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With or Without You: Time Use Complementarities and Divorce Rate in the US

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With or Without You:
Time Use Complementarities and Divorce Rates in the USA *

Job Market Paper

Domenico Tabasso†

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Abstract

In the last twenty years the divorce rate in the United States has being decreasing, differentiating the US trend from those of most Western countries. In this paper I explore the possibility to study this phenomenon by relating the patterns in the divorce rates to the role played by "time use complementarities"within the household. The changes in time consumption of couples in the last forty years are used as proxies for the changes in consumption habits and are analyzed through the American Time Use Data. The relation between time management and the likelihood of divorce is then studied making use of several datasets from the National Longitudinal Study, covering the period 1967-2004. The results show the emergence of relevant differences in the way American couples shape their time together during the last four decades. Spouses devote more time to joint leisure activities, while togetherness does not relate anymore to household chores and childcare. Furthermore the link between the way partners share household responsibilities and the hazard rate of divorce tends to vanish over time, suggesting a reduction in production complementarities as a deciding factor in the success of marriages.

JEL Classification: J12, J13, D12.
Key Words: Marital Market, Leisure, Time Use, Survival Analysis

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Introduction

Differently from what has been experienced by a number of Western countries, the divorce rate in the USA has been declining for more than twenty years. This fact, recently outlined by Stevenson and Wolfers (2007), is yet to be studied by economists. The reasons behind this phenomenon can be tracked down relying on standard economic theories, namely the existence of strong selection effects which might have been particularly relevant in recent times, or the impact of changes in family legislations. This last explanation would assume the emergence of a considerable stock-and-flow effect arising after the introduction of the so-called "unilateral divorce", which occurred almost simultaneously in most of the States at the end of the 60s. According to this theory, this effect was particularly intense at the beginning of the 70s until mid-80s and then waned throughout the following years. In this paper I do not question the validity of these theories. Conversely I aim at including an additional explanation in the set of complementary hypotheses. The possibility to (at least partially) study the trends that characterise the patterns of divorce rates in America stressing the role of "consumption complementarities" between partners has not been explored yet and represents the main goal of the present work.

The term "consumption complementarities" is not randomly chosen. The study of family economics has been obviously influenced by the important contribution of Gary Backer, whose theory of *production complementarities*[1] within the household has represented the main pillar of several studies on the determinants of marriage and divorce [2]. In this paper I enlarge the scope for complementarities within the household, stressing the importance of the possibility for couples to enjoy the simultaneous consumption of goods. The partnership formed in the wedlock is then observed as a "consumption unit" instead of a mere production center. The vector of goods to be included in the feasible set is to be intended in a relatively broad sense. Due to data availability, the focus of the paper will be on the consumption of time: the pure consumption of time with a spouse is to be seen as a utility improving action. In this respect, the present work can be located in the same strand of literature on *togetherness* as developed in Hamermesh (2002) and Hamermesh (2007). The very same decision of getting married (and hence that of divorcing) directly depends not just on the way

[1] See, among several contributions, Becker (1973), Becker (1974), Becker, Landes, and Michael (1977) .

[2] See, for example, Anderson and Little (1999), Baker and Jacobsen (2007), Cherlin (2004), Pollak (2003). The contribution of Becker is mainly based on frictionless framework, which leads toward positive assortative matching (see Becker (1973) and Becker (1991). Shimer and Smith (2000) and Smith (2006) show under which conditions positive (or negative) assortative matching can still be achieved when the hypothesis of frictionless matching is challenged).

the partners complement each other in the abilities to produce income and goods to be consumed in the household, but also (and perhaps more importantly) on their forecast on the activities they will perform together, on the quality, and not on the quantity, of the time they intend to consume while simultaneously engaged in the same activities.

The proposed characterization should not be seen as alternative to what suggested by the already established theories on marriages and divorce[3]. Conversely, my contribution goes toward an enrichment of these theories, although I will favor an empirical approach. In order to achieve this goal, I rely on two different databases: The American Time Use Data (ATUS, as harmonized by the American Heritage Time Use Study) and several surveys from the National Longitudinal Surveys. The use of two different data sources guarantees me a satisfying level of depth in the analysis, allowing me to test for a number of hypotheses and implications. In particular, the main focus will be on testing the existence of substantial changes in the way American couples spend their time together over the last forty years. The second step will then consist in analyzing the relation between these changes and the likelihood of divorce. The results on the ATUS data clearly show that the way partners spend their time when together has changed over the considered time horizon. Although the total amount of time spent together has decreased in the last thirty years, the data show a sensible increase in the time being devoted to joint leisure activities. On the contrary, the time patterns in the link between togetherness and the time variables related to house activities and child care varies depending on sex of the respondent. Regarding the study conducted on the NLS data, it is interesting to note that the estimated results suggest that the link between the way partners share household responsibilities and the hazard rate of divorce has varied considerably over time. In particular, the explanatory power of male participation to house chore over the likelihood of divorce has vanished in the most recent surveys, suggesting the establishment among American couples of new regularities that go beyond the household management schemes proposed by theory of production complementarities.

The paper is organized as follows: in the next two sections I will briefly analyze some of the contributions in the literature and the differences between the theoretical context of the present work and the existing models. I will then describe the datasets I use and expose the methodology I will rely on for the empirical analysis, which is presented in section 5. Section 6 concludes.

[3]Good surveys on the theoretical approaches on divorce are presented in Weiss (1997) and Bergstrom (1996).

Country	1960	1970	1980	1990	1995	2000	2002	2004	2005
United States	3.21	4.3	7.9	7.2	6.7	6.2	5.9	5.5	5.4
Canada	(NA)	(NA)	3.7	4.2	3.9	3.4	3.3	3.2	(NA)
Japan	1.1	1.5	1.8	1.8	2.3	3.1	3.4	3.2	3.1
France	0.7	0.9	2.4	2.8	3.2	3.0	3.0	3.4	3.9
Germany*	1	1.1	(NA)	2.5	3.1	3.5	3.7	3.9	3.7
Italy	(NA)	0.2**	0.3	0.7	0.7	1.0	1.1	1.2	1.2
Netherlands	0.6	0.9	2.7	2.8	3.2	3.2	3.0	2.8	2.9
Spain	(NA)	(NA)	(NA)	0.9	1.2	1.4	1.5	1.7	1.7
United Kingdom	0.6	1.2	4.1	4.1	4.5	4.0	4.1	4.2	3.9

** West Germany; ** 1975; (Source: US Census and Eurostat)*

Table 1: Divorce rate (per 1,000 population aged 15 to 64 years)

1 Motivation

Table 1 presents some evidence on the time trends of the divorce rates in several OECD countries[4]. The disparity between the American data, which show a clear decreasing pattern after 1980, and those relating to most of the European countries (where the the rates appear to be consistently more stable over time) is clear. This simple realization should be enough to question the possibility to mechanically apply to the US reality the same kind of models and theories commonly used to study any kind of dynamics related to what we can generally call "a marital market". The reason to rely on time use complementarities as a way to explain the American data does not deny the possibility to find alternative explanations. What is questionable is the urge of considering these alternatives in a competitive way instead of looking for a composition of several factors which might eventually lead toward a unique solution to a complex puzzle.

A number of studies have already tackled the issues of marriage and divorce is of course extremely relevant. Among several contributions it is certainly worth to mention Lundberg and Pollak (1994), Bergstrom (1996), Browning, Chiappori, and Lechene (2006), Lundberg and Pollak (2007). The main aim of my paper is to explore the reasons behind divorce, and thus it focuses on the causes of marital separations. The impact of changes in legislations on the number of divorces per year, for example, is a (to some extent controversial) topic to which scholars have devoted much attention. The introduction of the regime of *unilateral divorce*, which almost simultaneously occurred in the majority of the United States at the end of the 60's, provided a natural experiment on the impact

[4]Table 1 shows the divorce rate per thousand of individuals. Alternative ways to measure the divorce rate have been suggested (for example, the number of divorces per marriages in a year or the number of divorces per thousand of married individuals). All these rates confirm the existence of the same declining trend in the USA. See Stevenson and Wolfers (2007).

of this kind of shifts in laws. The apparently logic link between the number of divorces per year and the increased easiness in the achievement of the legal ending of a marriage has not been confirmed in all studies looking at law changes. For instance, the findings of Friedberg (1998), who argues that the relation between the new legislation and the divorce rate is strongly positive have been contradicted by Wolfers (2006), whose findings suggests that such a relation may only be valid in the short run, and by Gray (1998), for whom the impact of the legislative change is to be studied with respect to a shift in the female labour supply and not in the divorce race *tout-court*[5]. Rasul (2006) even argues that the introduction of unilateral divorce resulted in a decrease of the divorce rate, by increasing the probabilities of better matchings in the marital market.

Similar disagreements exist with regards to studies on self-selection into the marital market. In particular, the increasing importance that cohabitation has recently gained as an alternative to marriage[6] has led some analysts to assume that a prolonged pre-nuptial cohabitation period would at least partly guarantee the minimization of the "learning effect" problem which can in some cases drive the decision to divorce. Nonetheless, Barham, Devlin, and Yang (2009) provide a theoretical framework within which the decision of getting married after a period of cohabitation can be optimal even if the partners are already certain that it will lead to divorce. From an empirical perspective, Thomson and Colella (1992), Lillard, Brien, and Waite (1995) and more recently Dush, Cohan, and Amato (2003) have shown how couples which have experienced cohabitation before marriage tend to have low quality marital experiences and a higher likelihood of divorce (Brines and Joyner (1999) argue that the probability of separation is affected by a long period of cohabitation only if the partners are married, not if they cohabit). These contributions aim at studying the dynamics of the marital market through the learning effects that certainly characterize partnerships but which can only partly explain the set of reasons that may lead to the end of a marriage. Burdett and Coles (1998), for example, suggest two more motivations for divorce. Married couples may opt out of the wedlock after a change in the payoff related to the outside option (either being single or starting a new relationship) and if there is a change in the productivity of the match. The explicit introduction of the three reasons for a divorce (learning effects, changes in the match productivity and changes in the outside options) is to be found in a number of papers which tackle the issue of marital separation using a search and matching approach. A multiplicity of equilibria spanning from cases

[5]The effect of the introduction of unilateral divorce on the female labour supply is also the main focus of Stevenson (2007).

[6]Some basic evidence on this can be found in Cherlin (2004).

in which separation is never possible to cases in which divorce is taking into consideration even in the case of a good quality match are often the outcomes of these analyses, among which it is worth mentioning Burdett, Imai, and Wright (2004) and Cornelius (2003). Most of these studies assume that divorce is an event which might occur, but refrain from analysing the causes which can induce such a choice. In this respect, my paper tries to go beyond the mechanics of marital separation, in order to focus on the dynamics characterizing the relation between (one of the possible) causes of divorce and its occurrence.

2 The Changes in Time Management and their Effects on Couples

Within the economic literature the process of formation of families is usually summarized by the assumption that "[C]ouples marry and stay married when the gains from marriage exceed the gains from being single"[7]. The relation between the occurrence of marriages and divorces and the utility achieved by the partners is therefore pivotal for the survival probabilities of marital relationships. Nonetheless, what determines the level of utility achieved by the couple is not totally clear. Following Becker (1991) a relevant number of contributions have focused on the way spouses produce the public good whose consumption determines the utility level of the couple. In this respect, the division of labour within the family has been studied, with reference to the theory of comparative advantages and specialization in households, while the modes of consumption of the public good are generally neglected. Hamermesh (2002) proposes the explicit introduction of the time spent together by partners in the utility function of the household in order to establish a correlation between togetherness and gains from marriage. His conclusion is that partners' time is complementary in the sense that spouses are better off "having the possibility to consume time together"[8]. The possibility to study divorce rates in terms of their relation with time use complementarities is strictly connected to Hamermesh point of view and represents the main focus of this paper. In the same spirit as Stevenson and Wolfers (2007) consumption complementarities are defined as the extent of the spouses' joint consumption of public goods and quality time and are approximated by the amount of time devoted to shared leisure activities. The effectiveness of projecting the phenomenon

[7] Stevenson and Wolfers (2007), p.40.
[8] Hamermesh (2002), p.617.

of jointness in consumption onto the probability of divorce relies on a set of theoretical and methodological assumptions. In particular, the utility function of each partner needs to capture the desire for the joint consumption of leisure time. If we assume that the utility of an individual is increasing in the consumption of leisure, togetherness *per se* should imply that each partner is strictly better off when consuming leisure with the spouse than alone[9]. The benefit that partners can extract from the joint consumption of "quality time" goes beyond the simple summation of the individual benefit from leisure time and in this sense can be seen as a driving force toward the establishment of complementarities. The ability of couples to extract marginal utility gains from the time spent together is then to be interpreted as an indication of the quality of the match, whose realization determines the stability of the partnership[10]. The validity of this approach is based on some more hypotheses related to management of time within households. Linking time use complementarities to divorce rates necessarily implies that the patterns of time consumption across households are characterized by some regularities that allow for the detection of a relatively well established correlation between time consumption and marital separations. The existence and the extent of these regularities will be analyzed in section 4. Furthermore, this correlation is meaningful with respect to the trends in the divorce rates outlined in section 1 only if the trends of time consumption have been changing over time. In these respect, the modifications of the supply of working and non-working time during the last four decades are to be taken into account. The analysis proposed by Goldin (2006), which investigates the female labour supply in the United States from the end of the nineteenth century to present time, clearly indicates how the amount of time women devote to labour market has been steadily increasing from the end of the Second World War until mid-Nineties, and has only recently started to stabilize. This increase has been accompanied by an improvement in females' education, a rise in women salaries, which has made time spent in household chores relatively more expensive, and an increase in the average age at first marriage. Moreover Aguiar and Hurst (2007) show that the time spent during leisure activities has increased during the last four decades thanks to a reduction in work hours for the men and to a decrease in the time spent in household chores for the women. The simultaneous occurrence of all these phenomena certainly contributed to the

[9] If we assume the utility of an individual only depends on her consumption of leisure time and on the state of the world s, where $s = 1$ if the partner is present at time of consumption, $s = 0$ otherwise, then togetherness can be expressed as $u(l, 1) > u(l, 0)$ and $u'(l, 1) > u'(l, 0)$.

