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**Begoña Álvarez
Daniel Miles**

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Gender Effect on Housework Allocation: Evidence from Spanish Two-Earner Couples*

Begoña Álvarez	Daniel Miles
Universidad de Vigo	Universidad de Vigo
alvarez@uvigo.es	dmiles@uvigo.es

Abstract

Empirical evidence from developed countries consistently shows that working wives remain responsible for most household duties. The aim of this paper is to study the unequal distribution of housework between working spouses in Spain. Housework time allocation is modelled through a bivariate negative binomial distribution, conditional on a set of observable characteristics, such as paid labor conditions, education or the presence of children at home. We find that the probability of egalitarian housework sharing between spouses is particularly small, being greater the probability of wives bearing most of the household duties. Furthermore, these estimates are used to carry out an similar-to-Oaxaca decomposition, between observable characteristics effects and “price” effects. Our results suggest that an important part of housework allocation depends more on gender-specific effects - such as the cultural context or historical view of gender housework division - rather than on spouses differences in their observable characteristics.

Keywords: time allocation, gender differences, bivariate negative binomial

JEL Codes: J16, J22, C35

* *Correspondence to:* Daniel Miles, Departamento de Economía Aplicada, Universidade de Vigo, Lagoas Marcosende s/n, 36200 Vigo (Pontevedra), Spain. Phone: +34 986 812443. Fax: +34 986 812401. E-mail: dmiles@uvigo.es

1. INTRODUCTION

There is a widespread belief, at least in developed countries, that the traditional division of gender has significantly changed in the last quarter of the twentieth century. The facts that support this belief are simple observations of the social development of these communities: the increasing participation of women in the labor market; the improvement in their human capital characteristics and occupational distribution; the sizable reduction of the gender wage-gap; the presence of women in every aspect of political activity; or the impact of non-discriminatory or positive discrimination policies on social attitudes to gender roles.

However, statistical evidence on housework time allocation between spouses appears to contradict this belief and suggests that there has been a little change in the strength of gender-based family roles during this period. Surveys related to housework allocation show that working wives do about two thirds of the total housework, i.e. 20-30 hours per week, while working husbands spend, on average, 6-14 hours per week. Despite these actual differences, many researchers have observed that over the last decades there has been a clear increase in husbands' housework share. Nevertheless, firstly, this increase is shown to be a consequence of the sizable reduction of housework among women and to a much lesser extent to the small increase in housework by men. Secondly, though husbands might be increasing their participation in housework, there exists gender-segregation in domestic tasks. Thus, "feminine" household tasks are usually the most physically demanding, i.e. laundry, ironing, cleaning, etc. In sum, these empirical findings emphasize that the ultimate responsibility for homemaking continues to rest with women (see, among others, Hartmann, 1981; van der Lippe and Sieger, 1994; Bittman and Pixley, 1997; Gronau, 1977, Juster and Stafford, 1991, Hersch and Stratton, 1996; Alberdi, 1999; Folbre and Nelson, 2000; Blau et al., 1998).

The aim of this paper is to analyze the reasons behind the asymmetric distribution of housework within Spanish working couples. On the one hand, Spain has undergone important changes in those characteristics that support the belief of a change in gender roles. The percentage of women with college studies has been rising steadily since 1975 and

the participation of women in the labor force has increased by about forty percent over the past 25 years. On the other hand, the rigid Catholic education that prevailed in Spain until recently, shaped cultural and social habits with a high degree of gender role differentiation. Spanish attitudes toward gender-based family roles are illustrated in a survey carried out by the Spanish Sociological Research Centre in 1994. For high school or college educated individuals, nearly 40 percent of those older than 45 believed that “women should only devote themselves to housework”, while only 14 percent of those younger than 44 had this belief (CIS, 1994, Alberdi, 1999). The natural question that arises in Spain is: which forces are predominant in the allocation of housework between spouses, cultural habits or dramatic changes in observable characteristics, such as education or labor force variables? In this paper, we try to answer this question.

Theoretical models offer a variety of explanations for intra-household time allocation. Becker (1981) was among the first economists to theorize about the division of labor within the household. From his point of view, a married couple allocates wife’s and husband’s time according to the differential of each spouse’s productivity in the production of household commodities. Therefore, wives will be best suited to housework as a consequence of biology or gender-specific investment in human capital. An alternative theoretical explanation is given by bargaining models, which show that intra-household time allocation reflects power relations and strategic interactions between household members. In these models, market wages affect the bargaining power of spouses (McElroy and Horney, 1981; Lundberg and Pollak, 1993; Mahoney, 1995). In terms of traditional labor models, the wife’s decision to work is taken conditional on the husband also working, i.e. the couple faces a two-stage decision process. As a consequence, a wife’s labor market hours are a fully divisible good which adjusts depending on housework needs, implying leisure losses (see Widmalm, 1998 for references).

Despite the various theoretical attempts to explain intra-household decisions, empirical models do not show much evidence of the relevance of economic related variables on housework allocation of hours between husband and wife. Different specifications have been followed to characterize housework allocation between the spouses. A first alternative is to

focus on the share of housework of one of the partners. However, as Hersch and Stratton (1994) pointed out, changes in the husband's share do not identify whether it results from a change in his housework time or from a change in his wife's time. A second alternative is to focus on the conditional means of wives' and husbands' housework times separately (Hersch and Stratton, 1994 and Van der Lippe and Siegers, 1994). Nevertheless, the lack of evidence on the relevance of economic related variables on spouses' housework allocation gives rise to the idea that an important part of the division of labor could still depend on gender-specific factors, e.g. gender-role attitudes (Juster and Stafford, 1991).

In this paper, we follow a different empirical approach to characterize housework allocation between working spouses, by modelling husbands' and wives' housework time allocation in terms of a bivariate probability distribution. The advantages of this approach are, first, the possibility of characterizing every point of the housework allocation bivariate support, and not only spouses' conditional means. Second, the joint modeling of housework allocation by means of a bivariate count data process implicitly takes into account the interdependence of spouses' decisions, something that has been widely claimed in theoretical models.

In order to understand the impact of gender-specific factors on the observed housework time allocation, we perform estimations that are in the spirit of Oaxaca decomposition. We distinguish two broad sources of gender difference in housework allocation: one due to differences in observable characteristics (education, age, labor market conditions, etc.) and the other related to the different weights assigned to these characteristics in the couple's decision-making process. We call these weights the *domestic prices*. The difference between wives' and husbands' prices quantifies the effect of gender-based roles in the home in terms of housework division.

