The Risk of Divorce and Household Saving Behavior

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Abstract: We analyze the impact of an increase in the risk of divorce on the saving behaviour of married couples. From a theoretical perspective, the expected sign of the effect is ambiguous. We take advantage of the legalization of divorce in Ireland in 1996 as an exogenous increase in the likelihood of marital dissolution. We analyze the saving behaviour over time of couples who were married before the law was passed. We propose a difference-in-differences approach where we use as comparison groups either married couples in other European countries (not affected by the law change), or Irish families who did not experience a significant increase in the expected risk of divorce (such as very religious families, or single individuals). Our results suggest that the increase in the risk of divorce brought about by the law was followed by an increase in the propensity to save of married couples, consistent with a rise in precautionary savings interpretation. An increase in the risk of marital dissolution of about 40 percent led to a 7 to 13 percent rise in the proportion of married couples reporting positive savings.

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1. Introduction

This paper aims to test empirically the effect of an increase in marital instability on the saving behavior of married individuals. Previous theoretical studies have not been able to unambiguously sign this effect, due to conflicting channels at work. We use the legalization of divorce in Ireland in 1996 as an exogenous shock to the risk of divorce. We propose several comparison groups (unaffected by the law change) that allow us to use a difference-in-differences approach. Our findings suggest that the legalization of divorce led to an increase in the propensity to save by married individuals, which is consistent with individuals rising their precautionary savings as a response to the increase in the probability of a negative income shock.

Previous studies have looked into changes in the economic behavior of households as a response to a higher risk of divorce. The most common outcome of interest has been the labor supply behavior of the households, especially the female spouse (Johnson and Skinner 1986, Parkman 1992, Papps 2006, Stevenson 2008). Other outcomes that have received some attention are the degree of specialization within the marriage (Lundberg and Rose 1999), the division of labor between the spouses (Lommerund 1989), and the investment in marriage-specific capital (Stevenson 2007). The findings suggest that an increase in the risk of divorce may lead to increases in labor supply (especially among women) and a decline in marriage-specific investments.

A popular empirical strategy in the most recent studies is to exploit the variation across US states in the introduction of unilateral divorce legislation. However, recent research suggests that the effect of unilateral legislation on divorce rates may have been limited in the long term (Wolfers 2006), which raises the question of how much unilateral

divorce effectively affected the perceived risk of marital separation. At the same time, European countries have in recent decades undergone much broader reforms in their divorce legislation, and some countries have even legalized divorce fairly recently, such as Spain in 1981 or Ireland in 1996, resulting in significant increases in divorce rates (González & Viitanen 2008). We thus exploit the recent legalization of divorce in Ireland in the view that it provides a stronger shock to the risk of divorce than the legal reforms previously exploited in the literature.

The determinants of the saving behavior of individuals and households has long been the subject of study by economists, but we are still far from reaching full understanding of the factors that drive consumption and saving decisions.[1] The standard stylized models of saving do not account explicitly for life-changing events such as marriage and divorce, which have potentially relevant and long-lasting implications on income and consumption. This is regrettable given the high levels of marital instability reached in Western countries over the past few decades,[2] which may well have had a significant impact on saving rates.

Some recent theoretical work has made an attempt to introduce marriage and divorce explicitly in a model of savings,[3] stressing different channels through which marital transitions can affect consumption and savings. None of them, however, provide an unambiguous prediction regarding the effect of increasing marital instability on the saving behaviour of married couples.

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[1] An example is the lack of consensus in the literature regarding the source of the drastic fall in saving rates in the US since the 1980's (Browning & Lusardi, 1996).

[2] The divorce rate peaked in the US in the early 1980's at about 5 annual divorces per 1,000 people, and in the UK in the late 1980's/early 1990's at about 3.

[3] Cubbedu & Ríos-Rull (1997), Lupton and Smith (2003), Browning, Chiappori & Weiss (2004), Guner & Knowles (2004), Aura (2007).

Divorce is generally viewed as a costly event (lawyer fees, etc). Moreover, the economies of scale associated with marriage are lost upon marital dissolution. Therefore, an increase in the perceived risk of divorce would be viewed by the married individual as an increase in the probability of experiencing a negative shock, which is expected to lead to an increase in precautionary savings, similar to the effect of an increase in labor income risk (Cubbedu & Ríos-Rull 1997).

However, a divorce also implies that the common assets of the couple must be split between the partners. Uncertainty regarding the sharing rule (i.e. how much of the couple's joint savings each partner will get to keep) implies that an increase in the likelihood of divorce makes saving while married more risky, thus creating incentives to increase current consumption.[4]

There are additional channels that can also lead to a negative relationship between the risk of marital instability and savings, for instance if divorce involves fees that reduce the net worth and thus the return to saving of the couple, or if divorce is potentially followed by remarriage, which implies that individual assets will have to be shared with the new partner (Cubbedu & Ríos-Rull 1997).

Overall, the expected effect of an increase in the risk of divorce on the saving behaviour of the spouses is ambiguous, thus the need for empirical work to test which of the channels dominates in practice. To our knowledge, we provide the first empirical test for the effect of the increase in the risk of marital instability on the saving behavior of married couples. In order to do so, we take advantage of an exogenous increase in the risk of marital dissolution generated by the recent legalization of divorce in Ireland, and

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[4] Aura's theoretical model (Aura 2007) focuses on the effects of different aspects of the divorce legislation on the spouses' incentives to save.

follow a difference-in-differences approach to identify its effect on households' propensity to save.

Using both macro and individual-level data, we find that the saving rate increased in Ireland after 1996 relative to other European countries. This increase was particularly pronounced among married individuals, and even more so for non-religious marriages, relative to religious ones. We interpret the evidence as consistent with an increase in precautionary saving by married individuals in response to an increase in the risk of divorce.

The remainder of the paper is organized as follows. Section 2 introduces the data and the methodology. First we provide support for our identifying assumption that the Irish divorce law of 1996 led to an increase in the perceived risk of marital dissolution. We then propose several alternative control groups and provide some support for the claim that, while they were subject to similar economic conditions, they did not experience an increase in the perceived risk of divorce as a result of the law change. Next we introduce the econometric specification and we discuss the measures of saving behaviour available in the data. Section 3 discusses the results when using the alternative control groups, and section 4 concludes.

2. Data and Methodology

2.1 The Irish divorce law and the risk of marital dissolution

We propose to identify the effect of an increase in the risk of marital dissolution by taking advantage of the legalization of divorce in Ireland in 1996, which was followed by a rapid increase in divorce rates.

The Irish Constitution of 1937 banned the dissolution of marriage.[5] After frequent debates over the issue, a referendum was called in November 1995, and the ban on divorce was lifted after the "Yes" prevailed by a very narrow margin (50.28% of the vote).[6] The removal of the ban was subsequently incorporated in the Constitution in June 1996, and the new divorce law became effective in February 1997.

The new law dictated that a divorce could be granted only after the partners had been separated during four out of the previous five years. The Irish courts were granted a great deal of discretion regarding the economic consequences of divorce for the spouses. The law states the factors to be taken into consideration, including the contributions made by the two spouses (both pecuniary and non-pecuniary), but there is no explicit policy of equal division of assets.[7]

The legalization of divorce was followed by a rapid increase in the number of divorce applications filed as well as the number of divorces granted over the following years. Figure 1 displays the number of divorces granted between 1996 and 2004. In 1998, the second year after the law came into effect, about 1,500 divorces were granted. By 2004, more than 3,000 new divorces were granted annually.

Of course, it is possible that the new divorce law was merely allowing previously separated couples to provide legal burial to their already broken marriage. Our claim, however, is that the legalization of divorce in fact increased marital dissolution rates. In 1994-1995, only 1.78% of Irish adults aged 18 to 65 reported being separated or divorced

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[5] Judicial separation was posible since 1989.
[6] We take this as an indication that there were no clear expectations that the referendum would lead to a removal of the ban. Moreover, a similar referendum in 1986 failed to gain enough support for the "Yes". In that sense, the legalization of divorce was not anticipated.
[7] The law does mention the responsibility of both (ex-) spouses to maintain one another, even after the divorce. The calculation of actual maintenance payments is up for the courts to decide, and it should be based on the financial resources and needs of the spouses (Boele-Woelki, 2003).