[10] Fernandez, Guner, and Knowles (2005) implicitly introduce the quality of the match in the couple indirect utility, according to the following quasi-linear specification: $V(I, q) = u(I) + q$ where q is the quality of the match and $u(I)$ is a (strictly increasing) function of the family income.

establishment of new patterns of time consumptions among families, although the effects of these changes have certainly not been homogeneous across households. Nonetheless, the mere possibility to explore the existence of a link between divorce rates and togetherness and the assumption that such a link can play a more relevant role in recent times than it did in previous decades directly finds its rationale in the social changes described by Goldin (2006).

Although an investigation on the relation between time spent together and success of a match can appear redundant with respect to the reality of Western countries, a number of issues may still affect the effective transposition of the above theoretical claims onto an empirical research. First of all, it is not possible to rule out the possibility that couples exist in which partners prefer not to spend their quality time together. In this respect, the possibility to rely on well established datasets characterized by numerically relevant samples guarantee the achievement of relatively robust results. Furthermore, no claims can of course be made in terms of the existence of any causality between the extent of jointness and the trends in divorce rates given the obvious relevance of the issue of endogeneity. These points will be taken into consideration within the proposed empirical analysis through various specification robustness checks.

3 The Data

3.1 Time Use Data

The extent of "togetherness" within American household, its intertemporal dynamics and its relations with the way partners spend their time will be studied in this paper making use of data from three waves of the American Time Use datasets. Due to the increased availability of these datasets and the improved quality level of provided information, working with diary surveys has become a widely popular choice among applied researchers in the last few years. The already cited article by Aguiar and Hurst (2007), which focuses on the determinants of the increase in leisure time of Americans in the last forty years, probably represents the most cited example within this strand of literature. A number studies have focused on other phenomena related to family economics. With no presumption of completeness, it is worth to mention the contributions of Ramey (2008) on the changes of home production patterns across time, Guryan, Hurst, and Kearney (2008) on the impact of education on the time spent by parents with their children and Datta Gupta and

Stratton (2008) (using both American and Danish data) on the relations between changes in leisure time and bargaining power within the couple[11].

The dataset I use is based on surveys of the American Time Use Data as harmonized by the American Heritage Time Use Study [12]. The data are collected from the 1965-1966 Multinational Comparative Time-Budget Research Project, the 1975-1976 American's Use of Time and the 2003 American Time Use Survey[13]. Evidently, the sources of information are different, but all the datasets are characterized by a considerable degree of homogeneity in almost all the relevant variables. For instance, the time use variables are rather consistently categorized across surveys. Each individual is asked to indicate the amount of minutes she spends in every activity she carries out during the day[14]. The total amount of minutes indicated by every person is equal to 1440, so that the whole day is covered. The number of activities which can be chosen varies a little across surveys, from a minimum of 85 up to 94. I have initially grouped these variables into 13 categories, summarizing the main activities: work, education, household chores, purchases, childcare, adult care, voluntary activities, leisure, sport, social activities, art, relaxation (including sleep), travel (not toward work place)[15]. Furthermore, in surveys 1, 2 and 5 the interviewed individuals are also requested to specify the amount of time they spend alone, with their partner and with other people. These last variables represent an important tool in order to disentangle the differences in the way couples have changed their time consumption patterns across time. Table 2 shows some descriptive statistics of the data. In total, the sample I use for my analysis is composed of 247,117 married individuals, 58.61% of which are women, aged 21 to 65. The survey which contributes the most is the one of 2003, in which 177,000 individuals are included.

The variable "Time Spent with Spouse" (TWS) will play a pivotal role in the analysis. This measure of *togetherness* in fact can be seen as a valid proxy for measuring the amount of quality time spent together by the American couples over the last forty years. The aim is to identify

[11] As an example of a time use analysis not directly linked to family economics, see Aguiar and Hurst (2008). For a theoretical approach to the relation between time allocated in home production and market work and divorce and marital rates see Greenwood and Guner (2004).

[12] For more details on the data and the harmonization procedures, see http://www.timeuse.org/ahtus/

[13] The American Heritage Time Use Study also includes waves from 1985 and 1993. Nonetheless, these waves can not be included in my analysis as they lack two extremely relevant variables: in the 1985 survey does not include any information on the time eah individual spends with her partner, while in the 1993 dataset the sampled individuals are not required to provide any details regarding their marital status.

[14] Each individual is asked to indicate a main activity and a potential secondary activity she might carry out together with the main one. In my analysis I will concentrate on main activities only.

[15] The average times spent in each activity in different decades are reported in table 12 and tabel 13 in the Appendix.

	Total	Male	Females
Observations	247,117	41.39%	58.61%
Average Age	40.77	41.91	39.97
	10.75	10.78	10.66
Race White	90.61%	89.38%	91.48%
Others	9.39%	10.62%	8.52%
With Children	67.00%	66.33%	68.70%
Low Education	13.17%	14.53%	12.06%
High School	34.17%	30.12%	37.03%
College	52.66%	55.35%	50.91%
Employed	74.07%	93.95%	60.04%
1st Income Quart.	8.84%	8.61%	9.00%
4th Income Quart.	39.69%	41.58%	38.35%

Table 2: Sample Descriptive Statistics

how this time has been related to different variables, and how these links have changed over time. More specifically, I link TWS to a bundle of time consuming activities and see whether changes in the composition of this bundle might have an influence on the way individuals shape their time with the partners. As including all the time use variables into my empirical study would of course lead to relevant problems of endogeneity, I limit the number of activities to be included in the set of regressors to three: Household chores, childcare and leisure. Although a certain degree of arbitrariness can not be avoided when implementing this kind of selection, the three variables appear to be particularly relevant. The first two, in fact, represent time spent in activities traditionally assumed to be performed by women rather than men. A substantive modification over time on the way these activities affect the amount of time each individual spends with her/his spouse could represent a good indicator of changes in the way couples shape their time together. The relevance of the time spent in "leisure" on explaining the amount of time partners spend together is to be related to the attempt of linking TWS with the increased importance achieved by time use complementarities within the couple. For instance, leisure is to be seen as a proxy for all those activity that people may perform in order to relax and amuse themselves. In this respect, its positive impact on TWS would represent a first confirmation for an enhanced role of consumption complementarities. Table 3 shows the average amount of minutes per day spent in each of the three

	1965	1975	2003	Diff.03-65
Males				
House Chores	41.9492	65.3166	75.7055	33.756
Childcare	16.6116	17.843	46.4042	29.793
Leisure	19.4219	19.0704	32.1297	12.708
Time with Spouse	244.116	345.704	317.049	72.933
Females				
House Chores	266.105	190.778	149.539	116.566
Childcare	72.9	56.2074	94.884	21.984
Leisure	18.8104	15.3027	33.0473	14.237
Time with Spouse	235.252	334.57	289.928	54.676

* Estimated;

All differences presented in the last column are statistically significant at 1% level.

Table 3: Average Time per Day (in Minutes)

relevant activities and in TWS across the three decades under investigation.

3.2 The National Longitudinal Survey

The analysis of the Time Use data can be extremely useful for identifying the patterns of time consumption within couples and the role played by "togetherness" in shaping the evolution of these patterns. Nonetheless, the lack of a panel dimension in these data irremediably prevents any kind of analysis with respect to the effect of this evolution on the likelihood of divorce. Complementing the ATUS datasets with a number of waves from the National Longitudinal Surveys (NLS) has therefore appeared as a natural choice in order to fill the void and better characterize the contribution of this paper.

Out of the set of all the NLS I take three datasets into considerations: The NLS of Mature Women (NLSMW), the NLS of Young Women and the NLS of Youth 1979[16]. The first two share a very similar structure, allowing for a relevant degree of comparability. In the NLSMW around 5,000 women are first interviewed in 1967 when aged between 30-44 and then are reinterviewed at irregular time intervals until 2007. In total I can count on 16 waves. Taking into consideration the fact that only women which got married (at least once) are at risk of divorce, I drop from the sample all the individuals who never married. The data suffer from a considerable degree of attrition due to a number of effects (death, poor quality of some interviews, impossibility to constantly locate the individual, etc.). In all, the used sample starts with 4,615 individuals and includes

[16]Full details about all these datasets are available on the web page: http://www.bls.gov/nls/.

52,892 observations. The questions cover a multiplicity of fields and tend to vary in different years. Nonetheless, in each wave can be found a consistent bulk of questions regarding the demographic, social and economic characteristics of the individual, making the exploitation of the panel dimension of the dataset absolutely feasible.

The National Longitudinal Survey of Young Women (NLSYW) can be seen as a "twin dataset" with respect to the NLSW. Both the set of questions posed and the sampling strategy are in fact extremely similar to those described above. The interviews started in 1968 and the last one took place in 2003. The sampled individuals in this case are representative of different cohorts with respect to the respondents of the NLSMW, for their age being included between 15 and 24 years when first interviewed in 1968. By reducing the sample to all the individuals that have experienced marriage, I can make use of information on 4,316 women, which lead to a total of 52,987 observations.

The National Longitudinal Survey of Youth (NLSY79) substantially differs from the previous datasets. In this case in fact,the analysis is conducted on a sample of 13,201 individuals, including both women (7,006) and men (6,195). The interviews were first conducted in 1979, and the respondents were interviewed annually through 1994 and are currently interviewed on a biennial basis. Given the young age of the individuals included in this dataset, the attrition in this case represents a less problematic phenomenon. Nonetheless, given the fact that the focus is on respondents that have been married at least once, the number of observations is relatively small. The total number of observations is 92,513. With the inclusion of these data I am able to collect a relevant set of variables on several cohorts, ideally covering the whole spell of time between 1967 and 2003. The exploitation of the panel dimension of the survey will allow me to derive a number of conclusions on the changes in the impact of several variables on the probability to divorce across different decades. All the NLS datasets include questions that allow for the investigation on the way couples share household responsibilities; The data related to these questions will be comprised in the set of the explanatory variables, in the attempt to consistently complement the analysis conducted on the Time Use Data. In this sense, the way married individuals manage the household responsibilities, and the extent to which they are able to perform them together or individually, represent a way to directly introduce a measure of *togetherness* into the analysis of divorce probabilities over time.

4 The Results on Time Consumption

The starting point for the empirical analysis consists in the identification of the across time correlation patterns between the amount of time partners spend together and the relevant time use variables described in section 3.1. In this respect I use OLS to estimate:

$$TWS_i = \alpha + X_i\beta + Z_i\gamma + \sum_{k=1}^{3} \theta_k t_{i,k} \tag{1}$$

where the dependent variable, *Time Spent with Spouse* is regressed against a set of variables X that control for personal characteristics, such as age, education, income, presence of children, area where the individual lives (urban or rural), job status and the matrix Z composed by a set of controls for the day of the week and the season in which the individual kept her diary. The parameters θ relate to each of the three critical time use variables (household chores, childcare and leisure) and are the main objects of interest in this section. A positive sign for these coefficients indicates that an increase in the time spent in the included activity is related to an increase in the time spent with the spouse. Furthermore, considering that the regressand and the regressors are calculated in minutes, the interpretation of the parameters is quite straightforward as the estimated value indicates the change in TWS in terms of minutes per day that can be linked to a one minute increase in the time devoted to the activity under consideration. The analysis is initially performed separately on females and males and for each wave and is then complemented by the OLS estimation of the following equation[17]:

$$TWS_i = \alpha + X_i\beta + Z_i\gamma + S\delta + \sum_{k=1}^{3} \theta_k t_{i,k} + \sum_{k=1}^{3}\sum_{j=1}^{4} \lambda_{k,j} t_{i,k,j} s_j. \tag{2}$$

where the three waves are merged in a unique dataset and year effects and all the interaction terms between each time use variable and the year dummies are included in the set of independent variables. In particular, the matrix S contains three dummy variables for the survey years and the parameters λ are meant to capture the trend effects.