According to our results, what mostly determines the asymmetric housework allocation between Spanish working spouses are the differences in husband's and wife's *domestic prices*. This suggests that social or cultural factor prevail over labor market outcomes in the determination of housework allocation between Spanish spouses in our sample.

The paper is organized as follows. In section two, we discuss the sample selection and we briefly describe the data. In section three we present the estimation of the bivariate

probability model and comment on the main results. Section four analyzes the gender effect on housework allocation. In section five, we conclude.

2. DATA DESCRIPTION

The data used in this paper was obtained from the 1991 Work Situation and Time Use Survey (WSTUS), carried out by the Spanish Women’s Institute (Ministry of Labor and Social Affairs). The original target of this survey was to recover information in order to compare male and female performance in paid and unpaid activities. To reduce as much as possible the unobserved heterogeneity, the sample was designed to retain representation of sectors and occupations where men and women had similar participation rates. Information was collected among salaried workers from six regions: Andalucía, Cataluña, Galicia, Madrid, País Vasco and Valencia. The total sample size of the survey is of 2,054 employees, of which 1,049 are women and 1,005 are men.

The WSTUS offers information on several socio-demographic and economic characteristics as well as on the allocation of time between paid and unpaid work. The survey was carried out on the basis of personal interviews but, in the case of married or cohabiting workers, respondents were also asked about some questions related to their partners. Given that our purpose is to analyze couples’ behaviour, we created a new sample composed by married or cohabiting respondents and their partners.

Our variable of interest is the number of daily hours spent in housework, which is obtained as the response to the question: “*About how many hours do you (and your partner) spend on housework in an average day?*” That is, respondents report housework times for themselves and their partners separately. The questions explicitly excludes child care time. Although the WSTUS includes a specific question on this time use, we do not consider it in our analysis. The reason is that we are interested in analyzing the allocation of time to domestic tasks on which, in principle, are not attractive to spend time.

In order to compare spouses in similar conditions, and to minimize reported housework time inconsistencies that may arise from the tendency of any task to fill the amount of time

available, we restrict the analysis to couples in which both members are in the labor market (see Hersch and Stratton 1994 for a similar sample selection). The final subsample we use in our study contains 559 working couples that responded to all the survey questions that we have used in our analysis.

In Table 1 we provide means and standard deviations of housework time (in daily hours) for the couples in our sample. For the sake of comparison, we also include descriptive statistics corresponding to single-earner couples.

Insert Table 1

The results in this table suggest an important unbalanced situation against women. Overall, husbands average about 1.2 hours per day on housework, while wives average 4.5 hours per day. Although these differences persist when controlling by employment status, there is an important increase in husbands' hours of housework when moving from households where the husband is the only earner to those where both spouses are in the labor market. These results are similar to those observed for other countries (Blau et al., 1998, among others).

The gender disparity in housework time is even more severe if we distinguish between male housework times reported by husbands and male housework times reported by their wives. In Figures 1a-1b we observe that husbands tend to over-report the number of hours they devote to domestic work. However, female housework times are not importantly affected by who - wife or husband - reports the information.

Insert Figures 1a-1b

This is an interesting aspect - repeatedly shown in literature - that reveals the way social patterns induce a gap between facts and appearance (Hersch and Stratton, 1996; Roe, 1996; Alberdi, 1999). In line with this, Benin and Agostinelli (1988) report that among a sample of dual-earner couples they interviewed both men and women found a 50-50 split of the housework was ideal, though, on average, men's housework was far less that of women.

In order to correct for the effect of mis-reporting of housework time, the econometric

model includes a dummy variable capturing whether the information was reported by the spouse and whether it was self-reported.

In Table 2, we present the sample means and standard deviations of the main variables that could help to explain housework time allocation and which are included in the econometric specification. The selection of these variables was performed according to previous theoretical and empirical papers. We, additionally, present the mean of spouses' housework hours within those cells defined by discrete variables, as well as the sample correlation between housework times and those explanatory variables that are continuous.

Insert Table 2

Wage and time restrictions are of direct importance for the production of a home. Observe that, in our sample, the average female/male wage ratio is about 0.72, i.e. working wives earn, on average, 30% less than their husbands, which is consistent with 1991 official figures for the whole Spanish working population. According to theoretical models, market wage should affect intra-household time allocation process, either because it proxies the opportunity cost of housework or because it determines spouses' bargaining power in the home. Moreover, a higher income level relates to easier availability of market housework substitutes. In any case, we expect a negative effect of own wage on time devoted to housework, especially in the female case, due to the traditional role of Spanish women as secondary earners in the households.

Time restrictions are controlled for through the number of hours the individual spends on market labor per day. The negative relation between this variable and housework time is illustrated in Table 2. Since the interaction between spouses is of primary interest in this study, spouse's wage and time spent on paid work are also included as explanatory variables in the model.

It is commonly accepted that schooling and age (through experience) raise marginal productivity in both market and non-market activities. In addition, education and age are clearly linked to our perception of gender roles. In this sense, it is expected that younger and more highly-educated couples would exhibit more egalitarian gender-role orientations

at home and, consequently, a more egalitarian division of housework. On the contrary, conservative values that support traditional gender-role division are expected to arise among older people with lower education. In order to test differences in housework according to the educational attainments of spouses, we include dummy variables for the level of spouses' schooling. The descriptive analysis displayed in Table 2 shows that women with higher educational levels devote less time to housework than those with lower education. However, education does not affect importantly husband's housework times.

Note there is a positive correlation between housework and the presence of children in the home (see Table 2). Although the question on housework explicitly excludes child care time, it is unlikely that respondents deducted from the total time spent on housework some additional work created by children, such as extra laundry, cooking and cleaning (Hersch and Stratton, 1996). To account for this effect, we include three variables indicating the number of sons/daughters under age 3, aged 4-14 and aged 15 or more.

Finally, since external household help (hired or provided by relatives) can substitute the time each spouse spends in domestic work, a dummy for this situation has been included. Regional differences in housework times are controlled for through another dummy variable indicating whether the couple resides in the South of Spain or not.

There are several variables which do not appear in our final model though they were initially included. Among these are the occupation or the degree of the individual's responsibility at work. We found the effects of these variables to be insignificant in our initial specification of the model. Since the addition of each variable reduces the sample size due to missing values, we decided to exclude them from the analysis without compromising the integrity of our theoretical framework.

