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DIVISION OF HOUSEHOLD LABOR AND CROSS-COUNTRY DIFFERENCES IN HOUSEHOLD FORMATION RATES

Almudena Sevilla Sanz

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Manor Road Building, Oxford OX1 3UQ

Division of Household Labor and Cross-Country Differences in Household Formation Rates*

Almudena Sevilla Sanz

University of Oxford

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Abstract

This paper explains the existing cross-country differences in household formation rates in industrialized countries by highlighting how an individual's probability to form a household may be affected by social norms toward the household division of labor. Because social norms are to a large extent enforced through non-market interactions they are difficult to isolate empirically. Two identification strategies are proposed. First, a diff-in-diff like approach is used for the identification of the effect of social norms net of other country-specific and time varying factors. A second identification strategy uses an individual's reported attitudes toward the household division of labor to allow for the identification of the effect of social norms net of individual preferences. Empirical results support the predictions of a household formation model where less egalitarian social norms decrease the supply of men in the household market by increasing a man's cost of providing household labor. Both men and women living in more egalitarian countries have, everything else equal, a higher probability of forming a household. Furthermore, consistent with the theory, individual attitudes run opposite to social norms for the case of women. Whereas ceteris paribus a more egalitarian woman has a lower probability of forming a household, a woman living in a more egalitarian country has, everything else equal, a higher probability of forming a household.

JEL Classification: D13, J0, J1, J2, Z13.
Keywords: Household Formation, Marriage Markets, Division of Household Labor, Household Specialization, Social Norms.

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1 Introduction

Traditionally the literature has looked at relative female market human capital to explain differences in household formation rates. This paper explains the existing cross-country differences in household formation rates in industrialized countries by highlighting how the probability to form a household may be affected by social norms toward the household division of labor. Cross-country differences in household formation rates go hand in hand with the phenomenon of below replacement fertility and the economic challenges associated to it (e.g., Weil 1999). Figure 1 presents the proportion of individuals currently living in a partnership and the average number of children per woman for 15 European countries.[1] The relationship between fertility and household formation rates is clearly positive. Not surprisingly, countries like Italy or Spain, with the lowest fertility rates among OECD countries, also have the lowest household formation rates.[2]

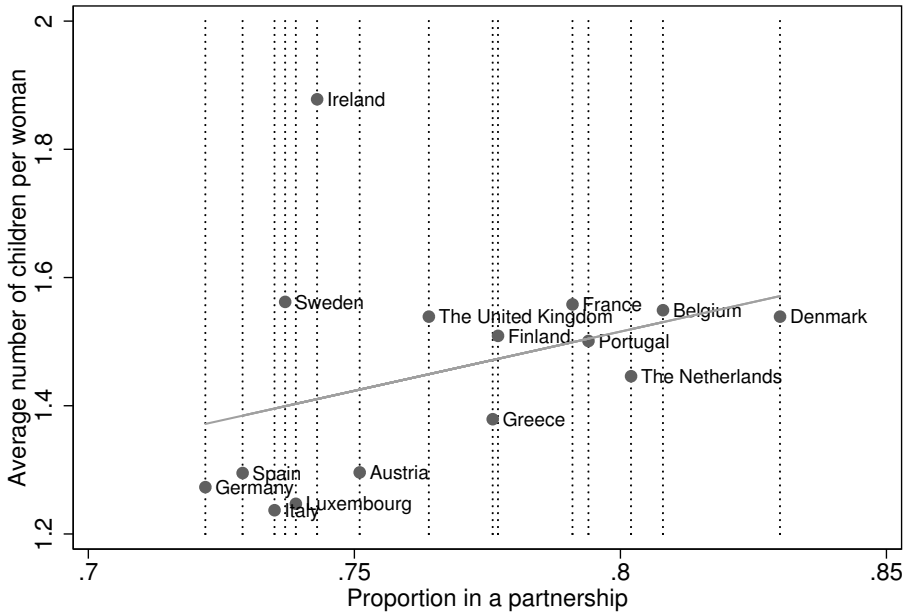
Incorporating social norms into an economic model of household formation contributes to the recent literature that looks at how social norms (or culture) shape an individual's economic behavior such as savings decisions (e.g., Carroll and Rhee 1994), fertility and female labor force participation (e.g., Fernández, Fogli, and Olivetti 2006), and living arrangements (e.g., Giuliano 2007). The fact that social norms are to a large extent enforced through non-market interactions makes them difficult to isolate empirically. These papers identify the effect of social norms by looking at the behavior of immigrants in the United States and find that, in most cases, immigrants behave in the US as they would in their country of origin. This replica of behavior in a neutral environment with the same institutions, policies and macroeconomic conditions, suggests that social norms in the country of origin play a role in determining an individual's economic behavior.[3]

[1]The sample is individuals between 30 and 40 years old that are taken from the 1994 to 2001 waves of the European Household Community Panel data set. The proportion of individuals in a partnership is calculated as the proportion of individuals who answer yes to be either cohabiting or married. The average number of children per woman is calculated as the number of children under 18 living with a woman aged 30 to 40 years old at the moment of the interview, regardless of whether the woman is in a partnership or not. Because Southern Europeans leave the parental home later, this measure is probably overestimating fertility and underestimating partnership formation in these countries, making the positive correlation between fertility and partnership formation even stronger. Using a different age for the main sample does not significantly change results.

[2]See Retherford, Ogawa, and Matsukura (2001) for a description of the Japanese case and Fraboni and Rosina (2004) for the case of Italy. See Ermisch and Francesconi (2000) for a cross-country comparison of cohabitation rates within Europe with a focus in the UK.

[3]Related to this literature is also the study of social or group effects. In the case of household formation models, Loughram (2002) analyzes the effect of male wage inequality on female's marriage probabilities and Drewianka (2003) exploits variations in a two-sided mate matching market to identify the externalities associated

FIGURE 1: Relationship between Fertility and Household Formation Rates in Europe



Source: Author's calculations from the European Community Household Panel Data

In the absence of experimental data this paper provides two different identification strategies of the effect of social norms on an individual's household formation probability. The first identification strategy comes from the time and cross-country variation of the data. In a similar approach to a difference in difference approach, where the treatment is a continuous rather than a discrete variable (i.e the degree of social norms in a given country), we are able to identify the effect of social norms net of other country-specific and time-varying factors. A second identification strategy relies on using an individual's reported attitudes toward the household division of labor, which allows for the identification of the effect of social norms net of individual preferences (e.g., Manski 2000) and (e.g., Manski 1993).[4]

We present a stylized model of household formation to illustrate how social norms on the division of household labor may influence individual decisions to form a household. Men and women in the household market have a demand for the household produced good and are interchangeable before they match into households. The equilibrium in the household market is thus characterized by an optimal *number* of households and a *price* of forming a household,

with spousal search.

[4]Hamermesh (2004) offers an interesting discussion of what economists can learn from the use of subjective outcomes as inputs to explain economic behavior.

which is the degree of household specialization defined as a woman's share of time in household production. Time-use studies show that a substantial amount of non-market work is devoted to household production and that cross-country differences in the division of household labor are significant. For example, weekly hours devoted to housework by Japanese men is 3.5 versus 13.8 hours by US men Juster and Stafford (1991). More recent time use studies reveal that women in Italy and Spain devote on average around 5 hours to domestic work per day, one more hour than women in Sweden, Norway or Finland. Similarly, just about 70 percent of Spanish and Italian men engage in household activities in any given day versus 92 percent of Swedish men (e.g., EUROSTAT 2004).

In light of this simple model less egalitarian social norms may either decrease the supply of men in the household market by increasing a man's cost of providing household labor, or may increase the demand for men (the supply of women) by decreasing a woman's cost of providing household labor. Thus, independently of whether social norms affect the supply of men or women in the household market, less egalitarian social norms toward the household division of labor decrease the equilibrium price of forming a household, i.e. the share of time that a woman devotes to household production once a household is formed goes down in the presence of less egalitarian social norms. However the effect of social norms on the equilibrium probability to form a household depends on whether social norms decrease the supply of men or increase the demand for men in the household market. If less egalitarian social norms decrease the supply of men by increasing a man's cost of providing household labor, the number of households will be lower in the presence of less egalitarian social norms. In contrast, if less egalitarian social norms increase the demand for men in the household market by lowering a woman's cost of providing household labor, the number of households formed in equilibrium will be higher.

