Social Effects, Household Time Allocation, and the Decline in Union Formation

Almudena Sevilla-Sanz*†

Congressional Budget Office

February, 2005

Abstract

Economic theories of the household and the marriage market can provide an explanation for differences in household formation rates over time based in part on the evolution of female wages. However, cross-country differences in female market human capital are unlikely to account for the current differences in union formation rates across developed countries. I develop a partial equilibrium model that formally incorporates social effects on the woman's decision to enter a

*The views expressed in this paper are those of the author and should not be interpreted as those of the Congressional Budget Office.

†I thank the participants at the the European Econometric Society Meeting in Madrid 2004 and at the Annual Meeting of Population Association of America in Philadelphia 2005.

household. Social effects are modelled as gender roles that constrain potential partners away from the efficient allocation of household labor and diminish the gains to forming a union. I test the model using individual level cross- country and longitudinal data (ISSP 1994 and 2002) containing information on attitudes toward gender roles and the allocation of time to household production. The empirical strategy uses the time and cross-country variation in the data as well as individual reported attitudes toward gender roles, which allows for the identification of gender roles net of individual attitudes and other social interaction effects. The empirical findings support the proposed model of social constraints upon the allocation of household time.

JEL classification: D13, J0, J1, J2, Z13

1 Introduction

During the past decade, below replacement fertility in most developed countries has drawn the attention of researchers in a variety of social science disciplines. Special focus has been given to the so called lowest-low fertility countries, i.e. those countries with fertility persisting well below replacementlevels (Kohler, 2002). Among these countries Spain, Italy and Japan are the leading examples with average total fertility rates of 1.2. Below replacement fertility presents new economic challenges for a society, as it changes the age structure of the population and may require structural adaptations with important implications for welfare (Weil, 1999). These factors have be-

come of special concern for lowest-low fertility countries, in which the sharp decline in fertility together with a slow increase in female labor force participation has raised questions about the viability of pay-as-you-go pension systems (Morgan, 2003).

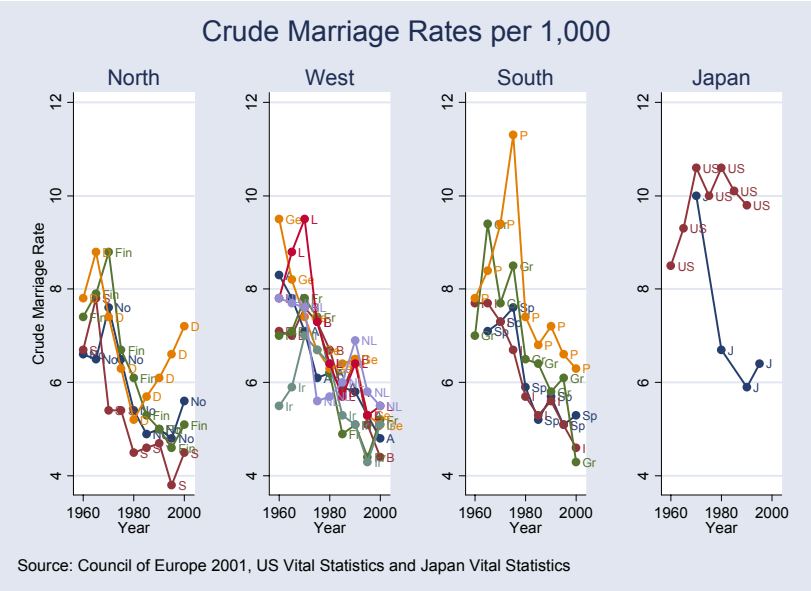

Figure 1: Crude Marriage Rates per 1,000

Most of the research on lowest-low fertility has focused on the number of children in married households.[1] Figure 1 shows that in the last decades mar-

[1] This approach has been justified by the lack of out-of-wedlock fertility, the high percentage of marriages and the empirical observation that the drop in fertility was mainly due to declines in third and higher order births within marriage (Bettio and Villa, 1998).

riage rates have substantially declined in all developed countries. However, while the decline in marriage has been followed by an increase in cohabitation and out-of-wedlock fertility in most developed countries, this has not occurred for lowest-low fertility countries.[2] Table 1 shows that union formation rates (either marriage or cohabitation) for women between 30 and 34 years old in Canada, Sweden and Norway (around 90 percent) are higher than in Italy or Spain (86 and 78 percent respectively). These cross-country differences widen for younger cohorts (those aged 25-29), who are entering a union at much smaller rates in Italy and Spain (40.7 and 53.3 percent respectively) versus 75 percent in Canada and Sweden. Moreover, the declines in marriage rates have been compensated by increases in cohabitation for Canada, Sweden and Norway, where cohabitation rates account for 40 percent of all unions. However, this has not happened in Spain and Italy, where only 9 percent of all unions are in the form of cohabitation. Finally, out-of-wedlock fertility is only about 5 percent for Italy and Spain, whereas it amounts to 9.7 and 13.2 for Sweden and Norway. In sum, substantial declines in marriage in lowest-low fertility countries, together with the fact that these countries have not experienced the increase in out-of-wedlock fertility and cohabitation characteristic of other developed countries, call into question previous fertility studies based solely on marital fertility and draw new attention onto household formation decisions as a contributor to fertility phenomena.

[2] See (Retherford, 2001) for a detailed description of the Japanese case and (Fraboni and Rosina, 2004) for the Italian case.

Country	Cohort	Out-of-wedlock Fertility****	Union Formation Indicators*	
			Percentage in a Partnership	Percent of Fist Marriages***
Canada	25-29	--	74.2	31.9
	30-34	1.5	90	53.5
	40-44	2.9	91.1	65
Sweden	25-29	--	75.9	7.4
	30-34	9.7	90	7.1
	40-44	13.7	90.4	9.4
Norway**	25-29	--	63.4	23.1
	30-34	13.2	88.4	39.5
	40-44	9.8	88.3	60.7
Spain	25-29	--	53.3	43.3
	30-34	5	86.2	75.2
	40-44	2.5	88.1	87.4
Italy	25-29	--	40.7	35.5
	30-34	5.1	78.3	70.1
	40-44	4.8	89.6	82.2

Source: UN Family and Fertility Surveys (1994-95)

(*) Union Formation Indicators are at age 25 for the cohort 25-29 and at age 30 for the rest
(**) For Norway, reference ages are 23 and 28
(***) Percentage of first unions that are marriages with no cohabitation
(****) Out-of-wedlock fertility: Percent not living in a partnership at first live birth

Table 1: Demographic Indicators in Some Developed Countries

Economic models of the household and the marriage market may offer potential explanations for the differences in household formation rates over time based on the evolution of relative female market human capital (Becker, 1973) and (Becker, 1974). However, differences in female education are unlikely to account for the current differences in union formation rates across countries. Moreover, comparative advantage or bargaining theories of the household also fail to explain the current patterns of household time allocation observed in the data. In particular, the increase female human capital

that led to an increase in female labor force participation has not, contrary to the predictions of both theories, led to a more egalitarian division of housework within the household.

Men's contribution to household production is small. Nevertheless, cross-country differences with respect to the division of household work are significant. For example, based on EUROSTAT's reports on HETUS (the Harmonized European Time Use Surveys project), the average daily time spent in domestic work by Swedish 20-74 year old women is about 3h 42min. Swedish men spend an average of 2h 29min. However, in the case of Spain these figures are respectively 4h 45min and 2h 08min. While the average man's contribution to household production only differs 21 minutes between the two countries, only 70 percent of Spanish men vs. 92 percent of Swedish men engage in household activities.

This paper theoretically develops a stylized partial equilibrium model of union formation in which social effects influence individual decisions to enter a union. Social effects are modelled as gender roles that constrain how potential partners divide the household surplus generated through household production. The inability of potential partners to credibly commit to make transfers of time, rather than private consumption, before the union is formed is at the root of the argument.[3] In this setting both the non-observability

[3]Time-use studies show that a substantial amount of non-market work is devoted to household production (Apps, 2003) and (EUROSTAT, 2004). Similarly, Hersch and Stratton (Hersch and Stratton, 2002) show that the allocation of time to household production

by third parties of spouse's time devoted to household production and the absence of credible threats for certain household production activities (especially those related to caring activities (Folbre and Bittman, 2004)) constrain potential partners to rely on gender roles when making a decision on how to divide the household surplus. The model predicts that gender roles result in inefficient household time allocations, which diminish a woman's gains to entering a union. Accordinly, women in less egalitarian countries have, ceteris paribus, a lower probability of entering a union.[4]

Social interactions or social norms are to a large extent enforced through nonmarket interactions and usually difficult to isolate empirically. I provide evidence for the existence of social constraints upon the allocation of household time by showing that, after controlling for employment status and other relevant variables, household time allocation patterns have not substantially changed over time. I further provide an identification strategy for the existence of social effects that relies on the time and cross-country variation in the data as well as individual reported attitudes toward gender roles, which allows for the identification of gender roles net of individual attitudes and other social interaction effects. Empirical results from the 1994 and 2002 In-

can account for a substantial part of the wage gender gap.