(Living in Ireland Survey). In 1997-2001, this figure had jumped to a significantly higher 2.66%.[8] The next subsection provides additional evidence that certain subgroups of the population experienced substantial increases in the probability of separation or divorce following the 1996 law.

2.2 Finding a control group

In order to identify the effect of the increase in the risk of marital dissolution generated by the legalization of divorce, we would like to find a source of variation in that increase in risk across the population.

Our first approach is to identify a subgroup of the Irish population that we can plausibly expect would be less affected by the legalization of divorce. One possibility is to use religiosity as a source of variation. It may be plausible to think that very Catholic families would be "less affected" by the legalization of divorce, given that the Catholic church bans marital dissolution.

Table 1 shows the percentages of the adult population that reported being separated or divorced by religiosity, both pre (1994-95) and post (1997-2001) the legalization of divorce. Individuals are classified as religious if they report attending religious services at least once a week.[9] Before 1996, non-religious individuals were significantly more likely to be separated than religious ones (3.1% versus 1.2%). This difference remains after 1996 (4.3 versus 1.6%).

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[8] The increase was from 3.45 to 4.33% for the ever-married adult population (also statistically significant).
[9] Studies in the Economics of Religion typically use as measures of religiosity at the individual level either church attendance or self-reported religiosity (answers to the question "How religious are you?"), see Iannaccone's 1998 survey. Our main dataset does not ask about religiosity directly. However, the 2002 EES survey for Ireland asks about both church attendance and self-reported religiosity (on a scale from 0 to 10). Among those who report not being religious (values 0, 1 or 2), only 3.4% report attending church at least once a week, while the percentage is 82.1% among those who report being very religious (8, 9 or 10).

Moreover, religious individuals did not experience a significant change in their separation and divorce rate after 1996. However, the separation and divorce rate among non-religious adults increased significantly, from 3.06% before 1996 to 4.28% after (a 40 percent increase).[10] We conclude that it is plausible to claim that legalizing divorce affected non-religious families differentially, increasing their risk of marital breakup, relative to religious ones.

The additional identifying assumption required is that the saving behavior of religious and non-religious families would have followed similar trends over time, in the absence of the law change. Figure 3 provides some support for this assumption by showing that the trends in several indicators of saving behavior were similar for both groups in the years preceding the legalization of divorce.[11]

One could also think that single individuals would be less affected by the increase in divorce rates relative to married ones. Thus, we also use singles as a comparison group, expecting their saving behavior to be less influenced by the increase in marital instability.

It is of course hard to claim that either religious families or singles in Ireland were completely unaffected by the legalization of divorce.[12] Thus we propose an alternative control group, composed of individuals in other European countries where divorce was already legal and no changes in the regulation of divorce took place during the 1990's. Although families in other European countries were certainly not affected by the Irish

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[10] This is even stronger if we look at separation and divorce rates among ever-married adults. While this rate remained stable at 2.3% among religious individuals, it increased significantly from 5.7 to 7.9% for non-religious ones.

[11] See section 2.4 for the definition of these saving indicators.

[12] In that sense, our estimates when using religious families or singles as a control group can be seen as lower bounds on the effect of interest.

divorce law, we need to find countries that were plausibly under similar economic conditions during the relevant period. This is not easy given that Ireland experienced an unprecedented period of economic growth during the 1990's.

The two EU-15 countries with more similar economic conditions to Ireland during the period appear to be the UK and Spain. In all three countries, GDP growth slowed down in 1990 and 1991, and then surged up, remaining at a higher level until 2000. That level, however, was about 8% for Ireland, compared with 4% for Spain and the UK. As for unemployment rates, they increased in the three countries until 1993-94, falling steadily since then, with the levels much higher in Spain than in Ireland or the UK. Figure 2 also shows that private sector savings as a percentage of GDP attained similar levels in the three countries in the early 1990's (about 18% in 1992), reaching a peak in 1994-95 and then declining slowly.

Although there are some differences in macroeconomic performance across the three countries, we feel the trends are similar enough to allow for the use of Spain and the UK as alternative control groups. For robustness, we also perform the analysis including additional European countries as controls.

The international comparison of saving behavior over time is carried out both using aggregate, macro data on saving rates as a percentage of GDP, and using individual-level, micro data for the different countries, which allows us to focus on the behavior of the married population as well as to include individual-level controls.

2.3 Econometric specification, data and sample

We estimate different versions of the following standard difference-in-differences specification:

$$S_{ijt} = F(\alpha + \beta_1 T_j + \beta_2 Post_t + \beta_3 T_j Post_t + X_{ijt}^{'}\gamma + \varepsilon_{ijt})$$

Where S is a measure of the saving behavior (see next subsection for the specific variables used) of an individual (or household, or country) i in group j (treated or control) and year t. The function F will depend on the specification (linear, probit and logit models are estimated). T is an indicator for individuals belonging in the treatment group, while Post takes value 1 for all years after divorce was legalized in Ireland. An interaction between T and Post is also included, and X stands for a set of control variables that are thought to affect savings.[13]

The coefficient β_1 measures the average difference in saving behavior between the treated and the control group, while β_2 captures the overall change in saving behavior after the reform. The key parameter is β_3, which indicates the change in the saving behavior of treated individuals after the reform, relative to the control group.

We estimate three sets of specifications. In the first set, we use aggregate data on saving rates as percent of GDP by country. The "treated group" in these regressions is Ireland, while other countries serve as control group. The data on national saving rates are obtained from OECD and Eurostat publicly available figures.

A second set of specifications uses micro-level data for Ireland from the Living in Ireland Survey, a longitudinal household survey that covers the period 1994-2001. The

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[13] Some specifications use more than one control group, in which cases the necessary additional dummy variables and interaction terms are included.

treated group in these specifications is composed of non-religious marriages, and the comparison group includes religious marriages and/or single individuals. A couple is defined as "religious" if both partners report going to church at least once a week in their first interview, typically in 1994.[14]

The main sample in these specifications is composed of married individuals. In order to avoid potential selection into marriage effects (since the legalization of divorce may well affect the incentives to marry), we exclude couples whose marriages took place in 1996 or later. In order to avoid selection due to separation or divorce, we also exclude all individuals that are observed getting separated or divorced at any point during the survey. Thus our married sample is in practice composed only of "stable marriages that started before 1996". We include individuals of all ages up to 65, in order to exclude retired individuals, whose saving behavior is expected to be different. Our pre-reform years are 1994 to 1996, while the post-reform period spans 1997-2001. The sample size is about 2,800 married couples in the Irish sample. Some additional specifications include singles as a control group. We define "singles" as individuals aged 18 to 65 who were never married in all the survey interviews.

Finally, a third set of specifications includes individual-level data for Ireland, Spain and the UK. This multi-country, individual-level data set merges the Living in Ireland sample with the Spain and UK samples from the European Community Household Panel (ECHP). The ECHP is a longitudinal survey spanning 1994 through 2001 and covering all EU-15 countries.[15]

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[14] We explore different variations in the definition of "religious marriages", as we report in the robustness checks section (3.4).

[15] Unfortunately, the ECHP does not include information on religiosity or church attendance.

In this final set of regressions, the treatment group is defined as married Irish individuals, the controls being married individuals in Spain and the UK. Additional specifications use non-religious married Irish couples as the treated group (thus religious married couples in Ireland serve as an extra comparison group). We also run specifications where we include singles as an additional control group. The married and single samples, as well as religiosity, are defined as before.

2.4 Saving measures

The aggregate specifications use national saving rates as a percentage of GDP as the dependent variable. There are three measures of national savings available: gross national saving, private sector saving, and household saving. Unfortunately, household saving rates are not available for Ireland before 1996. Thus, we perform our macro-level analysis with both national saving and private sector saving rates. Figure 2 displays private sector saving rates for Ireland, Spain and the UK between 1991 and 2001.

As for the individual-level analysis, the literature has typically measured savings either as current income minus consumption, or as changes in wealth holdings over time. Both measures are deemed to be very noisy as well as subject to substantial measurement error. Our micro data sources, however, lack good measures of either consumption or wealth. They do, however, include a range of indicators of saving behavior, both at the household and the individual level. We thus use a set of binary variables that we think capture the propensity to save of households and individuals, but we cannot attempt to construct continuous measures of saving rates.