3. ECONOMETRIC MODEL

3.1. A bivariate model

Let the data observed for household i be $\{(h_{wi}, h_{hi}, x_{wi}, x_{hi})\}$, $i = 1, \dots, N$, where $h_{ji} = 0, 1, 2, \dots$, $j = w, h$, denote the number of hours spent on housework by the wife and the

husband, respectively, and x_{ji} is a $(k_j \times 1)$ vector of explanatory variables, including the intercept. Note that housework hours can be described in terms of count data processes, i.e. non-negative integer values. Furthermore, if there is evidence that the hours of housework performed by the wife and the husband are jointly determined, a bivariate count data process is needed to characterize the couple's housework allocation.

Estimation of multivariate count data processes is not usual in applied economic literature (see Cameron and Trivedi, 1998 and Gurmu and Elder, 2000). Recent applications are based on Poisson bivariate models, though this distribution suffers from the same equidispersion problems as the univariate Poisson process (see Winkelmann, 1997 and Jung and Winkelmann, 1993 or King, 1989). Gouriéroux et al. (1984) suggested a more flexible Poisson specification which breaks with the equidispersion assumption. However, an empirical problem with the estimation method is found in the second step covariance matrix, which is commonly not positive definite (see Cameron and Trivedi 1998).

In this paper, we specify a bivariate negative binomial model given that, on the one hand, it allows a much more flexible approximation to overdispersion and, on the other, it nests previous distributions. Recent applications of multivariate negative binomial are presented in Gurmu and Elder (2000) who develop a semiparametric estimation method for multivariate models of health care utilization; Miles (2001) models the number of purchases of different sorts of bread using a trivariate negative binomial specification; and Bauer et al. (1999) analyze workplace accidents using bivariate count data models.

Before considering the estimation of the bivariate model, we tested the correlation between h_{wi} and h_{hi} . In order to test for zero correlation between the counts, we implemented the conditional moment test proposed by Cameron and Trivedi (1993) which is based on the idea that a joint probability distribution function factorizes into a product of its marginal distributions which, in turn, can be expressed as orthogonal polynomial sequences. The test of independence requires to test for zero correlation between all pairs of orthonormal polynomials. The results in Table 3 show that zero interdependence can be rejected at a 5 % significance level.

Insert Table 3

To model the bivariate probability distribution of male and female housework times, we follow the specifications developed by Arbous and Kerrich (1951) and Marshall and Olkin (1990). Consider that the dependent count variables are Poisson distributed, with respective parameters

$$\tilde{\lambda}_{ji} = \lambda_{ji} u_i \quad j = w, h$$

where u_i denotes the unobserved heterogeneity component that generalizes the Poisson distribution to allow for overdispersion. Assuming u_i is gamma distributed with shape parameter α and scale parameter $\tau = 1$, it can be shown that the mixture bivariate density has negative binomial marginal distributions and a joint distribution given by

$$\begin{aligned} \Pr(h_{wi}, h_{hi} \mid \lambda_{wi}, \lambda_{hi}, \alpha) &= \frac{\Gamma(h_{wi} + h_{hi} + \alpha)}{h_{wi}! h_{hi}! \Gamma(\alpha)} \left(\frac{\lambda_{wi}}{\lambda_{wi} + \lambda_{hi} + 1} \right)^{h_{wi}} \left(\frac{\lambda_{hi}}{\lambda_{wi} + \lambda_{hi} + 1} \right)^{h_{hi}} \\ &\times \left(\frac{1}{\lambda_{wi} + \lambda_{hi} + 1} \right)^\alpha. \end{aligned} \quad (1)$$

Parametrization of these models follows what is usual in empirical literature, by assuming, $\lambda_{ji} = \exp(x_{ji}'\beta_j)$, with $j = w, h$ and $i = 1, \dots, n$, where β_j is a $(k_j \times 1)$ vector of unknown coefficients. Estimation of parameters is carried out by maximum likelihood. Results are presented in Table 4.

3.2 Estimation results

In order to evaluate the predictive capacity of the model, in Figure 2 we compare the marginal probability estimates of husbands' and wives' housework times based on the bivariate negative binomial specification with the sample frequencies of counts (see e.g. Gurmu and Trivedi, 1996 and Deb and Trivedi, 1997). We observe that the model reproduces the original data rather well, though the prediction is better for wives' times than for husbands'.

Insert Figure 2

Note that male housework marginal probabilities are much more concentrated to the left than those corresponding to women. Thus, the model predicts that the probability of

finding a husband working zero hours at home is about 4.5 times higher than the probability of finding a wife in the same circumstance, when ignoring interrelations between spouses.

In Table 4 we present the coefficient estimates. Overall, the signs and significance of these marginal effects are consistent with other studies. In this sense, we find that there are not many significant variables - other than labor market conditions - explaining husbands' housework time. As regards wives, the educational level and the presence of children seem to be important factors in determining the amount of time devoted to domestic tasks.

Insert Table 4

Discussing particular estimates, observe, first, the incidence of educational level in the time spent on domestic activities. These coefficients highlight the lack of symmetry between male and female housework structures. Estimations show that the lower the wife's educational level, the higher her housework and the lower the housework provided by her husband. In addition, the lower the husband's educational level the higher the amount of wife's housework. Therefore, this suggests that the more egalitarian housework situation that could be expected in more educated couples should come via a reduction in wives' housework. Also, this result emphasizes the relevance of spouses' education in the achievement of a more egalitarian situation at the home.

There is a negative age effect on husbands' housework and a positive effect on wives' which are consistent with the theoretical pattern of generational change in which sex roles tend to dissolve. Nonetheless, the insignificant effect of this variable suggests that this generational change remains unimportant in our Spanish sample. We also tested for non-linear effects through the inclusion of a quadratic term and different dummy variables for age-groups. The estimates were insignificant in all cases.

As expected, there is an inverse relation between labor market outcomes - working hours per day and hourly wage - and the allocation of hours to domestic activities. Considering these variables separately, the increase in working hours per day has a slightly higher negative effect for husbands' than for wives. Observe that neither the husband nor the wife are significantly affected by their spouse's paid labor hours, though the effect of this variable is

positive in both cases.

