

The Effect of Gender Ideologies in Division of Household Labour

Who is Gender Displaying?

by
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Abstract

In this paper, we examine the process by which couples decide how they split household chores. While it is commonly observed that women do a relatively larger share of the housework and men are the major breadwinners of the household, we look at how their relative time use changes given a change in their relative earnings, time availability and gender ideology. We use the second wave of the National Survey of Families and Households to test whether the gender identity norm that says that "the man should be the major breadwinner and the woman should do housework" plays a role in the relative allocation of time spent on labor market and housework between the two members of a couple. We confirm previous results in the literature showing that both men and women follow a gender display model, described by a non-linear relation between their relative earnings and their share of total housework performed. We also show that in determining one's housework share, their partner's gender ideology and market work time are also relevant.

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Introduction

In Becker's work on marriage markets, the specialization of both members of the couple in housework or market work arises from their different opportunities on the labor market. Since men historically received higher wages than women, it seems like the best choice, for a utility maximizing household to have the man working on the labour market and the woman doing housework. Having a preference for both homemade and market goods, this specialization would provide them a higher level of utility. This story seemed to hold up until women started having better opportunities in the labor market. As women's earnings relatively increased, data does not indicate that men have specialized in home production.

Taking a random couple and ignoring gender, we would expect that an increase in one's relative earnings would decrease his (her) relative share of performed housework. To explain such non-rational observation with a behavioral model, sociology literature caught the attention of economics scholars. In our society, prescriptions on behavior to follow come with our gender. "Man should earn more than his wife", "Cooking and cleaning should be performed by the woman" are examples of social prescriptions that arise from one's gender.

Understanding the process by which couples decide how much housework, leisure and market work they perform and how they distribute it is important for policy purposes. For example, any government policy aiming to stimulate women's employment must consider not only how women substitute labour and leisure, but also how any change in their potential market gains will affect how the couple allocates its time.

It is also important to understand if and how gender norms affect our preferences and decisions. In simple models, where pure rationality is assumed, outcome could be different once we introduce the social norms' influence on our behavior.

In cross-countries analysis, knowing that gender ideology affects choices, and that it differs between countries would be a motivation to include such controls.

The idea that we modify our behavior to fulfill the gender role comes from the sociology literature. Akerlof and Kranton (2000) brought the idea into economics literature. They incorporate identity in a simple game-theoretic behavioral model. Identity is associated with social categories and the prescriptions on behavior that come with this category. This model is an explanation to questions that actual economics could not explain such as why some women are opposed to women's right movement¹.

It is relatively easy to explain why the level of housework for some women might be higher than their partner's even if they earn more money. However, in both economics and anthropology literature, empirical results show that there is a tendency for women to increase their housework performed once they earn relatively more than their partner.² When she earns relatively less, her earnings and housework are negatively related, which makes sense; if you work more, you do less work at home. But this relation seems to change sign when she earns more than 50% the income. Would that be linked with the gender norm associating men as breadwinners and women as housekeepers and childcare givers?

Different explanations are given in the literature. First, some authors look at the number of hours of housework performed while other use a distributional measure of housework performed. Gender display or gender deviance models explain this saying that, when people behave in a way that goes against the social norm, they neutralize this deviance by doing activities that are associated with their gender. Also, literature contrasts in reporting who does gender display. In

¹See Akerlof and Kranton (2000)

²Bertrand, Kamenica and Pan (2015), Brines (1994), Greenstein(2000), Bittman and al. (2003)

some papers, only the man neutralizes the fact the he is not the breadwinner by reducing his housework but the woman continues decreasing her housework performed with her higher earnings while in others, both feel the need to neutralize their gender deviance.

Different approaches are used or combined to explain how time use choices are made in couples. Relative-resources says that the couple will share work time and housework time given their relative earnings or resources which give them bargaining power. The time-availability perspective states that couples allocate housework time to both members given their relative availabilities. If one works relatively more, then he performs relatively less housework. Beckerian models for example bring both relative-resources and time-availability perspectives. The gender display approach brings in perceptions on gender roles and desire to fulfill them in the decision process.

In this paper, we will start by covering the relevant literature on the effect of gender ideology in couple's decisions. This includes both anthropology and economics literature. We will present a simple model to explain more rigorously the puzzle we face when comparing traditional theory with empirical observations. Then, we will describe and motivate the choice of our dataset and variables as well as give some insights and descriptive statistics that we find relevant to our research. We will conclude this paper with a discussion about the results and their implications for future research.

Literature Review

The idea that time allocation in a household is modified by our desire to fulfill gender roles is recent in the literature. Before then, the explanation of labor division process had its roots in comparative advantage theory models. In his marriage market models, Becker (1973, 1974) described marriage as a source of benefit from specialization. Having different opportunities on the labour market, spouses make a time allocation decision between home and market based on their relative productivity in providing market and homemade goods and thus, increasing the family's utility level. The efficient labor division is made such that the family's utility is maximized. This comparative advantage framework history fitted what we could observe at that time: Men had higher potential earnings on the labor market than women, and for Becker, women were more willing to spend time on childcare since "they want their heavy biological investment in production to be worthwhile"³. This comparative advantage determining their time allocation would influence their choice of investment in specialized human capital which reinforced again their biological differences. Through time, previous investment in capital where they were relatively more productive increased further away their different productivity levels. For Becker, these biological and opportunities differences explained why household are typically formed with heterosexual couples and why women typically use their time in household activities whereas men specialize in market activities. His models assumed that people in the household were altruistic. No notion of exchange or power in bargaining *who does what* given their relative earnings is involved in his models. For him, gender gap is the consequence of higher earnings for men and biological advantage in childcare for women.

Following this theory, the labor market relative gains for women should have resulted in a decrease in women's relative engagement in household activities. However, in the last 40 years, women have both increased their leisure time and

³Becker, G. S. *Treatise on the Family* 38–39.

market work time, but still spend less leisure time than their partner. The increase in leisure time for women is not significantly different by working status and women still perform a greater part of the housework than their partner (Aguilar and Hurst, 2006). Even though Becker's work brought relative resources and time availability perspectives in labor division models, and therefore, economists' focus on hourly wages and hours spent on the market in the literature, the comparative advantage framework fails to explain gender asymmetry in the process of labor division.

In the sociology literature, there is a primary distinction between one's *sex* and *gender*. While sex is something given at birth, gender category is the result of a social construction. West and Zimmerman (1987) pointed out that the notion of gender as a role makes it hard to understand how our everyday activities produce *gender*, while the notion of gender display puts light on how our interactions are producing gender. Through our interactions with others, *gender display* is both a way to identify others' gender and being identified. They claim that the social doing of gender is itself constituted through interactions. For example, take a girl wearing a pink dress. Does wearing pink makes her a girl? No. But pink is associated to girls. By wearing pink, she displays her gender and also, she reinforces the norm saying that pink is a girl's color. The idea behind is that gender is not a given state; it is established through regular behaviors.

This idea that we modify our behavior to fulfill gender roles was first applied to division of household tasks by Berk (1985). She pointed out that gender was an important input in households' time use. Even though wives were employed, they were responsible for the majority of the household production, and more surprisingly, this type of arrangement was perceived as fair by the couples. Even though women would also work, to them, it is fair that they are doing the majority of household chores since it is "women's job". As households perform household tasks and labor work, they "do" gender.