The appendix reports the exact definition of all the variables used to construct our saving indicators. The household-level variables include two alternative measures of whether a household saves a positive fraction of their income. One is derived from the answers to whether the household is "able to save" ("Save2"), while the other is derived from a more detailed question that asks whether, considering the household's income and expenses, at the end of the month there is money left that the household members can save ("Save"). A third household-level saving indicator measures negative savings by indicating households that are currently repaying debt other than mortgage payments or credit card debt ("Debt").

Descriptive statistics for the household-level measures of savings are shown in table 3 (panel a). The two binary indicators of positive household savings show significant differences in levels, suggesting the phrasing of the question may have an effect on reporting. For instance, in the pre-reform period, 50% of non-religious households report being "able to save", but only 32% report that there is usually money left at the end of the month that household members can save.

At the individual level, we use a binary indicator constructed from a question that asks whether an individual's savings, in the bank or other financial institutions, have increased over the previous 12 months ("Savings increase"). This variable is closer to the standard definition of saving and is phrased more precisely. Summary statistics for this variable can be found in table 3 (panel b). Before the reform, about 21% of all individuals in the sample reported an increase in their savings over the previous year.

We also report the results for some additional dependent variables that we think may be indicative of saving-related behavior. For instance, a household may increase

savings by reducing the consumption of goods or services in the market by producing them at home. We thus create a binary indicator takes value 1 if the household reports significant savings (more than 1,000 pounds a year) derived from do-it-yourself repairs or other home production activities ("DIY savings").

One may also think of housing wealth as a source of savings. We thus include an indicator of house ownership (as well as one for second-house ownership) as additional dependent variables. There are also other durables that may be thought of as wealth, thus we also run specifications for car ownership. Descriptive statistics for these additional dependent variables can be found in table 3 (panel a).

3. Results

3.1 Aggregate multi-country analysis

The evolution of the private saving rate as a percentage of GDP in Ireland, Spain and the UK between 1991 and 2001 can be found in Figure 2. This period covers 5 years before and 5 years after the legalization of divorce in Ireland. In the mid-1990's, all three countries had private saving rates around 20% of GDP.

We estimate simple diff-in-diff specifications where the dependent variable is the log of the private saving rate, and report the results in table 2 (columns 1 to 3). The first column includes only the UK as a control country, while the second adds Spain and the third also includes France and Germany.

On average, private savings declined after 1996 for the three sets of countries. However, relative to the control countries, private savings increased significantly in Ireland after 1996. The size of this (relative) increase was about 20% relative to the UK,

down to 13% when including Spain as an additional control, and 10% when adding Germany and France.[16]

A longer time series is available for the aggregate national saving rate, running from 1988 to 2007. The results of specifications that use the log of this measure of saving rates as a dependent variable are reported in columns 4 through 7. The results show that the Irish saving rate increased after 1996 by 30% relative to the UK (col. 4). The size of the estimated effect remains almost unchanged when we include additional control countries: Spain (col. 5), France and Germany (col. 6), and finally also Italy and Portugal (col. 7). The estimated effects are strongly significant.[17]

Thus, we find that the saving rate in Ireland increased significantly after 1996, and this increase was significantly higher than that experienced by other European countries (where in fact saving rates were stable or declining). The next subsections will provide some evidence that this relative increase in saving rates may have had something to do with the 1996 legalization of divorce.

3.2 Religious families as control group

Descriptives

Table 3 (panel a) shows some descriptive statistics for the Irish household sample, separately for religious and non-religious households, and for the pre and post-reform years. Religious households are defined as those where both partners report going to

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[16] We also run specifications that include a linear time trend, but the trend is never significant at the 10% level and its inclusion barely changes the magnitude of the estimated effects.

[17] We also run aggregate saving rates specifications for the restricted 1991-2001 period. The results are similar to those in cols. 1-3, with estimated effects of .203, .200 and .222, respectively, all strongly significant. Including linear trends in all specifications does not significantly alter the results, and the trend is typically not significant.

church at least once a week in the first interview, thus the religiosity indicator is time-invariant for a given family.

Note that non-religious households are younger than religious ones (by about 5 years on average), have slightly lower income, and slightly smaller household size (due to slightly smaller number of children). Thus it will be important to control for these factors.

Note also that non-religious families are less likely to save and more likely to be in debt than religious ones. Before the reform, 55% of religious families reported positive savings, compared with 50% of non-religious ones. After 1996, the proportion of households that reported positive savings increased for both treatment and control groups.

The descriptives for the individual sample are reported in table 3 (panel b). The proportion of all individuals that reported an increase in their savings over the previous year was between 21 and 22 percent before the reform in both groups. Again, treated individuals are younger, have lower income and smaller household sizes than the control group. After 1996, the proportion reporting that their savings were increasing rose for both groups.

Figures 3.a through 3.d show the year-by-year evolution of the four main individual-level measures of saving behavior for religious and non-religious marriages (and singles). Both indicators of positive household savings were higher for religious families before 1996, and both display a positive trend for both groups over the whole period. However, after 1996 it appears that the increase is steeper among non-religious marriages. The proportion of households in debt appears to peak in 1997 for all three groups, declining subsequently. Finally, the proportion of individuals reporting increases

in their savings evolves very similarly for all groups until 1997, but from then on non-religious married individuals are more likely to increase their savings than religious marriages and singles. The next section reports the results of a more formal regression analysis.

Regression Results

The main regression results for the household sample are reported in tables 4 and 5, while table 6 shows the results for the individual sample. Table 4 focuses on the binary dependent variable "Save". Results are reported for several different specifications. Columns 1 through 5 include only the married sample. The first specification is linear and includes no control variables, thus the results can be interpreted as pure differences in means, straight from figure 3.a. Married households were significantly more likely to save after 1996, while religious families saved more than non-religious ones. After 1996, non-religious families increased their propensity to save by almost 5 percentage points, relative to non-religious ones.

Column 2 includes age, age squared and age cubed as controls, with no substantial changes in the main coefficients. Then a full set of controls is added (col. 3), including educational attainment dummies (for the husband), a linear time trend, log household size and log household income (coefficients not reported). Some of these variables, however, could be determined endogenously, which calls for some caution when interpreting these results. More educated and higher-income households are significantly more likely to save, while larger families are less likely to. The time trend is not significant, and neither is age once all the other controls are included. The effect of interest is now estimated at almost 6 percentage points.

Column 4 reports the marginal effects from a Probit specification that includes the more plausibly exogenous controls (age and education). The estimated effect remains at 6 percentage points. Finally, column 5 includes household fixed-effects. Even then, the estimated effect is a significant 4 percentage points.

The last specification includes singles as an additional control group.[18] The results show that non-religious married couples were 3 percentage points more likely to save after 1996, relative to both religious marriages and singles.

Table 5 reports the coefficients on the interaction term between "Post" and "Non-religious" for the remaining household-level dependent variables and several different specifications. Each row reports the results for a different outcome variable. The results go in the same direction as those in table 4. The second indicator of a household's propensity to save ("Save2") increased by 3 to 4 percentage points more for treated relative to control families after divorce was legalized. We also find that non-religious families were significantly less likely to be in debt after the reform, relative to religious ones (and singles), by 3 to 6 percentage points.

Regressions are also estimated for the indicator of "do-it-yourself" related savings, as well as for house and car ownership. We find that after 1996, non-religious marriages were more likely to report "do-it-yourself" related savings and were more likely to own a house and a car, relative to the control groups. We find no effect on second-house ownership.

Table 6 reports the results for the individual measure of saving behavior, "Savings increase". We report the results for specifications that include both men and women, but we also ran separate specifications for husbands versus wives. The control variables show

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[18] Note that we do not separate singles by religiosity.

the same patterns as in the household-level specifications (coefficients not reported). Older, more educated individuals are more likely to report savings increases. Females are significantly less likely to report increases in their savings than men. Individuals in non-religious households are less likely to report increases in their savings, especially men. The overall propensity to save increased significantly after 1996.

Non-religious individuals were significantly more likely to report increases in their savings after 1996, relative to religious ones as well as singles, by 2 to 4 percentage points. The size of the effect is not significantly different for men and women.