[4]De Laat and Sevilla-Sanz (De Laat and Sevilla-Sanz, 2004) also show that there exists a negative cross-country relationship between fertility and non-egalitarian attitudes toward gender roles.

ternational Social Survey Program, a cross-country data set with individual level information on demographic and economic variables, as well as attitudes toward gender roles and the allocation of time to household production activities, support the predictions of a household formation model with social constraints upon the allocation of household time.

The paper is organized as follows. Section 2 presents a brief literature review of the different areas in economics to which the present paper contributes. Section 3 presents a stylized model that illustrates a role for social effects on individual union formation decisions. Section 4 describes the data used in the empirical analysis. Section 5 provides evidence of rigidities in the allocation of time to household production and provides an identification strategy for the isolation of social effects on individual union formation probabilities. Section 6 concludes.

2 Literature Review

Economic models of the household and the marriage market can provide an explanation for the differences in household formation rates over time based on the evolution of relative female market human capital. Unitary models of the household (Becker, 1973) predict a decline in marriage rates after an increase in women's labor supply (due to, for example, an increase in female education), which reduces the gains from specialization and exchange from

a union (Bryant, 1995). Bargaining models of the household also predict declines in marriage due to an increase in female education, which raises a woman's reservation utility and declines net gains to marriage (McElroy and Horney, 1981). Each theory perceives the household in an entirely different way.[5] Nevertheless, they share a focus on female market opportunity cost that does not seem to offer a good explanation to the observed cross-country differences in household formation rates.

Moreover, contrary to the predictions of comparative advantage or bargaining theories of the household, higher female human capital have not led to a more egalitarian allocation of time within the household.[6] The determinants of how spouses allocate time to household production are based on the predictions of either the unitary household production models (Becker, 1991) or bargaining models (McElroy and Horney, 1981). In the unitary framework family members cooperate to produce utility for all, either through the purchase of market goods and services with earnings from market work or through household production. Specialization is thus efficient and the spouse

[5] On the one hand, unitary models rely on altruism in the family and do not consider conflicts of interest between partners, which leads to the maximization of a single family utility function. On the other hand, bargaining models focus on self-interested actors that are not entirely altruistic and, when conflict arises, resources affect whose interests prevail.

[6] Time spent producing goods and services within the household has been recognized as important since Becker (Becker, 1965). However, the time devoted to household production continues to be overlooked in most household economic models (Juster and Stafford, 1991).

with the lowest opportunity cost (i.e. the lowest human capital or the highest home productivity) contributes the most to household production and the least to market work. Bargaining theories reach the same conclusion, that relative wages will affect relative contribution to housework, but the logic behind it is based on the concept of bargaining power and threat points.[7] Empirical findings contradict the prediction of both theories. For example, when a wife works more hours outside the home, she still undertakes a larger share of housework (Ackerlof and Kranton, 2000). Similarly, men's unpaid work increases with his wife's wage but only up to the point where the wife contributes as much as the husband to the household income (Bittman et al., 2001). Furthermore, this unequal division of housework persists after observable characteristics are taken into account (Alvarez and Miles, 2003). The literature has taken this residual as evidence for the presence of a "gender effect" underlying household decisions on the allocation of time.

In the present paper, this gender effect is traced to an imperfect commitment process within the household, long recognized in the household eco-

[7] Chiappori (Chiappori, 1992) and (Browning and Chiappori, 1997) unified both set of theories into a "collective" approach to the household, where efficiency in the household maximization problem is secured due to spousal transfers of private consumption. However, incorporating household production into the collective framework requires further restrictions on preferences and technology in order to identify the sharing rule and raises questions on the dichotomization of time into leisure and market work in household economic models (Apps and Rees, 1996) and (Apps and Rees, 1997).

nomics literature (Becker, 1991) and (Lundberg and Pollak, 1993). Recent discussions in the literature point at the inefficient allocation of household resources that may emerge upon a couple's inability to reach binding, legally-enforceable agreements about future behavior (Basu, 2001), (Rasul, 2002). Imperfect commitment is usually characterized as the inability of one spouse to make transfers of private consumption to compensate the other partner for utility losses such as in Lundberg (Lundberg and Pollak, 2001) and Mazzocco (Mazzocco, 2003) and inefficiencies arise in a dynamic setting once the union has taken place. The present paper differs from previous research in that it focuses on the inability of potential spouses to credibly commit to make transfers of "time" rather than "money" and on how the inefficiencies that may arise after the union has been formed affect the decision to enter a union in the first place.

Finally, incorporating gender roles into an economic model of household formation contributes to the growing literature of social interactions in economics interested in how attitudes, social norms or culture influence individual economic decisions. In the last decade economists have investigated such interpersonal effects in a multitude of applications, including crime (Sah, 1991), unemployment (Stutzer and Lalive, 2004), investment decisions (Duflo and Saez, 2000), welfare participation (Bertrand et al., 2000) and numerous decisions made by teenagers on matters such as education, childbearing, gang membership and drug use (Becker and Murphy, 2000). More recently, in the case of union formations, Loughram (Loughram, 2002) analyzes the effect

of male wage inequality on female's marriage probabilities and Drewianka (Drewianka, 2003) exploits variations in a two-sided mate matching market to identify the externalities associated with spousal search. This paper presents a potential channel of how social effects (gender roles) might affect individual union formation decisions by imposing a social constraint on the allocation of household time. Furthermore, the use of the ISSP data provides a unique opportunity for a direct measure of these social effects, allowing for the identification of gender roles net of individual attitudes and other social interaction effects.

3 A Model of Union Formation and Social Norms

This section presents a partial equilibrium model of union formation that focuses on social effects associated to the allocation of household time. Although omitting the male side of the market might seem unsatisfactory from a theoretical perspective, this partial equilibrium analysis does not invalidate the empirical results, which can be understood as the general equilibrium outcome of changes in social norms and union formation probabilities.

To begin a baseline model of spousal search is presented. A union is understood as a partnership for the purpose of joint production and joint consumption. I focus on two specific aspects of the gains to entering a union:

efficiency gains from specialization in household production and the consumption of market public goods.[8] Once the surplus from the union is defined, prospective mates need to form some notion as to whether families realize the potential gains and how those gains are divided. Whereas this is done efficiently under the baseline model, inefficient allocations arise in the presence of gender roles that diminish a woman's gains to entering a union. Thus, the model predicts that women living in countries with less egalitarian gender roles diminishes have, ceteris paribus, a lower probability of entering a union.

3.1 Baseline model: Efficient allocation of marital gains

Utility after the union is formed

A household is denoted by the superscript U (union) and is assumed to be formed by two individuals a man m and a woman f. The joint household utility depends on the consumption of two public goods: household maintenance (which is privately produced by the household members) and a composite consumption good (which is purchased in the market). This distinction, which bares the substitutability assumption between time spent at household production and money, is important on theoretical and empirical grounds. Empirically, time-use survey data shows low levels of household ser-

[8] Other dimensions to marriage such as risk pooling or consumption smoothing are left out of the analysis for exposition purpuses.

vices outsourcing, suggesting low substitution between time spent in household production and money spent in market goods.[9] On the theoretical front, Apps and Rees (Apps and Rees, 1996) and (Apps and Rees, 1997) discuss the theoretical limitations of the perfect substitutability assumption necessary to identify the sharing rule in Chiappori's collective approach (Browning and Chiappori, 1997).

The composite consumption good includes market consumption goods that are jointly consumed by the household C^U (such as groceries, housing, child care, etc.) and can be acquired in the market at a normalized price $p = 1$. For the remainder of the paper I will refer to C^U as the *market public good*. The household joint utility also depends on the production (and consumption) of a particular public good, household chores or *household public good*, Z^U (these are the "commodities" in Becker's language (Becker, 1965) such as a cleaned house or home-made meals). It differs from C^U in that it cannot be purchased in the market. Z^U is produced using both partners' time in household production H_i for $i = m, f$ such that[10]

[9] Using Australian time-use data, Bittman shows that during the period 1984-94 real expenditure in outsourcing for cleaning, for instance, did not increase (Folbre and Bittman, 2004) (p.229-230). Moreover, only 4 percent of the households bought any cleaning services during the two-week period of the survey. Similar evidence exists for the case of Britain and the United States, where despite increases in income inequality the demand for paid domestic services has not increased. Such low levels of outsourcing is also found in the 1994 and 2002 ISSP in this paper.