Evidence on asymmetries in division of labor and housework were first reported by Hochschild and Machung (1989). They noted the stagnation of wives' home production share even though their labor time increased. While women entered the labor market – families have been hit by a process which Hochschild and Machung call the "speed-up" in work and family life – the time constraint the households were facing did not change, but the housework to do increased⁴. They noted that it was mainly women who absorbed this "speed-up".

Economic dependency models explain the household division of labor saying that wives exchange unpaid labour for a share of their husband's income. Gender display models claim that performing an activity that is seen as typically feminine is a strategy to fulfill gender roles. In the literature, both types of models have been used in attempts to explain why women mainly absorbed the "speed-up".

Brines (1994) provides empirical findings that contradict the relative resources approach. In fact, she noted that even though the wife earns more than her husband, she would still perform more housework than him. Both dependency and display models assume that the process should be gender neutral. If the dependency model applies, we should also see the husband's share of housework changing given an increase in the wife's earnings. Her conclusion was that dependency models were compelling in explaining wives' behavior. Using the 1985 wave of the Panel Study of Income Dynamics (Institute for Social Research, University of Michigan 1989), she found that when wives' dependency decreases, the amount of housework hours she performs also drops. However, this model could not explain why the housework performed by the husband was decreasing when he would become more dependent. Her explanation was that while wives follow

⁴Akerlof and Kranton (2000) corroborate Hochschild's findings using PSID data by showing that husband's share of housework has a lower average and that its elasticity with respect to their share of labor work is low

a dependency model, gender display framework was more compelling in explaining husband's behavior. Households where the social gender norm saying that the man should be the breadwinner and his wife dependent was violated would compensate by *gender displaying*. She also showed that full-time employed wives perform more housework than their male counterparts who work the same or fewer hours, which contradicts the time-availability approach.

Greenstein (2000) replicated Brines' work adding controls such as region of residence, and second order term of the number of children⁵. He used the first wave of the National Survey of Families and Household to replicate what she did and test the results when a distributional measure of housework is used as the dependent variable. Following Brines results, he also found that processes linking economic dependency and housework hours performed were gender-specific when we look at the amount of housework the partners do. However, when looking at the housework share performed, he found that the process is not gender specific and complies with a neutralization of nonnormative gender display. In other words, for the wife, getting more independent is followed by an increase in relative housework, while getting more dependent for the husband has a negative effect on its share of housework when he is not the major breadwinner; he does this in order to neutralize the fact that they are deviating from the social prescription on men and women's roles. This result contradicted Brines observations.

Bittman and al. (2003) pointed out using Australian and American data that the effect of the wife's contribution to family income on the division of housework depends on the level on her relative contribution. They observed a negative relation between the wives' hours of housework and relative income when they earn less than half of the household's income, but the relation become positive once they earn more than half of the relative income. While Brines (1994) and Green-

⁵As Greenstein (2000) points out, literature (Kamo, 1991) suggests that the relation between the number of children and housework is non-linear.

stein (2000) found a curvilinear relationship between relative earnings and men's hours of housework, Australian data showed no significant linear or curvilinear effect. For women, the linear relationship between her relative earnings and hours of housework as found by Brines (1994) and Greenstein (2000) was only observed in Australian data up to the point of equality where the curve inflects. They concluded that these differences between Australian and U.S data were explained by real national differences. It appears to be more deviant for women to earn more and work full-time in Australia than in the U.S. which leaves room for stronger gender deviance neutralization.

Parkman (2004) tried to understand why the response of husbands' hours of housework to wives' higher earnings and labor force participation are relatively limited. He argues that two concerns are limitations to primary wage earner's response to secondary wage earner's employment in the bargaining process. First, the motivation to be employed might be motivated by expectations on the durability of the marriage for the second earner rather than family's welfare. While divorce became more likely in the U.S., employment could be seen as a protection in case of divorce for the relatively more dependent spouse. Facing a divorce when you don't have any experience on the labour market is more stressful than if you are used to it and have experience working and finding employment. Wives, who are more commonly the secondary wage earners, are increasing their participation in the labour market, and would normally reduce their housework time. However, their ability to adjust their housework is limited given than they want to keep their spouse happy.

As Parkman (2004) argues, the result is that they will increase their employment more than they reduce their housework time. An other concern he points out is the limited family's welfare increase following the employment of the secondary wage earner. While most studies focus on gross income, Parkman (2004)

mentions that net income might be more relevant. Wives' employment could increase the family's consumption possibilities, but the "marriage penalty" – no exemption/deductions on second income, potentially higher marginal tax rate – in taxation is likely to reduce substantially this benefit. Using the first wave of the National Survey of Families and Household, he shows that in individual's decision of hours of housework to perform, gender ideology and spouse's earnings are relevant factors. His empirical analysis also confirms that for husbands, housework performed responds less to change in relative earnings than does wives', which fits his explanation described above.

Using the 2002-03 Spanish Time Use Survey (STUS), Fernandez and Sevilla-Sanz (2006) find that primary income earners wives still undertake more than 50% of the housework and childcare. Following Brines (1994), Greenstein (2000), and Bittman and al. (2003), their empirical analysis shows that women's relative share of housework decreases with relative earnings up to the point where spouses earn the same. Finally, they show that relative childcare time does not vary with relative income.

In contrast, Gupta (2007) and Gupta and Ash (2008) argue that the gender display and economic dependence models have fundamental defects. Those models focus on women's relative earnings, instead of absolute earnings. Using a nonparametric approach, they provide support for an alternative framework focusing on partner's own earnings for their housework performed. In other words, one's decision on housework performed is solely determined by his or her absolute earnings. Their results show that women's housework time performed is negatively related to their absolute income, regardless of their partner's earnings. For them, this result means that a person's housework emerges from her (his) own decision process. According to this perspective, the difference in relative share of housework would therefore only be explained by different preferences.

More specifically, Davis (2007) looked at the effect of the union type on how the couple share housework using cross-national data in 28 nations. First, they noted that cohabitating men (women) report doing more (less) housework than married men (women). They find a negative relationship between gender ideology and a more egalitarian reported division of housework. They tested whether the relative earnings, time-availability and gender ideology perspectives were applied differently depending on the union type. Their results show that both the effects of time-availability and relative-resources on the housework division were the same regardless of the union type. However, as they show, having a stronger gender ideology is more influential for cohabitating couples, probably due to the traditional context of marriage.

However, when working with older data, we suspect that this effect would not be verified since the reasons to get married change through time. Maybe today, people who are more traditionalistic are more suspect to get married. However, not so long ago, getting married was more common a norm in our society.

Bertrand, Kamenica and Pan (2015) first note that the distribution of relative income shows a sharp drop from the point where the wife's relative earnings exceed 50%. They explain that people show aversion to situations where the gender identity norm is violated. Their results show that couples' satisfaction with their marriage and likeliness of its continuation is lower when the wife earns more. Primary income earning wives perform more housework than secondary earning ones. They note that their results might suffer from two limitations. "Traditionalism" could be an omitted variable; in couples more traditionalistic, women might be less likely to earn more and more likely to overtake a larger portion of housework. Also, the data they use only provides the absolute hours of housework performed by the respondent without information about her or his partner's.

The fact that some women perform more housework than their partner even though they earn more is consistent across studies. However, the conclusions on the relation between housework and income differ. When it comes to explaining how women's' relative income is linked with their housework performed, both linear and non-linear relations are found⁶. For men, Brines (1994) and Greenstein (2000) found that their housework time first increases with their wife's relative earnings but that this relation becomes negative for high wife's relative earnings. Bittman and al. (2003) could not conclude that relative earnings and housework time were significantly related for men.