One may also be interested in the timing of the estimated effects. We run additional specifications where we interact non-religious marriages with each single year after 1996, instead of with a single post-reform indicator. The results for the three main measures of saving behavior are reported in Table 7, for the fixed-effects specification. The coefficient estimates suggest that the effects increase over time for the three outcomes. In 1997, the effects are essentially zero, becoming positive but small in 1998 (and still not significantly different from zero). The estimated effects become significant in 1999, and they increase in magnitude in 2000 and 2001.

In sum, we find that married households in Ireland were more likely to save after 1996, and this increase was significantly higher among non-religious families. Non-religious households were also less likely to incur in debt relative to religious married households and singles. Also, individuals were significantly more likely to report that their savings had increased over the previous year after 1996, and this increase was higher for non-religious individuals. The results suggest that non-religious married

individuals in Ireland became more likely to save (relative to religious ones as well as singles) after 1996, the time when divorce was legalized.

3.3 Individual-level, multi-country analysis

Descriptives

Table 8 shows some summary statistics for the three-country sample, separately for Ireland, Spain and the UK and for the pre and post-reform periods. Before the reform, saving rates were much higher in the UK than in Ireland or Spain (68% compared with 33-35%). Before 1997, saving rates were increasing both in Ireland and in Spain, although the increase was steeper in Spain. The proportion of households in debt before the reform was lowest in Spain.

The age profile is similar in the three countries, while income levels (expressed in euros) were similar in the UK and Ireland but significantly lower in Spain. Household size was highest in Ireland. After 1996, the propensity to save increased in all three countries, while the proportion of households in debt remained essentially flat.

Regression Results

The regression results for the three-country sample are reported in tables 9 and 10. The control variables show similar patterns as in the Irish sample. Higher education is associated with a higher propensity to save and a lower likelihood of being in debt, while the age profile has low significance levels.

After 1996, the propensity to save of married couples increased in Ireland by about 4 percentage points, relative to the UK and Spain, and this effect was significant (table 8, cols. 1 and 2). In fact, this effect is mostly driven by the comparison to the UK.

When including only the UK as a control country, the estimated effect is a significant 9 percentage points, while it is only a less significant 2 points relative to Spain (not shown).

Columns 3 and 4 show the results when using non-religious Irish couples as the treated group. Since the ECHP does not include the church attendance variable, we cannot separate couples by religiosity in the UK and Spain. These specifications also include an indicator for Ireland interacted with non-religious (not reported). The results show that married couples were more likely to save in Ireland after 1996 relative to the other countries, but this increase was more pronounced among non-religious households. The estimated effect is between 4 and 5 percentage points.

Finally, the last two columns show the results when including singles as an additional control group.[19] These regressions now include a dummy for married interacted with each country, plus an indicator for married interacted with post-1996 (common for all countries), the interaction between Ireland and non-religious marriages, and the quadruple interaction of Ireland, married, non-religious and post. The results show that married individuals save more than singles in all three countries (not reported), while savings increased overall after 1996, and significantly more for married individuals relative to singles (not reported). We also find that the increase in the propensity to save was significantly more pronounced in Ireland (by 7 percentage points). Moreover, non-religious married individuals in Ireland increased their propensity to save more than religious couples and singles in Ireland, relative to the other countries, by about 4 percentage points.

Table 10 shows the results for the remaining dependent variables. The first two columns include only married couples and do not separate by religiosity, while columns 3

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[19] Note that singles are not broken down by religiosity.

and 4 include singles and also break down Irish married couples by religiosity. Focusing on the most complete specification in column 4, we find that non-religious marriages in Ireland were less likely to be in debt after 1996, relative to the control group of singles and religious couples in Ireland as well as married and single households in the UK and Spain. We also find a positive effect on the likelihood of owning a house and a car.

3.4 Additional specifications and robustness checks

We have estimated a number of alternative specifications as robustness checks. All individual-level regressions have been estimated using a probit, a logit and a linear probability model, with no significant differences. Moreover, we estimate specifications with and without individual fixed effects. The inclusion of the individual fixed effects affects the coefficients of interest surprisingly little, and typically does not alter the significance level.

We have also explored some variations in the sample selection and the control variables included. For instance, we have selected the sample based on the age of the husband or on the age of the wife, and have included as a control the age of the husband, the age of the wife or both at once. These variations made little difference in the results. We also tried including additional control variables, such as the aggregate unemployment rate instead of a time trend, which barely affected the main coefficients.

Perhaps more relevant were the specifications that used alternative definitions of religiosity. Our main definition of "untreated" household includes couples where both husband and wife report going to church *at least* once a week in the first interview (66% of the married sample). A more strict definition would include couples where both report

going to church *more* than once a week, but that would account for only about 5% of the sample. A less strict definition would include couples where at least one of them goes to church once a week, but this would include almost 99% of married households. Finally, we could classify as religious couples those where both report going to church at least once a month (76% of the sample). Using this less strict definition barely alters the magnitude of the estimated effects, which become slightly stronger for some of the dependent variables, as would be expected.[20]

We also experimented with different clustering strategies in the individual-level specifications, to account for the fact that the relevant variation is over time and by group (treated versus control). Allowing the residuals to be correlated within year and group reduces the significance of the estimated effects, as expected.

The main specification excludes couples who end up divorcing or separating by 2001. When we estimate specifications that include the separating couples, the effect typically gets stronger; indicating that those households adjust their saving behavior (while still married) more than the couples who do not break up, as would be expected. However, we observe few separations in the data, which may explain why the size of the coefficient only changes slightly.

The baseline results include all years between 1994 and 2001, but we also try dropping years 1996 and 1997, the "reform years". This weakens the estimated effects slightly, but they remain mostly significant.

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[20] Other definitions that we have tried use multiple interviews for each household (as in "both spouses go to church at least once a week in all interviews"), or use different thresholds for each spouse (as in "the husband goes to church at least once a week and the wife goes more than once a week"). These resulted in small changes in the "treated" sample but did not affect the results substantially.

Finally, when using families in other countries as comparison groups, we explored using only Spain and only the UK as control countries.[21] The estimated effect was smaller and less significant when using only Spain as a control country.[22]

4. Conclusions

We have shown that the propensity to save increased significantly in Ireland after 1996, relative to other European countries. This increase was significantly higher among non-religious married couples, compared with religious ones, and also relative to unmarried individuals.

One possible reason for this increase in the propensity to save of Irish married individuals is the legalization of divorce that took place in 1996, which increased the risk of marital breakup, especially for non-religious families. These results are consistent with married individuals increasing their precautionary savings in anticipation of a potential divorce.

We estimate that an increase in the risk of marital separation of about 40% led to a significant rise in the proportion of married households reporting positive savings (of 7-8% or 10-13%, depending on the saving indicator used). Married couples became 10 to 13% less likely to be in debt, and were about 17% more likely to report that their overall savings had increased over the previous year.

This suggests that divorce legislation may affect not only marital breakup rates and the income of individuals directly affected by a divorce, but also the economic

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[21] We also explored using all other EU15 countries as controls.
[22] Regression results for all the alternative specifications in this section are available from the authors upon request.

behavior of individuals who stay married, who may adjust to the change in the risk of future marital separation. Previous studies have suggested that one channel of adjustment is likely to be labor supply, and we provide evidence that saving behavior may also adjust significantly. The increase in savings can of course take place both directly through changes in consumption, or indirectly through increases in labor supply that in turn increase household income.

In order to tease out these channels, we have also estimated parallel specifications where the dependent variables are labor supply and household income. The results suggest that both men and women increased their labor supply significantly following the legalization of divorce, with increases in employment of 4 to 8 percent. This resulted in an average increase in household income of about 3 percent.[23]

Some caveats of our analysis are worth mentioning. First, in our individual-level analysis we are only able to use binary indicators of saving activity, thus cannot draw conclusions about changes in the individual saving rate as a proportion of household income. Second, we lack a true control group within Ireland, thus our analysis uses alternative "comparison groups", but the results may understate the true effect if the comparison group is also partially affected by the legal change. And third, we only have access to few pre-reform years, and are thus unable to control for long-term pre-reform trends, which would strengthen our identification strategy. Although we have performed a number of robustness checks, these caveats suggest that the results should be interpreted with caution, and further studies are required to confirm their robustness.

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[23] More detailed regression results are available from the authors upon request.

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Appendix. Variable Definition

A. Living in Ireland Survey

1) ZH37 Save (Household File)

When you consider your household's usual income on the one hand and its expenses on the other would you say that there is usually some money left which household members can save?