To uncover which effect dominates in equilibrium an individual's household formation probability is estimated as a function of individual characteristics and country specific variables. The empirical analysis uses data from the 1994 and 2002 International Social Survey Program (ISSP). The 1994 and 2002 ISSP data is a cross-country data that contains individual level information on demographic and economic variables, as well as the division of household labor and an individual's reported attitudes toward the division of labor. Empirical results support the predictions of a household formation model with social norms that decrease the supply of men in the household market by increasing a man's cost of providing household labor. Both men

and women living in more egalitarian countries have, everything else equal, a higher probability of forming a household. This effect holds after controlling for observed individual heterogeneity and time varying factors at the country level that might otherwise bias the estimated effect of social norms toward the household division of labor.

We further extend the analysis to include an individual's attitudes toward the household division of labor to see whether the effect of social norms is just capturing the effect of individual attitudes. Attitudes are clearly endogenous to the household formation decision, nonetheless they can inform us whether social norms matter beyond individual preferences. As predicted by the theory an individual's attitudes have a different effect on the probability to form a household depending on whether it is a man and or a woman. Whereas a man with more egalitarian attitudes toward the division of household labor has a higher probability to form a household, a woman with more egalitarian attitudes has a lower probability to form a household. Ultimately, the fact that the effect of social norms and individual attitudes run in opposite direction for women further supports the notion of social effects on an individual's household formation probability.

The paper is organized as follows. Section 2 presents a simple Supply and Demand model of the household market. Section 3 proposes two identification strategies of the effect of social norms on individual an individual's household formation probability. Section 4 describes the data used in the empirical analysis and Section 5 shows the main results. Section 6 concludes.

2 A Model of Household Formation and Social Norms

The model presented in this Section follows Becker's basic Demand and Supply analysis of the marriage market to illustrate the effect of social norms toward the household division of labor on individual household formation decisions (e.g., Becker 1973). A household market is defined for a particular set of female and male characteristics where the only source of individual heterogeneity comes from different tastes for remaining single. Men and women in the household market have a demand for the household produced good and are interchangeable before they match into households. For expositional purposes we abstract from other benefits from forming a household, such as extending credit or risk pooling, and focus on the gains from specialization and consumption of public goods within the household. Thus, assuming that future partners can contract over the future division of household labor, we can specify the household market

supply and demand as a function of the degree of household specialization.[5]

Similar to Becker's original marriage market model, the decision to form a household takes place when the utility that each individual gets within a household V_i^u is greater than the utility if single $V_i^s + \varepsilon_i$, where ε_i is a preference parameter towards remaining single that is distributed randomly with cumulative distribution F_i for $i = m, f$. Individual utilities once a household has been formed V_i^u are given by the sum of the utilities obtained from the consumption of a market public good c^u and a household produced public good z^u, and the disutility from the time spent in the production of the household public good $f(h_i^u)$. 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 that can be acquired in the market at a normalized price $p = 1$.

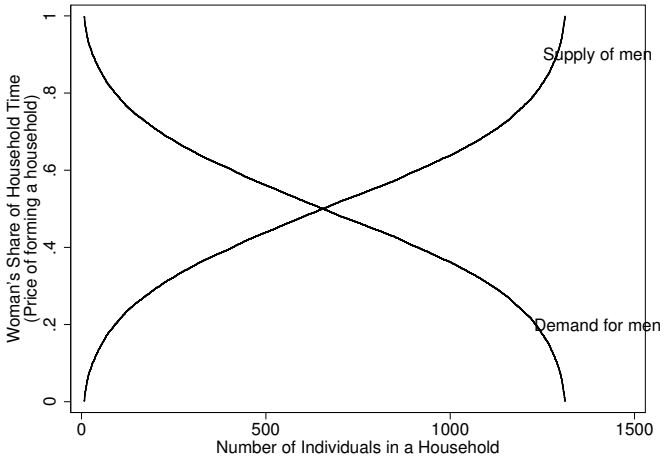
The household produced good z^u can be understood without loss of generality as a lower bound for the amount of household production that needs to be done in the household. These are the "commodities" in a *Beckerian* sense, such as a cleaned house or home-made meals (see Becker 1975). The household produced good z^u is consumed jointly by both partners but differs from c^u in that it cannot be purchased in the market. Instead, it is produced using both partners' time in household production such that $z^u = h_m^u + h_f^u$, for $0 \leq h_i^u \leq 1$ and $i = m, f$.[6] Each partner derives disutility $f(h_i^u)$ from the time devoted to household production h_i^u, where $f(.)$ is an increasing and convex cost function. We can write an individual's utility within the household as $V_i^u = U(z^u) - f(h_i^u) + c^u$, for $i = m, w$. Appendix A describes one possible household maximization problem that rationalizes the individual utilities presented here.

Given the above individual utilities it is useful to express the supply of men (or the demand for women) and the demand for men (or the supply of women) in the household market as a function of the division of household labor α. The specification that follows is presented from the men's perspective, but it is symmetric from the women's perspective. We can write each partner's time devoted to household production h_i^u as a fraction of the produced output such that $h_m^u = (1 - \alpha)z^u$ and $h_f^u = \alpha z^u$ for $0 \leq \alpha \leq 1$, where α is the share of total household labor done by the woman.

[5] An example of a characterization of the the marriage market as an exchange of household labor between spouses can be seen in Grossbard-Sechtman (1984).

[6] The assumption of perfect substitutability between partners' time in household labor is made for expositional purposes only. The results are robust to a more general specifications of the production function, which may include market goods as inputs in the production of the household produced public good as well as other forms of substitutability between partners' time.

FIGURE 2: Household Market Equilibrium



The supply of men (or the demand for women) is defined as the number of men willing to form a household at any given α, such that $V_m^u \geq V_m^s + \varepsilon_m$. Similarly, the demand for men (or the supply of women) is defined as the number of women willing to form a household at any given α, such that $V_f^u \geq V_f^s + \varepsilon_f$. It is easy to show that the supply of men is increasing in α. Intuitively, a higher value of α implies a higher degree of household specialization, with women taking on a greater share of household production. Given that a man's utility function is increasing in α, there will be more men are willing to form a household as α increases.[7] Following a parallel reasoning to the supply of men, it is straight forward to show that the demand for men is a decreasing function of α. The equilibrium in the household market is thus characterized by an optimal *number* of households and a *price* of forming a household, which is the degree of household specialization given by the parameter α. Figure 2 shows the equilibrium of the household market.[8]

Social norms toward the household division of labor

Social norms that constrain how potential partners divide the household surplus have long

[7]If $\alpha = 0$ the male partner does all the household labor, which gives him the lowest possible utility in the household. Given the distribution function of ε_m there will be N_{m0} men willing to marry at $\alpha = 0$, those for which $\varepsilon_m \leq U(z^u) - f(z^u) + c^u$. If $\alpha = 1$ the male partner's household labor is 0, which gives him the maximum possible level of utility in the household. Given the distribution function of ε_m there will be N_{m1} men willing to marry at $\alpha = 1$, those for which $\varepsilon_m \leq U(z^u) + c^u$. Given that F_m is increasing in ε_m, it follows that $N_{m1} > N_{m0}$.

[8]The taste parameter toward forming a household ϵ_i is assumed to be normally distributed, for $i = m, w$. A man is indifferent between forming a household or not when $5\alpha_m - 2.5 = \epsilon$ and a woman when $-5\alpha_f + 2.5 = \epsilon$. Thus, the cumulative distribution of ϵ can be written as a function of α, which yields the supply and demand for men (women) in the household market depicted in Figure 2.