When it comes to explaining how relative earnings are link to the share of total housework performed, Greenstein (2000) argues that the non-linearity is found for both men and women and concludes that both do "gender display". In contrast, Gupta (2007) and Gupta and Ash (2008) claim that gender display models are fundamentally wrong. Due to different preferences, men and women react differently to a change in their own income and this difference in reactions is what drives the previously mentioned linear and non-linear relationships observed.

In this paper, we would like to test the robustness of previously observed results in the literature with different data. More specifically, we want to see if we can find the gender deviance neutralization process (Greenstein, 2000) for both men and women when looking at a distributional measure of housework. We will start by attempting to replicate Greenstein's work and given the result, see how the model can be improved by adding different controls. We will complete this paper with an analysis of the results obtained, a discussion on their interpretations and implications for future research.

⁶Brines (1994) and Greenstein (2000) found a negative linear relationship with U.S. data. Parkman (2004) and Bittman and al. (2003) found a non-linear relationship.

Theoretical Model

Here, we present a simple model where the household picks how many market goods X to buy, woman's and man's hours of housework to perform, t_w and t_m , and their hours of outside work q_w and q_m to maximize their consumption of homemade goods Z given the price of market goods p , man's and woman's wage w_m and w_w and other fixed sources of income Y_0 ⁷:

$$\max_{X, q_w, q_m, t_w, t_m} Z = f(X, t_w, t_m)$$

Subject to their time constraints and the household's budget constraint:

$$T = q_m + t_m$$

$$T = q_w + t_w$$

$$pX \leq w_m q_m + w_w q_w + Y_0$$

Which becomes,

$$\max_{X, t_w, t_m} Z = f(X, t_w, t_m)$$

Subject to:

$$pX + w_m t_m + w_w t_w = (w_m + w_w)T + Y_0$$

Where $f(X, t_w, t_m)$ is the production function of *homemade* goods.

⁷In this model, people do not save, they spend all their income on market goods.

Solving the Lagrangian and combining the first order conditions for the optimal levels of housework gives us the following condition:

$$\begin{aligned}f'_X - \lambda p &= 0 \\f'_{t_w} - \lambda w_w &= 0 \\f'_{t_m} - \lambda w_m &= 0\end{aligned}$$

From which we obtain the following optimality condition:

$$\frac{f'_{t_w}}{f'_{t_m}} = \frac{w_w}{w_m}$$

Which states that at the optimal level of housework time allocations, the ratio of the marginal productivities must be equal to the wages ratio. All else being equal, an increase in one's earnings should be followed by a decrease in his (her) housework time if the household wants to maximize their consumption of homemade goods.

The relation of interest in this paper and in the literature previously covered concerns the relation between one's wage and the other's housework time. In other words, are $\frac{\delta t_m}{\delta w_w}$ and $\frac{\delta t_w}{\delta w_m}$ positive or negative?

One other important aspect of this relation is that it is gender neutral in our specification and the fact that the gender has appeared as a significant determinant in this relation represents a puzzle.

Data

In this paper, we will use the second wave of the National Survey of Families and Household (NSFH). This original sample includes 13,007 observations from 9,637 households. The second wave includes 10,007 observations on respondents from the original sample interviewed for a second time between 1992 and 1994 with personal interviews from their spouse/partner (N=5624). We chose to use the second wave rather than the first one because it is more recent and, to our knowledge, it has not been analysed in the literature yet⁸. We considered using the third and last wave (2001-2002) but due to budget cuts, the sampling's quality decreased.

Since we want to analyse the household division of labor from the time-availability, relative-resources and gender ideology perspectives, we had to drop from our sample respondents and partners for whom information on income, hours worked, gender ideology related questions or relevant control variables was missing. After merging the different files and applying the previously mentioned restrictions, our starting sample size includes observations on 2,617 couples. All the couples in the sample are heterosexual. Therefore, this data set allows us to run analysis on 2,617 men and 2,617 women.

The choice of this particular dataset is motivated mainly by the richness of the information it contains. While the American Time Use Survey offered many observations and data on housework, it only had information on the respondent. Since we are not willing to assume that the respondent's partner's housework time is fixed, we need to use a dataset that reports information on housework for both members of the couple.

The dataset requires rich information about the observations' gender ideology.

⁸Greenstein (2000) and Bittman and al. (2003) ran their analysis on the first wave of the NSFH

Also, as mentioned earlier, we want to reproduce Greenstein’s results to test the robustness of his results. The NSFH therefore provides the information we need to run this analysis.

Variables

Dependent Variable

Housework Share. To create our dependent variable, we sum time spent on household task for both the respondent and the spouse. These tasks include preparing meals, washing dishes, cleaning the house, outdoor tasks, shopping, washing and ironing, paying bills, auto maintenance and driving. We gave a total of 112 hours of housework to observations who were claiming doing more than this time in a week. This number represents a more realistic number of hours of housework per week, corresponding to an average of 16 hours for 7 days. The dependent variable is the respondent’s share of total housework performed by the couple.

Table 1: Average Housetime by categories - Respondents

	Female	Male
Preparing Meals	8.61	2.87
Washing Dishes	5.89	2.29
Cleaning the house	7.22	2.20
Outdoor tasks	1.77	4.93
Shopping	2.99	1.63
Washing and Ironing	4.59	1.12
Paying Bills	1.80	1.52
Auto Maintenance	0.22	1.75
Driving	2.11	1.41

Tables 1 and 2 report the average housework time for respondents and partners respectively. The tables give the average time spent per type of housework by gender. One obvious remark is that women tend to do more housework than men. The

Table 2: Average Housetime by categories - Partners

	Female	Male
Preparing Meals	7.63	2.79
Washing Dishes	5.05	2.12
Cleaning the house	6.66	1.93
Outdoor tasks	1.75	4.38
Shopping	3.25	1.31
Washing and Ironing	4.19	0.98
Paying Bills	2.01	1.30
Auto Maintenance	0.16	1.60
Driving	1.89	1.33

only two categories where men actually do more are Auto Maintenance and Outdoor Tasks. The big gaps lie on the more "feminine" activities; Preparing Meals, Cleaning the house and Washing and Ironing. Tables 3 and 4 reports the average hours of total housework performed by men and women in our sample. Women do close to twice as much as men with approximately 18 and 33 hours respectively.

Independent Variables

Work time. The survey includes different questions related to each member of the couple's weekly work time. Unfortunately, the preferred one had too many missing values. One question asked the partners *How many hours did you work last week at your main job?* where most of the observations had valid entries. For the purpose of this analysis, we will assume that the week they were asked was random. This variable will help us testing the time availability perspective with our data. As shown on Tables 3 and 4, men in our sample work close to 44 hours per week, which is more than the average 34 hours per week for women.

Log of Income. We used the reported spouse's and respondent's total income to reproduce Brines (1994) dependency index. This will allow us to investigate the relative-resources perspective and test for the curvilinearity found in the literature once women earn more than half the total income. The income measure

used includes any self-employment, wage/salary, social security, pension, public assistance, government program, child support, dividend or other income sources. As Parkman (2004) pointed out, we would ideally use the net income to reflect the "real" trade-off the family faces in terms of commodities that can be obtained with the additional revenue versus the foregone benefit of housework. Our measure is not perfect but includes various sources of income as well as government program revenue that are relevant in this decision. On tables 3 and 4, we can see that average yearly earnings of 38,653\$ for men is way higher than 22277\$ for women.