[10] Consider Z^U as a lower bound for the amount of household production that needs to

$$Z^U = H_f^U + H_m^U$$

with man's and woman's time being perfect substitutes in the production of household services.[11] Thus, whereas the output Z^U is consumed jointly by both partners, each partner privately contributes to its production. I assume that each partner derives disutility $f(H_i)$ from the time devoted to household production H_i for $i = m, w$, where $f(.)$ is an increasing and convex cost function. I normalize $0 \leq H_i \leq 1$.

The household's utility is defined as the sum of individual utilities such that:

$$V^U = 2U(C^U) + 2U(Z^U) - f(H_m^U) - f(H_f^U)$$

and the household's maximization problem is:

$$\begin{aligned} & \max_{C_i, H_i} 2U(C^U) + 2U(Z^U) - f(H_m^U) - f(H_f^U) \\ & st. \\ Z^U &\geq H_m^U + H_f^U \\ C^U &= \sum (1 - H_i^U) w_i \end{aligned}$$

be done in the household. The longitudinal dimension of the data allows to account for permanent differences across countries with respect to the level of household production.

[11] Perfect substitutability assumption is made for exposition purposes. The results are robust to general specifications of the production function.

at the optimum $C^{*U} = w_f(1 - H_f^*) + w_m(1 - H_m^*)$ and $Z^{*U} = H_f^* + H_m^*$, where w_i $i = m, w$ are the wages. That is, the household consumes all the joint disposable income and produces the needed amount of household production.

The amount of time that each partner devotes to household production H_i is given by the first order conditions:

$$H_i : -2U'(C^U)w_i + 2U'(Z^U) - f'(H_i^U) = 0$$

and for the case where $w_m > w_f$ it is the case that $H_f^U > H_m^U$.[12]

Given the household's utility and the contracted provision of household labor, each partner's utility in a union is given by

$$\begin{aligned} V_m^U &= U(C^U) + U(Z^U) - f(H_m^U) \\ V_f^U &= U(C^U) + U(Z^U) - f(H_f^U) \end{aligned}$$

and $V^U = V_f^U + V_m^U$.

It is important to note that in this unitary household there is a unique distribution of individual utilities. This derives from the assumption that the

[12] Under the assumption of interior solution, the second order conditions are satisfied such that:

$$H_i : 2U^{"}(C^U)w_i^2 + 2U^{"}(Z^U) - f^{"}(H_i^U) \leq 0$$

for $i = m, f$.

only private goods are essentially the disutility of time devoted to household production. Thus, unlike collective (Browning and Chiappori, 1997) or non-cooperative models of the household (Lundberg and Pollak, 1993), transfers of private consumption between partners cannot compensate for time devoted to household production.[13]

Utility if single

The utility for a given individual i if single is given by the following maximization problem

$$\begin{aligned} & \max_{C_i, H_i} U(C_i^S) + U(Z^S) - f(H_i^S) \\ & st. \\ Z^S & \geq H_i^S \\ C_i^S & = (1 - H_i^S) w_i \end{aligned}$$

where agent's i utility depends on market consumption goods C_i^S, which can be acquired in the market at a normalized price $p = 1$. It also depends on the amount of household production, Z^S. Without loss of generality let's

[13] Apps and Rees (Apps and Rees, 1997) point out that most of the goods consumed within the household are public goods (except for leisure) and show that the range of goods where consumption differs significantly across individuals in the household is relatively small. Similarly, Fella et al. (Fella et al., 2004) use the non-divisibility of public consumption goods within marriage to explain the relevance of divorce laws on the probability of divorce. In this setting, the allocation of private allocation of time, rather than private consumption, becomes the variable of interest.

assume that $Z_S = \alpha Z_U$, for $0 < \alpha < 1$. That is the amount of household work that needs to be done in the single household is less than that in the married household.

The solution to this problem is straight forward and given by

$$\begin{aligned} H_i^S &= Z^S \\ C_i^S &= (1 - Z^S)w_i \end{aligned}$$

and the utility in the single state is denoted by

$$V_i^S = U(C_i^S) + U(Z^S) - f(Z^S)$$

for $i = m, f$.

Decision to form a household

In this partial equilibrium setting a woman enters a union if V^U is greater or equal than the individual utility in the single state such that

$$V_f^U \geq V_f^S$$

This condition states that the decision to marry will follow if the utility each individual gets within marriage V_i^U is enough to compensate for the loss of utility if single V_i^S.

3.1.1 Social effects, the allocation of household time and the probability of union formation

This section builds on the baseline model of section 3.1 by explicitly analyzing the role of social effects characterized as the prevailing gender roles in a given country. Gender roles act as a social constraint that effectively prevents potential partners to perfectly contract upon the efficient division of household labor before the union is formed.[14] Thus, the amount of time each partner devotes to household production H_m and H_f is the value dictated by the existing gender roles.

The household maximization problem becomes:

$$\begin{aligned} & \max_{C_i, H_i} 2U(C^U) + 2U(Z^U) - f(H_m^U) - f(H_f^U) \\ & st. \\ \overline{Z}^U &\geq H_m^U + H_f^U \\ C^U &= \sum (1 - H_i^U) w_i \\ H_m^U &\leq \overline{H}_m^U \end{aligned}$$

where the constraint is characterized by the fact that the male partner cannot increase his time to household production above what is imperative

[14] The model specification, where the only private goods are the disutility from time devoted to household production, implies that it is not possible to compensate a woman for having a "socially constrained" partner.

by gender roles $\overline{H}_m^U$ (or symmetrically, that a woman cannot decrease the amount of time devoted to household production below what is prescribed by the existing social norms $\overline{H}_f^U$).[15] Under this scenario the solution is straight forward. Given that Z^U is fixed and $Z^U = \overline{H}_m^U + H_f^U$, $H_f^U = \overline{H}_f^U$ and $C^U = \sum(1 - \overline{H}_i^U)w_i$.

Gender roles affect the probability of entering a union in two ways: First, it diminishes the household utility and second, it alters the distribution of household surplus. On the one hand household utility is lower under gender roles that constraint spouses from reaching optimal time allocations. This is true despite consumption of *market public good* increases.[16]

$$\overline{C}^U_{Constraints} = (1-\overline{H}^U_m)w_m+(1-\overline{H}^U_f)w_f > C^U_{Baseline} = (1-H^U_m)w_m+(1-H^U_f)w_f$$

On the other hand social constraints also alter the distribution of the surplus. In particular, under strong gender norms in the way characterized

[15] In a context of high relative female wages as the one analyzed here, it is reasonable to assume that the social norm is always binding. For the remeinder of the paper I consider $H_m^U \geq \overline{H}$, i.e. the efficient amount of a man's time to household production is above the value that is prescribed by the social norm. Intertemporal cross-country differences in union formation probabilities can also be explained in light of this model, assuming that the constraint becomes effective for higher female wages.

[16] Under social constraints the man devotes less time to household production and more to market labor. Given that the man's wage is higher, the consumption of market public good increases.

above a man has no incentive to deviate from what is prescribed by gender roles once the union is formed. He can not only enjoy a higher level of market consumption good but also a lower disutility from household labor.

$$\overline{V}_m^U = U(\overline{C}^U) + U(Z^U) - f(\overline{H}_m^U) < V_m^U = U(C^U) + U(Z^U) - f(H_m^U)$$

Proposition 1 *Under gender roles that constraint the household allocation of time, a man's utility from entering a union rises.*

A woman is however worse off as a higher consumption of the market public good is not enough to compensate her for a higher amount of time devoted to household production.[17] On the one hand she gets higher consumption, but on the other hand she has to allocate more time to household production, which leads to lower utility within marriage.

$$\overline{V}_f^U = U(\overline{C}^U) + U(Z^U) - f(\overline{H}_f^U) < V_f^U = U(C^U) + U(Z^U) - f(H_f^U)$$

Proposition 2 *Under gender roles that constraint the household allocation of time, a woman's utility from entering a union falls.*

Finally, the probability of a woman entering a union under gender roles goes down

$$p(V_f^U \geq V_f^S) > p(\overline{V}_f^U \geq V_f^S) \iff p(V_f^U) > p(\overline{V}_f^U)$$

[17] Given that the household utility decreases in the presence of gender roles, and that man's utility increases, woman's utility must necessarily decrease.

Also, gender roles that prescribe lower (higher) levels of $\overline{H}_m^U$ ($\overline{H}_f^U$) lower (increase) a woman's probability of entering a union

$$p(\overline{V}_{1,f}^U \geq V_f^S) > p(\overline{V}_{2,f}^U \geq V_f^S) \iff p(\overline{V}_{1,f}^U) > p(\overline{V}_{2,f}^U)$$

for $\overline{V}_{i,f}^U = U(\overline{C}_i^U) + U(Z_i^U) - f(\overline{H}_{i,f}^U)$ for $i = 1, 2$ and $\overline{H}_{1,f}^U > \overline{H}_{2,f}^U$.