Tables 15 and 16 in the Appendix reports the estimated parameters for the matrices X and Z with respect to eq. (1). These coefficients appear to be fairly robust to any proposed specifications

[17]Eq. (1) can be simplified into $TWS_i = \alpha + X_i\beta + Z_i\gamma + \theta t_{i,k}$ where each time use variable is individually introduced into the regression. The results obtained by regressing this equation are extremely similar to those reported with respect to eq. (1) and are therefore not presented in the paper.

so that I avoid to report them in further specifications. In all, although the results from tables 15 and 16 are not particularly controversial, they suggest some interesting insights into the dynamics of the variables when correlated with TWS. The effect of age substantially differs between women and men, for the former being characterized by a constantly negative parameter (and a positive one with respect to the squared term, suggesting a concave relation between age and the time spent with the husband), while the latter shows a notable degree of variability in both the linear and the quadratic term. Similar differences can be found also for the dummy variable which indicates whether the respondent is unemployed. It is worth to notice that for both men and women the impact of the presence of kids in the family on the amount of time the partners can spend together is generally negative.

The coefficients related to each time use variable obtained running eq. (1) separately for each wave are summarized in Table 4[18]. The estimated parameter for leisure is positive for both genders, and in both cases the effect appears to gain relevance over time. For men, in fact, in 1965 one additional minute of leisure would have been related to an increase in the time spent with their spouse of just 0.05 of a minute. The impact of one more minute of leisure in 2003 is certainly more noticeable, as it is estimated in 0.66 of a minute. A statistically significant positive sign (although with a smaller magnitude) also characterizes the coefficient obtained regressing leisure on TWS for women. Taking into consideration the averages reported in table 3, that show a reduction in TWS as we move from the 1975 wave to that of 2003, the increasing effect of leisure on the dependent variable indicates a change in the composition of the time spent together. The estimated link between leisure and TWS directly relates with the hypothesis of a direct relation between the partners' utility and the quality of the time spent when together and represents a first, solid stepping stone toward a theory explaining the importance gained by time use complementarities within couples.

The parameters related to the time devoted to household chores and childcare also contribute to define a new pattern in the way wives and husbands shape their joint consumption of time. For males, in fact, a constant increase in the average time spent in these activities does not imply an increase in the magnitude of the (always positive) parameters; The male contribution to house chores and childcare is in present times more relevant in quantitative terms than in previous decades, as seen in table 3, and it is still linked to an increase in the time the husband spend with the wives.

[18] All the discussed regressions include the set of control variables shown in tables 15 and 16. As already mentioned above, the parameters of these variables are always very similar to those reported in tables 15 and 16 and are then not reported.

Males	Year 1965	Year 1975	Year 2003
Leisure	0.0525**	0.269***	0.669***
	(2.46)	*(9.66)*	*(56.79)*
House Chores	0.0481***	0.113***	0.0718***
	(2.98)	*(6.97)*	*(9.75)*
Childcare	0.258***	0.427***	0.192***
	(7.17)	*(11.09)*	*(19.23)*
R^2	0.272	0.207	0.262
Adjusted R^2	0.271	0.206	0.261
Observations	17043	20914	74200

Females	Year 1965	Year 1975	Year 2003
Leisure	0.165***	0.109***	0.415***
	(7.82)	*(4.37)*	*(43.18)*
House Chores	-0.0949***	0.0150	-0.0419***
	(-12.41)	*(1.46)*	*(-8.10)*
Childcare	-0.0274**	-0.240***	-0.00839
	(-2.20)	*(-13.43)*	*(-1.35)*
R^2	0.249	0.170	0.213
Adjusted R^2	0.248	0.170	0.213
Observations	25352	30777	102482

t Dependent Variable: Daily Time Spent with Spouse

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: OLS Regression, Time Use Variables Coefficients From General Regression

Nonetheless, the marginal contribution of these activities in "explaining"TWS decreases over time. For women, the evolution of the parameters across waves does not define a monotonic pattern. The coefficients are generally of smaller magnitude if compared to those observed for men, and always negative when statistically significant. Although the difference in the size of the estimated parameters for Household Chores between 1965 and 2003 is quite small, the fact that while the total amount of time devoted to these activities between in the same interval of time has dropped considerably, the coefficient for 1965 is still the larger in absolute value suggests a reduction in the across time degree of substitution between household chores and time with the partner. And this lack of relation between the the dependent variable and its regressors is more evident if we focus on Childcare, for which an increase in the total amount of time across waves is linked to a final coefficient which shows no statistical relation with TWS.

	Males		Females	
1975	39.97***	(16.13)	42.84***	(14.77)
2003	-17.65***	(-9.00)	-12.28***	(-5.39)
Leisure	0.185***	(8.21)	0.194***	(9.74)
Leisure*1975	0.079***	(2.44)	-0.170***	(-5.92)
Leisure*2003	0.505***	(20.42)	0.258***	(11.90)
House Chores	0.146***	(10.83)	-0.055***	(-8.00)
House Ch.*1975	-0.018	(-0.97)	0.093***	(8.66)
House Ch.*2003	-0.064***	(-4.29)	0.010	(1.21)
Childcare	0.168***	(5.27)	-0.031***	(-2.88)
Childcare*1975	0.162***	(3.62)	-0.185***	(-11.02)
Childcare*2003	0.034	(1.03)	-0.003	(-0.29)
R^2	0.259		0.220	
Adjusted R^2	0.259		0.220	
Observations	125304		177392	

t Dependent Variable: Daily Time Spent with Spouse

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: OLS Regressions, Coefficients for Year Dummies, Time Use Variables and Interaction Terms

Table 5 presents the results from the estimation of eq. 2, whose aim is to further investigate the way the relation between the time use explanatory variables and TWS changes over time, by explicitly introducing the interaction terms between surveys and time use variables among the regressors. The set of the year dummies and interaction terms does not include the 1965 wave so that the results can interpreted as changes with respect to this baseline year. The fact that for both men and women the survey year parameters show a change in sign simply reflects the non-monotonic time trend in the amount of time couples spend together, as already highlighted in table 3. Focusing on the time use variables, the emergence in recent years of a relevant link between leisure and time spent with the partner is once more evident. For both men and women the interaction term between leisure and the 2003 wave is characterized by a positive coefficient whose magnitude overcomes that of the non-interacted time variables. In this sense, although the average amount of minutes per day devoted to leisure noticeably increased in the last forty years, the marginal explanatory power of this variable with respect to TWS still gains momentum. This kind of regularity can not be observed with respect to the other time use variables. For men, the interaction terms related to household chores define a negative trend which acquire magnitude and

statistical significance over time. Hence, the dynamics that characterizes this parameters move in an opposite direction to that identified with respect to leisure. An increase in the average daily amount of time devoted to chores tends to be linked to a reduction in the time spent with the wife. As this effect accompanies the increase in TWS observed between 1965 and 2003 (but not between 1965 and 2003) the marginal contribution of the time spent in chores in explaining the composition of TWS seems to be limited. The corresponding parameters for women show an opposite pattern in terms of signs across interaction terms, but is important to stress that the 2003 interaction terms fails to achieve any statistical significance, so that establishing whether a correlation in the changes in the dependent variable and in the time devoted to household chores exist is not possible. Similar conclusions can be drawn for both sexes with respect to the amount of minutes spent in childcare. Of course as leisure emerges among the included time use variables as the only regressors consistently related to TWS across time and with a praticulary strong link in the last wave, it is important to recall that the way women and their spouses spend their time could have been strongly influenced by the changes in the social context that might have taken place over the spell of time under considerations. The reference is in particular with respect to the female participation to the labour market. In 1965, 30% of the interviewed women were working fulltime, while in 2003 the corresponding percentage had gone up to 46%. In order to better identify the effects of this intertemporal change, the analysis based on (2) was repeated splitting the sample of women between non-workers and workers. Table 6 shows the average amount of minutes per day spent by working and non-working women in the activities we have been focusing on, while table 7 presents the results for the OLS regressions (the parameters for all the other variables are included in the Appendix, table 18).

After having operated such a division in the sample, although the average figures tend to display similar evolving patterns, the regression results show several differences between the two set of individuals. As for non-working women the estimated coefficients tend to reproduce the same dynamics outlined for all the female sample (and this result can not be considered surprising for the set of non working women being characterised by a higher cardinality than that of the employed ones), the parameters for those women that declare to work full-time sensibly diverge from those observed so far. In particular, although the parameter characterising the link between TWS and leisure *per se* is still positive and significant, the time trend associated to this variable shows that

	1965	1975	2003	Diff.03-65
Not Working Women				
Leisure	20.783	12.943	31.089	10.306
House Chores	304.343	215.489	173.367	-130.976
Childcare	90.136	69.207	122.976	32.840
Time with Spouse	247.873	351.998	294.716	46.843
Working Women				
Leisure	14.206	18.303	35.314	21.108
House Chores	179.262	152.084	121.956	-57.306
Childcare	33.837	34.857	62.365	28.528
Time with Spouse	206.281	307.733	284.385	78.104

* Estimated;

All differences presented in the last column are statistically significant at 1% level.

Table 6: Average Time per Day (in Minutes)

such a relation is negative in 1975 and potentially non existent in 2003. The estimates for the other time use variable also do not lead to the identification of clear connection between the observed increase in the total TWS for working women and time spent on these activities over the last four decades.

All the sets of results presented in this section suggest the existence of strict correlation between the way partners model their leisure activities and the time they spend togheter. Furthermore (with possibly the only exception of the coefficients related to working women), such a link stands out from the whole group of estimates for its reinforcement over time. By connecting these results to the assumptions on the relation between time spent together and utility of the partners, as outlined in section 2, the hypothesis that in recent years the time spent together is to be identified more as quality time and less with the simple performance of routinary household activities appears to gain momentum. At this stage no obvious claim can of course be made neither on the direction of the causality of this link nor regarding the possible implications of this correlation on the divorce rates. Nonetheless, with respect to the latter, if the likelihood of divoce is to be linked to the quality of the match between two partners, than a further level of analysis can be implemented on the same data so as to shed some light on how the outlined relations between the time use variables and our measure of togetherness can be then reflected on the quality of the match. In this sense eq. 1 is used as baseline for performing a set of quantile regressions on the same group of variables already included in the previous estimations. In figures 1 and 2 the parameters obtained by the quantile regression

Females	**Non-Working**		**Working**	
1975	36.66***	(4.22)	47.51***	(11.46)
2003	-38.13***	(-11.03)	7.11***	(2.24)
Leisure	0.094***	(3.92)	0.369***	(10.00)
Leisure*1975	-0.059	(-1.53)	-0.392***	(-8.44)
Leisure*2003	0.396***	(14.78)	0.044	(1.15)
House Chores	-0.130***	(-14.46)	0.005	(-0.37)
House Ch.*1975	0.142***	(10.32)	0.019	(0.98)
House Ch.*2003	0.038***	(3.46)	0.023*	(1.60)
Childcare	-0.096***	(-7.81)	0.107	(4.30)
Childcare*1975	-0.228***	(-11.41)	-0.131***	(-3.75)
Childcare*2003	0.067***	(5.07)	-0.146***	(-5.61)
R^2	0.215		0.233	
Adjusted R^2	0.215		0.233	
Observations	102322		75070	

t Dependent Variable: Daily Time Spent with Spouse

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: OLS Regressions, Coefficients for Year Dummies, Time Use Variables and Interaction Terms

at decile level are plotted for each of the time use variables included among the regressors[19]. The graphs respectively refer to females and males and are presented separately for each year. The estimates can be interpreted as the marginal effects on the time spent with the spouse due to a one minute change of the covariate[20]. The dashed lines indicate the parameters obtained in the corresponding OLS regressions, while the solid horizontal lines indicate the confidence interval of the OLS estimators.