Table 3: Statistics for Men

	Market Work - Men	Income - Men	Housework Time - Men
mean	44.04	38652.77	18.47
sd	15.21	29853.23	14.33

Table 4: Statistics For Women

	Market Work - Women	Income - Women	Housework Time - Women
mean	33.89	22277.31	33.32
sd	15.08	17953.96	20.79

Dependency. Following Brines (1994) and Greenstein (2000), we constructed a dependency index. $Dependency_i = (earnings_i - earnings_j) / (earnings_i + earnings_j)$ take a value of -1 when i completely depends on j , that is when j earns 100% of their total income, and it takes a value of 1 in the opposite case. This measure is perfectly correlated with the income share i earns.

Gender Ideology. Following Greenstein (2000) we used a series of questions where respondent and their partner were asked about their gender ideology to construct an index. They had to answer, on a 1-5 scale (1 = Strongly agree, 5 = Strongly disagree), how they agree with the 5 following statements: "It is much better for everyone if the man earns the main living and the woman takes care of

the home and family", "Preschool children are likely to suffer if their mother is employed", "A husband whose wife is working full-time should spend just as many hours doing housework as his wife", "Both the husband and wife should contribute to family income", "A woman can have a fully satisfying life without getting married". Values have been rescaled so that the number given increases with a stronger gender ideology. Missing values were replaced by the person's average answer to other questions. As Greenstein (2000) pointed out, results are not sensitive to missing values treatment in this case. Our gender ideology index is normalized with a mean of 100 and standard deviation of 15⁹, which yields a Cronbach's α reliability coefficient¹⁰ of 0.7345 for respondents and 0.7469 for partners.

Control variables. In our analysis, we first try to replicate Greenstein (2000) work to see if we can find similar results with the second wave of the survey. Thus, we include basic controls such as the age and race. In line with the relative-resources theory, we add a variable that takes a value of 1 if the respondent has at least a college degree. This captures the potentially higher earning possibilities for this observation. Unfortunately, the information of the partner's education level was missing. We still use the variable to capture the effect of the "presence" of a college degree in the couple. We also include the size of the household excluding the respondent and its partner. We assume that any additional member of the household are likely to be children. This captures the amount of housework that comes with a more populated household and the type of housework that it generates which is likely to be took over by the woman. Its squared value is included to capture the non-linearity of the effect of the size on the division of housework¹¹. Indicator for whether the person lives in the metropolitan area is included. We also control for the region the person lives in.

⁹We chose those particular values for mean and standard deviation for comparability with Greenstein's (2000) results.

¹⁰It tests the reliability of an index constructed with different variables. It is a function of the average covariance between items, the variance of total score and the number of items.

¹¹This was first suggested by Kamo (1991) and also done by Greenstein (2000)

One issue with the controls used was with the race of the respondent's spouse. Since many people did not answer this question, including the information had a cost close to 800 observations. Since in most cases, when observable, couples were of same race so we only kept the respondent's race as a control.

Table 5: Geographical and Ethnical repartition of the sample

	West	South	Midwest	Northeast
Proportion of the sample	18.3%	32.23%	31.47%	17.95%
In Metropolitan Area	77.29%			
African American	10.36%			
Hispanic	4.53%			

Table 5 reports few more statistics on our sample. The regional distribution is similar to Greenstein's and the proportion of people in metropolitan is slightly higher which is consistent with the relative population increase in metropolitan area that happens through time, here in approximately 5 years. In our sample, 77% of the observations live in a metropolitan area, more than 10% are African American and 5% have Hispanic roots. Table 6 reports mean and standard deviation of respondent's control variables by sex of the respondent.

Table 6: Statistics

	Age	Size	College
Male			
Mean	40.55	2.45	.38
Standard Deviation	9.26	1.31	.47
Female			
Mean	39.61	2.55	.36
Standard Deviation	8.90	1.32	.48
Total			
Mean	40.07	2.5	.37
Standard Deviation	9.09	1.31	.4

The average age for men and women respondents in the sample is similar and around 40 years old. The average size of the household is of 2.5 persons (the variable size excludes the respondent and his or her partner). 38% of male respondents and 36% of female respondents have at least a college degree. Given the similarities between female and male respondents, we do not expect that who in the couple is the respondent has a big impact on our results.

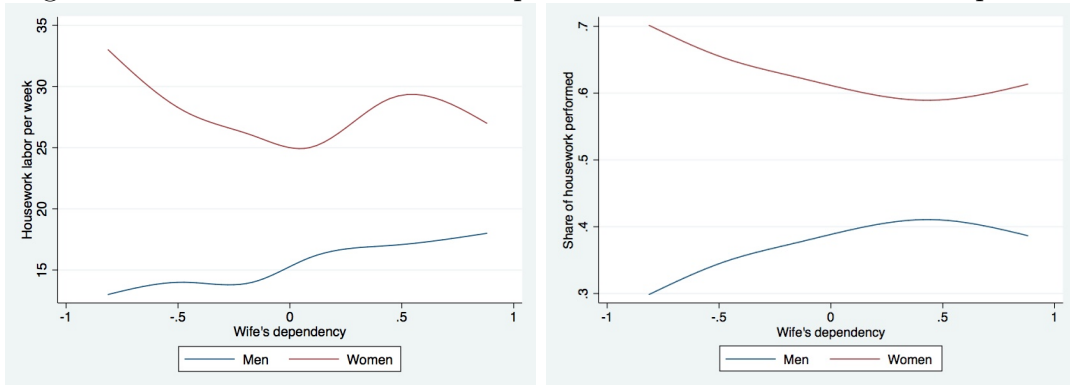
Results

Descriptive Statistics

We used our data to reproduce what Greenstein (2000) did with the first wave data to see if the same pattern was still present few years later. On the x-axis of those graphs is the wife's economic dependency measure¹² This measure takes a value between -1 and 1, where -1 means that the wife's earnings are equal to 0 which makes her completely dependent, and 1 means that the husband is completely dependent.

Figure 1 reproduces what Greenstein (2000) did with the first wave and gives the same relations. The more dependent the wife is, the more hours of housework she performs and the less hours of housework her husband performs (left). However, when we look at housework performed in terms of share of the overall housework (right), the relationship appears to be quadratic. For high wife's dependence, decreasing her earnings decreases her share of housework, but soon after the point where she is relatively less dependent than her husband, the opposite occurs.

Figure 1: Housework hours or share performed and wife's economic dependency



¹² $Wife's\ dependency = (earnings_{wife} - earnings_{husband}) / (earnings_{wife} + earnings_{husband})$. It was used by Greenstein (2000), Brines (1994) and originally suggested by Sørensen and McLanahan (1987).