In addition, own wage shows a convex relationship indicating that male and female housework hours first decrease with wage and then increase. Notice that, unexpectedly, coefficients are similar for men and women. Estimations, however, reveal that spouses' housework times are not responsive to their partners' earnings, which is consistent with previous findings in literature (Maasen and Groot, 1996).

Children have a strong effect on wives' housework. In particular, the presence of preschool children and children aged 15 or more increase significantly the time wives spend on housework. Consistently with other studies (e.g. Kooreman and Kapteyn, 1987), we do not obtain a significant effect of these variables on husbands' housework. These findings suggest that wives are the ones who afford extra domestic tasks - other than specific child care - generated by children. Therefore, the presence of children means a more unequal division of household labor between partners.

Domestic help (hired or provided by relatives) has a noticeable effect on spouses' housework. More precisely, the number of housework hours spent by husbands in households with external domestic help fall by approximately one third, with respect to other households, while for wives this decrease is only of about one fifth (see Cameron and Trivedi, 1998 for interpretation of coefficients).

Finally, we observe that residing in the South of the country (Andalusia) does not have a significant effect on men's housework time, but it leads to significant reductions in female housework time. Regional differences are likely to reflect cultural and attitudinal differences that are difficult to identify in this context.

In the next section, we study the possible reasons behind the unbalanced situation of men and women in the housework allocation process.

4. GENDER EFFECTS ON HOUSEWORK ALLOCATION

What is the probability of an egalitarian distribution of housework between spouses? Are the wife's characteristics those that define the unbalanced distribution of housework duties?

Or are they the consequence of social patterns or cultural habits, which are reflected in the value household members give to the wife’s observable characteristics? In this section, we will suggest some answers to these questions by studying to what extent eliminating the sources of gender differences would generate role-changes towards a more egalitarian distribution of housework between spouses.

First, let us consider the predicted unconditional bivariate distribution of wives’ and husbands’ housework hours based on the negative binomial model estimated in the last section, presented in Table 5. Predictions are computed as the sample mean of conditional probabilities in each cell, that is,

$$\widehat{P}_1(f, m) = \frac{1}{n} \sum_{i=1}^n \Pr(h_{wi} = f, h_{hi} = m \mid \hat{\lambda}_{wi}, \hat{\lambda}_{hi}, \hat{\alpha}) \quad f, m = 0, 1, 2, \dots \quad (2)$$

where $\hat{\lambda}_{wi} = \exp(x'_{wi}\hat{\beta}_w)$, $\hat{\lambda}_{hi} = \exp(x'_{hi}\hat{\beta}_h)$ are the estimated conditional means of wives’ and husbands’ housework times, respectively, and $\hat{\beta}_w$, $\hat{\beta}_h$ and $\hat{\alpha}$ are the maximum likelihood coefficient estimates. We will call this prediction the *original scenario*.

Insert Table 5

The results in Table 5 are fairly supportive of the unequal situation of men and women in our sample. Observe, first, that the probability accumulated below the diagonal is much higher than the probability above the diagonal. In particular, the probability of finding a couple where the wife bears most of housework is about five times the probability of finding the opposite situation. A second interesting finding is that 80 percent of husbands devote between 0 to 2 hours per day to housework. In contrast, we should add housework up to 5 hours per day for wives to accumulate the same marginal probability.

We also predict that the probability of spouses halving their housework, i.e. the cumulative probability at the main diagonal of Table 5, is 0.14. The probability of an egalitarian housework distribution reaches its mode at very low housework hours, between 1 and 2 hours a day. This is of concern because emphasizes that couples are more prone to halve domestic work in households where the total burden of housework to be performed is rel-

atively low. But when this burden increases, it is the women who bear most of it. This result coincides with what is observed for other countries (Widmalm, 1998).

Given that our interest focuses on identifying the reasons behind this asymmetric housework allocation within couples, we carry out an empirical exercise that is in the spirit of Oaxaca (1973)-Blinder (1973) decomposition. Our calculations, however, account for the idiosyncratic nature of housework data by analyzing the probability distribution of counts (see Belman and Heywood; 1990).

According to Oaxaca-Blinder methodology, we could distinguish two broad sources of gender differences in housework allocation: that due to differences in measured characteristics (education, labor market conditions, etc.) and the other related to the different weights assigned to these characteristics in the couple’s decision-making process (different wives’ and husbands’ coefficient estimates). When studying male-female wage differentials, these weights are associated to the *price* the market pays for men’s and women’s human capital endowments. In our context, the coefficient estimates can be understood as the value that household members assign to wife’s and husband’s characteristics in the housework allocation process. For that reason, we will refer to them as *domestic prices*.

To approximate the contribution of spouses’ measured characteristics to the housework allocation, assume that husbands have the same characteristics as their wives. In this case, the bivariate distribution of male and female housework can be estimated as

$$\widehat{P}_2(f, m) = \frac{1}{n} \sum_{i=1}^n \Pr(h_{wi} = f, h_{hi} = m \mid \hat{\lambda}_{wi}, \hat{\lambda}_{hi}^w, \hat{\alpha}) \quad f, m = 0, 1, 2, \dots \quad (3)$$

where $\hat{\lambda}_{wi} = \exp(x'_{wi}\hat{\beta}_w)$, $\hat{\lambda}_{hi}^w = \exp(x'_{wi}\hat{\beta}_h)$ are predicted using wives’ characteristics but leaving the *domestic prices*, $\hat{\beta}_w$ and $\hat{\beta}_h$, unchanged. The prediction in this counterfactual scenario is presented in Table 6.

Insert Table 6

The changes in the distribution of domestic labor are in the direction of a more egalitarian distribution. Note, however, that predicted probabilities in this hypothetical scenario are very similar to those corresponding to the *original scenario*. This suggests that the difference in spouses’ observable characteristics are not the prime explanation for the unequal

allocation of domestic work within two-earner couples. Indeed, this finding may not be surprising given that wives and husbands in our sample are allowed to differ only in terms of labor conditions and education and even in some of these aspects - e.g. education - discrepancies are moderate (see Table 2). Nonetheless, this result reveals the first interesting fact of our counterfactual exercise: given the actual structure of housework allocation, the approximation of men and women in terms of education and labor market conditions would not necessarily equalize them in the home. Therefore, the inference is that some further set of variables, such as norms, values and other sociological and psychological processes, must be generating the asymmetry in housework allocation between men and women.