By comparing the plotted lines with the OLS estimates it is evident that in some cases the linear regression does not fully capture the "inter-quantile" dynamics of the effects on the dependent variable. It is worth noting that for women, the parameters associated with leisure time tend to show a different dynamics in comparison to those related to household chores and childcare. With respect to these last two variables, in fact, the effect of an increase of the time spent on these activities generally appears to be decreasing (the only notable exception being the coefficients related to childcare in 1965). So for those women who already tend to spend a relatively high

[19]The independent variables included in the quantile regressions are the same as in the OLS analysis. The complete list of regressors is included in the Appendix. The results of the quantile regressions for the non time use variables are not reported but can of course be made available by the author.

[20]A good summary on how to implement and interpret quantile regressions see Koenker and Hallock (2001).

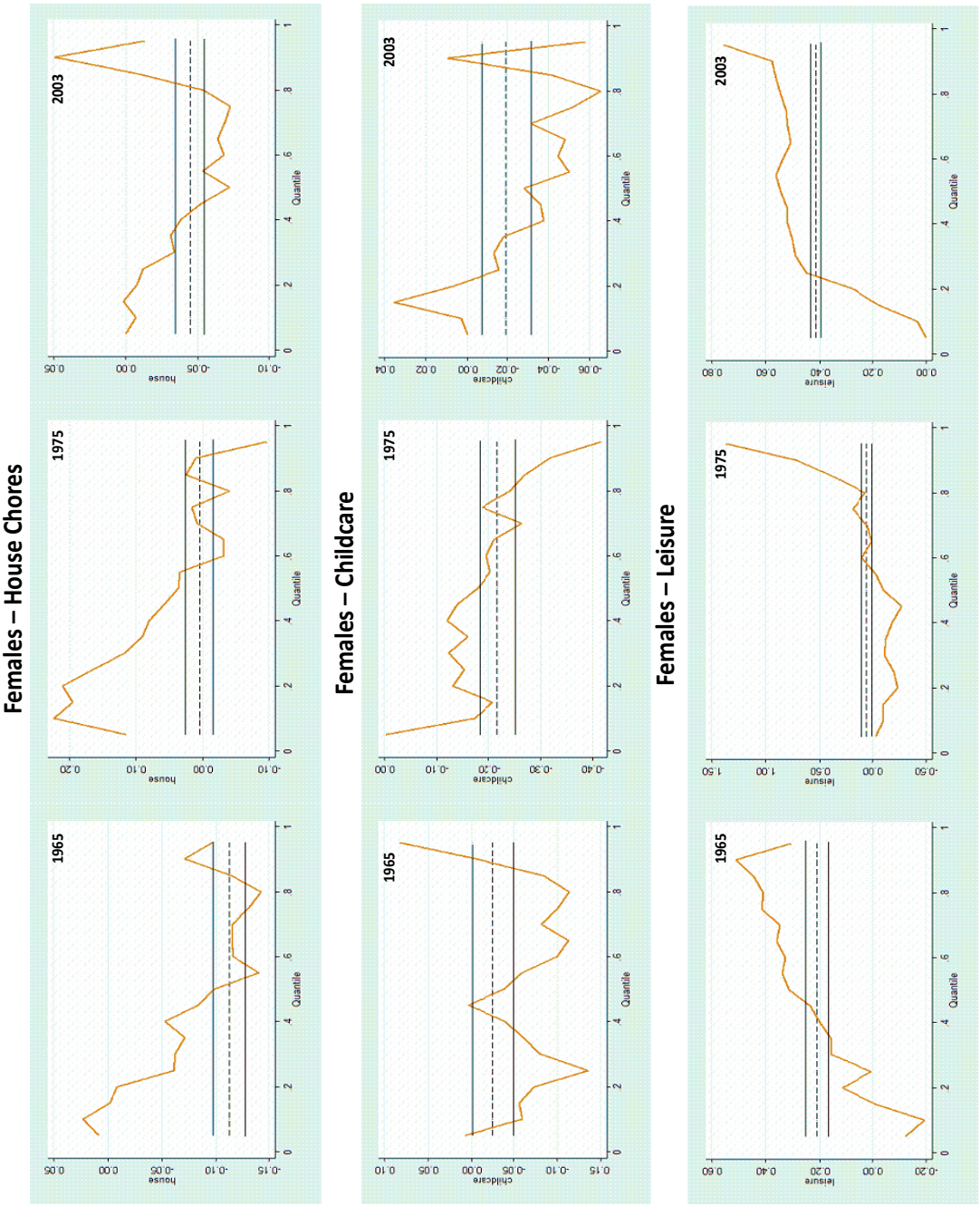

Figure 1: Quantile Regressions - Females. Dependent Variable: Time Spent with Spouse

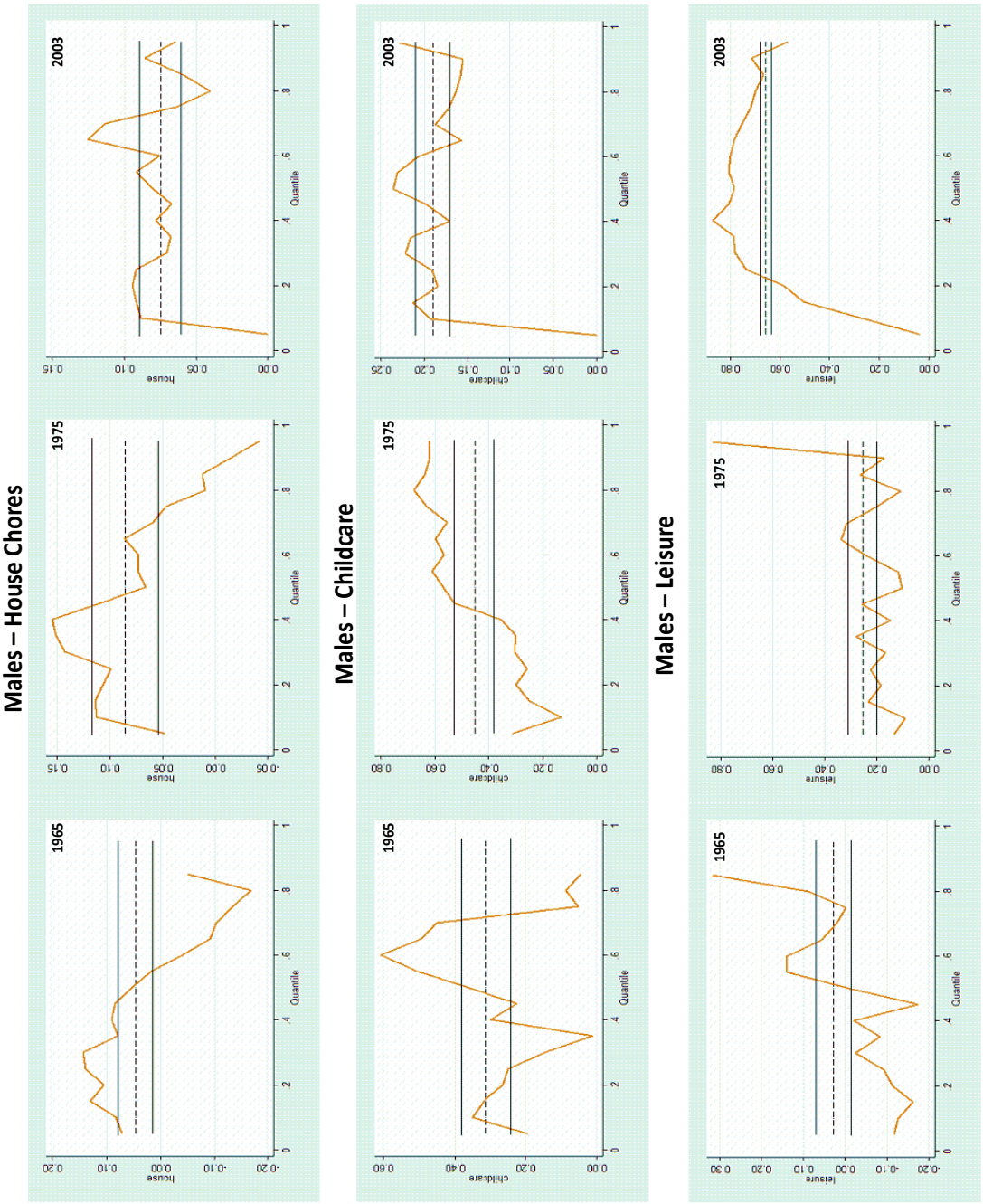

Figure 2: Quantile Regression - Males. Dependent Variable: Time Spent with Spouse

amount of time with the partner, the negative impact of the house and family related activities on "togetherness" is particularly relevant. This evidence was at least partially captured by the negative signs of the OLS coefficients presented in table 4. The opposite results characterize the impact of a one minute increase in leisure. The coefficients in this case vary considerably across the distribution, with the larger effects being observed on the higher deciles. This pattern appears to be rather systematic in 1965 and 2003, while the positive sign associated with the OLS parameter in 1975 seems to be largely driven by the huge increase in the parameter values observed with respect to last two deciles.

The signs and the magnitudes of the parameters obtained with the OLS regressions clearly showed different impacts of the regressors between women and men. It is therefore not surprising (and actually quite reassuring with respect to the validity of the results commented so far) that the graphs resulting from performing the quantile regressions on the male sample considerably differ from those related to women. The major disparities emerge with respect to the effect on the dependent variable of an increase of the time devoted to childcare. The largely negative effects that characterized the results related to women are now completely overturned. The coefficients for men are steadily positive across deciles, and in particular, the parameters for 2003 appear to be reasonably close to the least square estimate. With respect to the impact of an increase in leisure, the results in this case are less straightforward as the shapes of the graphs tend to change overtime. Nonetheless, as already noted for women, both the 1965 and the 2003 estimates show a positive trend across deciles. This particular result can be related to the theoretical assumption proposed in section 2. As spending more quality time together should be seen as a sign of an improvement in the utility level reached by the partners, the relation between leisure time and "togetherness" can be seen as a good proxy for the quality of a match. In this respect, the outlined pattern in the quantile regression coefficients indicates that partners that already spend a relatively high amount of time together tend to increase the time with the spouse were their leisure time marginally incerase by an additional minute.

5 Time at Home and Probability to Divorce

The structure of the Time Use Data is particularly useful for picturing the way time consumption has changed over time, but does not allow for any inference with respect to the consequences of

these changes in terms of individual choices. The lack of any panel dimension, in fact, hinders starting a new level of analysis, aimed at the study of a cause-effect relation between time use and social and economic decisions. In the case of the present paper, I try to (at least partially) fill this void taking advantage of a set of questions that can be found in the National Longitudinal Surveys. All the sampled populations are in fact asked to provide information on the way they share some of the household responsibilities with the other members of the family. By using the resulting variables as proxies for home activities in general and including them in the set of regressors used to study the probability of divorce, I investigate how different attitudes toward home activities may be correlated to the stability of a marriage. To some extent, this is a natural step after the analysis reported in the previous paragraph: Not only the amount of time dedicated to a certain activity matters, but the way the activity is performed can also be crucial for the duration of a relationship. Unfortunately, no questions are posed with respect to leisure activities, so that at this stage it is not possible to complement the analysis with a symmetric study on leisure.

The empirical strategy employed in this section is that of a standard survival analysis on discretely grouped data (but with a continuous underlying survival process), performed through a complementary log-log specification[21], in which the dependent varaible is given by the hazard rate of divorce. The starting point is given by the following survivor function at time a_j:

$$S(a_j, X) = exp\left[-\int_0^{a_j} \theta(u, X)du\right] \tag{3}$$

where the the survivor function $S(a_j, X)$ (in this case indicating the probability of remaining married at least a_j periods of time) is linked to the realizations of a set of variables X directly linked to the underline continuous hazard process in the following way: $\theta(t, X) = \theta_0(t)e^{\beta' X}$. Defining the discrete time hazard function as:

$$h_j = \frac{S(a_{j-1}, X) - S(a_j, X)}{S(a_{j-1}, X)}. \tag{4}$$

and taking into account eq.(3):

$$h_j = 1 - exp\left[e^{\beta' X}(\Omega_{j-1} - \Omega_j)\right] \tag{5}$$

[21]For a good theoretical introduction to survival analysis see Jenkins (2005) and Wooldridge (2001), chapter 20. Hosmer, Lemeshow, and May (2008) provide a good summary of applied techniques for survival analysis.

is obtained, where $\Omega_j = \int_0^{a_j} \theta_0(u, X)du$.