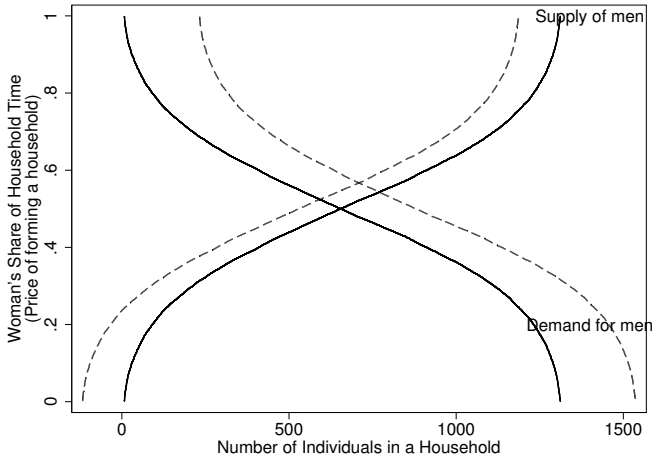
been present in the economics and sociological literature.[9] For example, Lundberg and Pollak (1993) develop a model in which the behavior of any particular couple may be directed towards a focal point equilibrium that conforms with the behavior or those around them and is consistent with socially sanctioned social norms. Similarly, Akerlof and Kranton (2000) present a model of economic identity to explain the empirical observation that when a wife works more hours outside the home, she still undertakes a larger share of household labor. In their model a husband looses identity when his wife earns more than him, because of the prescription held by most men that *men should earn more than their wives*. Equality in utility is restored when the wife undertakes more housework than her husband, given the prescription that *men should not do women's work at home*. This argument is similar to the *doing gender* hypothesis brought forward by the sociological literature to explain the same empirical regularity in a variety of countries (see Bittman, England, Folbre, Sayer, and Matherson (2001) for the Australian case and Brines (1994) for the U.S among others).

In light of this simple model, social norms toward the household division of labor can be easily captured by a parameter γ_i in either the man's or the woman's household utility functions.[10] Individual utilities within the household become $V_i^u = U(z^u) - \gamma_i f(h_i^u) + c^u$, where γ_i is the additional cost (or reward) to any man (woman) for devoting time to household production activities, for $i = m, w$. We may characterized the effect of living in a country with *less egalitarian* social norms toward the household division of labor as either a higher γ_m or a lower γ_f. A higher γ_m means that a man living in a country with less egalitarian social norms toward the household division of labor experiences a higher cost for any given time that he devotes to household labor than a man living in a country with more egalitarian social norms. A lower γ_f means that a woman living in a country with less egalitarian social norms toward the household division of labor experiences a lower cost (or even a reward) for any given time that she devotes to household labor than a woman living in a country with more egalitarian social norms. Thus, less egalitarian social norms toward the household division of labor may lead either to a reduction in the supply of men or an increase in the demand for men in the household market.

[9] Although of genuine interest, it is out of the scope of this paper to address how social norms and gender roles that constrain a particular family time allocation arise and how are they maintained.

[10] It is assumed throughout the paper that country specific social norms affect the ability of potential partners to efficiently divide the household surplus and thus individual household formation probabilities. We further assume that there is no substitutability between household markets. This theoretical assumption is not particularly strong given that mobility across countries is relatively small and in such a case it is reasonable to consider separate markets, one for each country of substitutable potential partners.

FIGURE 3: Household Market Equilibrium with Social Norms



Independently of whether social norms affect the supply of men or the demand for men in the household market, it is easy to see that less egalitarian social norms increase the equilibrium price of forming a household α, i.e. the degree of household specialization, defined as the share of time that a woman devotes to household production, goes up.[11] However the effect on the equilibrium number of households is an empirical question that depends on whether social norms affect the supply of men or the demand for men in the household market. If less egalitarian social norms decrease the supply of men by increasing the costs of providing household labor to them, the number of households will be lower in the presence of less egalitarian social norms. In contrast, if less egalitarian social norms increase the demand for men (or the supply of women) in the household market by lowering the cost of providing household labor to women, the number of households formed in equilibrium will be higher. The dashed lines in Figure 2 represent the new supply of men and demand for men in the household market when social norms in the household market become less egalitarian.[12]

3 Econometric Specification

In order to see which effect dominates in equilibrium we estimate a baseline binary response model (probit) of an individual's probability of forming a household as a function of observable individual characteristics and a country's social norms toward the division of household labor.

[11] This result follows from a straight forward application of the envelope theorem.

[12] γ_f is and γ_m is

The observed dependent variable, $y_{i,t,k}$ is binary and takes value one if the individual has ever formed a household, and zero otherwise. If $y^*_{i,t,k}$ represents the unobservable propensity to form a household for individual i at time t and country k, we can write:

$$y^*_{i,t,k} = X_{i,t,k}\beta_1 + E_{t,k}\beta_2 + \varepsilon_{i,k} \tag{1}$$

where $y_{i,t,k} = 1$ if $y^*_{i,t,k} > 0$, and 0 otherwise. $X_{i,t,k}$ is a vector of individual observable characteristics (education, age and sex). Social norms in survey-year t and country k are captured by $E_{t,k}$. Higher values of $E_{t,k}$ represent more egalitarian social norms toward the division of household labor. The error term captures, among other things, the unobserved taste for forming a household and is assumed to follow a normal distribution with variance σ_k, which is independently distributed across countries but correlated within countries $k = 1...13$.[13]

The coefficient of interest is β_2. If β_2 is positive then more egalitarian social norms would be correlated with a higher probability of forming a household. Thus we may conclude that the effect of social norms on an individual's household formation probability is mostly driven by supply of men in the household market. If β_2 is negative, then more egalitarian social norms would be correlated with a lower probability of forming a household. Thus we may conclude that the effect that dominates is the demand for men in the household market.[14]

3.1 Identification of social norms (I)

The coefficient β_2 in Equation (1) cannot be interpreted causally. The first identification strategy of the effect of social norms toward the division of household labor on individual household formation probabilities relies on the time and country variation in the data. This approach is similar to a difference in difference approach, where the treatment is a continuous rather than a discrete variable (i.e the degree of social norms in a given country).

One of the potential identification problems of the effect of social norms on individual household formation probabilities is that any permanent differences across countries over the sample period might lead to a biased coefficient on social norms if these changes are correlated with an

[13] See Moulton (1990) for the need of considering correlated disturbances when estimating the effects of aggregate variables on micro units.

[14] Choosing a relatively large cell size, the respondent's country, minimizes measurement error in my estimates of partnerships-market specific social norms. Given that mobility across countries is relatively small, choosing a large cell size also avoids the self-selection problem that is present in most group studies.

individual's probability of forming a household. For example, a change in public policy in all countries that made entering a household less attractive over the period, and that was positively correlated with more egalitarian social norms toward the household division of labor, would lead to a downward bias in the social norms coefficient. I.e, the social norms coefficient β_2 would be partly capturing the negative effect of the policy rather than the effect of social norms toward the household division of labor, and thus this coefficient would be biased downwards. Another potential bias could arise if there exist country-level factors that change during the sample period and these changes correlated with a country's social norms toward the division of household labor. For example, if more egalitarian countries also have public policies that increase (decrease) the costs of forming a household, then omitting country fixed effects would lead to a downward (upward) bias in the social norms coefficient. I.e. the social norms coefficient β_2 would be partly capturing the negative (positive) effect of the policy, and thus overestimating the effect of social norms. To avoid this potential biases we introduce survey-year and country fixed effects in Equation (1).

The above approach yields an unbiased estimate of the social noms coefficient β_2 so long as the country fixed effects do not vary over the survey period and the survey-year fixed effect does not vary across-countries. There might be however changing factors at the country level that are correlated with both, with an individual's probability of entering a household and with a country's social norms toward the household division of labor. These country-year effects are thus not controlled for by either the survey-year or the country fixed effects and omitting them might bias the estimate β_2. Among these country-specific variables are country specific marriage market characteristics, a country's family policies, or even social norms toward the formation of households per se. Introducing these country-year variables in the analysis may allow to differentiate whether the β_2 coefficient captures the effect of social norms toward the division of household labor on an individual's household formation probability or whether this coefficient is just capturing the effect of these country specific variables (let it be a country's social policies or other social norms).

In order to take these changing country-level variables into account we augment the model with variables at the country level that change over the sample period. We estimate the following equation:

$$y^*_{i,t,k} = X_{i,t,k}\beta_1 + E_{t,k}\beta_2 + Z_{t,k}\beta_3 + I_t\beta_4 + I_k\beta_{k,5} + \varepsilon_{i,k} \quad (2)$$

where I_t and I_k are the country and year dummies respectively, and $Z_{t,k}$ are a country-year variables other than a country's social norms toward the household division of labor.