Consider now the effect of *domestic prices*. In this case, we compute the joint probability of spouses' housework times by assuming husbands and wives are similar not only in their observable characteristics but also in the way these characteristics are valued in the housework allocation process. In this case, the predicted probabilities are obtained from

$$\widehat{P}_3(f, m) = \frac{1}{n} \sum_{i=1}^n \Pr(h_w = f, h_h = m \mid \widehat{\lambda}_{hi}^w, \widehat{\lambda}_{hi}^w, \widehat{\alpha}) \quad f, m = 0, 1, 2, \dots \quad (4)$$

where $\widehat{\lambda}_{hi}^w = \exp(x'_{wi} \widehat{\beta}_h)$, i.e. we attribute wife's measured characteristics and husband's coefficient estimates to both spouses¹. Coefficient estimates imputed to wives $\widehat{\beta}_h$ except in the parameter corresponding to the dummy variable "Answered by spouse" that we have left unchanged. Table 7 displays predictions for this new scenario. In contrast to the previous hypothetical situation, now the probability distribution has changed significantly with respect to the *original scenario*.

Insert Table 7

A striking fact from Table 7 is the remarkable increase in the probability of halving housework between spouses. In addition, the off-diagonal probabilities are much more uniformly distributed, meaning a similar probability of finding a man or a women bearing most of housework burden. For the marginal distribution of housework, we find that the

¹ $\widehat{\beta}_w$ equals $\widehat{\beta}_h$ except in the coefficient corresponding to the dummy variable "Answered by spouse" that we have left unchanged.

probability of high counts has diminished, in particular there is a transition of couples from higher counts to cells corresponding to 0, 1 or 2 housework hours per day. These movements suggest an increase in couples' leisure.

In order to characterize the three scenarios discussed in the last paragraph, Table 8 presents three summary statistics. The first row displays the cumulative probability of spouses halving housework, i.e. the sum of the main diagonal elements of Tables 5, 6 and 7 above, $\sum_{\{f=m\}} \widehat{P}_t(f, m)$, $t = 1, 2, 3$. The second row shows the probability that the wife bears most of housework, i.e. $\sum_{\{f>m\}} \widehat{P}_t(f, m)$, $t = 1, 2, 3$. Finally, the probability that the husband bears more housework than his wife, i.e. the sum over the upper diagonal of distribution $\sum_{\{f<m\}} \widehat{P}_t(f, m)$, $t = 1, 2, 3$ is presented in the third row. The last column of Table 8 displays the difference between the hypothetical distributions (3) and (4). We call this differential the “gender effect” as far as it accounts for the unequal treatment, in terms of housework allocation, of wives and husbands equally endowed.

In Table 9 we reproduce the same statistics above but considering a more flexible conception of an egalitarian allocation of housework. In this case, we add spouses whose housework time differs in at most one hour from those who halve domestic work.

Insert Table 8 and Table 9

The basic result from these tables is that eliminating differences in *domestic prices* would move couples towards a more egalitarian distribution of housework. In other words, social pattern or cultural habits are those prevailing in the asymmetric distribution of housework within two-earner couples.

Finally, the role-changes towards a more egalitarian situation are illustrated in Figure 3, where we plot the sum of the diagonal probabilities in the three different scenarios we have discussed.

Insert Figure 3

From this figure, the increase in the probability of halving domestic duties between spouses after equalizing the *domestic prices* becomes clear.

To summarize, if we introduce fairness considerations by making spouses value women's

characteristics in the same way as men’s characteristics, then couples will tend, on the one hand, to increase the probability of equally sharing housework and, on the other hand, to increase leisure as a consequence of an overall reduction in the time allocated to housework.

5. CONCLUDING REMARKS

The evidence generally found in previous studies supports the persistence of gender inequalities in housework allocation. In this paper, an attempt is made to determine which part of this inequality comes from the unequal endowments (labor conditions and education) of spouses and which part might be attributable to the unequal treatment of men and women at home in a sample of Spanish two-earner couples. The novelty of this paper is that we analyzed the whole distribution of housework time assuming decisions are interdependent, therefore our approach allows a deeper insight into the housework allocation process of spouses.

Evidence obtained suggests that even when there is near-equality in the spouses’ employment statuses and educational attainments, the outcomes are far from equality in domestic work. The main force that moves couples towards a more egalitarian allocation of housework is the equalization of spouses’ *domestic prices*, i.e. the equalization of the weights attached to wives’ and husbands’ observable characteristics in the time-allocation decision process. This result is consistent with previous findings in literature claiming that the habitual patterns of gender-differentiated activity at home are mainly the result of gender identities.

Clearly our approach has some drawbacks, given that it only addresses the issue of gender differences in housework allocation in terms of couples’ measured characteristics. Differences in the distribution of unmeasured characteristics of wives relative to husbands could still have an impact on the observed asymmetric allocation of domestic work. For instance, it is possible that unmeasured group differences in productivity may explain part of the gender effect. Furthermore, we have only focused on differences in housework allocation, in terms of time spent on these activities. Undoubtedly, gender-segregation of domestic

tasks are another important source of inequality between men and women at home. These are important topics that requires further research in the Spanish case, and that clearly depends on the data available.

Despite the possible limitations of our analysis, the results raise some interesting issues for reflection. We find that convergence of Spanish men and women in the labor market are not accompanied by equal changes in the home. Given that increases in male housework time do not compensate for women's increases in paid labor, a realistic equalizing public policy should be oriented towards lowering the contribution of women's domestic labor. In this sense, favoring substitution of wives' time in household production by market domestic services, through reductions in tax payments related to the incorporation of this external help, would be an accurate option.

Undoubtedly, policies targeting gender-discriminatory attitudes by means of educational or affirmative action policies are most desirable. But that is a long-run process the benefits of which will be appreciable by future generations.