        Yes 1
No (or very little).............. …………2

2) ZH28_37 Save2 (Household File)

Here is a list of things which a person might have or be able to do. [Int. Show Card HB] Could you tell me which of the things listed you have or can avail of?

    -   Able to save?
Yes.................................. 1
No.................................. 2

3) ZH29 Debt (Household File)

Do you or anyone in your household *currently* have to repay debts from hire purchases or any other loans, apart from any mortgage or loan connected with the house and apart from outstanding credit card debts?
Yes 1
No 2
Missing…….……………9

4) Z2J64 Savings increase (Individual File)

I would like you to consider, in general, all the savings you have (both in your own name and jointly with other household members) in the Bank, Building Society, Post Office, Credit Union, Savings Bank or in Savings Certificates, Savings Bonds or Prize Bonds. How does your TOTAL balance in all these savings today compare with what it was 12 months ago? Would you say, in general, that it … [Waves 2-8 only]
Increased a Lot 1
Increased a Little.........................2
Remained the Same......................3
Fell a Little..................................4
Fell a Lot 5
Missing …………………………9

5) (ZH46_1+ ZH46_2+ ZH46_3) DIY savings (Household File)

Would you say that any of the following results in *a significant* saving (of say IR£1,000 or more each year) in your household's expenditure …
ZH46_1 … Consuming food you produce on your own farm or garden Yes/ No
ZH46_2 … Consuming goods from your business (other than farming) Yes/ No
ZH46_3 … Saving money by carrying out any form of home production, repairs, maintenance, all forms of DIY etc. Yes/No

6) ZH11 House ownership (Household File)
Does your household own this dwelling or are you a tenant or sub-tenant? If you own, or are purchasing, please say whether the purchase was through a local authority or with a private mortgage (or no mortgage).
Owner (or purchasing) – not Local Authority………1
Owner (or purchasing) – Local Authority…………..2
Accommodation provided rent-free…………………3
Tenant/subtenant……………………………………4

7) ZH28_9 Car (Household File)
Here is a list of things which a person might have or be able to do. [Int. Show Card HB]
Could you tell me which of the things listed you have or can avail of?
- Has car?

Yes.................................. 1
No.................................. 2

8) ZH28_49 Second house (Household File)
Here is a list of things which a person might have or be able to do. [Int. Show Card HB]
Could you tell me which of the things listed you have or can avail of?
- Has second home?

Yes.................................. 1
No.................................. 2

B. European Community Household Panel

1) HF013 Save (Household file)
Is there normally some money left to save (considering household's income and expenses)
Yes…………………1
No or very little……..2

2) HF001 Debt (Household file)
(Repay Debts Other than Mortgage)
Does anybody in the household presently have to repay debts from hire purchase or loans, etc., not connected with the house? To what extent is this a burden on the household?
Yes, repayment a heavy burden………………………………..1
Yes, repayment somewhat a burden………………………………2
Yes, repayment not a problem……………………………………..3
Yes, repayment, but whether a burden or not is unknown………..4
No, does not have to repay…………………………………..5

3) HA023 House (Household File)
(Tenure Status)
Does your household own this dwelling or do you rent it?

Owner…………………………………………..1
Tenant/subtenant, paying rent……………………..2
Accommodation is provided rent-free…………….3
Not applicable………………………………….-8
Missing…………………………………………-9

4) HB001 Car (Household File)
Possession of a car or van (for private use):
Yes………………………………1
No- cannot afford……………..2
No- other reason………………3
No- reason unknown………….4
Not applicable………………..-8
Missing………………………-9

5) HB007 House2 (Householf File)
Possession of a second home (e.g. for vacation):
Yes…………………………………1
No- cannot afford……………..2
No- other reason………………3
No- reason unknown………….4
Not applicable………………..-8
Missing………………………-9

Figure 1. Annual number of divorces granted, Ireland 1996-2004
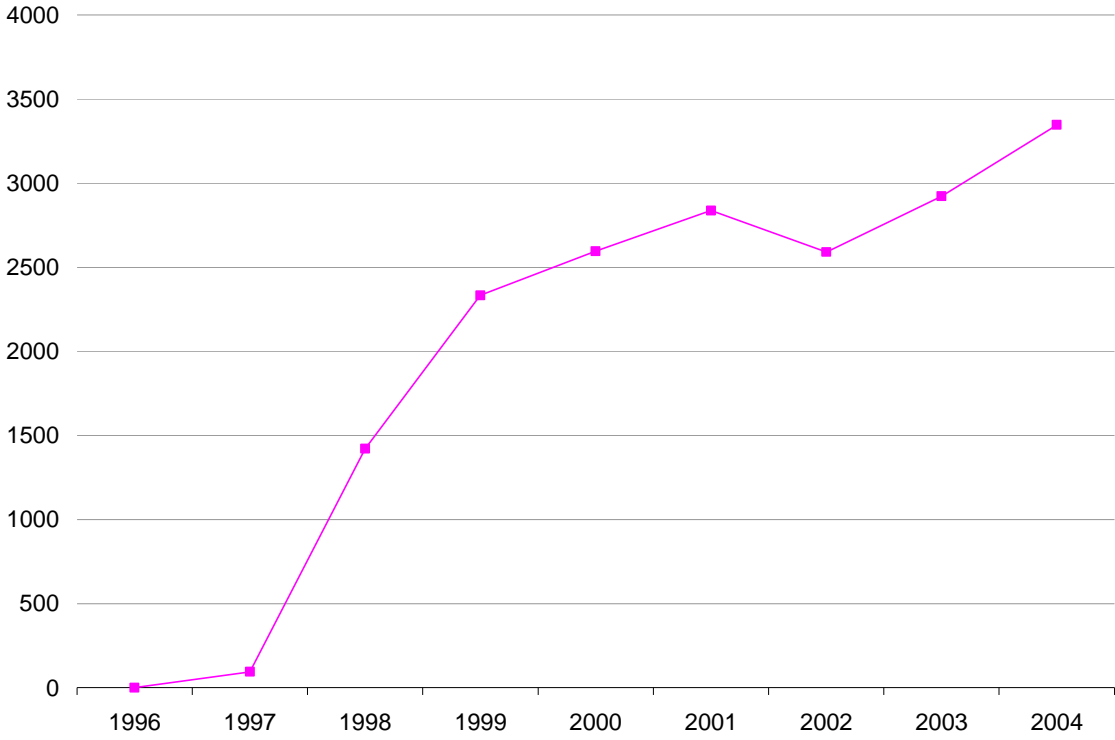
Figure 2. Gross Private Sector Saving as % of GDP, Ireland, Spain and UK, 1991-2001
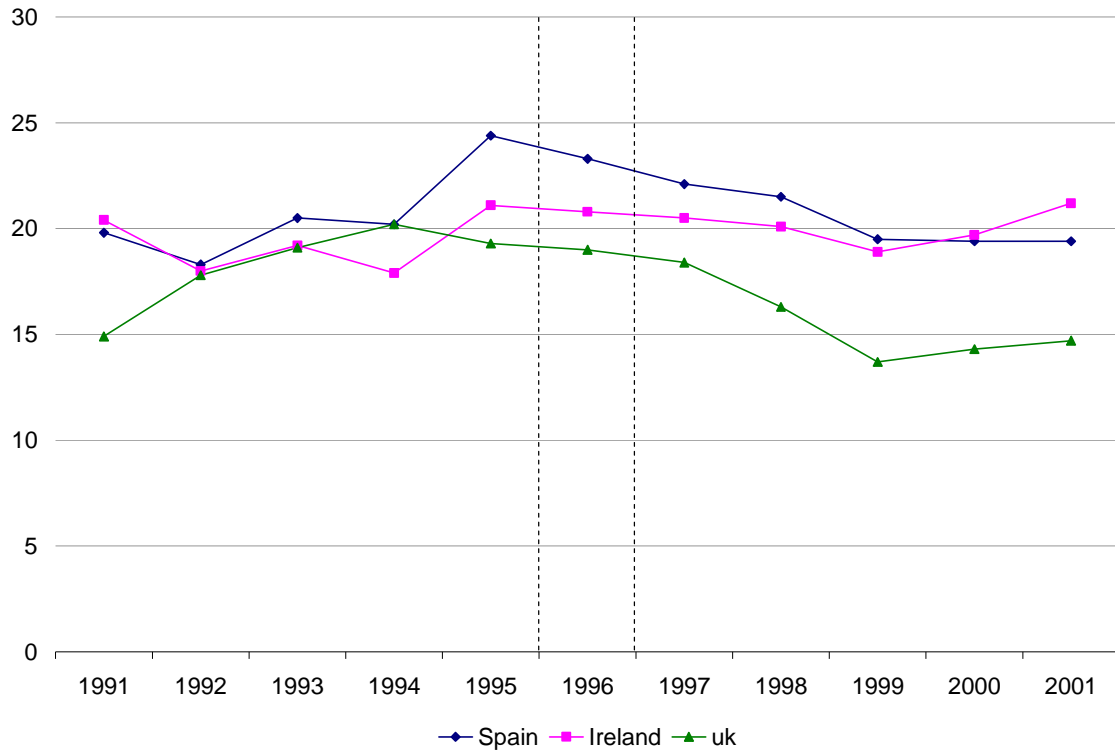
Source: European Commission Report (2000) "European Economy: Broad
Economic Policy Guidelines-Convergence Report for Single Currency" Statistical Anex,
Table 48.