3.2 Identification of social norms (II)

The second identification strategy of the effect of social norms on individual household formation probabilities comes from the direct use of reported individual attitudes toward the division of household labor in our main specification. Because country-specific social norms are likely to be correlated with individual attitudes, a potential identification problem may arise if the reported *individual* attitudes toward the household division of labor are associated with an individual's probability of forming a household. In this case, the social norms coefficient β_2 in Equation (2) would be capturing the effect of individual attitudes rather than the effect of social norms on an individual's household formation probability.

This potential identification problem of the effect of social norms on an individual's household formation probability is apparent from the theory presented in Section 2. Theoretically, the distinction between the effect of social norms or the effect of reported individual attitudes toward the household division of labor relies on pinning down whether the observed change in the number of households formed in equilibrium derives from a shift of the demand and/or supply curves in the household market, or whether it comes from a movement along these curves. The model can be useful in this respect because it offers two different predictions depending on whether it is a man or a woman regarding the relationship between individual heterogeneity toward the household division of labor and an individual's probability of entering a household. Whereas a man with more egalitarian attitudes toward the division of household labor has a higher probability to form a household, a woman with more egalitarian attitudes has a lower probability to form a household.

To see this consider that we are interested in identifying whether a decrease in the probability to form a household (i.e. the decline in the number of households in equilibrium) comes either from a decline in the supply of men due to less egalitarian social norms, or whether it comes from movements along the supply of men or along the demand of men. We already showed

that less egalitarian social norms may decrease the supply of men in the household market by increasing the costs to form a household to any man, and that this decrease in the supply of men led to a decrease in the equilibrium number of households, i.e. to a decrease in the probability of forming a household for both, men and women. Individual attitudes toward the household division of labor are captured in he model by the taste parameter towards forming a household ε_i, for $i = m, f$. On the one hand, a man with less egalitarian attitudes toward the household division of labor experiences a greater penalty for any given time that he devotes to household labor. Thus, for any household division of labor (i.e. for any household price α) he will be less willing to form a household, and his probability of entering a household will be lower. On the other hand, a woman with less egalitarian attitudes toward the household division of labor experiences a lower penalty for any given time that she devotes to household labor. Thus, for any household price α she will be more willing to form a household than a woman with more egalitarian attitudes, and her probability of entering a household will be higher at any household price α.

Thus, whereas for the case of men the predictions of the model with respect to individual attitudes and social norms go in the same direction, i.e. living in a country with less egalitarian social norms or being less egalitarian both reduce a man's probability to form a household, for the case of women the model predicts otherwise. In fact, the effect of individual attitudes and social norms on a woman's household formation probability go in the opposite direction. Whereas a woman living in a less egalitarian country has a lower probability of forming a household than a woman living in a more egalitarian country, a woman who holds less egalitarian attitudes toward the division of household labor has a higher probability of forming a household than a woman with more egalitarian attitudes toward the household division of labor.

In order to take individual attitudes into account we introduce an individual's reported attitudes toward the household division of labor as a regressor in Equation (2) and estimate Equation (3):

$$y^*_{i,t,k} = X_{i,t,k}\beta_1 + E_{t,k}\beta_2 + Z_{t,k}\beta_3 + I_t\beta_4 + I_k\beta_{k,5} + A_{i,t,k}\beta_6 + \varepsilon_{i,k} \tag{3}$$

where all the variables are defined as before and $A_{i,t,k}$ represents an individual's reported attitudes toward the household division.

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

The data used in the analysis come from a pooled cross-section of the 1994 and 2002 International Social Survey Program (ISSP). The ISSP is an annual program of cross-national collaboration on surveys between several social science institutes dating back to 1983. Each member state individually carries a module of a 15-minute self-completion supplement to their regular national surveys, and includes a common core of background variables. The number of member states is currently 39 (although not all members have participated since 1983). The ISSP data offer a unique opportunity for cross-country analysis 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. An example of the use of the ISSP data in labor economics can be found in Albrecht, Edin, and Vroman (2000).

Each year a topical module on a specific subject is developed, and put together with the standard questionnaire. In the years 1994 and 2002 the ISSP topical module was *Family and changing social norms* and on top of the usual demographic and economic variables, the survey also collected information on respondents' division of labor within the household as well as individual attitudes toward social norms regarding the household division of labor. In each of the participating countries, an individual older than 16 or 18 years (depending on the country) from the selected household is administered (almost) the same questionnaire across all countries. The countries included for the reminder of the analysis are Australia, Austria, Germany (West), Great Britain and Northern Ireland, Ireland, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, and the United States.[15]

4.1 Sample and summary statistics

Table 1 reports basic summary statistics for the variables used in the main analysis. The sample is respondents (men and women) between 20 and 45 years old living in countries that participated in the survey both years. A country's social norms toward the household division of labor is captured by the *country egalitarian index*, which is the average of individual attitudes toward the household division of labor in each each country. Individual attitudes toward the household

[15]Some Eastern European and developing countries are also part of the 1994 and 2002 ISSP data. However, due to the differences in economic systems and demographic processes they are left out of the analysis.

division of labor are constructed as the first principal component using the answers to eight attitudinal questions.[16] Column 1 in Table 1 shows the average value of the *egalitarian index* in each country for the relevant sample. Countries are ranked from more to less egalitarian, with a higher value of the index meaning that on average individuals in that particular country hold more egalitarian attitudes toward the division of household labor. Given the high correlation between men and women attitudes toward the household division of labor within countries using the women's or the men's index does not significantly change the rank of countries. Among the most egalitarian countries are Sweden and Norway, whereas Austria and Japan are among the least egalitarian.

The cross-country relationship between the actual division of household labor and a country's *egalitarian index* can be seen in Column 2 in Table 1. The ISSP data do not contain information on the time that each partner devotes to household production, but it does contain information on each partner's share of household labor. Questions on household specialization 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 categories are *always* and *usually the woman*, the third category is *both* and the fourth and fifth categories are *usually* and *always the man*. A sixth category is *a third person*. There is only about 2% of the sample that report any level of household labor outsourcing. This small percentage of outsourcing is consistent with values obtained from more detailed time-use diary surveys and highlights the importance of the substitution of time within the household rather than substitution of market goods and services for one individual's time Folbre and Bittman (2004). Column 2 in Table 1 presents the proportion of respondents that are currently living in a partnership and who report whether the female partner *always or usually* does laundry, shops for groceries and prepares meals.[17] The relationship between household labor and social norms toward the household division of labor is as expected. In more egalitarian countries the proportion of women *always* or *usually* doing any of these housework activities is smaller than in

[16]The principal component is calculated for each respondent using information from all respondents on the answers to the eight statements below. These statements are coded on a 1 to 5 scale, from *strongly agree* to *strongly disagree*: "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." "A man's job is to earn money; a woman's job is to look after the home and family."

[17]The variable *who cares for the sick* has too many missing observations and estimates are not significant.

less egalitarian countries. Thus, consistent with the model in Section 2, the degree of household specialization (or the price of forming a household) is lower in countries with more egalitarian social norms toward the household division of labor.

Column 3 in Table 1 presents the percentage of respondents who have ever been in a partnership. Unfortunately, for many of the countries in the analysis the data do not allow any distinction between respondents who are married and respondents who are cohabiting. A respondent is considered to have ever been in a partnership if he or she is either currently married or has ever been married (i.e. is currently divorced or widow), or if the respondent is currently living with a partner in a long lasting relationship.[18] The cross-country relationship between social norms toward the household division of labor and being in a partnership is not as clear-cut as the cross-country relationship between housework and social norms toward the household division of labor. However, we do observe that more egalitarian countries such as Norway and Sweden seem to have a higher proportion of individuals in partnerships than do other less egalitarian countries such as Japan or Spain.

Years of schooling have been generally used in the literature as a measure of market human capital and thus as potential female outside opportunities to marriage. Years of schooling are not significantly different across countries. In fact, the women to men years of schooling ratio is small for all countries and differences across countries are not significant. There is also a weak relationship between years of schooling and household formation rates. This weak correlation together with the small variation of education ratios across countries may suggest that differences in relative female human capital, while important in explaining differences in partnership formation, cannot fully explain the observed cross-country differences observed in the data. Although informative, it is difficult to make any causal inferences from this raw cross-country averages on the relationship between years of schooling and social norms toward the household division of labor, and household formation probabilities. Section 5 takes into account country, year, and individual heterogeneity to shed some light onto the effect of these variables on an individual's household formation probability.