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TABLE 1 : Average Hours of Housework Per Day and Husbands' Share (standard deviations in brackets)

Sample	Average value		Husband's share	Number of observations
	Wives	Husbands		
Total	4.543 (3.341)	1.259 (1.552)	0.229 (0.221)	782
Working husband and non working wife	7.863 (4.051)	0.863 (1.483)	0.110 (0.181)	198
Working wife and non working husband	3.760 (1.786)	1.920 (1.631)	0.326 (0.247)	25
Both spouses working	3.402 (2.110)	1.370 (1.547)	0.267 (0.218)	559

TABLE 2 : Descriptive Statistics of Explanatory Variables

	Mean	Std	*Mean/**Correlation	
			Wife's housework	Husband's housework
Age	37.8	8.08	0.07**	-0.04**
Number of children				
no children	0.27	0.46	2.89*	1.42*
0-3 years	0.25	0.48	3.50*	1.00*
4-14 years	0.31	0.57	3.71*	1.82*
>15 years	0.47	0.96	4.01*	1.45*
Educational level				
primary, wife	0.37	0.48	3.94*	1.26*
university, wife	0.35	0.48	2.84*	1.36*
primary, husband	0.33	0.47	3.96*	1.30*
university, husband	0.35	0.47	3.05*	1.41*
Household help				
yes	0.42	0.49	2.97*	1.10*
no	0.58	0.49	3.72*	1.56*
Working hours per day				
wife	38.13	8.46	-0.09**	-0.002**
husband	41.24	8.72	0.02**	-0.11**
Hourly wage				
wife	0.84	0.57	-0.03**	-0.01**
husband	1.04	0.55	-0.04**	-0.01**
Region				
South	0.08	0.28	3.02*	1.59*
other	0.92	0.28	3.44*	1.35*
Respondent				
wife	0.60	0.49	3.36*	1.17*
husband	0.40	0.49	3.48*	1.67*

TABLE 3 : Independence Tests

Distribution	Polynomial order			
	j=1, k=1	j=1, k=2	j=2, k=1	j=2, k=2
Poisson	6.68	2.51	3.43	2.32
Negative binomial	6.69	2.99	4.50	3.63

Note: The test statistic is asymptotically $\chi^2(1)$ distributed; j, k denote the polynomial order corresponding to H^M and H^F , respectively.

TABLE 4: Bivariate Negative Binomial Estimations

	Husbands		Wives	
	Coefficient	Standard error	Coefficient	Standard error
Const.	-1.014	0.549	-0.865	0.382
Age	-0.034	0.083	0.031	0.040
Number of children				
0-3 years	0.074	0.088	0.142	0.048
>15 years	0.070	0.055	0.098	0.029
Educational level				
university	0.165	0.127	-0.201	0.060
Spouse's educational level				
primary	-0.199	0.130	0.132	0.062
university	-0.097	0.123	0.065	0.066
Household help	-0.313	0.108	-0.207	0.055
Working hours per day	-0.083	0.032	-0.066	0.015
Spouse's working hours per day	0.009	0.034	0.018	0.012
Hourly wage (in miles)	-0.315	0.175	-0.314	0.107
Hourly wage ² (in miles)	0.044	0.022	0.044	0.014
Spouse's hourly wage	-0.028	0.114	-0.049	0.051
Living in the South (Andalucía)	0.154	0.163	-0.265	0.087
Answered by spouse	-0.269	0.097	0.032	0.051
$1/\delta$	13.25	3.75		
log-lik			-1966.20	

TABLE 5 : Estimated Distribution of Hours of Housework

Wife	Husband									Marg.
	0	1	2	3	4	5	6	7	8+	
0	0.021	0.020	0.011	0.004	0.002	0.000	0.000	0.000	0.000	0.059
1	0.047	0.048	0.028	0.012	0.005	0.001	0.000	0.000	0.000	0.142
2	0.058	0.063	0.039	0.018	0.007	0.003	0.001	0.001	0.000	0.190
3	0.052	0.061	0.041	0.020	0.008	0.003	0.001	0.000	0.000	0.187
4	0.039	0.049	0.034	0.018	0.008	0.003	0.001	0.000	0.000	0.152
5	0.026	0.034	0.025	0.014	0.006	0.003	0.001	0.000	0.000	0.108
6	0.015	0.021	0.016	0.009	0.004	0.002	0.001	0.000	0.000	0.070
7	0.008	0.012	0.010	0.006	0.003	0.001	0.001	0.000	0.000	0.042
8+	0.009	0.014	0.012	0.008	0.004	0.002	0.001	0.001	0.001	0.050
Marg.	0.275	0.323	0.217	0.109	0.047	0.018	0.007	0.002	0.001	1.000

TABLE 6 : Hypothetical Distribution of Hours of Housework After Equalizing Observable Attributes and Weights

Wife	Husband									Marg.
	0	1	2	3	4	5	6	7	8+	
0	0.056	0.064	0.041	0.020	0.008	0.003	0.001	0.000	0.001	0.192
1	0.073	0.092	0.065	0.034	0.015	0.006	0.002	0.001	0.000	0.287
2	0.053	0.073	0.057	0.032	0.015	0.006	0.002	0.001	0.001	0.240
3	0.028	0.043	0.036	0.022	0.011	0.005	0.002	0.001	0.000	0.148
4	0.012	0.021	0.019	0.012	0.007	0.003	0.001	0.001	0.000	0.076
5	0.005	0.009	0.008	0.006	0.003	0.002	0.001	0.000	0.000	0.034
6	0.002	0.003	0.003	0.003	0.002	0.001	0.000	0.000	0.000	0.014
7	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.005
8	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.003
Marg.	0.230	0.306	0.231	0.130	0.062	0.026	0.010	0.004	0.002	1.000

TABLE 7: Hypothetical Distribution of Hours of Housework After Equalizing Observable Attributes

Wife	Husband									Marg.
	0	1	2	3	4	5	6	7	8+	
0	0.018	0.020	0.012	0.006	0.002	0.001	0.000	0.000	0.000	0.059
1	0.040	0.047	0.031	0.015	0.006	0.002	0.001	0.000	0.000	0.142
2	0.049	0.061	0.043	0.022	0.010	0.004	0.001	0.000	0.000	0.190
3	0.044	0.058	0.043	0.024	0.011	0.004	0.002	0.001	0.000	0.187
4	0.032	0.046	0.036	0.021	0.010	0.004	0.002	0.001	0.000	0.152
5	0.021	0.032	0.026	0.016	0.008	0.003	0.001	0.001	0.000	0.108
6	0.012	0.020	0.017	0.011	0.006	0.003	0.001	0.000	0.000	0.070
7	0.007	0.011	0.010	0.007	0.004	0.002	0.001	0.000	0.000	0.042
8+	0.007	0.012	0.012	0.009	0.005	0.003	0.001	0.001	0.001	0.050
Marg.	0.230	0.306	0.231	0.130	0.062	0.026	0.010	0.004	0.001	1.000

TABLE 8 : Gender Effect on Housework Distribution (I)

