimations by geographical division)

	(1) Eastern	(2) Northern	(3) Southern	(4) Western
Unemp. Rate	-0.005	-0.155***	-0.042***	-0.074**
	(0.032)	(0.033)	(0.009)	(0.026)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Observations	168	263	196	188
R^2	0.842	0.863	0.946	0.877

Notes: Dependent variable: CMR in all Columns. Eastern, Northern, Southern and Western countries in Columns (1), (2), (3), and (4), 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
(Estimations by sub-periods of time)

	(1) 1991-1994	(2) 1995-2007	(3) 2008-2013	(4) 2014-2018
Unemployment Rate	-0.042	-0.068***	-0.092***	-0.111
	(0.055)	(0.014)	(0.032)	(0.066)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Observations	120	384	176	135
R^2	0.974	0.866	0.982	0.994

Notes: Dependent variable: CMR in all Columns. Years 1991-1994, 1995-2007, 2008-2013, and 2014-2018 included in Columns (1), (2), (3), and (4), 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 12: Married by Previous Marital Status Per 1,000
(Columns (1) – (3): Men; Columns (4) – (6): Women)

	Men			Women		
	Divorced	Single	Widowed	Divorced	Single	Widowed
	(1)	(2)	(3)	(4)	(5)	(6)
Unemployment Rate	-0.615***	-0.405***	-0.158***	-0.254*	-0.506***	-0.007
	(0.129)	(0.092)	(0.041)	(0.126)	(0.112)	(0.032)
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
Observations	301	381	301	290	381	290
R^2	0.979	0.909	0.954	0.937	0.917	0.476

Notes: Dependent variable: Ratio of the number of men (women) married and previously divorced to the total male (female) divorced population, per 1,000 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 1,000 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 1,000 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 13.- Crude Marriage Rate Models
(Endogeneity concerns)

	(1)	(2)
Male unempl. Rate	-0.048***	
	(0.010)	
Empl. Population ratio		0.039*
		(0.021)
Country fixed effects	Y	Y
Year fixed effects	Y	Y
Country x Time	Y	Y
Observations	815	742
R^2	0.859	0.852

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 14.- Stock of marriages and Unemployment Rates

Dependent variable	(1) Stock of marriages	(2) CMR
Unemployment rate	-1.342***	-0.114***
	(0.437)	(0.025)
Country fixed effects	Y	Y
Year fixed effects	Y	Y
Country x Time	Y	Y
Observations	372	372
R^2	0.987	0.897

Notes: Dependent variable: The stock of marriages in Column (1) and the CMR in Column (2). The variation in the number of observations is due to the lack of information for the stock of marriages for some years and countries. 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 15.- Stock of unmarried couples

	(1)	(2)	(3)	(4)
Unemployment rate	0.029	0.010	0.075	0.040
	(0.148)	(0.126)	(0.172)	(0.146)
Country fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Country x Time	Y	Y	Y	Y
Observations	193	379	193	379
R^2	0.648	0.711	0.780	0.835

Notes: Dependent variable: The cohabitation is calculated for those aged 18 and older in Columns (1) and (2), and among those between 18 and 50 years old in Columns (3) and (4). That rate has been interpolated in Columns (2) and (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.

Appendix

Table A1.- Crude Marriage Rate and Unemployment Rate Differences
(Replication of Baseline Estimates)

	(1)	(2)	(3)	(4)
Unemployment rate difference	-0.083***	-0.054***	-0.060***	-0.011***
	(0.017)	(0.017)	(0.017)	(0.003)
Country fixed effects	N	Y	Y	Y
Year fixed effects	N	Y	Y	Y
Country x Time	N	Y	Y	Y
Country x Time^2	N	N	Y	N
Observations	785	785	785	785
R^2	0.715	0.847	0.894	0.870

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

	(1)	(2)	(3)	(4)
Youth Unemployment rate	-0.025***	-0.024***	-0.023***	-0.006***
	(0.008)	(0.005)	(0.007)	(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^2	N	N	Y	N
Observations	815	815	815	815
R^2	0.096	0.858	0.900	0.887

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 A3: Married by Previous Marital Status Per 1,000
(Columns (1) – (3): Men; Columns (4) – (6): Women)

	Men			Women		
	Divorced	Single	Widowed	Divorced	Single	Widowed
	(1)	(2)	(3)	(4)	(5)	(6)
Youth Unemployment Rate	-0.301***	-0.166***	-0.054***	-0.152***	-0.198***	-0.007
	(0.081)	(0.044)	(0.018)	(0.051)	(0.054)	(0.008)
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
Observations	301	381	301	290	381	290
R^2	0.979	0.904	0.952	0.937	0.910	0.477

Notes: Dependent variable: Ratio of the number of men (women) married and previously divorced to the total male (female) divorced population, per 1,000 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 1,000 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 1,000 in Column (3) and (6), respecitvely. 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.