Figure 2: Cumulative difference in housework & labor time for male & female

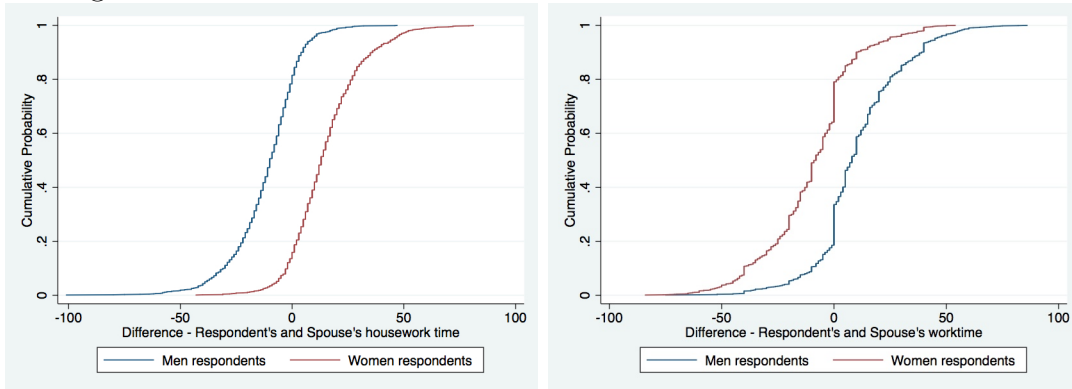


Figure 2 (left) reports the cumulated difference between the respondent's housework and its partner's for male and female respondents. Figure 2 (right) reports the cumulated difference in market work time. As expected, women do more housework and work relatively less outside home. The cumulated difference curve in housework for men has only a small part in the positive side of the graph. However, a bigger part of the women's cumulated difference curve in work time lies on the positive side of the graph. In other words, even though it is very unlikely to find a couple where housework is split equally or where the man performs a bigger share of it, it is relatively more likely to meet a household where the woman works the same or more hours outside the home.

Figure 3: Fitted values - Housework & Worktime

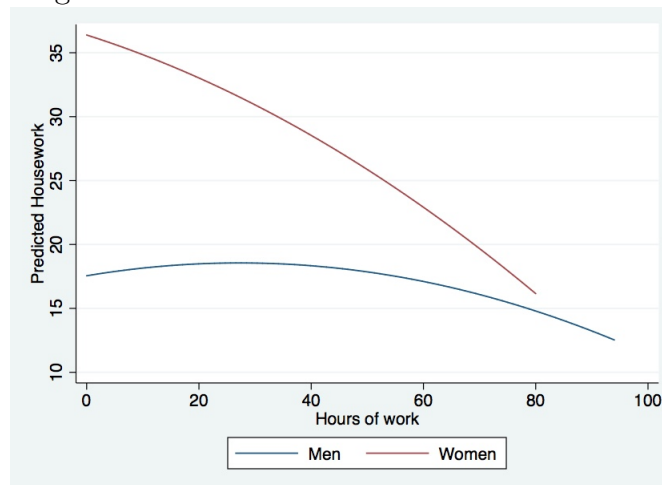


Figure 3 is interesting from the time-availability perspective. It represents the quadratic fit of the housework time given the work time hours for men and women. First, if men and women would share housework only given their relative availability, we would obtain two similar curves, which is not the case here. Men's curve appears to be negative but only weakly curved. An interesting thing to note while looking at this graph is how rigid or stagnant men's housework time is to changes in their work time. As Bittman and al. (2003) noted, with such low levels of housework, possibilities for adjustment are limited. Women's housework time is more sensitive to changes in their work time, but the former stays over men's for the most part.

Figure 4: Fitted values - Housework & Income share

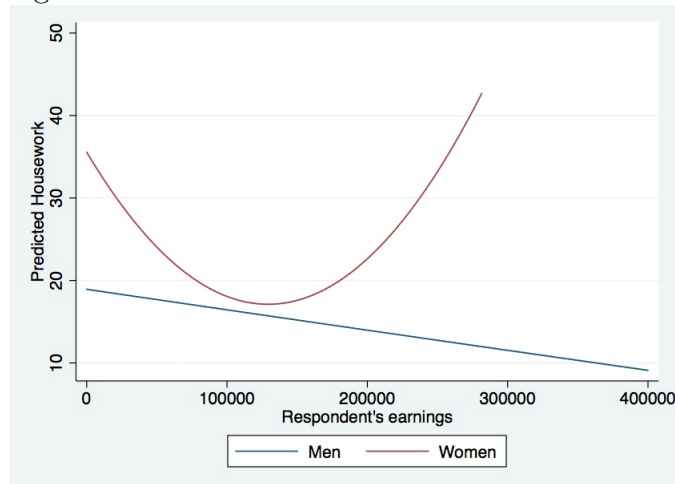


Figure 4 illustrates really well how different is the effect of earning more money (in absolute terms) for men and women. It reports the quadratically fitted values of housework given the income earned for men and women. While one could think that the gender norm only applies in a way where women do more, but faces the same trade-off, this figure shows that the few women who earn a high income tend to do high levels of housework. The relation for men is negative and linear. While Bines (1994) reported that women were best described by the exchange theory model and men by the gender display perspective, this graph reports the oppo-

site. Maybe some missing information gives this graphic the aspect it has; in the limit, it could be possible that those high earnings women are in a relationship with even richer men. If the gap between men and women's income increases at higher rate than their total income, but that the relation between earnings and housework stays the same, then those curves could make sense.

Figure 5: Fitted values - Housework & Income share

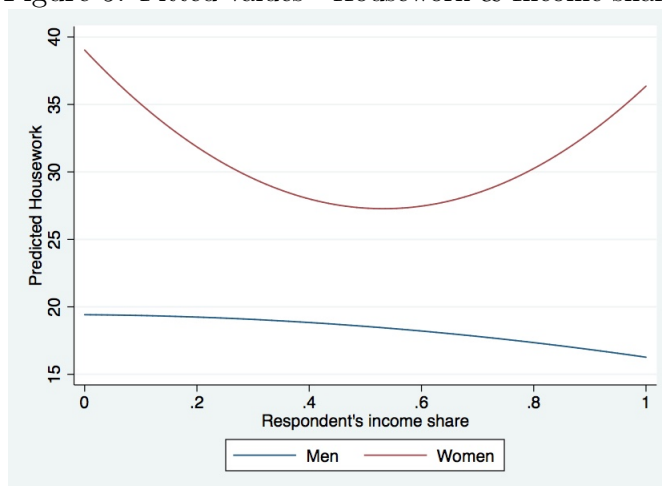


Figure 5 was made in line with Greenstein's (2000) contribution. It reports the quadratic prediction of the housework time given the share of the couple's income the respondent earns for men and women. Greenstein (2000) reported that both men and women were neutralizing their gender deviance. This explanation fits what we see for women; they would increase their housework when earning more than half the couple's income to neutralize the fact that their action goes against the social norm saying that the man should provide. However, the curvature for men is very weak. If men would also neutralize their gender deviation, they would use the small room they have (they are doing less than 20 hours of housework) to decrease it even more.

Since the main purpose of this paper is to investigate on the role of gender ideology on division of labor, it is interesting to see how the gender ideology of

observations changes given our variables of interest and control variables. The average gender ideology score for people having a college degree is 101.89 for women and 101.48 for men. This score is lower for both group for people who don't have their college degree with 96.77 for women and 97.47 for men.

To see if people tend to be with a partner who has similar gender ideology level, we computed the difference between the man's and the woman's gender ideology for each couple. The result is quite close to zero but has pretty low and high minimum and maximum value.

Figure 6 plots the difference in ideologies between men and women against men's gender ideology. One interesting thing to note is that according to this graph, we do not necessarily only observe couples with the same ideology. If we would, then the difference would be zero even for "extremists". Our data show that instead, people with very high ideologies tend to be with a moderate partner.