	Original estimates	Female base		Gender effect (2)-(1)
		(1)	(2)	
		$\beta^w = \hat{\beta}^w; \beta^h = \hat{\beta}^h$	$\beta^w = \hat{\beta}^h; \beta^h = \hat{\beta}^h$	
$Y^w = Y^h$	0.140	0.146	0.236	0.090
$Y^w > Y^h$	0.726	0.693	0.423	-0.270
$Y^w < Y^h$	0.134	0.161	0.341	0.180

TABLE 9 : Gender Effect on Housework Distribution (II)

	Original estimates	Female base		Gender effect (2)-(1)
		(1)	(2)	
		$\beta^w = \hat{\beta}^w; \beta^h = \hat{\beta}^h$	$\beta^w = \hat{\beta}^h; \beta^h = \hat{\beta}^h$	
$Y^w = Y^h \pm 1$	0.396	0.413	0.610	0.197
$Y^w > Y^h + 1$	0.548	0.515	0.225	-0.290
$Y^w < Y^h - 1$	0.056	0.072	0.165	0.093

FIGURE 1.A: HOUSEWORK TIME USE (HUSBANDS)

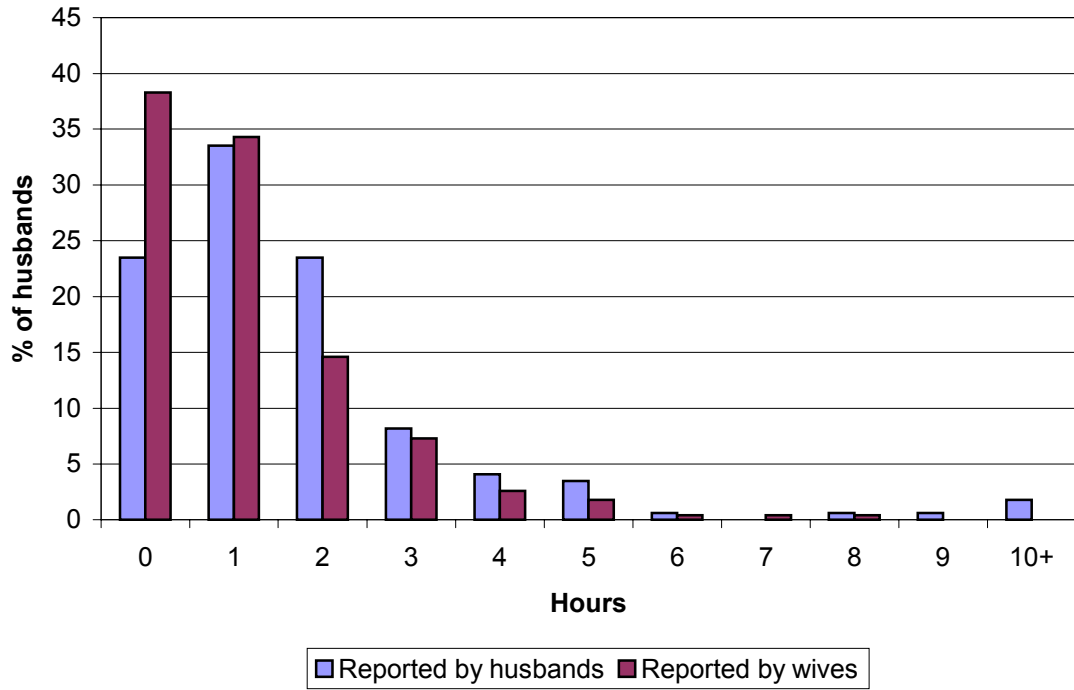


FIGURE 1.B: HOUSEWORK TIME (WIVES)