[18] We do not include divorcees in the main analysis. One can argue that social norms may have an entirely different meaning for the sample of divorcees. Also, because divorce is more common in more egalitarian countries including divorcees might bias the *egalitarian index* coefficient upwards. Despite the above, robust checks including divorcees does not change the main results.

5 Empirical Results

5.1 The relationship between social norms on an individual's household formation probability (I)

Column 1 in Table 2 presents the results from estimating Equation (1) for the main sample of men and women between 20 and 45 years old without survey-year or country dummies.[19] The coefficient of interest is the *egalitarian index* coefficient β_2, which captures the relationship between a country's social norms toward the division of household labor and an individual's household formation probability. This coefficient is positive and significant, suggesting that an individual living in a more egalitarian country has a higher probability of forming a household. The positive relationship between social norms toward the household division of labor and an individual's household formation probability is consistent with a model where a country's more egalitarian social norms increase the supply of men in the household market more than they decrease the demand for men. I.e more egalitarian social norms toward the household division of labor decrease the costs of providing household labor for men more than they increase the costs of household labor to women.

Column 1 in Table 2 shows that one standard deviation (one unit increase) in the *egalitarian index* is associated to a decline of 8.5 percentage points in the probability of forming a household. For example, the average Japanese, with an index of .004 has a probability of forming a household that is about 8 percentage points lower than its Swedish counterpart, living in a country with an egalitarian index of 1.03. The positive relationship between social norms toward the household division of labor and an individual's probability to form a household is the same for men and women irrespectively. The coefficient of the interaction between gender and the *egalitarian index* is neither statistically nor economically significant.[20]

As mentioned in Section 3, the *egalitarian index* coefficient presented in Column 1 of Table 2 cannot be interpreted causally. The specification in Column (2) controls for survey-year and country fixed effects that might be correlated with the country's *egalitarian index* by adding a survey-year dummy I_t and country dummies I_k in the right hand side of equation (1). In-

[19] In all the specifications the reported coefficients are the marginal effects from a probit model and represent the change in the probability of forming a household due to an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability of forming a household for dummy variables.

[20] Results are presented for the joint sample of men and women and all the controls are interacted with a man dummy. Main results follow when women and men are considered separately, although significance in the coefficients is reduced. Tests reject separate specifications by gender.

troducing a survey-year fixed effect in equation (1) does not significantly change the *egalitarian index* coefficient. This coefficient is still highly significant and increases from 8.5 to 11.4 percentage points. The increase in the coefficient suggests that omitting survey-year fixed effects in equation (1) results in an underestimation of the effect of social norms on an individual's household formation probability. In fact, the survey-year coefficient is negative and significant, which shows a decreasing trend in the probability of forming a household over the survey period of around 3 percentage points.

The specification in Column (3) controls for country-level heterogeneity that might be correlated with the *egalitarian index* by adding country dummies I_k in the right hand side of equation (1). Introducing country fixed effects in equation (1) does not significantly change the sing or the size of the *egalitarian index* coefficient. This coefficient increases from 8.6 to 9.9 percentage points. However, it is no longer significant, which may suggest that the *egalitarian index* coefficient was indeed capturing cross-country variation. This specification however does not have time variation in it. To have a complete picture we need to look at Column (4).

Column (4) in Table 2 presents the preferred specification in this table. It includes both year and country dummies to account for both, permanent differences across countries over the survey period and changing factors over time in all countries. The size of the *egalitarian index* coefficient is higher than in the previous specifications, and its magnitude doubles with respect to specification (1). In particular, one standard deviation of the index leads to a 23.1 percentage points increase in the probability of entering a household. This increase in the size of the coefficient suggests that omitting year and country fixed effects results in an underestimation of the effect of social norms on an individual's household formation probability.

The coefficients of education and age are as expected and remain stable across all specifications. An increase in one year of schooling diminishes a woman's probability of forming a union by 1.2 percentage points. This coefficient is .8 for men. The small size of this coefficient, together with the fact that the cross-country educational differences are not significant, suggests that relative female education cannot explain the full picture of the variation of household formation rates across countries. The coefficient on age is positive and significant as expected. An increase in one year of age increases the probability of being in a household by 2.6 percentage points for women and 3.1 for men.

5.2 The effect of social norms on an individual's household formation probability (I)

Controlling for year and country fixed effects does not take into account changing factors at the country level that might be correlated with an individual's probability of forming a household as well as with social norms toward the division of labor. Thus, in previous results the *egalitarian index* might still be subject to biases and thus cannot be interpreted causally. In order to avoid these biases we control for country-specific variables that change over the survey period. As is common in the marriage market literature we control for the ratio of men to women in each country and year to capture any effect of the conditions of the household market on an individual's household formation probability.[21] We also use the proportion of individuals who have positive views toward marriage, cohabitation, and divorce to capture the costs associated to entering a household for individuals living in different countries over the period. These proportions are calculated as the proportion of respondents in a given country and year who answer *strongly agree* or *agree* to the following statements respectively: "To what extent do you agree or disagree...?: (1) Married people are generally happier than unmarried people, and (2) It is all right for a couple to live together without intending to get married and (3) Divorce is usually the best solution when a couple cant seem to work out their marriage problems." The answers to these statements take five values and range from *Strongly agree* to *Strongly disagree*.[22]

Table 3 shows the summary statistics of these aggregate variables by country. As before, countries in Table 3 are ordered from most to least egalitarian according to the *egalitarian index* constructed in Section 4. Column 1 shows the ratio of men to women, which varies from .40 in Austria to .51 in Germany. There does not seem to be any apparent relationship between social norms toward the household division of labor and this ratio. Columns 2 to 4 show the proportion of individuals with positive attitudes toward marriage, cohabitation and divorce respectively. Whereas the two most egalitarian countries, Sweden and Norway, are also the countries where the majority of individuals approve of cohabitation and divorce, there are also countries such as Austria, one of the least egalitarian countries, with a similar proportion

[21] Grossbard and Amuedo-Dorantes (2007) analyze the effect of sex ratios on married women's labor force participation. In their model more favorable sex ratios for women increase the gains from marriage and thus make it less likely for any woman to participate in the labor force.

[22] These three variables might either capture social norms regarding the household formation per se, or country specific policies toward the formation of households. What is relevant from the point of view of this paper is to isolate the effect coming from this variables from the effect of social norms toward the household division of labor on an individual's household formation probability.

of individuals with positive views toward divorce and cohabitation. Thus, a-priori there is no clear correlation between a country's social norms toward the division of household labor and the costs associated to entering a household for individuals living in different countries.

To explore the potential bias in the egalitarian index coefficient of omitting these country-year variables, Columns 1 to 4 in Table 4 present the results from estimating Equation (2) by first introducing these variables one by one. Results from Columns 1 and 2 show that neither the coefficient on the ratio of men o women or on the proportion of individuals who think married people are happier are significant. Thus, omitting these aggregate variables from the analysis is unlikely to bias the *egalitarian index* coefficient. In fact the *egalitarian index* coefficient remains very similar in magnitude than the one in Column 4 of Table 2, at around 25 percentage points.

The coefficient on the proportion of individuals with positive views toward cohabitation is highly positive for women, and less so for men. The proportion of individuals in a country with positive views toward cohabitation most likely captures either existing social norms regarding cohabitation per se (or social policies promoting this kind of household formation). Thus, the positive sing on this coefficient can be interpreted as a lower cost to enter a household (either as a marital union or as a cohabiting union) faced by individuals living in countries where cohabitation is generally positively viewed.

The coefficient on divorce is negative, both for men and women. The interpretation of this coefficient is far from being straight forward. One might think that this variable captures either the lower social stigma attached to divorce or more favorable laws regarding divorce. Either interpretation would imply lower dissolution costs of a household, which would imply a higher household formation probability. however, the negative sign on the divorce coefficient suggests a reverse causality argument whereby individuals living in countries with a higher probability of divorce also are also less likely to form households in the first place (even a cohabiting one), precisely because the household is more likely to end. In this case, this aggregate variable would be capturing the negative preferences toward household formation in these countries.