Figure 3. Individual-level Saving Measures, Ireland 1994-2001

3.a) Save

3.b) Save2

3.c) Debt

Married, religious   Married, non-religious   Single
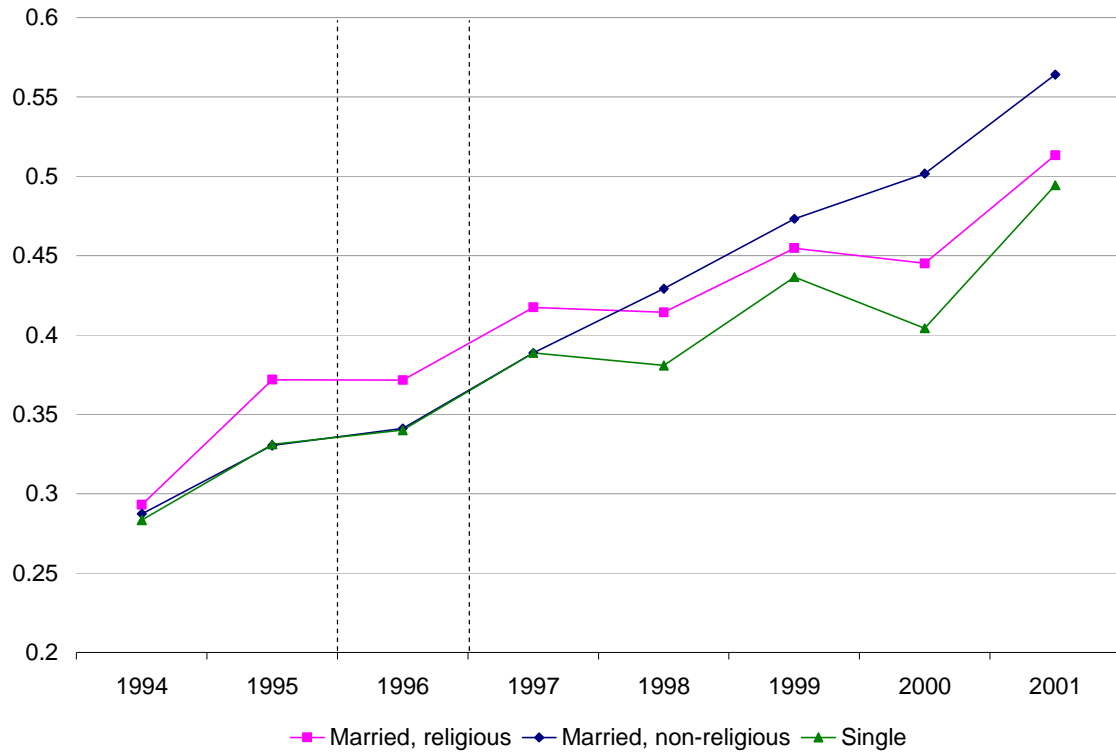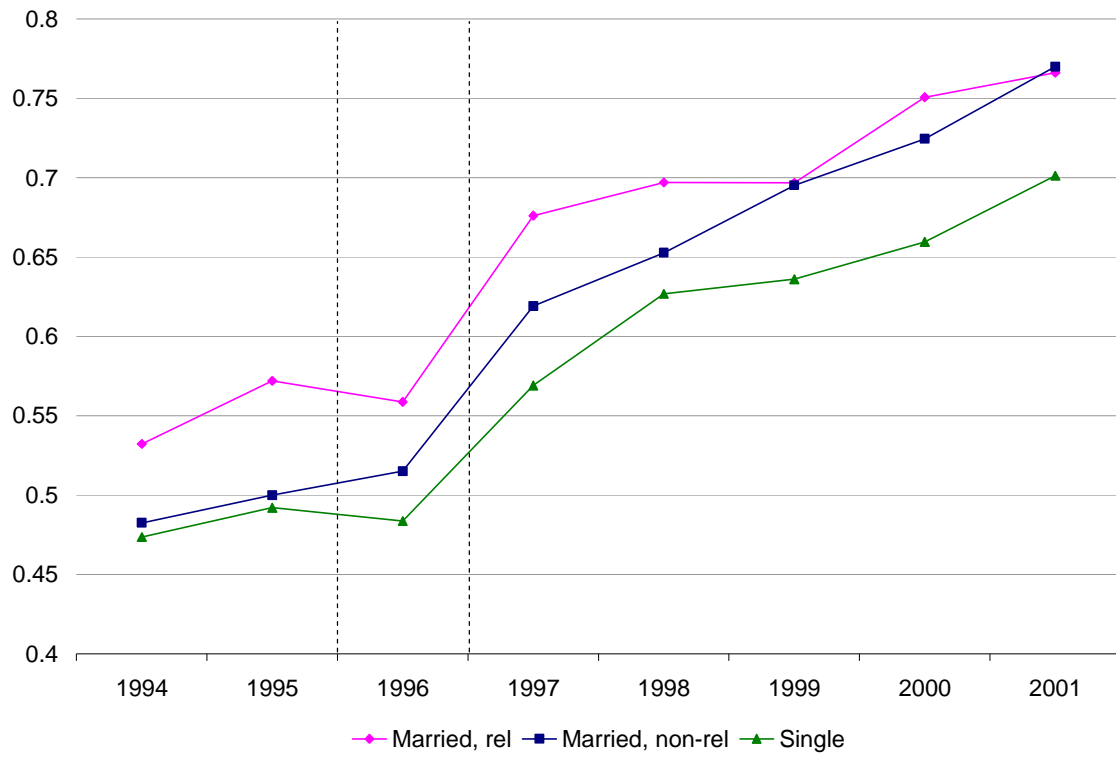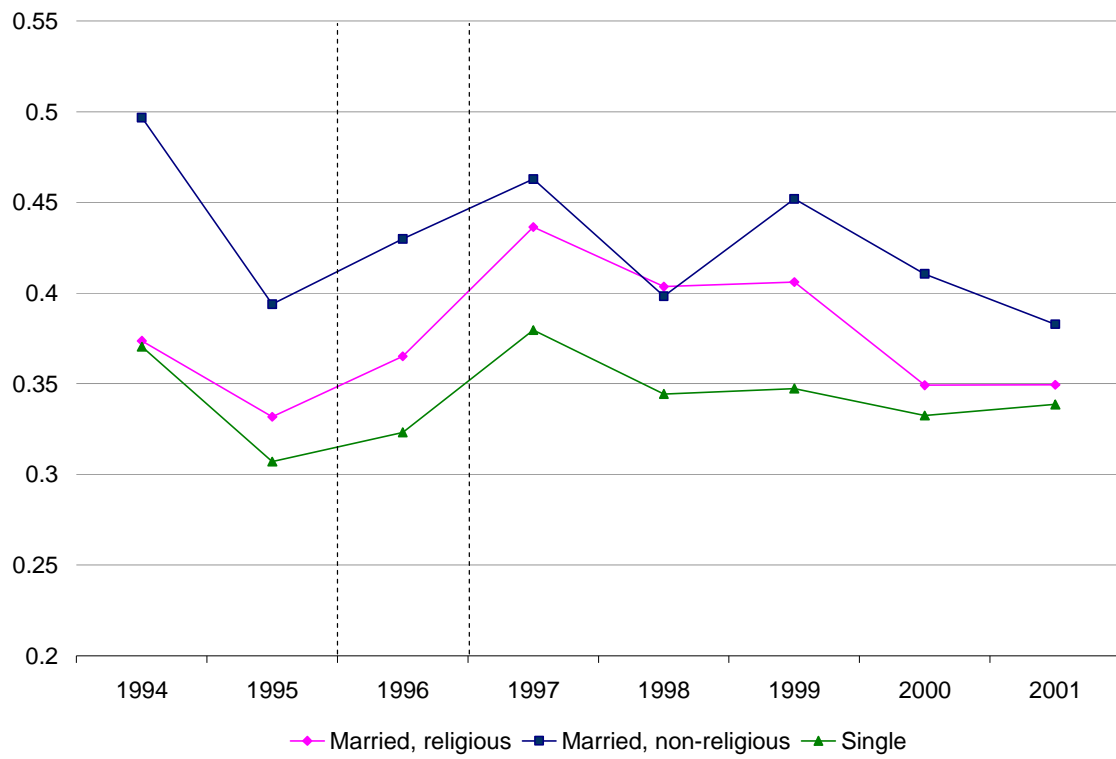
3.d) Savings Increase
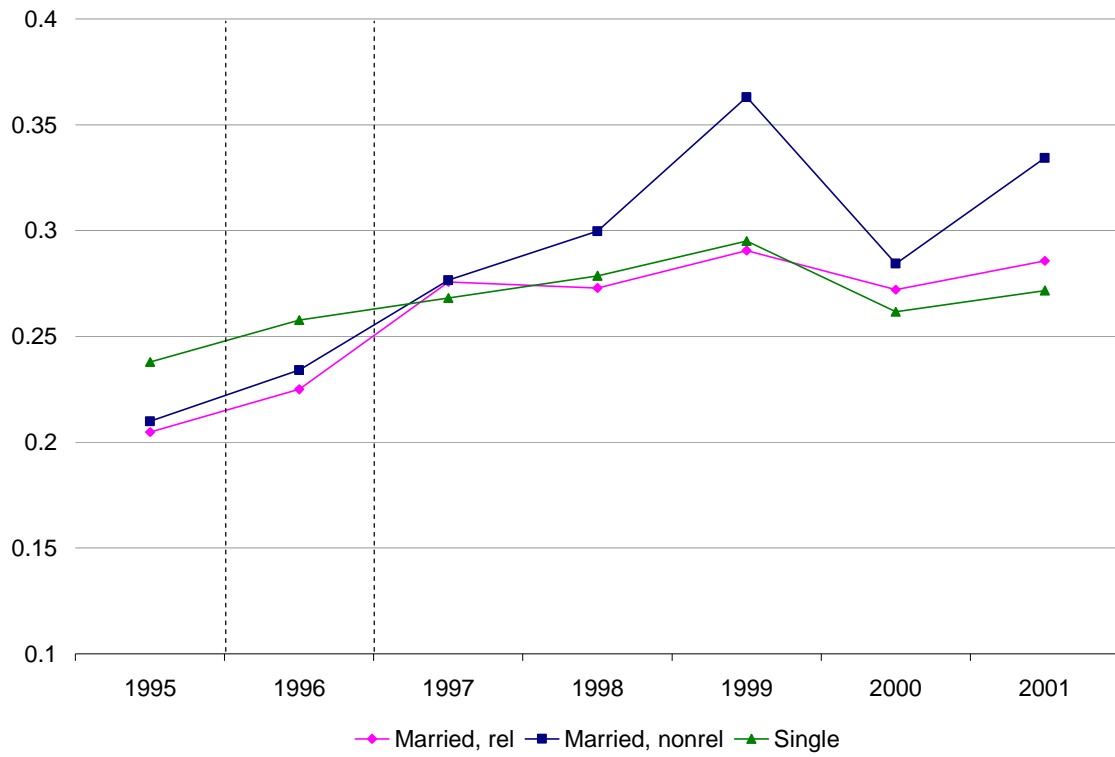
Table 1. Separation and divorce rates by religiosity, Ireland 1994-2001