This eventually leads to:

$$h(a_j, X) = 1 - exp[-exp(\beta' X + \gamma_j)] \tag{6}$$

where $\gamma_j = log\left[\int_{a_{j-1}}^{a_j} \theta_0(u)du\right]$. This is the final expression for the equation which, given a set of covariates X, can be estimated[22]. Furthermore the last equation can be modified in order to account for unobserved heterogeneity. Taking the logarithms of (6) and adding an error term v we can obtain:

$$cloglog[h(a_j, X|v)] = \Omega_j + \beta' X + u \tag{7}$$

where $u = log(v)$. The possibility to further manipulate (7) in order to obtain the corresponding survival function depends on the assumption on the functional form of u. In what follows I will assume that u follows a zero-mean Normal distribution and the results of the estimation obtained taking into account unobserved heterogeneity will be presented along those where this phenomenon is not accounted for[23].

The estimation procedure is then rather simple[24]. Each individual is followed for the entire duration of her marriage. For each dataset I run a regression in which the dependent variable is a dummy which takes value 0 in every period the individual is married; if the individual divorces the dummy takes value 1 in the first year of divorce and the individual is then dropped from the sample (and possibly included again in case of new marriage). The dependent variable is regressed against a set of independent ones which contain the log of the length of the "treatment period"(i.e. the marriage), several personal and demographic characteristics and the set of dummy variables on the responsibility of household chores. This last set of variables varies depending on the dataset taken into consideration. The NLSMW and the NLSYW are characterized by a relevant degree of homogeneity, so that the results obtained by the described regression on the two datasets can be easily compared. The set of household responsibilities included in my regressions is composed by:

[22]The estimation procedures have also been repeated using a *logit* specification, obtaining results which are very similar to those presented.

[23]An alternative specification would consist in assuming that the error term follows a Gamma distributions (see Abbring and Berg (2007)). The results obtained with such a specification are very similar to those obtained assuming a Normal distribution and therefore are not presented.

[24]Details on how to perform the estimation of the suggested equations can be found in Jenkins (1995) and Jenkins (1998).

grocery shopping, childcare, cooking, cleaning the dishes, housekeeping, washing the clothes and garden maintenance. The questions related to this topic are designed in a way that allows to identify the person within the family which is mainly (but not necessarily the only) responsible for the chore (which might be not only one of the spouses but also a third person). It then become possible to study the probability of divorce as function of the way chores are split between partners[25]. Such an analysis gains momentum as it is performed on two different cohorts of individuals interviewed in the same period, so that it is possible to control for the emergence of different attitudes toward these responsibilities. Table 8 shows some descriptive statics related to the variables of interest. The figures indicates the percentage of women that indicated themselves or their husbands as the person responsible for a certain chore in the household. The simple observation of the table suggests a clear division between chores whose responsibility mostly pertains to women and those mostly performed by men (that in the set of available variables are represented by "yard maintenance"). It is worth noticing some differences in the percentages we observe with respect to the two datasets. In particular, the percentage of husbands which are (at least partly) responsible for the chores is systematically higher in the NLSYW than in the NLSMW and this regularity applies to all the household activities included in the analysis. Furthermore, with the notable exception of childcare, for which the role of men appears to have gained an extremely relevant impact, the percentage related to women have not changed in very significant way. This fact suggests that for younger cohorts a more active role of men in the management of the household can be highlighted, possibly as a substitute for the work of third persons.

The study conducted on the NLSY79 dataset is slightly different, as the questions only ask whether the respondent is responsible for the chores (the list of activities is extremely similar to the one of the NLSMW and NLSYW). It is therefore not possible to identify the person responsible for the chore, were the respondent not in charge. In particular, the questions ask the respondent to indicate how often he or she takes care of a particular household activity. Table 9 shows the percentages of individuals which have indicated one answer among: "Half of the time", "Most of the times", "Always" [26]. Due to the differences in the formulation of the questions a direct comparison

[25]For each variable I construct two dummies, one for the respondent and one for her husband, that take value 1 if the respondent or the husband are the responsible persons for the chore. The dummy variables are then included in set of regressors.

[26]In table 24 in the Appendix I propose the estimation of a regression in which the dummy variables related to the household chores are constructed giving value 1 only for the individual that answered "Most of the times" or "Always" to the question outlined above. As the results are almost identical to those proposed in tables 11 and 23 I will not discuss them in this paragraph.

	NLSW			NLSY		
	Wife	Husband	*Number of Observations*	Wife	Husband	*Number of Observations*
Grocery Shopping	61.10	26.31	*49,058*	68.32	28.87	*45,584*
Childcare	44.75	14.39	*32,177*	39.18	52.07	*40,616*
Cooking	70.63	14.25	*48,873*	70.62	22.80	*45,543*
Cleaning Dishes	53.54	18.57	*48,864*	52.53	22.88	*45,501*
House Keeping	57.64	14.40	*48,861*	57.06	23.34	*45,548*
Washing Clothes	74.79	7.38	*48,874*	77.97	13.02	*45,563*
Yard Maintenance	9.73	58.19	*47,699*	13.00	67.41	*43,087*

Questions:"Is Respondent the Main Responsible for the Chore?"
"Is the Husband the Main Responsible for the Chore?"

Table 8: Percentage of positive answers

	NLSY79			
	Wife	*Number of Observations*	Husband	*Number of Observations*
Childcare	95.40	*10,079*	37.29	*4,248*
Cooking	87.73	*16,269*	12.60	*8,317*
Cleaning Dishes	89.87	*16,269*	13.61	*8,317*
Errands	67.53	*16,235*	56.97	*8,301*
Grocery Shopping	85.42	*16,232*	40.38	*8,316*
House Keeping	91.95	*16,269*	16.58	*8,298*
Washing Clothes	90.21	*16,259*	13.23	*8,317*
House Maintenance	24.33	*16,269*	74.37	*8,317*
Outdoor Chores	29.71	*16,250*	63.00	*8,301*
Paperwork	62.21	*16,247*	46.85	*8,303*

Question:"Are you the one responsible for the chore?"

Table 9: Percentage of Individuals Answering: "Half of the Time and More"

of the figures presented in tables 8 and 9 would not be appropriate. Nonetheless it can certainly be noticed that the division of tasks between genders is once more evident. The fact that the list of activities is slightly richer comparing to those of NLSWM and NLSYW allows for a better identification of the chores that can be seen as mostly "male-oriented". In particular we can refer to the percentages that characterize "outdoor chores", "house maintenance" and (to some extent) "errands" as examples of this types of activities.

Table 10 reports the results of the empirical analysis on the NLSMW and NLSYW with respect to the household chores included in the set of regressors and a few other relevant variables (the complete regressions and a description of the variables are presented in the Appendix). For each dataset column (1) shows the results obtained without taking unobserved heterogeneity into account, while

column (2) presents the results observed when the specification suggested by (7) is followed [27]. As the results do not vary significantly across columns any comment will be based on the results presented in column (1), but can of course be easily applied to column (2). As the average duration of a marriage for the Mature Women is above 20 years, while it does not reach 7 years for the individuals included in the Young Women sample, the differences in the effects of the duration of marriage in the samples is to be linked to a cohort effect. This is in line with what has already been found in the relevant literature[28] and any conclusions to be drawn with respect to this dataset should always take this difference into consideration. Hence, it is quite surprising to observe that the impact of remarriage is particularly important with respect to young women. Of course, in the NLSYW sample the number of respondents that have already experienced more than one marriage is relatively limited (less than 1,000 individuals out of 5,200), so that the estimated coefficient appears extremely relevant. To some extent, the parameter suggests that the attitude toward marriage *per se* can play an important role in the stability of a partnership[29], so that if a woman has experienced a divorce in the first marriage, the likelihood of divorce in case she remarries is higher compared to the hazard for those that have never experienced a divorce.

Focusing more on the effect of the responsibility of the household chores, some regularities in the estimated parameters deserve to be highlighted. In both samples the majority of the statistically significant effects show a negative sign and are linked to activities performed by the husband. Nonetheless, the in results related to the NLSMW samples up to three activities are connected to a reduction in the hazard of divorce when (at least partly) performed by the husband, namely grocery shopping, hose cleaning and childcare. The latter is the only variable that still present a negative and statistically significant sign in the study conducted on the NLSYW data. Linking this evidence to what observed in the previous section and in particular to the fact that the average time men spend on childcare and household chores is increasing over time and assuming a (perhaps stereotypical) point of view, in which the woman is traditionally responsible for housekeeping activities and the man takes care of the garden and the outdoor tasks[30], the estimated parameters suggest that moving away from this framework, implying a more relevant participation of the men

[27] In the Appendix, only the results for the corresponding column (1) of each dataset are reported. The results obtained when accounting for unobserved heterogeneity are extremely similar.

[28] See, for example, Weiss and Willis (1997).

[29] Although within a different context, some of the findings of Lillard, Brien, and Waite (1995) confirm this hypothesis.

[30] Some hints about the validity of this point of view can be found in Becker (1973), Akerlof and Kranton (2000) and Cherlin (2004).

	NLSMW		NLSYW	
	(1)	(2)	(1)	(2)
Duration of Marriage	-0.500**	-0.496**	0.510***	0.890***
	(-2.54)	(-2.43)	(3.88)	(4.47)
Number of Marriages	0.387	0.441	0.592***	0.832***
	(1.49)	(1.40)	(4.22)	(4.15)
Age	0.371***	0.374***	0.675***	0.755***
	(4.32)	(4.27)	(10.77)	(10.18)
Age^2	-0.00321***	-0.00323***	-0.00792***	-0.00868***
	(-3.99)	(-3.97)	(-10.03)	(-9.60)
Grocery-Wife	-0.260	-0.266	-0.233	-0.251
	(-1.30)	(-1.32)	(-1.55)	(-1.33)
Grocery-Husband	-1.331***	-1.342***	-0.247	-0.275
	(-3.73)	(-3.73)	(-1.47)	(-1.34)
Childcare-Wife	0.113	0.118	0.0819	0.0671
	(0.72)	(0.74)	(0.69)	(0.44)
Childcare-Husband	-0.643**	-0.645*	-0.467***	-0.605***
	(-1.97)	(-1.96)	(-3.54)	(-3.62)
Cooking-Wife	-0.0244	-0.0251	0.0507	0.0347
	(-0.11)	(-0.11)	(0.36)	(0.20)
Cooking-Husband	-0.248	-0.256	0.0355	0.0338
	(-0.61)	(-0.62)	(0.22)	(0.17)
Washing Dishes-Wife	0.112	0.108	-0.139	-0.172
	(0.52)	(0.49)	(-1.17)	(-1.15)
Washing Dishes-Husband	-0.183	-0.182	-0.0958	-0.155
	(-0.49)	(-0.48)	(-0.61)	(-0.81)
House Cleaning-Wife	-0.206	-0.206	-0.0544	-0.0922
	(-0.90)	(-0.89)	(-0.42)	(-0.56)
House Cleaning-Husband	-1.270**	-1.279**	0.0754	0.0474
	(-2.22)	(-2.22)	(0.46)	(0.24)
Washing Clothes-Wife	-0.297	-0.299	-0.245*	-0.370**
	(-1.37)	(-1.36)	(-1.80)	(-2.11)
Washing Clothes-Husband	0.370	0.380	-0.244	-0.282
	(0.78)	(0.79)	(-1.28)	(-1.19)
Yard Maintenance-Wife	0.168	0.183	0.470***	0.635***
	(0.85)	(0.90)	(3.70)	(3.75)
Yard Maintenance-Husband	-1.748***	-1.754***	-0.400***	-0.538***
	(-8.18)	(-8.10)	(-3.47)	(-3.65)
Log lik.	-1017.4	-1017.4	-2177.8	-2165.3
Chi-2	384.0	234.1	924.9	359.7
Observations	25752	25890	22671	22688

Dependent Variable: Marital Status, 0 =*Married,* 1 =*Divorce*

Table 10: Clog-log analysis

in the household activities, positively relates to the duration of a marriage but such a result does not appear to be robust in a long run perspective. A different evidence characterise the of the coefficients related to "yard maintenance", the only "male dominated" activity included in the samples under investigation. With respect to the sample of the Mature Women, the parameters related to this chore suggest that the performance of these tasks by the husband is negatively correlated to the likelihood of divorce and this result is confirmed in the analysis conducted on the Young Women sample. But with respect to this last dataset, we can certainly notice how the parameter characterizing this variable when performed by the wife appears to be positive (and statistically significant). The coefficients suggest the existence of a relevant rigidity in the way the division of tasks relate the divorce hazards, with particular reference to the possibility for men to delegate the "male chores" to women. This result can not be considered surprising: The analysis on the Time Use Data has already highlighted a considerable reduction in the time women tend to devote to household chores in favour of an increase in time dedicated to leisure activities. The scope for a substitution of female time for that of men in the performance of chores such as the maintenance of yard is therefore extremely limited, especially with respect to younger cohorts.