Proposition 3 *Stronger gender roles, which constraint household time allocation to lower (higher) levels of $\overline{H}_m^U$ ($\overline{H}_f^U$), lower a woman's probability of entering a union*

From Proposition 3 some women (those with a lower taste for household production or with lower taste toward forming a union) might be better off not entering a union altogether. Everything else equal, the probability of entering a union diminishes with the probability of facing a stronger constraint. That is, women living in less egalitarian countries where gender norms are well entrenched would have, ceteris paribus, a lower probability of entering a union.

4 The Data: International Social Survey Program: Family and Changing Gender Roles (ISSP 1994 & 2002)

The data used for the empirical analysis are drawn from the International Social Survey Program (ISSP), which is an annual program of cross-national

collaboration on surveys between several social science institutes dating to 1983.[18] These data sets offer a unique opportunity for cross-country analyses in topics such as social inequality, social networks , and the role of government, as they coordinate national social science surveys to produce a common set of questions asked in identical form in the participating nations.[19]

This analysis is based on a pooled cross-section of the 1994 and 2002 surveys analyzing "Family and Changing Gender Roles". In each of the participating countries, a male or female adult older than 16 or 18 years (depending on the country) from the selected household was administered (almost) the same questionnaire across all countries. Although the same individuals are not surveyed in both years, the data allow the researcher to take into account country and survey-year fixed effects, which are useful for the identification of social effects. This survey is particularly useful for the purpose of this analysis because it collected general demographic information, employment and wages, the actual division of labor within the household and

[18]The ISSP is a cross-country effort in which each member state individually collects data and (1) jointly develops topical modules dealing with important areas of social science, (2) carries a module of a 15-minute self-completion supplement to their regular national surveys, (3) includes a common core of background variables, and (4) makes the data available to the social science community as soon as possible. The number of member states is currently 39 (although not all members have participated since 1983).

[19]Examples of the use of the ISSP are Blau and Kahn (Blau and Kahn, 1992) and Albrech et al. (Albrecht et al., 2000).

several attitudinal variables toward gender roles.

I restrict the sample to those countries who undertook the survey in both years.[20] Table 4 reports the list of countries used in this analysis for both, men and women between the ages of 18 and 70. It includes households from Australia, Austria, Germany (West), Great Britain and Northern Ireland, Ireland, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, and the United States.

A main contribution of this survey is that it asks questions about gender roles. I construct a principal component index from a series of eight responses that capture the level of agreement with statements designed to capture attitudes towards the gender division of household labor.[21] The responses

[20] Some Eastern European and developing countries were also part of the ISSP survey. However, due to the differences in economic systems and demographic processes, this analysis concentrates on western developed countries.

[21] The principal component factor analysis finds a number of common factors that linearly reconstruct the following 13 variables:

"A working mother can establish just as warm and secure a relationship with her children as a mother who does not work."

"A pre-school child is likely to suffer if his or her mother works."

"All in all, family life suffers when the woman has a full-time job."

"A job is all right, but what most women really want is a home and children."

"Being a housewife is just as fulfilling as working for pay."

"Having a job is the best way for a woman to be an independent person."

"Both the man and woman should contribute to the household income."

are coded on a 1 to 5 scale, from "strongly agree" to "strongly disagree". Table 4 shows the average value of the principal component index in each country by survey year. Countries are ordered from higher to lower values of this index according to 1994 values, with a higher index meaning more *egalitarian*. Attitudes toward the gender division of household labor are less egalitarian in countries such as Austria, Italy, Japan, and Spain than in countries such as Norway, Sweden, and Canada. There is not a substantial change with respect to the ranking of countries according to this index in the two survey periods. Neither a clear trend toward more egalitarian attitudes across countries can be observed from aggregate values. It is also noticeable that among the countries with less egalitarian gender norms are those with lowest-low fertility and union formation rates, such as Japan, Italy and Spain.

Given that the object of interest is household formation and not marriage per se, I define an ever married woman as a woman who is either married or has ever been married (i.e. divorce or widowed). I also include all women who are currently living with a partner in a long lasting relationship. I construct this variable using the answers to the questions on marital status and steady life partnership (i.e. whether living together with a partner). Table 4 reports summary statistics for these two variables. The first thing to observe is that the percentage of women ever to cohabit is much higher for those countries with more egalitarian attitudes. This difference is also more pronounced in

"A man's job is to earn money; a woman's job is to look after the home and family."

2002 than in 1994. Secondly, both marriage and partnership rates seem to increase as we move toward countries with more egalitarian attitudes.

Country (From more to less egalitarian)	Year	% Ever Married	% Ever in Partnership	Gender Roles Principal Component Index	Yrs. Of Schooling (males)	Yrs. Of Schooling (female)	Obs.
Canada	1994	0.71	0.71	0.87	---	---	1,313
	2002	---	---	---	---	---	---
Sweden	1994	0.76	0.76	0.72	11.51	11.50	1177
	2002	0.54	0.80	0.83	11.93	12.50	974
Norway	1994	0.66	0.79	0.35	13.22	12.60	1,910
	2002	0.70	0.85	0.58	13.50	13.22	1,368
Great Britain	1994	0.81	0.81	0.35	11.46	11.38	867
	2002	0.76	0.76	0.06	12.28	12.21	1,672
Northern Ireland	1994	0.75	0.75	0.34	11.50	11.33	545
	2002	0.72	0.72	0.02	---	---	845
US	1994	0.77	0.77	0.33	13.46	13.38	1,270
	2002	0.74	0.78	0.11	13.59	13.51	1,063
Netherlands	1994	0.72	0.72	0.14	12.95	12.10	1,743
	2002	0.67	0.78	-0.07	14.30	13.19	1,110
New Zealand	1994	0.84	0.84	-0.01	12.03	11.90	932
	2002	0.80	0.87	-0.25	13.31	13.19	888
Ireland	1994	0.71	0.71	-0.08	11.09	11.58	866
	2002	0.68	0.71	0.03	12.34	12.58	1094
Spain	1994	0.68	0.68	-0.10	---	---	2,259
	2002	0.66	0.71	0.01	11.90	11.50	2,170
Australia	1994	0.86	0.86	-0.15	11.52	11.30	1,560
	2002	0.81	0.86	-0.27	12.22	12.17	1,239
Japan	1994	0.79	0.79	-0.18	12.21	11.67	1,143
	2002	0.81	0.81	-0.13	13.05	12.34	948
Germany	1994	0.75	0.85	-0.21	---	---	2,129
	2002	0.71	0.86	0.20	11.38	11.00	835
Italy	1994	0.71	0.71	-0.27	11.27	9.86	983
	2002	---	---	---	---	---	---
Austria	1994	0.82	0.82	-0.50	12.45	11.18	852
	2002	0.71	0.79	-0.14	---	---	1770.00
Overall	1994	0.75	0.77	0.09	12.18	11.80	19,549
	2002	0.72	0.79	0.11	12.57	12.42	21,948

Table 4: Summary Statistics by Country and Survey Year

Female education is used as a measure of market female human capital and potential outside opportunities. Education is given in years and levels, but data on levels applies different criteria among different countries and it is hard to interpret. Instead I use completed years of schooling. I lose

information on Austria, Germany, Northern Ireland, and Spain, for one survey year because these countries have no information on this variable.[22] As mentioned in the introduction, differences in education across countries are not significant. Especially the woman to man education ratio is small for all countries in the two survey years.

4.1 The Allocation of Time to Household Production

The data also contains information on the share of household production that each partner undertakes. Questions on household production include who does the laundry, who shops for groceries, who prepares meals and who cares for the sick. Answers to the question "who does what" are tabulated in 6 different categories: The first two is *always* and *usually* the woman , the third is *both* and the fourth and fifth are *usually* and *always the man.* A sixth category is *a third person.* In the data less than 2% of the sample outsource these services, so I drop these observations.[23] Table 4.1 shows the share of housework performed by each partner in each country during the two

[22]Rather than dropping these countries alltogether, I control for missing education in these countries adding a dummy for missing education and continue to use the other relevant information.

[23]Low levels of housework outsourcing are consistent with more detailed time-use surveys.

years the survey was implemented.[24] Countries are ordered from more to less egalitarian according to their 1994 egalitarian index. Table 4.1 shows that, first, more egalitarian countries tend to have a higher participation of men in household activities and second, that the spousal distribution of housework share has not changed much over the two survey years.

[24]Section 5 provides further evidence that the division of housework has changed little both, across countries and over time.