	1994-95	1997-2001	Difference
Religious	1.181	1.552	0.371
	(0.108)	(0.124)	(0.164)
Nonreligious	3.059	4.278	1.219 **
	(0.172)	(0.202)	(0.265)
Difference	1.878 **	2.726 **	0.848 **
	(0.203)	(0.237)	(0.312)

Note: The main body of the table show the percentage of the population aged 18 to 65 (by religiosity) who reported being either separated or divorced in each time period. "Religious" is defined as "attends church at least once a week". Two asterisks indicate 99% significance.

Table 2. Aggregate saving sate results

	Log Private Saving Rate				Log Aggregate National Saving Rate		
	1	2	3	4	5	6	7
Post-1996	-0.1729 ***	-0.1018 **	-0.0703 ***	-0.0004	0.0241	-0.0003	-0.057 ***
	(0.0551)	(0.0405)	(0.0229)	(0.0390)	(0.0234)	(0.0166)	(0.0197)
Ireland*Post-1996	0.2003 **	0.1292 *	0.0976 *	0.3009 ***	0.2763 ***	0.3007 ***	0.3574 ***
	(0.0779)	(0.0701)	(0.0513)	(0.0552)	(0.0408)	(0.0377)	(0.0530)
N	22	33	55	38	58	98	138
Years		1991-2001			1988-2007		
Control countries	UK	UK, Spain	UK, Spain, Germany, France	UK	UK, Spain	UK, Spain, Germany, France	UK, Spain, Germany, France, Italy, Portugal

Note: All regressions include individual country dummies.
Source: Eurostat for private saving rates, OECD for aggregate saving rates.

Table 3. Summary statistics, Irish married sample (Living in Ireland Survey).

3.a) Household-level variables

	Religious		Nonreligious	
	Pre (1994-1996)	Post (1997-2001)	Pre (1994-1996)	Post (1997-2001)
Save	0.3406	0.4477	0.3169	0.4708
Save2	0.5526	0.7182	0.4975	0.6919
Debt	0.3575	0.3880	0.4433	0.4208
DIY savings	0.4286	0.2623	0.3851	0.2551
House	0.9423	0.9504	0.8249	0.8572
Car	0.9231	0.9554	0.8144	0.9008
2nd house	0.0681	0.1106	0.0692	0.0966
Age of husband	47.90	49.91	42.07	44.97
Univ. Degree	0.133	0.144	0.200	0.201
Hh income (pounds per week)	418.55	576.42	399.24	565.54
Hh size	4.55	4.38	4.30	4.37
N	3952	4376	2010	2630

3.b) Individual-level variables

	Religious		Nonreligious	
	Pre (1995-1996)	Post (1997-2001)	Pre (1995-1996)	Post (1997-2001)
Savings increase	0.2140	0.2786	0.2208	0.3077
Age	47.35	49.33	41.44	44.32
Univ. Degree	0.122	0.128	0.178	0.188
Hh income (pounds per week)	431.96	570.04	411.17	568.32
Hh size	4.48	4.31	4.30	4.35
N	4985	9274	2486	4771

Table 4. Regression results, Irish household sample, dependent variable "Save"

	1		2		3		4		5		6	
Post-1996	0.1071	***	0.1071	***	-0.0039		0.0994	***	0.0999	***	0.1085	***
	(0.0107)		(0.0107)		(0.0167)		(0.0109)		(0.0096)		(0.0060)	
Non-religious	-0.0237	*	-0.0258	*	-0.047	***	-0.0418	***				
	(0.0133)		(0.0136)		(0.0124)		(0.0142)					
Non-rel.*Post	0.0468	***	0.0499	***	0.0567	***	0.0599	***	0.0398	**	0.0312	**
	(0.0182)		(0.0182)		(0.0165)		(0.0193)		(0.0163)		(0.0145)	
Control group	Religious marriages		Religious marriages		Religious marriages		Religious marriages		Religious marriages		Rel. marriages and singles	
Control variables	None		Age, age squared, age cubed		All		Age and education		None		None	
Specification	Linear		Linear		Linear		Probit (m.e.)		Linear, indiv. fixed-effects		Linear, indiv. fixed-effects	
N	12698		12698		12675		12698		12698		29759	

Note: The married sample includes all couples married before 1996 and never separated or divorced. The singles sample includes all never married individuals who do not change marital status. Marginal effects reported in the Probit specification. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%. "All" controls in col. 3 include age, age squared, age cubed, four educational attainment dummies, a linear time trend, log household size and log household income.