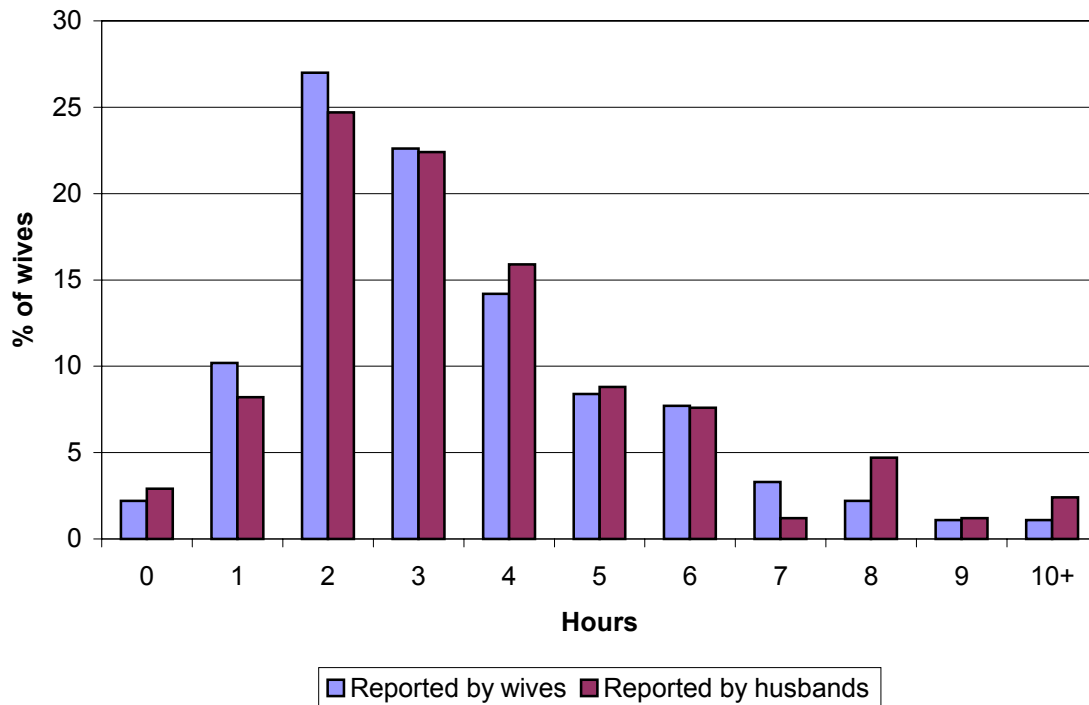


Figure 2
Observed and Predicted Housework Hours Marginal Frequencies

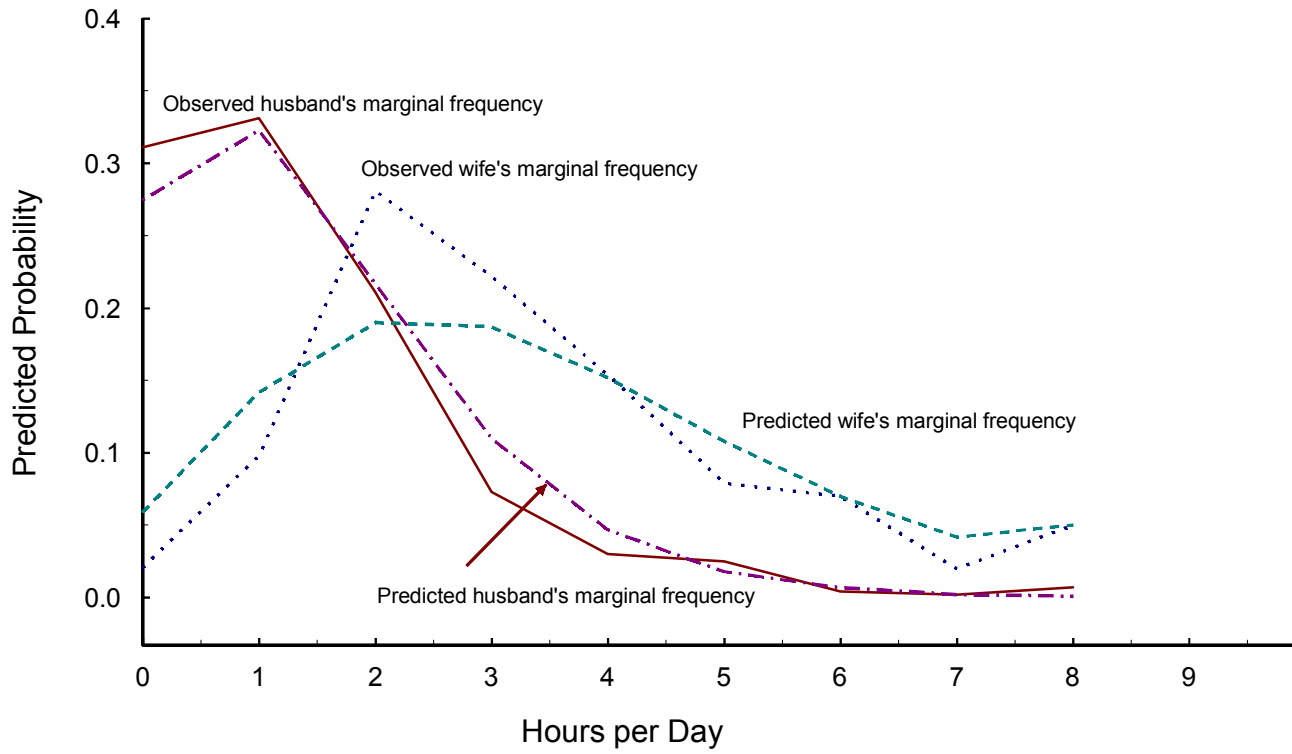
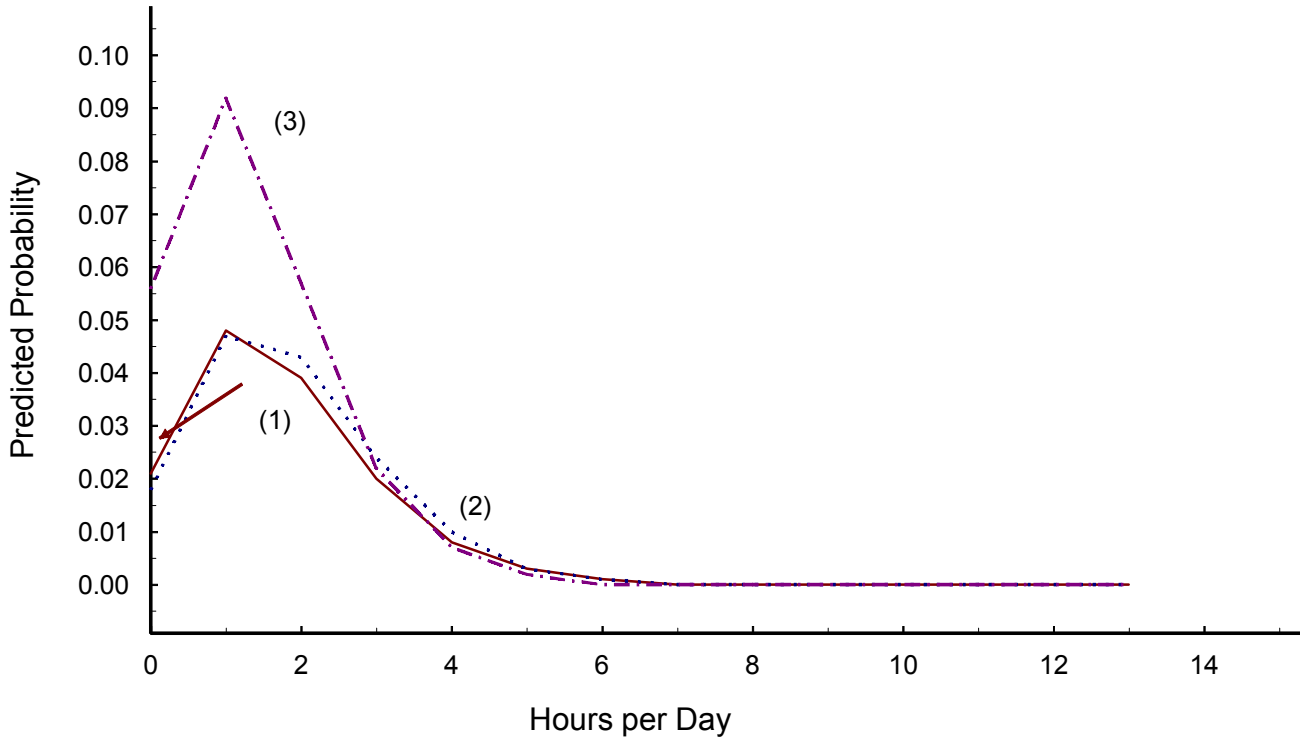


Figure 3

Gender effects on Equal Allocation of Housework Hours



Note:

- (1): Prediction with original coefficients and characteristics
- (2): Prediction with original coefficients and imputing wife's characteristics to both spouses
- (3): The same as (2) but imputing husband's coefficients to both spouses