Country Survey Year	Laundry Usually/ Always woman	Both	Usually/ Always man	Out-sourcing	Obs.	Sick Caring Usually/ Always woman	Both	Usually/ Always man	Out-sourcing	Obs.
CA										
1994	0.70	0.25	0.05	0.01	829	0.50	0.49	0.01	0.00	781
2002										
SW										
1994	0.80	0.17	0.03	0.00	831	0.41	0.57	0.02	0.01	773
2002	0.73	0.21	0.07	0.00	731	0.40	0.56	0.04	0.00	649
NO										
1994	0.82	0.16	0.02	0.00	1,365	0.44	0.55	0.01	0.01	1,232
2002	0.80	0.16	0.04	0.00	1,033	0.43	0.55	0.02	0.02	918
GB										
1994	0.81	0.18	0.01	0.01	547	0.50	0.49	0.01	0.01	520
2002	0.79	0.16	0.05	0.01	998	0.55	0.42	0.03	0.01	885
NI										
1994	0.90	0.09	0.01	0.02	310	0.53	0.46	0.01	0.01	299
2002	0.87	0.10	0.03	0.02	437	0.60	0.36	0.04	0.01	421
US										
1994	0.68	0.27	0.05	0.02	718	0.48	0.50	0.02	0.01	708
2002	0.62	0.28	0.10	0.02	629	0.49	0.45	0.06	0.01	608
NL										
1994	0.88	0.10	0.01	0.00	1,162	0.49	0.50	0.02	0.00	1,132
2002	0.85	0.11	0.04	0.00	748	0.50	0.47	0.02	0.00	721
NZ										
1994	0.75	0.22	0.04	0.00	705	0.59	0.40	0.01	0.00	682
2002	0.77	0.19	0.04	0.00	647	0.59	0.38	0.03	0.00	602
IR										
1994	0.88	0.12	0.00	0.00	555	0.52	0.47	0.01	0.00	550
2002	0.87	0.10	0.03	0.01	679	0.56	0.40	0.03	0.01	646
SP										
1994	0.91	0.08	0.01	0.02	1,416	0.61	0.38	0.01	0.00	1,402
2002	0.83	0.14	0.03	0.01	1,332	0.53	0.43	0.04	0.01	1,271
AUS										
1994	0.79	0.16	0.05	0.01	1,415	0.62	0.35	0.03	0.01	1,336
2002	0.75	0.14	0.11	0.03	1,128	0.63	0.31	0.06	0.04	1,065
JA										
1994	0.96	0.04	0.01	0.02	827	0.79	0.20	0.01	0.02	790
2002	0.91	0.07	0.02	0.03	689	0.73	0.23	0.04	0.02	630
GE										
1994	0.91	0.08	0.01	0.02	1,472	0.57	0.42	0.01	0.01	1,341
2002	0.89	0.09	0.03	0.02	568	0.57	0.40	0.03	0.01	499
IT										
1994	0.98	0.02	0.00	0.01	625	0.57	0.41	0.01	0.00	616
2002										
OS										
1994	0.94	0.04	0.02	0.01	590	0.62	0.37	0.02	0.01	556
2002	0.90	0.07	0.03	0.02	1,082	0.58	0.39	0.03	0.02	937

Table 4.1: The Division of Household Production

Country Survey Year	Grocery Shopping: Usually/ Always woman	Both	Usually/ Always man	Out-sourcing	Obs.	Meal Preparation: Usually/ Always woman	Both	Usually/ Always man	Out-sourcing	Obs.
CA										
1994	0.47	0.43	0.10	0.00	839	0.57	0.37	0.06	0.00	837
2002										
SW										
1994	0.42	0.49	0.09	0.00	830	0.56	0.42	0.03	0.00	829
2002	0.38	0.49	0.13	0.00	732	0.60	0.29	0.11	0.00	732
NO										
1994	0.40	0.50	0.10	0.00	1,366	0.53	0.42	0.05	0.00	1,366
2002	0.43	0.48	0.10	0.00	1,035	0.59	0.31	0.09	0.00	1,034
GB										
1994	0.43	0.53	0.05	0.00	554	0.59	0.36	0.05	0.00	553
2002	0.46	0.46	0.08	0.00	997	0.59	0.31	0.11	0.01	1,000
NI										
1994	0.59	0.38	0.03	0.00	315	0.65	0.33	0.02	0.01	314
2002	0.62	0.34	0.04	0.00	442	0.64	0.31	0.05	0.01	442
US										
1994	0.49	0.45	0.06	0.00	729	0.54	0.40	0.06	0.00	726
2002	0.48	0.42	0.10	0.00	642	0.55	0.31	0.13	0.00	639
NL										
1994	0.58	0.34	0.08	0.00	1,163	0.66	0.31	0.03	0.00	1,163
2002	0.58	0.30	0.10	0.00	748	0.66	0.24	0.09	0.00	747
NZ										
1994	0.60	0.36	0.04	0.00	707	0.70	0.26	0.04	0.00	706
2002	0.58	0.35	0.07	0.00	647	0.65	0.27	0.08	0.00	648
IR										
1994	0.67	0.29	0.04	0.00	554	0.75	0.23	0.02	0.00	555
2002	0.63	0.29	0.08	0.01	681	0.71	0.23	0.06	0.01	682
SP										
1994	0.68	0.29	0.03	0.01	1,421	0.81	0.18	0.01	0.01	1,431
2002	0.51	0.42	0.07	0.00	1,346	0.75	0.19	0.06	0.01	1,337
AUS										
1994	0.60	0.31	0.09	0.00	1,391	0.71	0.23	0.06	0.00	1,412
2002	0.61	0.25	0.14	0.02	1,113	0.68	0.19	0.13	0.03	1,112
JA										
1994	0.80	0.20	0.01	0.03	824	0.94	0.05	0.01	0.03	821
2002	0.76	0.22	0.02	0.01	700	0.91	0.08	0.02	0.03	691
GE										
1994	0.49	0.44	0.06	0.01	1,489	0.55	0.43	0.02	0.01	1,485
2002	0.51	0.41	0.08	0.01	573	0.76	0.18	0.06	0.00	573
IT										
1994	0.58	0.37	0.05	0.01	627	0.73	0.25	0.02	0.00	630
2002										
OS										
1994	0.52	0.39	0.09	0.01	592	0.58	0.40	0.03	0.00	589
2002	0.46	0.46	0.09	0.00	1,101	0.77	0.17	0.06	0.01	1,096

Table 4.1 (cont.): The Division of Household Production

5 Empirical Analysis

The empirical analysis in this section tests the implications for individual behavior that follow from the partial equilibrium model. The first part of the empirical analysis provides evidence of the hypothesized social constraint upon the allocation of family time. The second part of the empirical analysis evaluates the effect of this social constraint on a woman's probability of entering a union. This social constraint is captured by the "attitudinal index" reported in Table 4 by the principal component index. Higher (more egalitarian) values of this index represent a lower constraint upon the division of household production.

5.1 Evidence for the Persistence of Gender Roles

As mentioned in the introduction despite the increase in relative female human capital (and labor force participation) men's time to household production remains low and has not substantially increased over time. This regularity is inconsistent with household models based on either specialization or bargaining theories and suggests the existence of *gender effect* associated to household production. This section provides evidence for the hypothesized *gender effect* based on the 1994 and 2002 ISSP data sets. The data does not contain information on the time that each partner devotes to household production, but it does contain information on each partner's share of total time.

		Laundry		Cares for the sick		Grocery Shopping		Meal preparation	
		Woman's work status		Woman's work status		Woman's work status		Woman's work status	
		not working	working	not working	working	not working	working	not working	working
1994	Always woman	0.718	0.512	0.4	0.256	0.399	0.272	0.491	0.282
	Usually woman	0.207	0.316	0.313	0.308	0.293	0.288	0.319	0.35
	Both	0.06	0.134	0.273	0.411	0.267	0.369	0.161	0.3
	Usually man	0.008	0.021	0.007	0.014	0.028	0.049	0.019	0.045
	Always man	0.005	0.014	0.005	0.01	0.011	0.02	0.007	0.02
2002	Always woman	0.651	0.435	0.399	0.261	0.359	0.257	0.498	0.296
	Usually woman	0.251	0.354	0.318	0.315	0.302	0.292	0.322	0.364
	Both	0.078	0.164	0.27	0.4	0.292	0.379	0.153	0.281
	Usually man	0.011	0.026	0.007	0.013	0.032	0.05	0.017	0.04
	Always man	0.007	0.018	0.005	0.009	0.012	0.02	0.007	0.017

Sample: Women between 30 and 40 years old
In 2002: 2,940. In 1994: 2,297
Estimated probabilities from ordered logit regressions

Table 5.1: Estimated Logit Probabilities from second column in Table A.

Table 5.1 provides evidence for the existence of rigidities associated to the allocation of time to household production and summarizes some interesting results regarding the allocation of time to several household production activities for a representative cohort of women between 30 and 40 years old.[25] Predicted probabilities are derived from the ordered logit regression model in Appendix A.