The estimated regularities presented in table 10 are confirmed by the figures shown in table 11, which summarizes the results of the regressions performed on the data available through the National Longitudinal Survey of Youth (the whole set of results can be found in table 23)[31]. In this case the variables related to household chores are recorded as dummies taking value one if the respondent is in charge for the chore, zero otherwise. If we focus on the subset of variables composed by "errands", "outdoor chores" and "house maintenance", it is easy to notice that the relation of these regressors with the hazard of divorce follow the same patterns previously highlighted with respect to "yard maintenance". The possibility that the wife is (at least half of the time) the person in charge for carrying out these chores implies an increase in the hazard of divorce, validating the hypothesis of a limited substitutability of partner times on predominantly male activities. Two more results are worth to be underlined. In particular it is interesting to notice that the impact of the participation of men in household activities on the likelihood of divorce does not appear to be very relevant (the only exception being the coefficient related to "outdoor activities", which goes in the direction already outlined with respect to the set of "man activities"). The estimates in

[31] Again, column (1) shows the results when heterogeneity is not taken into account, while column (2) presents the coefficient obtained when correcting for heterogeneity. Given the evident similarity of the two sets of results only the results obtained in the corresponding column (1) are reported in the Appendix.

NLSY79	Men		Women	
	(1)	(2)	(1)	(2)
Duration of Marriage	-0.607***	-0.608***	-0.743***	-0.854***
	(-2.75)	(-2.73)	(-5.58)	(-4.79)
Number of Marriages	0.213	0.213	0.253	0.266
	(0.46)	(0.46)	(1.29)	(1.13)
Age	0.818***	0.822***	0.273***	0.392***
	(4.60)	(4.40)	(2.80)	(3.07)
Age^2	-0.0125***	-0.0125***	-0.00331**	-0.00471***
	(-4.69)	(-4.53)	(-2.34)	(-2.69)
Resp. Childcare	0.00373	0.00420	-0.110	-0.0245
	(0.02)	(0.02)	(-0.44)	(-0.08)
Resp. Cooking	0.0166	0.0191	-0.686***	-0.801***
	(0.04)	(0.05)	(-3.42)	(-3.07)
Resp. Cleaning Dishes	0.425	0.422	0.0138	0.0529
	(1.17)	(1.15)	(0.06)	(0.19)
Resp. Grocery Shopping	-0.167	-0.167	-0.284	-0.368
	(-0.67)	(-0.67)	(-1.45)	(-1.54)
Resp. Housekeeping	-0.162	-0.160	0.451*	0.408
	(-0.52)	(-0.51)	(1.72)	(1.29)
Resp. Washing Clothes	-0.259	-0.262	-0.122	-0.174
	(-0.51)	(-0.52)	(-0.55)	(-0.64)
Resp. Errands	0.0939	0.0918	0.465***	0.541***
	(0.45)	(0.43)	(3.26)	(3.14)
Resp. House Maintenance	-0.0193	-0.0200	0.278**	0.384**
	(-0.08)	(-0.08)	(2.15)	(2.36)
Resp. Outdoor Chores	-0.658***	-0.660***	0.0461	0.0245
	(-2.67)	(-2.65)	(0.35)	(0.15)
Resp. Paperwork	0.605**	0.602**	0.0797	0.0657
	(2.53)	(2.47)	(0.58)	(0.40)
Log lik.	-354.3	-354.3	-1057.6	-1054.8
Chi-2	332.2	199.9	389.7	258.6
Observations	3019	3019	5522	5522

Dependent Variable: Marital Status, 0 =*Married,* 1 =*Divorce*

Table 11: Clog-log analysis

this sense confirm the pattern already outlined with respect to the differences between the results obtained with the NLSMW and the NLSYW data and they can be interpreted as reflecting a different perception of men's role within the household: Over the last four decades the involvement of men in house activities has evolved from an exceptional event to a common practice so that no actual impact of these activities on the duration of a relationship can be detected.

The picture obtained from the estimates shown in tables 10 and 11 can be now related to what has already been presented in section 4. Together, these results help to analyze to which extent time use complementarities can be exploited in explaining the pattern in the divorce rate observed in the US over the last forty years. The analysis on the time use data has highlighted the increasing importance of leisure time activities in relation to the time spouses spend together, while the time devoted to household chores can only be positively linked to the phenomenon of "togetherness" when performed by men. The data from the NLS surveys can only partly help in projecting these result onto the hazard of divorce, for the lack of any information regarding leisure activities. Nonetheless, with respect to household chores, the increase in the time devoted to these activities by men and the simultaneous reduction by women seems to lead toward a model of partnership in which spouses tend to split household responsibilities in a more even way comparing to the previous decades. In this respect, the lack, in more recent years, of a statistically significant relationship between a marginal increase in the level of responsibility of these activities by men and the hazard of divorce contributes to configure the design of partnerships in which "togetherness" is increasingly more connected to leisure than to the joint management of the chores. The already cited paper by Aguiar and Hurst (2007) presented some evidence of the fact that the increase in leisure time experienced by American women in recent years is to be mostly attributed to a reduction in the time spent performing household chores. The positive link that I documented between the responsibility of women in "male-dominated" activities (which may also cause a reduction in leisure time) and the hazard of divorce once more confirms how the changes in the time arrangements of spouses can be tied to the duration of marriages.

6 Conclusions

In this paper I investigated the reasons behind the decrease in the divorce rate that can be observed in the United States since the early 80s. Several theories can be used in order to explain the

decreasing trend of divorce. The importance of self-selection into market, that finds evidence in the increasing number of cohabitations before marriage has been often cited as a reason for this peculiar pattern. Other contributions have focused on the role of family laws. In particular, the fact that in most of the States the "unilateral divorce" was introduced at the end of the 60s, is considered crucial for the emergence of a stock-and-flow effect which might have now came to an end. In the present work, I do not question the validity of these hypotheses, but I try to enlarge the set of possible explanations by linking the decrease in the divorce rate to the role played by time use complementarities in shaping marital market decisions. The relation between the two phenomena had been suggested by Stevenson and Wolfers (2007) and I propose a set of empirical tests based on their assumptions.

The analysis is conducted in two stages. I first study the patterns of time consumption of American couples across five decades, starting in 1965. By this investigation, I can measure to which extent consumption complementarites have substituted production complementarities in determining the stability and the success of a relationship. Although given the way data are collected, I am forced to use time consumption as a proxy for consumption of any other good, the obtained picture is rather complete. Over the years under consideration, partners clearly show a tendency to modify the structure of the time they spend together, favoring a considerable increase in the time devoted to joint leisure activities. The time spent in household chores, childcare and other activities shows different impacts. In particular, my findings suggest that although the amount of time men spend in childcare is increasing, this phenomenon does not positively relate to the time spent with the spouse, which is then dedicated to other activities. Results with respect to women change considerably depending on the working status of the individual, suggesting a lower degree of dynamics in the time consumption trends for working women.

This investigation is then complemented with the analysis conducted on several datasets collected within the National Longitudinal Survey series and aimed at exploring the relation between the way partners share their house responsibilities and the likelihood of divorce. Taking advantage of panel dimension of the datasets I exploit the presence of a set of questions on the management of household chores in order to disentangle how the changed amount of time spent at home by the partners can effectively play a role on the duration of a marriage. Interestingly, the estimated results show that the explanatory power of male participation to house chore over the likelihood

of divorce has vanished in the most recent surveys. This evidence can be interpreted as suggesting the establishment among American couples of new regularities that go beyond the household management schemes proposed by theory of production complementarities.

The implications of this paper suggest a number of questions for further research. In particular, the possibility to exactly separate the effects on the likelihood of divorce due the existence of consumption complementarities from those that can be linked to self-selection into market appear as a relevant task, which should guarantee a considerable degree of robustness for the obtained results. Furthermore, the empirical analyses to be performed in order to test for the relevance of consumption complementarities should be enhanced by making use of data on actual consumption of goods instead of time, so to obtain a clearer image of the changes in consumption preferences over time.

References

Abbring, J. H., and G. J. V. D. Berg (2007): "The unobserved heterogeneity distribution in duration analysis," *Biometrika*, 94(1), 87–99.

Aguiar, M., and E. Hurst (2007): "Measuring Trends in Leisure: The Allocation of Time over Five Decades," *The Quarterly Journal of Economics*, 122(3), 969–1006.

——— (2008): "The Increase in Leisure Inequality," NBER Working Papers 13837, National Bureau of Economic Research, Inc.

Akerlof, G. A., and R. E. Kranton (2000): "Economics And Identity," *The Quarterly Journal of Economics*, 115(3), 715–753.

Anderson, W. L., and D. W. Little (1999): "All's Fair: War and Other Causes of Divorce from a Beckerian Perspective," *American Journal of Economics and Sociology*, 58(4), 901–922.

Baker, M. J., and J. P. Jacobsen (2007): "Marriage, Specialization, and the Gender Division of Labor," *Journal of Labor Economics*, 25, 763–793.

Barham, V., R. A. Devlin, and J. Yang (2009): "A theory of rational marriage and divorce," *European Economic Review*, 53(1), 93–106.

Becker, G. S. (1973): "A Theory of Marriage: Part I," *Journal of Political Economy*, 81(4), 813–46.

——— (1974): "A Theory of Marriage: Part II," *Journal of Political Economy*, 82(2), S11–S26.

Becker, G. S. (1991): *A Treatise on the Family - Enlarged Edition*. Harvard University Press.

Becker, G. S., E. M. Landes, and R. T. Michael (1977): "An Economic Analysis of Marital Instability," *Journal of Political Economy*, 85(6), 1141–87.

Bergstrom, T. C. (1996): "Economics in a Family Way," *Journal of Economic Literature*, 34(4), 1903–1934.

Brines, J., and K. Joyner (1999): "The Ties That Bind: Principles of Cohesion in Cohabitation and Marriage," *American Sociological Review*, 64, 333–355.

Browning, M., P.-A. Chiappori, and V. Lechene (2006): "Collective and Unitary Models: A Clarification," *Review of Economics of the Household*, 4(1), 5–14.

Burdett, K., and M. G. Coles (1998): "Separation cycles," *Journal of Economic Dynamics and Control*, 22(7), 1069–1090.

Burdett, K., R. Imai, and R. Wright (2004): "Unstable Relationships," *Frontiers of Macroeconomics*, 1(1), 1–42.

Cherlin, A. J. (2004): "The Deinstitutionalization of American Marriage," *Journal of Marriage and Family*, 66, 848–861.

Cornelius, T. J. (2003): "A Search Model of Marriage and Divorce," *Review of Economic Dynamics*, 6(1), 135–155.

Datta Gupta, N., and L. S. Stratton (2008): "Institutions, Social Norms, and Bargaining Power: An Analysis of Individual Leisure Time in Couple Households," IZA Discussion Papers 3773, Institute for the Study of Labor (IZA).

Dush, C. M. K., C. L. Cohan, and P. R. Amato (2003): "The Relationship Between Cohabitation and Marital Quality and Stability: Change Across Cohorts?," *Journal of Marriage and Family*, 65(3), 539–549.

Fernandez, R., N. Guner, and J. Knowles (2005): "Love and Money: A Theoretical and Empirical Analysis of Household Sorting and Inequality," *The Quarterly Journal of Economics*, 120(1), 273–344.

Friedberg, L. (1998): "Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data," *American Economic Review*, 88(3), 608–627.

Goldin, C. (2006): "The Quiet Revolution That Transformed Women's Employment, Education, and Family," *The American Economic Review*, 96(2), 1–21.

Gray, J. S. (1998): "Divorce-Law Changes, Household Bargaining, and Married Women's Labor Supply," *American Economic Review*, 88(3), 628–42.

Greenwood, J., and N. Guner (2004): "Marriage and Divorce since World War II: Analyzing the Role of Technological Progress on the Formation of Households," No. 10772.

Guryan, J., E. Hurst, and M. S. Kearney (2008): "Parental Education and Parental Time With Children," NBER Working Papers 13993, National Bureau of Economic Research, Inc.

Hamermesh, D. S. (2002): "Timing, Togetherness and Time Windfall," *Journal of Population Economics*, 15, 601–623.

——— (2007): "Time to Eat: Household Production under Increasing Income Inequality," *American Journal of Agricultural Economics*, 89(4), 852–863.

Hosmer, D. W., S. Lemeshow, and S. May (2008): *Applied Survival Analysis*. John Wiley and Sons, New Jersey.

Jenkins, S. (2005): "Survival Analysis," Mimeo, ISER-University of Essex.

Jenkins, S. P. (1995): "Easy Estimation Methods for Discrete-Time Duration Models," *Oxford Bulletin of Economics and Statistics*, 57(1), 129–38.