Table 5. Regression results, Irish household sample, 6 dependent variables

	1		2		3		4	
Save2	0.0312	*	0.0395	**	0.0266		0.0325	**
	(0.0182)		(0.0158)		(0.0164)		(0.0142)	
Debt	-0.05	***	-0.0594	***	-0.0258	*	-0.0434	***
	(0.0179)		(0.0174)		(0.0154)		(0.0151)	
DIY savings	0.029		0.0561	***	0.0241		0.0414	***
	(0.0182)		(0.0172)		(0.0155)		(0.0149)	
House	0.0036		0.0224	***	0.0033		0.044	***
	(0.0074)		(0.0052)		(0.0096)		(0.0062)	
Car	0.0111		0.0487	***	0.0272	***	0.0487	***
	(0.0074)		(0.0072)		(0.0097)		(0.0078)	
2nd house	-0.0137		-0.009		-0.007		0.0007	
	(0.0093)		(0.0098)		(0.0082)		(0.0083)	
Control group	Religious marriages		Religious marriages		Rel. marriages and singles		Rel. marriages and singles	
Control variables	Age and education		None		Age and education		None	
Specification	Probit (m.e.)		LPM w. f-e		Probit (m.e.)		LPM w. f-e	
N	12698		12698		29759		29759	

Note: The coefficients reported correspond to the interaction between "post-1996" and "treated" (nonreligious) in cols. 1 and 2, and "post-1996", "married" and "nonreligious" for cols. 3 and 4. The married sample includes all couples married before 1996 and never separated or divorced. The singles sample includes all never married individuals who do not change marital status. Marginal effects reported in the Probit specifications. Also included in the regressions are the separate dummies for "post-1996" and "treated", and a dummy for "single" in specifications 3 and 4. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%.

Table 6. Regression results, Irish individual sample, dependent variable "Savings increase"

	1		2		3	
Post-1996	0.0635	***	0.0653	***	0.0651	***
	(0.0076)		(0.0078)		(0.0059)	
Non-religious	-0.0041					
	(0.0114)					
Non-rel.*Post	0.0245	*	0.0368	***	0.0370	***
	(0.0140)		(0.0135)		(0.0126)	
Control group	Religious marriages		Religious marriages		Rel. marriages and singles	
Control variables	Sex, age and educ.		None		None	
Specification	Probit (m.e.)		Linear, indiv. fixed-effects		Linear, indiv. fixed-effects	
N	21516		21516		35775	

Note: The married sample includes all individuals married before 1996 and never separated or divorced. The singles sample includes all never married individuals who do not change marital status. Marginal effects reported in the Probit specification. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%.

Table 7. Regression results over time, Irish married sample, 1994-2001

	Save		Save2		Savings Increase	
Nonrel.*1997	-0.0288		-0.0137		-0.0039	
	(0.0212)		(0.0206)		(0.0168)	
Nonrel.*1998	0.0125		0.0186		0.0203	
	(0.0223)		(0.0216)		(0.0176)	
Nonrel.*1999	0.0453	*	0.0587	**	0.0780	***
	(0.0239)		(0.0232)		(0.0188)	
Nonrel*2000	0.1216	***	0.0877	***	0.0506	***
	(0.0247)		(0.0240)		(0.0193)	
Nonrel*2001	0.1694	***	0.1329	***	0.0977	***
	(0.0255)		(0.0248)		(0.0199)	
Control group	Religious marriages		Religious marriages		Religious marriages	
Control variables	None		None		None	
Specification	Linear, indiv. fixed-effects		Linear, indiv. fixed-effects		Linear, indiv. fixed-effects	
N	12698		12698		21516	

Note: The sample includes all individuals married before 1996 and never separated or divorced. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%.

Table 8. Summary statistics, three-country married sample

	Ireland		Spain		UK	
	Pre	Post	Pre	Post	Pre	Post
Save	0.3326	0.4558	0.3469	0.4621	0.6820	0.7214
Debt	0.3864	0.3995	0.2601	0.2599	0.3999	0.3759
House	0.9027	0.9178	0.8255	0.8762	0.8409	0.8580
Car	0.8864	0.9363	0.8678	0.9052	0.9272	0.9520
2nd house	0.0684	0.1057	0.1826	0.2037	0.1101	0.0987
Age	45.94	48.18	46.02	47.55	44.93	47.29
Univ. Degree	0.155	0.164	0.177	0.191	0.388	0.506
Hh income (euros)	25381	33557	16637	20241	25149	38498
Hh size	4.43	4.38	3.93	3.95	3.32	3.38
N	5962	6736	11387	12380	4739	6688

Source: Living in Ireland Survey for Ireland, ECHP for the UK and Spain.
Note: The sample includes all individuals married before 1996, younger than 65 and never separated or divorced.

Table 9. Regression results, three-country sample, dependent variable "Save"

	1		2		3		4		5		6	
Post-1996	0.0814	***	0.0693	***	0.0816	***	0.0693	***	0.0422	***	0.0431	***
	(0.0051)		(0.0045)		(0.0051)		(0.0045)		(0.0048)		(0.0047)	
Ireland*Post	0.0402	***	0.0443	***	0.0232	**	0.0306	***	0.0767	***	0.0717	***
	(0.0098)		(0.0094)		(0.0115)		(0.0111)		(0.0088)		(0.0094)	
Ireland*Post*Nonrel.					0.0505	***	0.0398	**				
					(0.0176)		(0.0172)					
Ireland*Post*Nonrel.*Married									0.048	***	0.0398	**
									(0.0178)		(0.0174)	
Control group	Married couples in UK and Spain				Non-rel. mar. in Ireland, married in UK and Spain				Non-rel. mar. in Ireland, married in UK and Spain, singles in Ire., UK and Sp.			
Control variables	Age and education		None		Age and education		None		Age and education		None	
Specification	Linear		Linear, indiv. fixed-effects		Linear		Linear, indiv. fixed-effects		Linear		Linear, indiv. fixed-effects	
N	47892		47892		47892		47892		106636		106636	

Note: The married sample includes all couples married before 1996 and never separated or divorced in Spain, the UK and Ireland. The singles sample includes all never married individuals who do not change marital status in Spain, the UK and Ireland. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%. All specifications include country dummies. Specifications 3 to 6 also include a dummy for Ireland*Nonreligious. Specifications 5 and 6 also include dummies for Married*country, Married*Post, and Ireland*Post*Married.

Table 10. Regression results, three-country sample, 4 dependent variables

	1		2		3		4	
Debt	0.0225	**	0.0377	***	-0.0486	***	-0.0594	***
	(0.0096)		(0.0094)		(0.0170)		(0.0169)	
House	-0.0244	***	-0.0238	***	0.0213		0.0224	**
	(0.0069)		(0.0042)		(0.0139)		(0.0089)	
Car	0.0205	***	0.0250	***	0.0595	***	0.0487	***
	(0.0059)		(0.0030)		(0.0132)		(0.0093)	
2nd house	0.0277	***	0.0195	***	-0.0153		-0.0090	
	(0.0071)		(0.0057)		(0.0129)		(0.0108)	
Control group	Married, UK and Spain				Non-rel. mar. in Ireland, married in UK and Spain, singles in Ire., UK and Sp.			
Control variables	Age and education		None		Age and education		None	
Specification	Linear		LPM w. f-e		Linear		LPM w. f-e	
N	47892		47892		106636		106636	

Note: The coefficients reported correspond to the interaction between "post-1996" and Ireland in cols. 1 and 2, and Ireland, "post-1996", "married" and "nonreligious" for cols. 3 and 4. The married sample includes all couples married before 1996 and never separated or divorced in Spain, the UK and Ireland. The singles sample includes all never married individuals who do not change marital status in Spain, the UK and Ireland. One asterisk indicates a 90% confidence level, two indicate 95%, and three indicate 99%. All specifications include country dummies and a dummy for "post-1996". Specifications 3 and 4 also include dummies for Ireland*Post, Married*country, Married*Post, and Ireland*Post*Married.