Column 1 analyzes the case where a woman is not working (and only the male partner is) and column 2 analyzes the case where both partners work. Several interesting results are worth mentioning. First, working women are less likely than non-working women to do most of the household produc-

[25] See Appendix A for estimates from the ordered logit regression. The predicted probabilities presented here are derived from the regressions in the second column of table A.

tion and are more likely to share this activities with her partner. Similarly, men are more likely to contribute when the woman is working. Nonetheless, differences between genders are significantly apart with women contributing most of the time to household production. Second, although the probability that a man contributes to household production activities has increased from 1994 to 2002, it remains significantly small at around 4 percent if the woman works, and 2 percent if she does not. Thus, women have gone from *always* doing household activities to *usually*. For example, for the case of doing laundry the probability that *both* partners contribute has increased only 3 percent if the woman works and close to nothing if she does not (although the probability that a woman contributes *always* to this activity has gone from .71 to .65 in the case that she works and from .51 to .43 if she does not). Third, the probability that a woman *always* or *usually* does household production activities remains very high at about 40 percent (compared to 4 percent and 2 percent for men).

5.2 Social Constraints and Household Formation

The theoretical model predicts that the mechanism through which gender roles affect a woman's probability of entering a union is by constraining the allocation of household time, which reduces the gains from forming a union. In particular, proposition 3 showed that a woman who lives in a country with more egalitarian gender roles has, ceteris paribus, a higher probability

of entering a union than a woman in a less egalitarian country.[26] Formally, the model states that the decision rule to form a union for woman i in country k is given by

$$\text{form a union } if\ V_{i,k}^{U} \geq V_{i,k}^{S} + \varepsilon_{i,k} \text{ for } i = m, f$$

where $\varepsilon_{i,k}$ is an individual taste parameter toward remaining single. This is randomly distributed across countries but correlated within countries,[27] with cumulative distribution $\varepsilon_{i,k} \tilde{} N(0, \Sigma_k)$ for $i = m, f$ (male or female) and $k = 1...13$.

In effect, the probability of a union may be written as a function of observable individual and "marriage market" characteristics, which include gender roles

$$\begin{aligned} p_{i,k} &= p(V_{i,k}^{U} - V_{i,k}^{S} \geq \varepsilon_{i,k}) = \\ &= p[f(\text{EDU}_{i,k}, \text{AGE}_{i,k}, \text{GR}_k) \geq \varepsilon_i] \end{aligned}$$

thus the reduce form econometric specification is

$$p_{i,t,a,k} = X_{i,t,a,k}\beta_1 + E_{t,k}\beta_2 + \theta_t + \lambda_a + \omega_k + +\varepsilon_{i,k}$$

[26] Throughout the analysis it is assumed that the country's attitudes toward gender roles is the implicit reference group that affects the ability of potential partners to efficiently divide the marital surplus. This assumption avoids self-selection problems given that mobility across countries does not take place.

[27] I choose a relatively large cell size, the woman's country in a particular survey year, to minimize measurement error in my estimates of marriage-market specific social constraints.

where $p_{i,t,a,k}$ is the probability of entering a union for woman i in survey year t, cohort a, and country k. $X_{i,t,a,k}$ is a set of individual observable characteristics (education, age and labor force participation) and θ_t and ω_k are the year and country fixed effects respectively. The error term captures the taste for marriage that is assume to follow a normal distribution with variance σ_k the same for all women in country k.

The identification of social effects on individual union formation probabilities comes from the differential changes over the survey period and across countries of the variable $E_{t,k}$, which is the principal component index that captures the level of *gender roles* (or social constraint) at survey year t in country k. Higher values of this variable are associated with more egalitarian gender roles, and therefore with a lower constraint upon the division of household production between partners.

Notice that ω_k, the country fixed effect, accounts for permanent differences across countries over the survey period that may systematically affect the probability of women entering a union in some countries. For example, permanent differences in preferences toward forming a union, so that everything else equal women living in some countries are more prone to enter a union than in others, would be captured by the country fixed effect. Similarly, systematic differences in preferences toward household production across countries, which would affect the probability of entering a union, are also captured by the country fixed effect. This would the case if, for example, Spaniards prefered (on average) a cleaner household (and therefore had

a higher preference for more household production). This would imply that, ceteris paribus, Spaniards would have a lower probability of entering a union (as they would require, ceteris paribus, a higher union formation gain than say, Swedes). By the same underlying principle, the survey year fixed effect θ_t accounts for any common change to all countries over the survey years. For example, a change in attitudes toward forming a union that would have similarly occurred in all countries during the survey period, would be captured by the survey year fixed effect.[28] Thus, so long as the country fixed effect does not vary over the survey period and the survey year fixed effect does not vary across-countries, this approach yields an unbiased estimate of β_2.[29]

[28] The survey also contains information on attitudes toward marriage and cohabitation. Appendices B and C present the answers to these questions. In general, more egalitarian countries are more receptive to cohabitation whereas less egalitarian countries seem to place more value on marriage. This is captured in the regression by ω_k. Moreover, these attitudes change consistenly in all countries over the two survey periods (in all countries cohabitation has become more acceptable and marriage has become less). This is captured in the regression by θ_t. Thus, β_2 is not likely to capture a differential change in attitudes toward union formations.

[29] Notice that this aproach is similar to a difference in difference approach, where the treatment is a continuous rather than a discrete variable (mainly, the degree of gender roles in a given country).

Probit: Woman's Probabiltiy of Entering a Union	No individual Effects	With Individual Effects
Completed years of schooling	-0.009	-0.009
	[-9.08]***	[-8.76]***
Age	0.006	0.006
	[29.17]***	[26.57]***
Survey Year (=1 if 2002)	0.007	0.011
	[1.08]	[1.63]
Gender Roles by country and survey year	0.077	0.085
(higher values mean more "egalitarian")	[2.08]**	[2.23]**
Woman's individual attitudes toward gender roles		-0.012
(higher values mean more "egalitarian")		[4.56]***
Observations	17,981	15,587

Robust z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%
Sample: Women between 20 and 70 years old
The coefficients are marginal effects of the independent variables on the probability of entering a union

Table 5.2: Probit Estimates of Gender Roles and a Woman's Probability of Entering a Union.

Column 1 in Table 5.2 shows the results for this regression, for a sample of women between 20 and 70 that are not currently studying.[30] The coefficients of the woman's individual variables have the usual sign. The higher the woman's education, the lower the probability of entering a union, which is consistent with the specialization theory of the household proposed in Section 3. Thus, a one year increase in schooling decreases a woman's probability of entering a union by almost 1 percentage point. The small magnitude of this

[30] The reported coefficients from the probit models presented here are the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables.

coefficient, together with the fact that the cross-country educational differences are not significant, further supports the argument that relative female education is not the appropriate variable to explain cross-country differences in union formation. The coefficient on age is negative and significant, although small in sign.[31] There is no significant change on the probability of entering a union in the survey-years. The coefficient of *survey year* is not significant, probably because the period of analysis is too short to identify intertemporal changes.

The coefficient of interest β_2 is the coefficient corresponding to the country-year variable *gender roles by country and survey year.* This variable is the principal component index that measures average gender roles in a country in a given survey year. This coefficient is statistically significant and has the predicted sign, i.e. a woman living in a more egalitarian country has a higher probability of entering a union. In particular, a one unit increase in the principal component index increases leads to a 0.07 increase in the probability of entering a union. Thus, the average Spanish woman, with an index of 0.01 in 2002 had a 5.74 percentage points lower probability of entering a union than her Swedish counterpart, living in a country with an egalitarian index of .83. This value is just above the 3 percentage points reported in Table 1 for the 30-34 cohort.

[31] This can be explained by the fact that the coefficients reported in Table 5.2 are evaluated at mean values of the independent variable. In the case of age, the mean value is relatively high (46.44 years old).

5.3 Identifying Social Effects

I have argued that more egalitarian attitudes toward gender roles in a country positively affect individual choices, in particular individual union formation probability by imposing a social constraint that prevents potential partners from dividing the marital surplus in an efficient manner. This results in a lower surplus for a woman, which diminishes her probability of entering a union.

However, average attitudes in a country are, by definition, correlated to individual attitudes and so it could be argued that average gender roles are capturing the effect of individual attitudes. For instance, if one believed that individual attitudes toward gender roles are associated with a higher probability of union formation (i.e. if being a more egalitarian woman was associated with a higher taste for forming a union) then omitting individual attitudes would result in a bias of the β_2 coefficient. The remaining of this section takes advantage of the specific features in the ISSP data set and use subjective data, as proposed in Manski (Manski, 1993) and (Manski, 2000), in order to identify the social effects from individual attitudes.

Column 2 of Table 5.2 shows that adding individual attitudes toward gender roles in the regression presented in column 1 of Table 5.2 does not change the sign of the coefficient on *gender roles by country and survey year*. Furthermore, individual and average country gender roles seem to go in opposite directions. These two results further support the existence of social

effects on woman's individual probability of entering a union.