Jenkins, S. P. (1998): "Discrete time proportional hazards regression," *Stata Technical Bulletin*, 7(39).

Koenker, R., and K. F. Hallock (2001): "Quantile Regression," *Journal of Economic Perspectives*, 15(4), 143–156.

Lillard, L., M. Brien, and L. Waite (1995): "Pre-Marital Cohabitation and Subsequent Marital Dissolution: A Matter of Self-Selection?," *Demography*, 32, 437–458.

Lundberg, S., and R. A. Pollak (1994): "Noncooperative Bargaining Models of Marriage," *American Economic Review*, 84(2), 132–37.

Lundberg, S., and R. A. Pollak (2007): "The American Family and Family Economics," *Journal of Economic Perspectives*, 21(2), 3–26.

Pollak, R. (2003): "Gary Becker's Contribution to Family and Household Economics," *Review of Economics of the Household*, 1(1), 111–141.

Ramey, V. A. (2008): "Time Spent in Home Production in the 20th Century: New Estimates from Old Data," NBER Working Papers 13985, National Bureau of Economic Research, Inc.

Rasul, I. (2006): "Marriage Markets and Divorce Laws," *Journal of Law, Economics and Organization*, 22(1), 30–69.

Shimer, R., and L. Smith (2000): "Assortative Matching and Search," *Econometrica*, 68(2), 343–370.

Smith, L. (2006): "The Marriage Model with Search Frictions," *Journal of Political Economy*, 114(6), 1124–1146.

Stevenson, B. (2007): "Divorce-Law Changes, Household Bargaining, and Married Women's Labor Supply Revisited," Working Paper Series 07-03, Population Studies Center - University of Pennsylvania.

Stevenson, B., and J. Wolfers (2007): "Marriage and Divorce: Changes and Their Driving Forces," *Journal of Economic Perspectives*, 21(2), 27–52.

Thomson, E., and U. Colella (1992): "Cohabitation and Marital Stability: Quality or Commitment?," *Journal of Marriage and the Family*, 54(2), 259–267.

Weiss, Y. (1997): "The formation and dissolution of families: Why marry? Who marries whom? And what happens upon divorce," in *Handbook of Population and Family Economics*, ed. by M. R. Rosenzweig, and O. Stark, no. 1. Elsevier.

Weiss, Y., and R. J. Willis (1997): "Match Quality, New Information, and Marital Dissolution," *Journal of Labor Economics*, 15(1), S293–329.

Wolfers, J. (2006): "Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results," *American Economic Review*, 96(5), 1802–1820.

Wooldridge, J. M. (2001): *Econometric Analysis of Cross Section and Panel Data*. MIT Press.

Appendix 1 - Time Use Variables

Activity	**1965**	**1975**	**1985**	**2003**
Work	421.09	314.36	339.71	279.48
Education	10.19	5.42	4.69	1.40
Household chores	41.95	65.32	70.53	75.71
Purchases	45.37	37.98	47.87	56.85
Child Care	16.61	17.84	17.68	46.40
Adult Care	4.73	9.26	4.65	10.49
Voluntary Activities	15.12	25.32	16.41	26.82
Leisure	19.42	19.07	13.61	32.13
Sport	9.55	22.90	26.57	37.05
Social Activities	32.31	39.78	27.74	46.41
Art	3.96	4.99	4.03	1.30
Relaxation	260.27	273.47	315.37	300.42
Travel	17.57	22.96	22.99	17.00

Table 12: Average Time per Activity - Males

Activity	**1965**	**1975**	**1985**	**2003**
Work	110.71	103.68	147.70	145.73
Education	12.74	2.99	7.91	1.42
Household chores	266.10	190.78	188.51	149.53
Purchases	65.42	66.42	71.68	76.27
Child Care	72.89	56.21	58.97	94.88
Adult Care	6.66	12.87	4.66	14.89
Voluntary Activities	18.76	29.47	19.46	30.79
Leisure	18.81	15.30	13.18	33.05
Sport	8.90	18.93	21.67	25.15
Social Activities	47.94	57.36	30.53	52.72
Art	15.23	15.52	11.19	1.47
Relaxation	208.22	265.51	277.28	242.56
Travel	17.23	19.33	17.19	15.26

Table 13: Average Time per Activity - Females

Variables included in the regressions:

Variable	Num. of Observations	Mean	St. Dev.	Min.	Max
Males					
Age	126659	40.7715	10.7547	21	65
Urban-Rural	126259	0.7421	0.4375	0	1
Education	126536	3.8179	1.3279	1	6
Presence of Children	126123	0.6772	0.4676	0	1
Full-time Workers	126348	0.6192	0.4855	0	1
1st Income Quartile	126659	0.0884	0.2838	0	1
4th Income Quartile	126659	0.3969	0.4892	0	1
Females					
Age	179386	39.9689	10.6637	21	65
Urban-Rural	178915	0.7362	0.4406	0	1
Education	179334	3.7703	1.2729	1	6
Presence of Children	178257	0.6869	0.4637	0	1
Full-time Workers	179009	0.4233	0.4941	0	1
1st Income Quartile	179386	0.0899	0.2862	0	1
4th Income Quartile	179386	0.3835	0.4862	0	1

Table 14: List of Regressors

Description of the variables:

1. Urban-Rural: dummy variable, 1 if the respondent lives in an urban area, 0 otherwise;
2. Education: categorical variables: from 1 (no formal education) to 6 (university education);
3. Presence of Children: dummy variable, 1 if children younger then 18 are present in the family, 0 otherwise.

Males	Year 1965	Year 1975	Year 2003
age	3.612***	-6.013***	-1.704***
	(4.41)	(-4.87)	(-2.62)
age squared	-0.0448***	0.0673***	0.0153**
	(-4.49)	(4.58)	(2.03)
urban-rural	6.619***	-12.04***	11.96***
	(2.64)	(-3.47)	(5.88)
kids in family	-30.93***	-68.78***	-40.79***
	(-9.83)	(-16.75)	(-19.65)
education	-6.282***	-6.589***	1.533**
	(-6.49)	(-5.51)	(2.17)
fulltime job	23.47*	-108.7***	-44.67***
	(1.74)	(-11.51)	(-16.23)
unemployed	171.6***	-59.38***	46.00***
	(8.69)	(-4.37)	(8.79)
2nd lowest quartile	-10.07**	4.307	-10.67***
	(-2.09)	(0.52)	(-3.24)
2nd highest quartile	-23.68***	-22.57***	-26.01***
	(-4.93)	(-2.80)	(-8.64)
highest quartile	-18.32***	11.83	-29.54***
	(-3.69)	(1.46)	(-9.09)
spring	23.55***	-25.55***	-8.003***
	(9.13)	(-4.30)	(-3.56)
summer	0	-27.75***	-12.00***
	.	(-4.37)	(-5.34)
autumn	-2.055	-16.17***	-28.72***
	(-0.59)	(-2.98)	(-12.88)
monday	-13.21***	18.91***	11.58***
	(-3.22)	(2.63)	(3.34)
tuesday	15.79***	36.30***	1.057
	(3.83)	(4.89)	(0.31)
thursday	24.14***	52.74***	-31.99***
	(5.71)	(6.66)	(-9.03)
friday	14.09***	45.66***	34.48***
	(3.25)	(6.93)	(9.92)
saturday	136.5***	207.3***	187.6***
	(29.90)	(31.13)	(62.52)
sunday	213.8***	265.5***	230.6***
	(49.51)	(40.93)	(78.41)
Constant	134.7***	520.9***	304.0***
	(6.64)	(19.94)	(21.92)
R^2	0.272	0.207	0.262
Adjusted R^2	0.271	0.206	0.261
Observations	17043	20914	74200

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15: OLS Regressions - Results for the variables not included in Table 4

Females	Year 1965	Year 1975	Year 2003
age	-5.013***	-17.46***	-9.691***
	(-7.69)	(-17.55)	(-18.42)
age squared	0.0644***	0.212***	0.102***
	(7.95)	(16.97)	(16.19)
urban-rural	-1.480	-17.44***	-11.59***
	(-0.74)	(-6.18)	(-7.01)
kids in family	-26.05***	-40.24***	-56.46***
	(-9.09)	(-10.69)	(-29.91)
education	-1.244	-4.422***	-2.829***
	(-1.33)	(-3.27)	(-4.69)
fulltime job	-59.85***	-57.35***	-30.82***
	(-25.51)	(-19.66)	(-22.03)
unemployed	0	-48.69***	0.991
	.	(-6.59)	(0.27)
2nd lowest quartile	-34.95***	-20.91**	-16.90***
	(-9.91)	(-2.37)	(-6.65)
2nd highest quartile	-45.48***	-19.14**	-18.64***
	(-12.64)	(-2.19)	(-7.90)
highest quartile	-39.30***	-5.345	-5.062**
	(-10.65)	(-0.60)	(-2.01)
spring	14.90***	-27.85***	2.092
	(6.78)	(-6.11)	(1.15)
summer	0	-55.49***	12.77***
	.	(-10.58)	(7.00)
autumn	11.81***	-62.82***	-17.00***
	(4.61)	(-15.19)	(-9.32)
monday	-11.85***	0.117	6.250**
	(-3.32)	(0.02)	(2.24)
tuesday	25.03***	-15.73***	-17.87***
	(7.73)	(-2.83)	(-6.45)
thursday	17.87***	-21.88***	-20.09***
	(5.32)	(-3.64)	(-7.22)
friday	44.11***	-31.54***	43.99***
	(12.64)	(-5.62)	(15.63)
saturday	134.5***	103.2***	175.4***
	(36.77)	(19.37)	(72.76)
sunday	220.9***	174.4***	206.1***
	(56.41)	(33.41)	(86.67)
Constant	364.4***	757.3***	493.8***
	(28.18)	(37.89)	(46.24)
R^2	0.256	0.176	0.229
Adjusted R^2	0.256	0.175	0.229
Observations	25352	30777	102482

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16: OLS Regressions - Results for the variables not included in Table 4

	Males		Females	
age	-1.115**	-9.094***	-8.823***	-8.976***
	(-2.51)	(-25.61)	(-19.37)	(-15.86)
age squared	0.0116**	0.103***	0.0969***	0.102***
	(2.21)	(23.96)	(17.47)	(14.88)
urban-rural	0.741	-10.67***	-12.49***	-7.339***
	(0.55)	(-9.75)	(-8.49)	(-4.48)
kids in family	-37.84***	-38.19***	-53.07***	-25.79***
	(-25.63)	(-28.92)	(-26.48)	(-14.34)
education	-0.927*	-2.455***	-0.323	-5.527***
	(-1.92)	(-5.52)	(-0.54)	(-8.28)
fulltime job	-43.15***	-39.69***	0	0
	(-19.03)	(-38.67)	.	.
unemployed	46.95***	-15.93***	-14.60***	-196.4***
	(11.44)	(-5.55)	(-5.02)	(-5.40)
2nd lowest quartile	-15.87***	-23.76***	-28.24***	-14.63***
	(-6.52)	(-12.58)	(-12.38)	(-4.34)
2nd highest quartile	-29.36***	-26.25***	-30.73***	-17.44***
	(-12.82)	(-14.47)	(-13.58)	(-5.59)
highest quartile	-24.98***	-16.05***	-34.32***	10.36***
	(-10.35)	(-8.42)	(-14.28)	(3.22)
spring	-2.016	1.147	8.268***	-8.865***
	(-1.26)	(0.89)	(4.89)	(-4.50)
summer	-7.614***	8.742***	5.166***	11.47***
	(-4.36)	(6.15)	(2.68)	(5.47)
autumn	-17.95***	-14.22***	-14.31***	-15.99***
	(-11.05)	(-10.99)	(-8.50)	(-7.93)
monday	9.368***	2.368	-8.330***	18.05***
	(3.92)	(1.23)	(-3.26)	(6.18)
tuesday	8.989***	-5.406***	-13.52***	4.716
	(3.76)	(-2.89)	(-5.65)	(1.57)
thursday	-5.681**	-8.328***	-13.06***	-4.300
	(-2.30)	(-4.32)	(-5.29)	(-1.40)
friday	31.16***	30.38***	31.75***	30.80***
	(13.25)	(15.88)	(12.42)	(10.72)
saturday	178.4***	152.7***	127.9***	178.2***
	(83.23)	(89.07)	(56.00)	(67.89)
sunday	227.6***	195.6***	177.4***	211.6***
	(23.11)	(9.74)	(12.41)	(0.50)
Constant	298.7***	462.6***	526.6***	365.8***
	(32.12)	(61.76)	(53.30)	(30.73)
R^2	0.259	0.220	0.217	0.236
Adjusted R^2	0.259	0.220	0.217	0.236
Observations	125304	177392	102322	75070