Figure 6: Observed & Fitted values - Difference in Gender Ideology in Couples & Men's Ideology

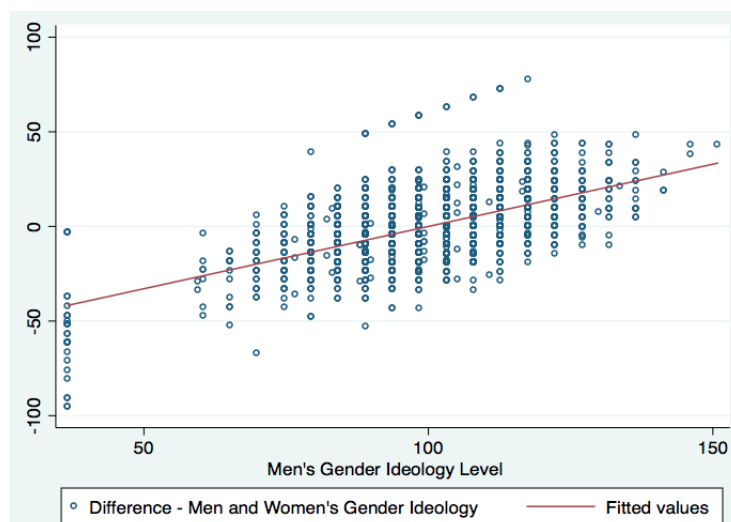
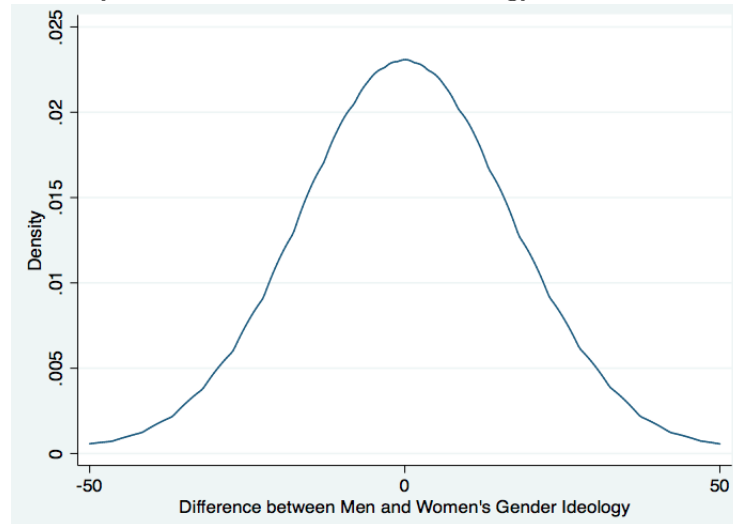


Figure 7 reports the probability density function of the gender ideology difference. Its bell curve shows that our gender ideology difference in the sample is centered around zero.

Figure 7: Density of Difference in Gender Ideology between Men and Women



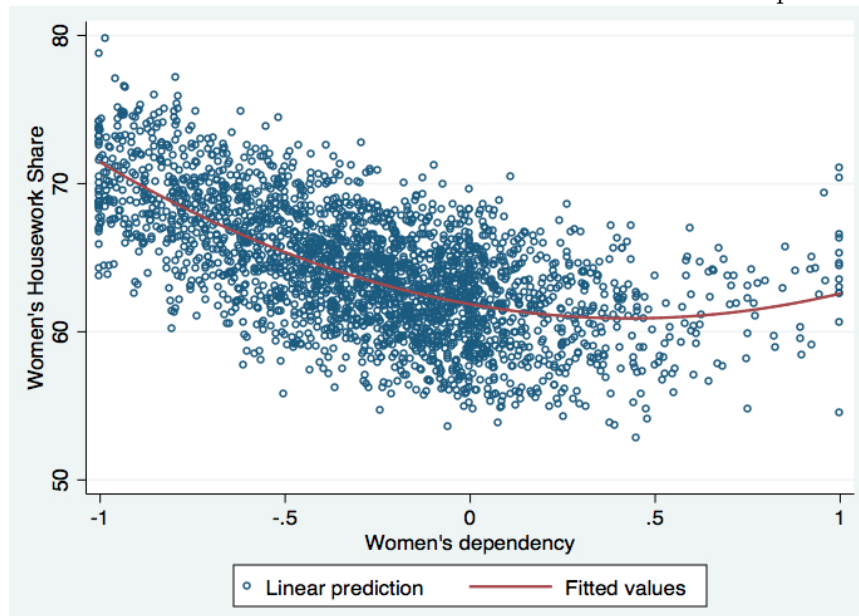
Regression Results

To start the analysis, we first replicated Greenstein (2000)'s final regression. All our specifications use the *Seemingly Unrelated Regressions* (SUR) technique. This estimation method is appropriated when we suspect that the error terms of two different regressions are correlated. Here, it is likely that the unobservables for our couples' members will be correlated. There are a few things that we will test. We will verify that one's dependency has a non-linear effect on their housework share, and that it is observed for both men and women as found by the main paper we based our analysis on. Also, in his paper, Greenstein (2000) only included the person's own gender ideology so we will test whether the partner's gender ideology has a significant effect on the housework share and its curvature. Table 7 reports the estimates for the 2617 women in the sample and Table 8 reports the estimates for the 2617 men in the sample. Since the housework share for a woman in any given couple is equal to one minus the housework share of the man, and because most of the explanatory variables are similar of the same for the partners, the parameters obtained are very similar and most of the time, only differ by their sign.

Model (1) replicates Greenstein's work. However, he includes hours of housework performed by children and other members of the household, which we could not consistently measure. The reported values were either missing, or too large and noisy to be included in the analysis. The first thing to note is that both the parameters for the dependency variable and its square value are significantly different from zero. This indicates that the relation between housework share and dependency for women has the "U" shape. However, in our case, the curvature happens at a point where the women's dependency is around 0.5 which corresponds to a point when women earn 75% of the income. In Greenstein's case, this would happen around 63% of the income. Given the results for women, this implies and can be verified in the following table that men increase their housework

share when their female partner increases her earnings from 0% to 75%, after this point, the relation is inverted. This difference with previous literature concerning the level of women’s independence at which the relation changes sign raises questions. Neither our analysis or Greenstein’s could show that the gender ideology had an effect on the dependency level at which the relation changes sign. In terms of similarities with previous work, our replication also shows that being an African American woman rather than a white woman decreases the expected housework share performed by 2.5%. Greenstein found a larger but close effect. The effect is of opposite sign and also significant for males. The size of the household excluding the couple increases women’s share and decreases men’s share. We can’t conclude that it has a non-linear effect. Living in a metropolitan area decreases women’s share of housework by 2.9% and being in a southern region increases the expected women’s share by 2.24%. Figure 8 plots the predicted share of housework for women against their dependency level to visualize to "U" shaped relation.

Figure 8: Fitted values - Women’s Housework Share & Women’s Dependency Index



Our findings differ from Greenstein’s for some parameters. First, the logarithm of the couple’s income has a negative effect on women’s share of housework. This

result seems surprising but, if we think about it, this is the marginal effect of the logarithm of income all else being equal, including the dependency index, which is perfectly correlated with the income share they earn. This may indicate that richer households have more egalitarian sharing of housework.

The age of the person as a significant effect of 0.03% on the housework share, positive for women and negative for men. Having a college degree has a negative effect of 2.86% for women and a positive effect of 2.85% for men. While Greenstein used the number of years of education, we had a dummy variable taking the value of 1 if the person graduated from college. The marginal effect of education on how sensitive to fairness people are must be too small from year to year to be detected. The size of the household has a positive effect for women and negative for men. We can't conclude that it has a non-linear effect.