On the one hand, woman's individual attitudes toward gender roles significantly and negatively affect[32] (although in small magnitude) the probability of entering a union. This is consistent with the model presented in Section 3, as more egalitarian women can be thought of as having a higher disutility from the time allocated to household production. Therefore, more egalitarian women need, everything else equal, a higher share of the surplus when entering a union, which translates in a lower probability of entering a union ceteris paribus. The coefficient on the social effect on the other hand continues to be significant and positive, which suggests that women living in more egalitarian countries have a higher probability of entering a union of 9 percentage points on average.

6 Conclusion

The study of below replacement fertility characteristic of developed economies has traditionally overlooked union formation processes. However, cross-country differences in union formation rates are significant, especially among

[32] The coefficient on individual attitudes must be interpreted with caution. Only under the assumption that individual attitudes toward gender roles are not just refleting attitudes toward union formation can this coefficient be interpreted causally.

younger cohorts. Both, declines in marriage rates and increases in cohabitation rates have followed very different trends across the developed world. In particular, the so-called lowest-low fertility countries, like Italy, Spain or Japan, have experienced a decline in marriage rates that have not been accompanied by increases in cohabitation (and out-of wedlock fertility) rates characteristic of the rest of the developed world. It becomes thus increasingly important to look at union formation processes for the study of fertility.

Economic theories of the household and the marriage market may provide an explanation for the differences in household formation rates over time based on the evolution of female wages. However, cross-country differences in female market human capital are unlikely to account for the divergence in existing union formation rates across developed countries. This paper empirically and theoretically explores the social effects associated to household formation decisions in order to shed light onto the factors that contribute to differences in the probabilities of entering a union across countries.

A stylized partial equilibrium model of union formation is developed that formally analyzes the channel through which social effects affect the individual decision to entering a union. Social effects are rationalized as gender roles that constrain how potential partners divide the gains from entering a union. The inability of potential partners to credibly commit to make transfers of time, rather than private consumption, before the union is formed is at the root of the argument. In this setting both, the non observability by third parties of spouse's time devoted to household production and the inexistence

of credible threats for certain household production activities leads potential partners to rely on gender roles when making a decision on how to divide the household surplus. The model predicts that gender roles result in inefficient household time allocations, which diminishes a woman's gains to entering a union. Thus, women in less egalitarian countries have, ceteris paribus, a lower probability of entering a union.

Social interactions or social norms are usually neglected in economics because they are to a large extent enforced through nonmarket interactions and difficult to isolate empirically. Empirical results from individual level cross-country and longitudinal data support the predictions of a household formation model with social constraints upon the allocation of household time. I first show that after controlling for employment status and other relevant variables household time allocation patterns have not substantially changed over time. This provides evidence for the existence of social constraints upon de allocation of household time. I then provide and identification strategy of these social effects which exploits the time and cross-country variation in the data as well as individual reported attitudes toward gender roles, which allows for the identification of gender roles net of individual attitudes and other social interactions.

The relevance of the present work goes beyond the academic sphere and has important policy implications for the recent demographic developments in the industrialized world. Ultimately, this work calls for rethinking traditional work-family policies designed to reconcile work and family by reduc-

ing the private costs of devoting time to family responsibilities. While such family policies have been somewhat successful in terms of fertility in Scandinavian countries, there is a concern that they have reinforced the traditional gender division of labor (Gornick and Meyers, 2003). In this paper the presence of social effects that constraint the allocation of household time has been argued to be the result of imperfect commitment processes within the household, which might provide the theoretical foundations for the design of policies that encourage men's participation in family work.

References

Albrecht, James W., Per-Anders Edin and Vroman, Susan B., "A Cross-Country Comparison of Attitudes Towards Mothers Working and their Actual Labor Market Experience", Labour 14 (4) 591-608.

Akerlof, G., and Kranton, R. (2000), "Economics and Identity", Quarterly Journal of Economics, Vol. 115, Issue 3: 715-753.

Apps, P. (2003), "Gender, Time Use and Models of the Household", IZA Discussion Paper No. 796.

Apps, P. and Rees, R. (1997), "Collective Labor Supply and Household Production", The Journal of Political Economy, Vol. 105, No. 1, 178-190.

Apps, P. and Rees, R. (1996), "Labour Supply, Household Production and Intra-Family Welfare Distribution", Journal of Public Economics (60), 199-219.

Alvarez and Miles (2003), "Gender effects on Housework Allocation: Evidence from Spanish two-earners couples", Journal of Population Economics 16: 277-242.

Basu, Kaushik (2004) "Gender and Say: A Model of Household Behavior with Endogenously-determined Balance of Power", Harvard Institute of Economic Research Discussion Paper No. 2054.

Becker, G. (1965), "A Theory of the Allocation of Time", Economics Journal 75: 493-517.

Becker, G. (1973), "A Theory of Marriage: Part I", The Journal of Political Economy, Vol. 81, No. 4, pp. 813-846

Becker, G. (1974), "A Theory of Marriage: Part II", The Journal of Political Economy, Vol. 82, No. 2, Part 2: Marriage, Family Human Capital, and Fertility, pp. S11-S26.

Becker, G. (1991), "A Treatise on the Family", Harvard University Press, Cambridge, Massachusetts.

Becker and Murphy (2000), Social Economics: Market Behavior in a Social Environment . Cambridge, MA: Belknap Press.

Bertrand, Luttmer and Mullainatham (2000), "Network Effects and Welfare Cultures", Quarterly Journal of Economics 115:3.

Bettio, F. and Villa, P. (1998), "A Mediterranean Perspective on the Breakdown of the Relationship between Participation and Fertility", Cambridge Journal of Economics 22, 2: 137-71

Bittman, M., England, P., Folbre, N., Matherson, G. (2002), "When Gender Trumps Money: Bargaining and Time in Household Work", MIMEO.

Blau Francine D., and Kahn, Lawrence M. (1992), "The Gender Earnings Gap: Learning from International Comparisons", The American Economic Review (May 1992) 553-538.

Bryant, W.Keith, The Economic Organization of the Household, Cambridge University Press 1995.

Browning and Chiappori (1997), "Efficient Intra-Household Allocations: A General Characterization and Empirical Tests", Econometrica, Vol. 66, No. 6. (Nov., 1998), pp. 1241-1278.

Chiappori, P-A (1992), "Collective Labor Supply and Welfare", The Journal of Political Economy, Vol. 100, Iss. 3.437-467.

Council of Europe, Recent Demographic Developments in Europe, Council of Europe Press 2001.

De Laat, J. and Sevilla-Sanz, A. (2004). "Working Women, Husband's Home Time, and Lowest-Low Fertility in Europe" (mimeo).

Drewianka, Scott (2003), "Estimating Social Effects in Matching Markets: Externalities in Spousal Seach", The Review of Economics and Statistics, 85(2): 409-423.

Duflo, Esther and Saez, Emmanuel (2000), "Participation and Investment Decissions in a Retirement Plan: The Influence of Colleges' Choices", NBER working paper No. 7735.

"How Europeans spend their time Everyday life of women and men". Luxembourg: Office for Official Publications of the European Communities, 2004 (ISBN 92-894-7235-9). European Communities, 2004.

Fella, Giulio, Mariotti, Marco, Manzini, Paola (2004) "Does Divorce Law Matter?", Journal of the European Economic Association, 2(4):607–633

Fernández, Raquel, Fogli, Alessandra and Olivetti, Claudia (2004),

"Mothers and Sons: Preference Formation and Female Labor Force Dynamics"Quarterly Journal of Economics, Volume 119, Number 4.

Folbre N. and Bittman, M (2004), "Family Time: The Social Organization of Care", Routledge, New York, NY.

Fraboni, R. and Rosina, A. (2004). "Is Marriage Losing its Centrality in Italy?." Demographic Reseach, Volume 11, Art. 6

Gornick, Janet C., Meyers, Marcia K (2003), "Families That Work: Policies for Reconciling Parenthood and Employment", New York : Russell Sage Foundation.

Hersch, J. and Stratton, L.S. (2002), "Housework and Wages", Journal of Human Resources, Vol. 37 Issue 1, p217

Hersch, J. and Stratton, L.S. (1994), "Housework, Wages, and the Division of Housework Time for Employed Spouses", The American Economic Review, Volume 84, Issue 2, Papers and Proceedings of the Hundred and Sixth Annual Meeting of the American Economic Association, 120-125.

International Social Survey Program, Module "Family and Changing Gender Roles" (1994)

Juster, T. and Stafford, F. (1991), "The Allocation of Time: Empirical Findings, Behavioral Models, and Problems of Measurement", Journal of Economic Literature, Vol. 29, No. 2, pp. 471-522.