Column (5) in Table 4 shows the results from estimating Equation (2), with controls for the percentage of people with positive views toward cohabitation and divorce in each country and year (the only two variables whose coefficient is significant). The *egalitarian index* continues to be significant at the 5 per cent level and its size increases by 5 percentage points (to 30 percentage points) with respect to our preferred specification in Column 4 of Table 2. This

increase in the *egalitarian index* coefficient shows that omitting the percentage of people with positive views toward divorce leads to a downward bias of the effect of social norms toward the household division of labor. Thus, the *egalitarian index* coefficient in Column 4 of Table 2 was most likely capturing the fact that countries that have become more egalitarian over the survey period also have increased the costs of entering a household for any individual living in these countries.

5.3 The effect of social norms on an individual's household formation probability (II)

The remaining of this section exploits the specific features in the ISSP data to identify the effect of social norms net of individual attitudes as proposed in Manski (1993) and Manski (2000). The correlation between country-specific social norms with individual attitudes poses a potential problem for the previously shown empirical results if *individual* attitudes toward the household division of labor are associated with an individual's probability of forming a household. If this is the case, the coefficient of the *egalitarian index* β_2 in Equation (2) would be capturing the effect of individual attitudes rather than the effect of social norms. Although caution should be exercised when interpreting the coefficient on an individual's attitudes because these attitudes are clearly endogenous to an individual's probability of entering a household, including these attitudes as a control can still shed some light onto the presence of social effects associated to an individual's household formation probability.[23]

Columns (1) to (4) in Table 5 show the restuls from estimating the same regressions as in Table 2, but adding a control for an individual's reported attitudes toward the household division of labor as specified in Equation 3. An individual's attitudes toward the household division of labor are constructed as the principal component index for that individual as described in Section 4. Incorporating individual attitudes does not change the sign or the significance of the country *egalitarian index* coefficient. Its size increases by 5 percentage points to about 30 percentage points in the preferred specifications shown in Column (4). This increase in the size of the *egalitarian index* coefficient supports the presence of social effects net of individual attitudes and suggests that social norms are not just capturing the effect of individual attitudes toward the household division of labor.

[23] One might argue that social norms might enter an individual's utility maximization problem either through preferences (captured by an individual's attitudes) or through the constraint. This section deals with the latter.

More interesting is that fact that, as predicted by the theory, the relationship between an individual's attitudes toward the household division of labor and an individual's household formation probability is different for a man than for a woman. Whereas individual attitudes toward the division of household labor are positively correlated with a man's probability to form a household, individual attitudes are negatively correlated with a woman's probability to form a household. Thus, whereas the effect of individual attitudes toward the household division of labor on a man's probability to enter a household run in the same direction to the effect of social norms, the effect of individual attitudes on a woman's probability to enter a household run opposite to the effect of social norms. The negative sign on the coefficient on a woman's reported individual attitudes toward the household division of labor is (-0.051). In other words, whereas ceteris paribus being a more egalitarian woman is associated with a lower probability of entering a household by 5.1 percentage points, a woman living in a more egalitarian country has, everything else equal, a higher probability of entering a household of 30 percentage points. Individual attitudes are however positively associated with a man's probability of entering a household. The interaction of individual attitudes and the man dummy is .061, which means that a more egalitarian man has a higher probability of entering a household by 1.1 percentage points.

As before, we control for changing country-level factors over the survey period. Column (5) in Table 5 shows the results from estimating 3, but controlling for the proportion of people that hold positive views toward cohabitation and divorce. Results are virtually unchanged with respect to the results shown in Column (5) of Table 4. The *egalitarian index* coefficient continues to be highly significant, and its magnitude increases 3 percentage points to .38 with respect to the results shown in Column (5) of Table 4.

Finally, Column (6) controls for individual attitudes toward cohabitation and divorce. These two variables take value 1 if the respondent answered *strongly agree* or *agree* to the following statements respectively: "To what extent do you agree or disagree...?: (1) It is all right for a couple to live together without intending to get married. (2) Divorce is usually the best solution when a couple cant seem to work out their marriage problems." These variables can be thought of as a proxy for an individual's taste toward the formation of household per se. As before, caution should be exercised when interpreting the coefficients on the individual attitudes toward cohabitation and divorce causally. Nonetheless, introducing these variables into the

regression analysis can inform us on whether the coefficient on the proportion of people in a country with positive views toward cohabitation and divorce are capturing the effect of policies or social norms regarding household formation, or whether these variables are just capturing an individual's taste toward household formation.

Both coefficients, the coefficient on attitudes toward cohabitation and the coefficient on attitudes toward divorce, are negative and significant. Introducing individual attitudes toward divorce or cohabitation does not change the coefficient on the country *egalitarian index*, although it lowers the coefficient on individual attitudes toward the household division of labor by .03 percentage points to 4.7. A lower coefficient on individual attitudes toward the household division of labor after individual attitudes toward cohabitation and divorce are introduced suggests that attitudes toward the household division of labor were partly captured the negative correlation between individual attitudes toward divorce and an individual's probability to form a household. Neither an individual's attitudes toward cohabitation nor an individual's attitudes toward divorce change the sign or significant of the country-specific cohabitation or divorce variables. Furthermore, individual attitudes toward cohabitation are negative, whereas the coefficient on the proportion of people with positive views toward cohabitation is positive. These two findings suggests that these country-specific variables are indeed capturing country-level factors that affect an individual's cost of forming a household, rather than just capturing an individual's preferences toward forming a household per se.

6 Conclusion

The study of below replacement fertility characteristic of industrialized countries has traditionally overlooked household formation processes. However, cross-country differences in household formation rates are significant. 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, Japan or Spain, have experienced a decline in marriage rates that have not been accompanied by increases in cohabitation (and out-of wedlock fertility) rates characteristic of other developed countries. It becomes thus increasingly important to look at household formation processes for the study of fertility.

A simple model of household formation is developed that formally analyzes the channel through which social norms toward the division of household labor may affect an individual

decision to entering a household. In light of the model less egalitarian social norms toward the division of household labor may either increase the cost of providing household labor for men or decrease the cost of providing household labor for women. In the first case, social norms decrease the supply of men in the households market, whereas in the second case social norms increase the supply of women. However, whereas in both cases the effect on the equilibrium price of forming a household (which in the context of this model is the degree of household specialization) decreases with less egalitarian social norms, the effect on the equilibrium number of households is an empirical question.

Social interactions or social norms are to a large extent enforced through non-market interactions and usually difficult to isolate empirically. In the empirical analysis I first provide an identification strategy of social effects that relies on the time and cross-country variation in the data and allows for the identification of country specific social norms net of other social interaction effects. A second identification strategy comes from using an individual's reported attitudes toward the household division of labor, which allows for the identification of social norms net of individual preferences. Empirical results support the predictions of the household formation model with social constraints upon the allocation of household time presented here: Whereas, ceteris paribus, more egalitarian women have lower probability of entering a union, women living in more egalitarian countries have, everything else equal, a higher probability of entering a household. Moreover, and consistent with the model, social norms in a country and individual attitudes run in the same direction for the case of men and positively affect the probability of a man entering a household.

It has been beyond the scope of this paper to look at how social norms are formed and maintained over time. Understanding these processes however might provide the theoretical and empirical foundations for the design of work and family policies. For example, policies geared toward solving imperfect commitment mechanisms within the household that may constrain the allocation of household time to what is prescribed by social norms. We leave this issue for further research.

References

Akerlof, G. A., and R. Kranton (2000): "Economics and Identity," *Quarterly Journal of Economics*, 115, 715–753.

Albrecht, J. W., P. Edin, and S. B. Vroman (2000): "A Cross-Country Comparison of Attitudes Towards Mothers Working and their Actual Labor Market Experience," *Labour*, 14, 591–607.

Becker, G. (1973): "Theory of Marriage: Part I," *Journal of Political Economy*, 81, 813–846.

——— (1975): "Theory of the Allocation of Time," *Economics Journal*, 75, 493–517.

Bittman, M., P. England, N. Folbre, L. Sayer, and G. Matherson (2001): "When Gender Trumps Money: Bargaining and Time in Household Work," *The American Journal of Sociology*, 109, 186–214.

Brines, J. (1994): "Economic Dependency, Gender, and the Division of Labor at Home," *The American Journal of Sociology*, 100, 652–688.

Carroll, C. D., and B.-K. Rhee (1994): "Are There Cultural Effects on Saving? Some Cross-Sectional Evidence," *Quarterly Journal of Economics*, 109, 685–699.