Two major differences came up with our estimation. First, the coefficients for gender ideology are far from having a significantly different from zero effect for both men and women. This raised some doubts about the method used to create it. Our index includes 5 items instead of 6, but the questions are very similar. The means are also close to what Greenstein reported in his paper. Our results are robust to this change in the gender ideology index specification. Another parameter that did not come up significant is the number of hours the person works. While literature usually finds a negative effect, here we can't conclude anything.

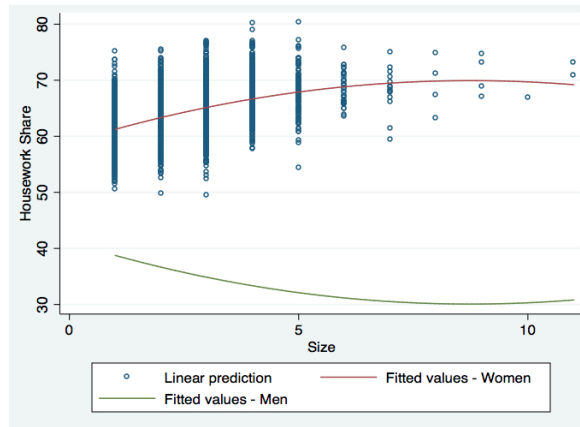
In the second columns in tables 7 and 8 we add the partner's gender ideology as an independent variable. First, we want to know if the curvature of the relation between dependency and housework share is robust to this inclusion. It would be possible that women who are relatively more independent end up with men who have a very strong gender ideology, vice versa. Also, ignoring the curvature of the mentioned relation, it is plausible that what affects the felt need to gender display

or neutralize gender deviance is not only our idea of our role and responsibilities attached to the gender we associate our self with, but also the need to comfort our partner given his or her gender ideology.

As tables 7 and 8 report, the inclusion of the partner's gender ideology increases the proportion of the variance in housework share explained by the model. With means of 100, a marginal score in person's own gender ideology increases its expected housework share by 0.06% for women and decreases it by 0.10% for men. When our partner's gender ideology increases by one unit, the housework share increases by 0.1% for women and decreases by 0.07% for men. We can't conclude that the effect of the person's ideology and the partner's ideology have effects of different level on the person's housework share. We point out that the curvature found in the relation between one's dependency and housework share is robust to these inclusions. In this specification, the size of the household appears to have a non-linear effect for both men and women.

Figure 9 plots the predicted housework shares against the size of the household excluding the couple. Additional people are women's job to take over, but when we compare with the relation between the amount of housework she does and the size of the household which shows a less pronounced non-linear effect, we see that the decreasing marginal share for women is the result of a take over of some housework by the men when the size increases.

Figure 9: Fitted values - Women’s Housework Share & Size of the Household



Inclusion in the second model has no effect on the interaction between the person’s ideology and the quadratic term for dependency. In the third model, we keep both person’s and partner’s gender ideology index and replace the interaction between the person’s own gender ideology and quadratic term by the partner’s gender ideology and quadratic term. The idea is that it is possible that the need to neutralize gender deviance happens earlier not because of the person’s ideology but because of their partner’s ideology. This inclusion had no effect on the explanatory power of the model and did not appear to have a significant effect on the housework division process.

Through those specifications, the person’s work time variable never appeared to have an effect of the expected housework share. Similar to what we did with the gender ideology index earlier, we add the partner’s labor market hours performed as well. We think that this variable is central in models where the effect of gender ideology on division of labor is estimated. Only including the persons’ hours of work captures their availability, but in a couple, decisions are likely to be taken given the relative time-availability. Otherwise, the effect obtained for dependency is for different level of income and hours of work for the partner. Omitting this variable is only valid if we assume that the relative value of working is not important in the decisions process. Given that we had no reliable information on

wages, the inclusion of some measure of both relative earnings and relative time-availability is central if we want to compare our empirical results to discuss their effect related to Beckerian theory.

In the last specification, we included the partner's hours of market work and kept the interaction of ideology with the squared dependency out, which does not change the following results. According to our results, if the woman work one more hour outside the home, it decreases her share of housework performed by 0.1% and increases her partner's share by the same amount. When the man works an additional hour, it increases his partner's share by 0.06% and decreases his own share by the same amount. We reject the null hypothesis that the effect of work is the same for men and women and conclude that the effect of women's hours of work as a larger effect of how the couple divide labor. Our preferred specification is therefore the fourth one since it is consistent with findings in the literature, and includes two additional explanatory variables that appears to be relevant in the decision process we are trying to explain here. Once we add the partner's work time as well, the quadratic term remains significant but only a a 10% level.

Our estimate for the relation between dependency and housework sharing is significantly non-linear. For women, the relation becomes positive around the point where they earn about 65% of the couple's income. The effect of the size obtained is consistent with literature findings¹³ The effect of the logarithm of the couple's income had no significant effect in the end. Gender ideologies and outside work time are all significantly different from zero with expected signs. The significant effects of living in a metropolitan area and living in the south are robust to our different specifications.

¹³Although Greenstein could not confirm this effect, our results are consistent with Kamo's (1991) suggestion.

Table 7: Regression Results for Women (SUR)

	(1)	(2)	(3)	(4)
Women's Share of Housework				
Dependency	-3.978***	-2.964***	-2.964***	-1.838**
Dependency ²	4.185**	3.607**	3.655**	2.521*
Age	0.0323***	0.0163*	0.0163*	0.00401
African American	-2.471**	-2.168*	-2.168*	-2.279**
Hispanic	-0.00380	-0.0406	-0.0404	0.123
College Degree	-2.866***	-2.214***	-2.214***	-2.450***
Size	2.275***	2.330***	2.330***	2.098***
Size ²	-0.135	-0.165**	-0.165**	-0.142*
Ln(Couple's income)	-1.292**	-1.040*	-1.039*	-0.844
Market Work - Self	-0.00175	-0.00103	-0.000983	-0.107***
Market Work - Partner				0.0608***
Ideology - Self	0.00179	0.0696***	0.0698***	0.0661***
Idelology - Partner		0.103***	0.102***	0.0994***
In Metropolitan Area	-2.893***	-2.755***	-2.755***	-2.708***
Northeast	-0.262	-0.259	-0.259	-0.402
South	2.238***	1.948**	1.947**	2.105***
Midwest	1.018	0.937	0.937	0.839
Ideology - Self X Dependency ²	0.00160	0.00105		0.000264
Ideology - Partner X Dependency ²			0.000600	
Constant	72.78***	53.75***	53.74***	54.69***
Observations	2617	2617	2617	2617
R ²	0.0877	0.1001	0.1001	0.1102

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Regression Results for Men (SUR)