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17: OLS Regressions with Trends - Results for the variables not included in Table 7

Females	**Non-Working**		**Working**	
age	-8.338***	(-18.29)	-9.037***	(-15.96)
age squared	0.0910***	(16.39)	0.104***	(15.05)
urban-rural	-13.47***	(-9.15)	-6.777***	(-4.13)
kids in family	-52.85***	(-26.36)	-25.84***	(-14.35)
education	0.197	(0.33)	-5.221***	(-7.82)
fulltime job	0	.	0	.
unemployed	-12.17***	(-4.19)	-209.0***	(-5.75)
2nd lowest quartile	-26.63***	(-11.64)	-14.03***	(-4.16)
2nd highest quartile	-29.80***	(-13.15)	-16.41***	(-5.26)
highest quartile	-33.05***	(-13.73)	10.14***	(3.15)
spring	9.269***	(5.46)	-8.640***	(-4.36)
summer	5.824***	(3.02)	11.50***	(5.47)
autumn	-12.67***	(-7.47)	-16.63***	(-8.10)
R^2	0.216		0.234	
Adjusted R^2	0.216		0.234	
Observations	102322		75070	

t Dependent Variable: Daily Time Spent with Spouse

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 18: OLS Regressions with Trends - Results for the variables not included in Table 8

Appendix 2 - National Longitudinal Surveys

Description of the variables:

1. Marital Status: dependent variable; dummy variable, 0 if married, 1 if divorced;
2. Duration of Marriage: duration in months;
3. North/South: dummy variable, 0 if the respondent lives in the Northern part of the US, 1 otherwise;
4. White, Black, Other Race: dummy variables;
5. Employment Status: dummy variable, 1 if the respondent works full-time or part-time, 0 otherwise;
6. Difference in the Number of Kids (NLSY79 only): difference between the desired number of kids in 1979 and the actual number of children at time of the interview.

Variable	Num. of Observations	Mean	St. Dev.	Min.	Max
NLSMW					
Marital Status	52982	.01369	.1162	0	1
Duration of Marriage	52269	330.9271	141.9804	1	780
Number of Marriages	52982	1.0456	.2745	0	4
Age	52982	49.9367	10.4286	30	80
North/South	52701	.3822	.4859	0	1
White	52982	.7583	.4281	0	1
Black	52982	.2264	.4185	0	1
Other Race	52982	.0154	.1229	0	1
Number of Kids	52811	1.9434	1.7810	0	16
Enrolled in Education	52982	.0159	.1252057	0	1
Years of Education	52982	12.7299	8.6438	0	18
Employment Status	50165	.4138	.4925244	0	1
Weekly Hours of Work	52982	14.1008	18.8842	0	168
Wage	45327	29.5305	73.76072	0	2500
Family Income	49973	10639.15	7855.32	0	201795

Table 19: List of Regressors, NLSMW

Variable	Num. of Observations	Mean	St. Dev.	Min.	Max
NLSYW					
Marital Status	52987	0.0339	0.1808	0	1
Duration of Marriage	52987	87.8962	60.2198	12	3.044523
Number of Marriages	52987	1.1172	0.3593	1	4
Age	52987	33.9355	10.3581	14	61
North/South	52984	0.4081	0.4915	0	1
White	52987	0.7730	0.4188	0	1
Black	52987	0.2165	0.4118	0	1
Other Race	52987	0.0105	0.1017	0	1
Number of Kids	52673	1.8638	1.4115	0	12
Enrolled in Education	52987	0.0573	0.2324	0	1
Years of Education	52886	12.477	2.4824	0	18
Employment Status	42863	0.4779	0.4995	0	1
Weekly Hours of Work	43726	34.6036	13.2472	0	168
Wage	44327	56.834	210.1157	0	19586.41
Family Income (categ.)	51035	8.4466	3.4513	0	13

Table 20: List of Regressors, NLSYW

Variable	Num. of Observations	Mean	St. Dev.	Min.	Max
NLSY79 - Males					
Marital Status	41968	0.04086	0.19798	0	1
Duration of Marriage	40528	7.0267	5.4058	1	32
Number of Marriages	41968	1.1342	0.37208	1	4
Age	41968	31.0489	6.14346	17	47
White	41784	0.73887	0.43926	0	1
Other Race	41784	0.20369	0.40275	0	1
Number of Kids	39743	1.4194	1.28692	0	10
Diff. in Number of Kids	39743	1.109	1.84132	-9	19
Enrolled in Education	41968	0.04079	0.19781	0	1
Years of Education	41505	13.0686	4.65119	0	95
Employment Status	31676	0.69163	0.46183	0	1
Weekly Hours of Work	24484	36.3818	19.1515	0	168
Wage	34909	2007.21	46478.9	0	6000000
Family Income	36408	48160.1	74419	0	1057448
NLSY79 - Females					
Marital Status	50545	0.04171	0.19992	0	1
Duration of Marriage	49220	7.7878	5.7724	1	33
Number of Marriages	50545	1.15003	0.39568	1	5
Age	50545	30.3641	6.29048	17	47
White	50172	0.74727	0.43458	0	1
Other Race	50172	0.19274	0.39445	0	1
Number of Kids	48025	1.53447	1.31964	0	10
Diff. in Number of Kids	87768	1.0034	1.882	-7	25
Enrolled in Education	50545	0.04869	0.21522	0	1
Years of Education	49974	13.2996	4.95882	0	95
Employment Status	45935	0.46194	0.49855	0	1
Weekly Hours of Work	34969	18.7992	19.7919	0	168
Wage	36481	1317.25	26154.9	0	2940000
Family Income	42389	45060.1	74759	0	1057448

Table 21: List of Regressors, NLSY79

	NLSMW		NLSYW	
Duration of Marriage	-0.502**	(-2.54)	0.510***	(3.88)
Number of Marriages	0.385	(1.49)	0.592***	(4.22)
Age	0.370***	(4.31)	0.675***	(10.77)
Age^2	-0.00320***	(-3.98)	-0.00792***	(-10.03)
Region	-0.103	(-0.66)	-0.251***	(-2.77)
White	-0.207	(-0.35)	1.251*	(1.76)
Black	-0.681	(-1.12)	1.028	(1.44)
Number of Kids	-0.154***	(-2.84)	-0.0713*	(-1.94)
Enrolled in Ed.	0.776**	(2.20)	0.661***	(4.55)
Educ. level	0.00668	(1.34)	0.0622***	(3.00)
Work	0.578**	(2.32)	1.021***	(9.42)
Work hrs.	0.0136**	(2.44)	0.0182***	(5.51)
Wage	0.00025	(0.29)	-0.00113**	(-2.47)
Family Income	-0.00002	(-1.53)		
Fam. Inc. (cat.)			-0.220***	(-15.12)
Grocery-Wife	-0.262	(-1.31)	-0.233	(-1.55)
Grocery-Husb	-1.331***	(-3.73)	-0.247	(-1.47)
CH. Care-Wife	0.112	(0.72)	0.0819	(0.69)
CH. Care-Husb	-0.644**	(-1.97)	-0.467***	(-3.54)
Cooking-Wife	-0.0268	(-0.12)	0.0507	(0.36)
Cooking-Husb	-0.250	(-0.61)	0.0355	(0.22)
Dishes-Wife	0.112	(0.51)	-0.139	(-1.17)
Dishes-Husb	-0.184	(-0.49)	-0.0958	(-0.61)
House-Wife	-0.206	(-0.90)	-0.0544	(-0.42)
House-Husb	-1.269**	(-2.22)	0.0754	(0.46)
Clothes-Wife	-0.298	(-1.37)	-0.245*	(-1.80)
Clothes-Husb	0.372	(0.79)	-0.244	(-1.28)
Yard-Wife	0.169	(0.86)	0.470***	(3.70)
Yard-Husb	-1.747***	(-8.17)	-0.400***	(-3.47)
Log lik.	-1017.8		-2177.8	
Chi-2	383.3		924.9	
Observations	25752		22671	

Dependent Variable: Marital Status, 0 =*Married,* 1 =*Divorce*

Table 22: Clog-log analysis

NLSY79	Women		Men	
Duration of Marriage	-0.743***	(-5.58)	-0.607***	(-2.75)
Number of Marriages	0.253	(1.29)	0.213	(0.46)
Age	0.273***	(2.80)	0.818***	(4.60)
Age^2	-0.00331**	(-2.34)	-0.0125***	(-4.69)
Black	-0.290*	(-1.91)	-0.164	(-0.63)
Other Race	-0.325	(-1.15)	-0.142	(-0.34)
Number of Kids	-0.215***	(-3.45)	-1.762***	(-12.81)
Education Level	0.119***	(3.49)	-0.0270	(-0.55)
Work Status	0.495***	(3.35)	0.00554	(0.02)
Wage	0.0000226	(1.17)	0.0000299	(0.62)
Family Income	-0.000112***	(-12.50)	0.00000500	(0.62)
Urban/Rural	0.438***	(3.28)	0.0823	(0.35)
North-East	-0.239	(-1.14)	-1.048***	(-3.00)
North-Center	0.166	(1.12)	-0.104	(-0.45)
West	-0.101	(-0.65)	-0.774**	(-2.57)
Resp. Childcare	-0.110	(-0.44)	0.00373	(0.02)
Resp. Cooking	-0.686***	(-3.42)	0.0166	(0.04)
Resp. Cleaning Dishes	0.0138	(0.06)	0.425	(1.17)
Resp. Errands	0.465***	(3.26)	0.0939	(0.45)
Resp. Grocery Shopping	-0.284	(-1.45)	-0.167	(-0.67)
Resp. Housekeeping	0.451*	(1.72)	-0.162	(-0.52)
Resp. Washing Clothes	-0.122	(-0.55)	-0.259	(-0.51)
Resp. House Maintenance	0.278**	(2.15)	-0.0193	(-0.08)
Resp. Outdoor Chores	0.0461	(0.35)	-0.658***	(-2.67)
Resp. Paperwork	0.0797	(0.58)	0.605**	(2.53)
Constant	-4.671***	(-3.59)	-10.89***	(-4.54)
Log lik.	-1057.6		-354.3	
Chi-2	389.7		332.2	
Observations	5522		3019	

Dependent Variable: Marital Status, 0 =*Married,* 1 =*Divorce*

Table 23: Clog-log analysis

NLSY79	Women		Men	
Duration of Marriage	-0.707***	(-5.36)	-0.525**	(-2.37)
Number of Marriages	0.205	(1.05)	0.312	(0.67)
Age	0.258***	(2.68)	0.802***	(4.56)
Age^2	-0.00311**	(-2.22)	-0.0123***	(-4.69)
Number of Children	-0.196***	(-3.20)	-1.761***	(-12.88)
Education Level	0.128***	(3.70)	-0.0335	(-0.69)
Work Status	0.447***	(3.04)	0.0466	(0.17)
Wage	0.0000164	(0.86)	0.0000308	(0.74)
Family Income	-0.000114***	(-12.65)	0.00000693	(1.01)
Urban/Rural	0.434***	(3.24)	0.124	(0.54)
North-East	-0.229	(-1.09)	-0.959***	(-2.76)
North-Center	0.142	(0.96)	-0.125	(-0.53)
West	-0.148	(-0.97)	-0.679**	(-2.30)
Black	-0.327**	(-2.19)	-0.235	(-0.90)
Other Race	-0.266	(-0.94)	-0.0293	(-0.07)
Resp. Childcare	-0.144	(-1.02)	0.261	(0.82)
Resp. Cooking	-0.514***	(-3.06)	0.00342	(0.01)
Resp. Cleaning Dishes	0.0227	(0.13)	0.727	(1.34)
Resp. Errands	0.287**	(2.18)	0.152	(0.69)
Resp. Grocery Shopping	0.0686	(0.43)	-0.563*	(-1.93)
Resp. Housekeeping	-0.182	(-1.04)	0.00804	(0.01)
Resp. Washing Clothes	-0.252	(-1.47)	-0.102	(-0.12)
Resp. Maintenance	0.311**	(2.05)	-0.156	(-0.73)
Resp. Outdoor Chores	0.253	(1.62)	-0.498**	(-2.27)
Resp. Paperwork	0.204	(1.52)	0.558**	(2.32)
Constant	-4.279***	(-3.34)	-11.04***	(-4.62)
Log lik.	-1057.6		-354.3	
Chi-2	389.7		332.2	
Observations	5522		3019	

Dependent Variable: Marital Status, 0 =*Married,* 1 =*Divorce*

Table 24: Clog-log analysis