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

Ermisch, J., and M. Francesconi (2000): "Cohabitation in Great Britain: not for long, but here to stay," *Journal of the Royal Statistical Society*, 163, 153–171.

EUROSTAT (2004): *How Europeans spend their time Everyday life of women and men*. Office for Official Publications of the European Communities, Luxembourg, Brussels.

Fernández, R., A. Fogli, and C. Olivetti (2006): "Fertility: The Role of Culture and Family Experience," *Journal of the European Economic Association*, 4, 552–561.

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

Fraboni, and Rosina (2004): "Is Marriage Losing its Centrality in Italy?," *Demographic Reseach*, 11, 607–633.

Giuliano, P. (2007): "Living Arrangements n Western Europe Does Cultural Origin Matter?," *Journal of the European Economic Association*, Forthcoming.

Grossbard, S., and C. Amuedo-Dorantes (2007): "Cohort-Level Sex Ratio Effects on Women's Labor Force Participation," Unpublished manuscript.

Grossbard-Sechtman, A. (1984): "A Theory of Allocation of Time in Markets for Labour and Marriage," *The Economic Jounal*, 94, 863–882.

Hamermesh, D. S. (2004): "Subjetive Outcomes in Economics," *NBER WP 10361*.

Juster, T., and F. Stafford (1991): "The Allocation of Time: Empirical Findings, Behavioral Models, and Problems of Measurement," *Journal of Economic Literature*, 29, 471–522.

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

Lundberg, S., and R. A. Pollak (1993): "Separate Spheres Bargaining and the Marriage Market," *Journal of Political Economy*, 101, 988–1010.

——— (1996): "Bargaining and Distribution in Marriage," *The Journal of Economic Perspectives*, 10, 139–158.

Manski, C. F. (1993): "Identification of Endogenous Social E.ects: The Reflection Problem," *The Review of Economic Studies*, 60, 531–542.

——— (2000): "Economic Analysis of Social Interactions," *Journal of Economic Perspectives*, 14, 115–136.

Moulton, B. R. (1990): "An Illustration of the Pitfall in Estimating the Effects of Aggregate Units on Micro Units," *Review of Economics and Statistics*, 72, 334–338.

Retherford, R., N. Ogawa, and R. Matsukura (2001): "Late Marriage and Less Marriage in Japan," *Population and Development Review*, 27, 65–102.

Weil, D. (1999): "Population Growth, Dependency, and Consumption Why Has Fertility Fallen below Replacement in Industrial Nations, and Will It Last?," *American Economic Review*, 89, 251–255, Papers and Proceedings of the One Hundred Eleventh Annual Meeting of the American Economic Association.

Appendix A: Household Maximization Problem

The household's utility is defined as the sum of individual utilities such that $V^u = U(z^u) - \gamma_m f(h_m^u) - \gamma_f f(h_f^u) + c^u$. The household's maximization problem is given by:

$$\begin{aligned} & \max_{c_i, h_i} U(z^u) - \gamma_m f(h_m^u) - \gamma_f f(h_f^u) + c^u \\ & st. \\ z^u &\geq h_m^u + h_f^u \\ c^u &= \sum (1 - h_i^u) w_i \\ 0 &\leq h_i^u \leq 1 \text{ for } i = f, m \\ c^u &\geq 0 \text{ for i=f,m} \end{aligned}$$

where w_m and w_f are man's and woman's wages respectively. It is easy to see that at the optimum 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^u is given by the first order conditions $h_i^u : -w_i + U'(z^u) - f'(h_i^u) = 0$, for $i = m, f$. As usual, if w_m is greater or equal than w_f, the male partner will devote less time to household production for a sufficiently low γ_m. Under the assumption of interior solution, the second order conditions $h_i^u : 2U^{"}(c^u)w_i^2 + 2U^{"}(z^u) - f^{"}(h_i^u) \leq 0$ are satisfied for $i = m, f$.

For expositional purposes we assume that the only private goods are essentially the disutility of time devoted to household production and subtract from examining the internal distribution of consumption within the household. We are thus implicitly assuming a unitary model of household decision-making. The literature has vastly recognized that households behave in a much more complex way (e.g., Lundberg and Pollak 1996). However, if we take the traditional assumption that the household maximizes in a two-step process, where hours of household labor and the amount of the commodities to be produced are determined independent of the sharing rule, then the basic predictions of the model do not change under a more complex household decision-making process.

The decision for a single individual is straight forward. He or she maximizes his or her utility $V_i^s = U(z^s) - f(h_i^s) + c_i^s$ for $i = m, f$ with respect to the market good c_i^s, the produced good z^s and the amount of time spent in household production h_i^s. Without loss of generality we assume that the amount of household work that needs to be done in the single household is less than that in the married household so that $z^s < z^u$. The solution to this problem is straight forward and given by $h_i^{*s} = z^{*s}$ and $c_i^{*s} = (1 - z^{*s} w_i)$.

Table 1: Summary statistics[1,2]

	Egalitarian Index (1)	Proportion in a Partnership (2)	Housework: Laundry (3)	Housework: Shopping (4)	Housework: Cooking (5)	Education: Men (6)	Education: Women (7)	Education: Ratio (8)	Age (9)	Number of Observations
Sweden	1.03	0.74	0.71	0.40	0.55	12.46	12.51	1.00	33.25	952
	(0.06)	(0.01)	(0.02)	(0.02)	(0.02)	(0.22)	(0.19)	.	(0.22)	.
Norway	0.68	0.81	0.78	0.44	0.54	13.41	13.26	0.99	33.29	1,616
	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.17)	(0.14)	.	(0.17)	.
Northern Ireland	0.63	0.70	0.85	0.61	0.62	6.20	4.66	0.75	33.39	682
	(0.07)	(0.02)	(0.02)	(0.02)	(0.02)	(0.26)	(0.21)	.	(0.26)	.
Great Britain	0.53	0.71	0.78	0.47	0.56	12.52	12.54	1.00	33.30	1,298
	(0.05)	(0.01)	(0.01)	(0.02)	(0.02)	(0.19)	(0.15)		(0.19)	
US	0.47	0.70	0.61	0.47	0.50	13.67	13.55	0.99	33.14	1329
	(0.05)	(0.01)	(0.01)	(0.02)	(0.02)	(0.19)	(0.15)	.	(0.18)	.
Ireland	0.48	0.64	0.84	0.57	0.63	12.66	12.97	1.02	33.27	938
	(0.06)	(0.01)	(0.02)	(0.02)	(0.02)	(0.23)	(0.18)	.	(0.22)	.
Spain	0.40	0.63	0.81	0.50	0.70	6.48	6.10	0.94	32.29	2,171
	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.14)	(0.13)	.	(0.14)	.
Netherlands	0.31	0.70	0.85	0.59	0.62	14.40	13.41	0.93	33.75	1,452
	(0.04)	(0.01)	(0.01)	(0.02)	(0.01)	(0.18)	(0.15)	.	(0.18)	.
Germany	0.24	0.82	0.87	0.49	0.55	2.80	3.32	1.19	32.96	1,489
	(0.05)	(0.01)	(0.01)	(0.02)	(0.01)	(0.16)	(0.15)		(0.17)	
New Zealand	0.21	0.78	0.72	0.60	0.64	12.96	13.02	1.00	33.30	854
	(0.06)	(0.02)	(0.02)	(0.02)	(0.02)	(0.25)	(0.19)	.	(0.23)	.
Australia	0.20	0.78	0.74	0.60	0.66	12.49	12.54	1.00	35.21	1,210
	(0.05)	(0.01)	(0.01)	(0.01)	(0.01)	(0.20)	(0.16)		(0.19)	
Austria	0.04	0.75	0.90	0.50	0.69	4.09	3.10	0.76	33.85	1,278
	(0.05)	(0.01)	(0.01)	(0.02)	(0.02)	(0.20)	(0.15)	.	(0.19)	.
Japan	0.04	0.70	0.94	0.80	0.94	13.33	12.82	0.96	33.67	899
	(0.06)	(0.01)	(0.02)	(0.02)	(0.02)	(0.23)	(0.19)	.	(0.22)	.