Kohler, H (2002), "The Emergence of Lowest Low Fertility in Europe

during the 1990's", Population and Development Review 28(4): 641-680

Loughram, David S., (2002), "The Effect of Male Wage Inequality on Female Age at First Marriage", The Review of Economcis and Statistics, 84(2): 237-250.

Lundberg, S. and R.A. Pollak, (2001), "Efficiency in Marriage,"NBER Working Paper 8642.

Lundberg, S. and R.A. Pollak, (1993) Separate Spheres Bargaining and the Marriage Market, Journal of Political Economy, 101, iss. 6, pp. 988-1010

Manski, Charles F. (1993), Identification of Endogenous Social Effects: The Reflection Problem, The Review of Economic Studies, Vol. 60, No. 3, 531-542.

Manski, Charles F., (2000), "Economic Analysis of Social Interactions", Journal of Economic Perspectives, Volume 14, Number 3, pp. 115-136.

Mazzocco, Maurizio (2003) "Individual Euler Equations rather than Household Euler Equations", Working Paper , University of Wisconsin.

McElroy, M. and M.J. Horney (1981), "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand", International Economics Review, Vol. 22, Issue 2 pp. 333-349.

Morgan, S.Philip (2003), "Is Low Fertility a Twenty-First-Century Demographic Crisis?", Demography, Vol. 40, Number 4 pp 589-604.

Rasul, Imran, Household Bargaining Over Fertility: Theory and Evidence from Malaysia, working paper, London School of Economics, 2002.

Retherford, Robert D., Ogawa, Naohiro, Matsukura, Rikiya, "Late Marriage and Less Marriage in Japan", Population and Development Review, Vol. 27, No. 1. (Mar., 2001), pp. 65-102.

Sah, Raahj (1991), "Social Osmosis and Patterns of Crime", Journal of Political Economy 99:6, 1272-1295.

Stutzer, Alois and Lalive, Rafael (2004), The Role of Social Work Norms in Job Searching and Subjective Well-Being, Journal of the European Economic Association, Vol 2, Issue 4.

UN FFS surveys and country reports, http://www.unece.org/ead/pau/ffs/

Weil D. (1999), "Population Growth, Dependency, and Consumption" (in Why Has Fertility Fallen below Replacement in Industrial Nations, and Will It Last?) The American Economic Review, Vol. 89, No. 2, Papers and Proceedings of the One Hundred Eleventh Annual Meeting of the American Economic Association. pp. 251-255.

A Ordered Probit Model Results: Allocation of Time to Household Production

Table A shows the ordered logit used for constructing table 5.1. The sample is restricted to those who are married or living as married and have finished school. The dependent variables are "who does the laundry", "who takes care for the sick", "who does the grocery shopping" and "who prepares meals". The dependent variables go from 1 to 5, 1 meaning always woman, and 5 meaning always the man. I control for survey year, country, gender of the respondent, work status of the respondent and the spouse and an interaction term to control for whether the work status is related to the man or the woman.

We see that the variable "survey year" has a positive coefficient. This variable takes value 1 if the survey year is 2002, which means that there has been an increase in the probability for higher values of the dependent variable, i.e. men are more likely (or women less likely) to take on household production activities. However, when evaluating this probabilities at mean values as in 5.1, we see that this has only happened for low values of the dependent variable (i.e. the man partner continues to allocate very little time to household production).

Notice that there is also a disconnect between what men report and what women report. Men tend to report higher values of the dependent variables

than women (i.e. the dummy that controls for the man being the respondent has a positive and significant coefficient).

Ordered Logit	Allocation of Time To Houshold Production Activities							
	laundry		cares_for_sick		shop_for_groceries		meal_preparation	
Survey Year	0.18	0.16	0.05	0.04	0.096	0.085	0.065	0.05
	(5.99)***	(5.54)***	(1.81)*	1.3	(3.38)***	(2.97)***	(2.26)**	(1.75)**
Man respondent	0.58	0.78	0.73	0.91	0.58	0.8	0.56	0.764
	(22.92)***	(16.19)***	(29.18)***	(19.26)***	(24.40)***	(17.54)***	(23.38)***	(17.01)***
Respondent Working		0.84		0.62		0.46		0.827
		(21.00)***		(16.9)***		(12.72)***		(22.57)***
Spouse Working		-0.135		-0.125		-0.25		-0.153
		(3.13)***		(3.08)***		(6.52)***		(3.85)***
Respondent Working		-0.84		-0.69		-0.8		-0.877
(if man)		(14.56)***		(12.25)***		(14.97)***		(16.17)***
Spouse Working		0.73		0.53		0.65		-0.877
(if man)		(12.74)***		(9.42)***		(12.22)***		(16.17)***
Observations	24,175	24,175	22,605	22,605	24,219	24,219	24,239	24,239

Absolute value of robust z statistics in brackets
* significant at 10%; ** significant at 5%; *** significant at 1%

Dependent variable is "Who does what"?
It takes values frrom 1 (always woman) to 5 (always man).
Controls: Respondent's gender (=1 if man), survey year,
repondent's and spouse's work status,
iteration of man dummy with respondent's and spouse's work status,
cohort and country dummies.

Table A: Ordered Logit Estimates of the Allocation of Household Production

B Evolution of Cross-Country Attitudes regarding Marriage

Country/ Survey	Year	Attitudes Toward Marriage* Agree	N/A	Disagree	Obs
CA	1994	0.31	0.37	0.32	1,313
	2002				
SW	1994	0.17	0.38	0.44	1,177
	2002	0.14	0.39	0.47	974
NO	1994	0.16	0.33	0.50	1,910
	2002	0.15	0.38	0.47	1,368
GB	1994	0.23	0.39	0.38	867
	2002	0.21	0.42	0.36	1,672
NI	1994	0.25	0.39	0.36	545
	2002	0.30	0.24	0.45	845
US	1994	0.43	0.32	0.24	1,270
	2002	0.39	0.33	0.28	1,063
NL	1994	0.11	0.25	0.64	1,743
	2002	0.22	0.37	0.41	1,110
NZ	1994	0.22	0.20	0.39	932
	2002	0.21	0.43	0.35	888
IR	1994	0.32	0.22	0.46	866
	2002	0.31	0.26	0.43	1,094
SP	1994	0.31	0.19	0.50	2,259
	2002	0.21	0.18	0.70	2,170
AUS	1994	0.41	0.35	0.23	1,560
	2002	0.43	0.33	0.24	1,239
JA	1994	0.38	0.31	0.31	1,143
	2002	0.31	0.36	0.32	948
GE	1994	0.38	0.27	0.34	2,129
	2002	0.32	0.32	0.36	835
IT	1994	0.30	0.31	0.39	983
	2002				
OS	1994	0.44	0.27	0.29	852
	2002	0.33	0.32	0.35	1,770

Source: ISSP 1994 and 2002. Author's calculations
*Do you agree or disagree:
Married people are generally happier than unmarried people
** Countries are ordered from more to less egalitarian according to the egalitarian index in 1994

Table B: Attitudes toward Marriage

C Evolution of Cross-Country Attitudes toward Cohabitation

Country/ Survey	Year	Attitudes toward cohabitation* Agree	N/A	Disagree	Obs
CA	1994	0.69	0.13	0.18	1,313
	2002				
SW	1994	0.83	0.09	0.07	1,177
	2002	0.89	0.05	0.06	974
NO	1994	0.76	0.08	0.15	1,910
	2002	0.90	0.08	0.10	1,368
GB	1994	0.70	0.14	0.17	867
	2002	0.75	0.13	0.12	1,672
NI	1994	0.50	0.18	0.31	545
	2002	0.62	0.17	0.20	845
US	1994	0.46	0.18	0.31	1,270
	2002	0.50	0.18	0.20	1,063
NL	1994	0.85	0.06	0.08	1,743
	2002	0.91	0.50	0.03	1,110
NZ	1994	0.61	0.16	0.23	932
	2002	0.67	0.15	0.18	888
IR	1994	0.54	0.09	0.36	866
	2002	0.65	0.13	0.22	1,094
SP	1994	0.67	0.09	0.23	2,259
	2002	0.80	0.07	0.11	2,170
AUS	1994	0.6	0.15	0.25	1,560
	2002	0.67	0.16	0.17	1,239
JA	1994	0.38	0.22	0.40	1,143
	2002	0.44	0.20	0.36	948
GE	1994	0.71	0.10	0.18	2,129
	2002	0.81	0.08	0.11	835
IT	1994	0.60	0.12	0.27	983
	2002				
OS	1994	0.64	0.10	0.25	852
	2002	0.80	0.10	0.09	1,770

Source: ISSP 1994 and 2002. Author's calculations
* Do you agree or disagree:
It is all right for a couple to live together without intending to get married
** Countries are ordered from more to less egalitarian according to the egalitarian index in 1994

Table C: Attitudes toward Cohabitation