Notes: [1] Standard errors in parenthesis [2] Countries are ordered from more to less egalitarian social norms toward the household division of labor

Table 2: The relationship between social norms and an individual's household formation probability (I) [1,2,3]

	(1)	(2)	(3)	(4)
	Pooled	Year FE	Country FE	Year and Country FE
Country egalitarian index	0.085***	0.114***	0.099	0.231*
	(0.03)	(0.03)	(0.07)	(0.12)
Gender roles index x Man dummy	0.012	0.003	–0.035	–0.061
	(0.04)	(0.05)	(0.08)	(0.14)
Years of education	–0.012***	–0.012***	–0.012***	–0.012***
	(0.00)	(0.00)	(0.00)	(0.00)
Years of education x Man dummy	0.004***	0.004***	0.006***	0.006***
	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.026***	0.026***	0.026***	0.026***
	(0.00)	(0.00)	(0.00)	(0.00)
Age x Man dummy	0.005***	0.005***	0.005***	0.005***
	(0.00)	(0.00)	(0.00)	(0.00)
Man dummy (d)	–0.339***	–0.341***		–0.340***
	(0.04)	(0.04)		(0.06)
2002 dummy (d)		–0.029**		–0.028
		(0.01)		(0.02)
2002 dummy x Man dummy (d)		0.008		0.006
		(0.02)		(0.03)
Country dummies	No	No	Yes	Yes
R sq.	0.172	0.172	0.184	0.184
N	15010	15010	15010	15010

Notes: [1] The reported coefficients are the marginal effects from a probit model and represent the change in an individual's probability of forming a household due to an infinitesimal change in each independent variable [2] Standard errors in parenthesis [3] ***Significant at the 1% level **Significant at the 5% level *Significant at the 10 % level

Table 3: Summary Statistics of Country-Year Variables[1,2]

		Proportion of Respondents who think that:		
	Ratio men to women	Married people are happier	Cohabitation is OK	Divorce is OK
Sweden	0.47	0.15	0.83	0.52
	(0.00)	(0.00)	(0.00)	(0.00)
Norway	0.46	0.15	0.75	0.50
	(0.00)	(0.00)	(0.00)	(0.00)
Northern Ireland	0.43	0.30	0.48	0.57
	(0.00)	(0.00)	(0.00)	(0.00)
Great Britain	0.44	0.24	0.66	0.58
	(0.00)	(0.00)	(0.00)	(0.00)
United States	0.42	0.42	0.43	0.45
	(0.00)	(0.00)	(0.00)	(0.00)
Ireland	0.46	0.31	0.55	0.53
	(0.00)	(0.00)	(0.00)	(0.00)
Spain	0.48	0.26	0.67	0.76
	(0.00)	(0.00)	(0.00)	(0.00)
Netherlands	0.46	0.15	0.84	0.71
	(0.00)	(0.00)	(0.00)	(0.00)
Germany	0.51	0.34	0.67	0.67
	(0.00)	(0.00)	(0.00)	(0.00)
New Zealand	0.42	0.23	0.58	0.50
	(0.00)	(0.00)	(0.00)	(0.00)
Australia	0.49	0.43	0.60	0.55
	(0.00)	(0.00)	(0.00)	(0.00)
Austria	0.40	0.34	0.70	0.75
	(0.00)	(0.00)	(0.00)	(0.00)
Japan	0.46	0.36	0.38	0.32
	(0.00)	(0.00)	(0.00)	(0.00)
Obs.	15,307	15,307	15,307	15,307

Notes: [1] Standard errors in parenthesis [2] Countries are ordered from more to less egalitarian social norms toward the household division of labor

Table 4: The effect of social norms on an individual's household formation probability (I)[1,2,3]

	(1)	(2)	(3)	(4)	(5)
Country egalitarian index	0.255**	0.255*	0.151	0.352***	0.302**
	(0.13)	(0.13)	(0.12)	(0.13)	(0.13)
Country egalitarian index x Man dummy	–0.077	–0.041	0.053	–0.039	0.018
	(0.15)	(0.17)	(0.15)	(0.15)	(0.15)
Years of education	–0.012***	–0.012***	–0.013***	–0.012***	–0.013***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of education x Man dummy	0.006***	0.006***	0.007***	0.006***	0.007***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.026***	0.026***	0.026***	0.026***	0.026***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age x Man dummy	0.005***	0.005***	0.005***	0.005***	0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Man dummy	–0.283	–0.356***	0.326	–0.242	0.272
	(0.22)	(0.10)	(0.24)	(0.21)	(0.25)
2002 dummy	–0.029	–0.030	–0.114***	–0.040*	–0.161***
	(0.02)	(0.02)	(0.04)	(0.02)	(0.04)
2002 dummy x	0.006	0.004	0.080**	0.007	0.102**
	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)
Men to women ratio	0.655				
	(0.42)				
Men to women ratio x Man dummy	–0.149				
	(0.54)				
Proportion of married people happier		0.368			
		(0.32)			
Proportion of married		0.083			
people happier x Man dummy		(0.38)			
Proportion cohabitation OK			1.440**		2.008***
			(0.61)		(0.64)
Proportion cohabitation OK x Man dummy			–1.231***		–1.612***
			(0.48)		(0.57)
Proportion divorce OK				–1.005***	–1.424***
				(0.30)	(0.33)
Proportion divorce OK x Man dummy				–0.194	0.534
				(0.39)	(0.47)
Country dummies	Yes	Yes	Yes	Yes	Yes
R sq.	0.184	0.184	0.184	0.185	0.186
N	15010	15010	15010	15010	15010

Notes: [1] The reported coefficients are the marginal effects from a probit model and represent the change in an individual's probability of forming a household due to an infinitesimal change in each independent variable [2] Standard errors in parenthesis [3] ***Significant at the 1% level **Significant at the 5% level *Significant at the 10 % level

Table 5: The effect of social norms on an individual's household formation probability (II)[1,2,3]

	(1)	(2)	(3)	(4)	(5)	(6)
Country egalitarian index	0.118***	0.143***	0.162**	0.302**	0.384***	0.381***
	(0.03)	(0.04)	(0.07)	(0.13)	(0.13)	(0.13)
Gender roles index x Man dummy	–0.008	–0.007	–0.103	–0.153	–0.106	–0.114
	(0.05)	(0.05)	(0.09)	(0.15)	(0.16)	(0.16)
Individual egalitarian index	–0.050***	–0.050***	–0.050***	–0.051***	–0.050***	–0.047***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Individual egalitarian index x Man's dummy	0.060***	0.060***	0.061***	0.061***	0.060***	0.060***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Years of education	–0.010***	–0.010***	–0.010***	–0.010***	–0.010***	–0.011***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Years of education x Man dummy	0.002	0.002	0.003*	0.003*	0.005**	0.004**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age	0.025***	0.026***	0.025***	0.025***	0.026***	0.026***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Age x Man dummy	0.005***	0.005***	0.005***	0.005***	0.005***	0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Man dummy (d)	–0.320***	–0.320***	–0.315***	–0.298***	0.385	0.364
	(0.04)	(0.04)	(0.07)	(0.08)	(0.31)	(0.32)
2002 dummy (d)		–0.025*		–0.029	–0.153***	–0.151***
		(0.01)		(0.02)	(0.05)	(0.05)
2002 dummy x Man dummy (d)		0.000		0.012	0.089**	0.088**
		(0.02)		(0.03)	(0.04)	(0.04)
Proportion cohabitation OK					1.864***	1.859***
					(0.67)	(0.67)
Proportion cohabitation OK x Man dummy					–1.321**	–1.306**
					(0.60)	(0.60)
Proportion divorce OK					–1.478***	–1.483***
					(0.34)	(0.34)
Proportion divorce OK x Man dummy					0.619	0.657
					(0.49)	(0.49)
Individual attitudes toward cohabitation (d)						–0.023*
						(0.01)
Individual attitudes toward cohabitation x Man dummy (d)						0.010
						(0.02)
Individual attitudes toward divorce (d)						–0.012
						(0.01)
Individual attitudes toward divorce x Man dummy (d)						–0.031*
						(0.02)
Country dummies	No	No	Yes	Yes	Yes	Yes
R sq.	0.178	0.179	0.190	0.191	0.193	0.194
N	12836	12836	12836	12836	12836	12836

Notes: [1] The reported coefficients are the marginal effects from a probit model and represent the change in an individual's probability of forming a household due to an infinitesimal change in each independent variable [2] Standard errors in parenthesis [3] ***Significant at the 1% level **Significant at the 5% level *Significant at the 10 % level