	(1)	(2)	(3)	(4)
Men's Share of Housework				
Dependency	-3.983***	-2.970***	-2.971***	-1.838**
Dependency ²	-4.248**	-3.646**	-3.620**	-2.535*
Age	-0.0306***	-0.0153*	-0.0154*	-0.00361
African American	2.469**	2.168*	2.167*	2.278**
Hispanic	0.0196	0.0458	0.0461	-0.122
College Degree	2.850***	2.205***	2.205***	2.449***
Size	-2.283***	-2.335***	-2.334***	-2.099***
Size ²	0.136	0.166**	0.166**	0.142*
Ln(Couple's income)	1.304**	1.043*	1.044*	0.843
Market Work - Self	-0.000958	-0.000413	-0.000471	-0.0609***
Market Work - Partner				0.107***
Ideology - Self	-0.00242	-0.102***	-0.103***	-0.0993***
Ideology - Partner		-0.0701***	-0.0698***	-0.0662***
In Metropolitan Area	2.884***	2.752***	2.752***	2.708***
Northeast	0.256	0.255	0.254	0.401
South	-2.233***	-1.945**	-1.945**	-2.105***
Midwest	-1.032	-0.946	-0.947	-0.841
Ideology - Self X Dependency ²	-0.00125	-0.000786		
Ideology - Partner X Dependency ²			-0.00103	
Constant	27.30***	46.30***	46.29***	45.32***
Observation	2617	2617	2617	2617
R ²	0.0839	0.0999	0.0999	0.1102

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Discussion

In this paper, we first exposed the puzzle that represents the observed division of labor in empirical research. Our analysis was mainly based on Greenstein (2000) who argued that both men and women change their behavior once they deviate from the gender norm. We had three objectives related to his work. We used the second wave of the National Survey of Families and Household to see if the results Greenstein (2000) had in the first wave were similar to the ones we obtained in the second wave. We confirmed that the relative income had a non-linear effect on the division of housework, and that this non-linearity was found for both men and women. The effects found are close to the work we based our estimations on. We could not reject the null hypothesis that the gender ideology of one person had an effect on the level of dependency at which he or she starts changing his or her behavior regarding housework division. Similarly, we could not conclude that the partner's gender ideology had an effect on gender neutralization behaviors.

Two main results from this paper stand out and contribute to the existing literature. First, we showed that the partner's gender ideology is determinant in a person's housework share performed. If we argue that people are using gender display to neutralize a non normative gender role, we must also control for the partner's gender ideology since gender displaying is not likely to be a process we enter in to ensure ourselves only, but also something we do to neutralize the deviance in the eyes of our partner. The second important result is that our estimates show that the partner's work time is also relevant in the decision making process. Given that the robustness of the quadratic term seemed sensitive to this inclusion, we would like to see in further empirical research if the non-linear effect is robust to the addition of reliable wages variables in the model. Also, a measure of appreciation of their job could be included to test whether the relative appreciation of our work enters the bargaining process in couples. Furthermore, it is possible that a selection bias drives our observations. For example, energetic women could work

more, earn more and perform more housework while energetic men only earn more and work more hours¹⁴. An other limit is that most of the work done on this topic does not include childcare in the housework measure. Someone who stays home to provide childcare is likely to do more cooking, cleaning and other related chores.

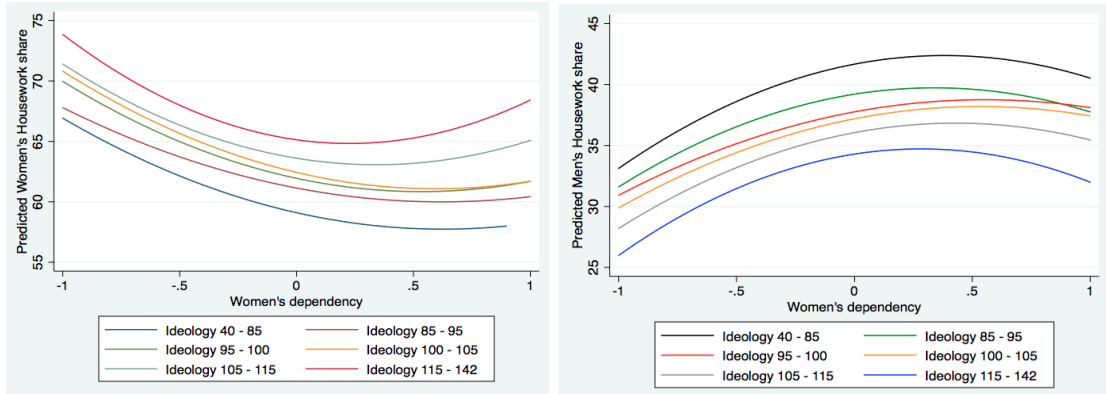
One important remark is on the conclusion that both men and women do gender neutralization¹⁵. As you may have noticed, the parameters are very similar for men and women and only vary in terms of sign for most of them. Since we have a share of total housework, if the quadratic term appears significant in women's regression, it is likely to appear significant as well in men's one. Remember that Brines (1994), after estimating similar models using housework time (not the share) as a dependent variable, only had a statistically significant quadratic term for men. Therefore, she concluded that women "behaving like men" don't feel the need to gender display, but men who are not the major breadwinners, reduce their housework to neutralize the gender deviant situation they are in. Greenstein (2000) argued that the problem was that Brines did not look at distributional measure of housework. He used it in his model and saw that the quadratic term was statistically significant for both. He concluded that both behaviors were consistent with gender display model. Is this effect only the result of a high gender display done by men, that affect women's share?

Our conclusion is that gender ideology does not affect the point at which the non-linearity between the share of housework and dependency, it rather affects the level of housework performed by women and men among every level of dependency. Figure 10 (left) shows the predicted relation between women's share of housework and their dependency for different level of women's gender

¹⁴This hypothesis is related with Gupta (2007) and Gupta and Ask (2008) conclusions that the non-linearity might be driven by differences in preferences between men and women.

¹⁵This is Greenstein's (2000) conclusion.

Figure 10: Share of housework performed and wife’s economic dependency, by gender and level of gender ideology



ideology. Figure 10 (right) shows the predicted relation between men’s share of housework and women’s dependency for different level of men’s gender ideology. While Greenstein (2000) was testing whether the dependency level at which the curvature happens depends on the gender ideology, it appears that gender ideology has a fixed effect rather than a variable one. We therefore conclude that gender display is something that stands apart from gender ideology. In future research, it would be useful to understand what causes gender display by understanding what could possibly drive the curvature to happen at a different level of dependency.

An other important thing to note when looking at the effect of gender ideology is not only how it affects our behavior today, but how it came up to us. As West and Zimmerman (1987) pointed out, the notion of gender as a role society gives us makes it hard to understand how our everyday activities create our notion of gender. In our model, we observe how people allocate their time given their gender and the role they associate with. At day x , they fulfill their gender role according to their knowledge of it and their desire to do so. We are far from understanding the causal effects since gender ideology and gender display are two separate things where the same level of ideology does not guarantee a similar desire to gender display.

Further research on the development of gender ideology would be useful to really understand the gender displaying process and motivation. This could link the effect of exposure to gender display on gender ideology. Recently, many young fashion and music stars came out saying they do not identify to any gender category. The LGBT community gained a lot of attention and consideration. People are getting more aware of subtle sexist attitudes. It would be interesting to see how these changes in social attitudes will be reflected in time use allocation in couples in the future.

One other thing that remains unexplained is what influences the point at which the relation between dependency and housework share changes sign. We and other authors argue that gender display causes it without having the parameter for the interaction between the quadratic term and gender ideology significantly different from zero. It would be useful to investigate on more reliable alternative to measure one's gender ideology.

Bibliography

References

- [1] Aguiar, Mark, and Erik Hurst, *Measuring Trends in Leisure: The Allocation of Time Over Five Decades*, Quarterly Journal of Economics, 122 (2007), 969–1006.
- [2] Akerlof, George A., and Rachel E. Kranton, *Economics and Identity*, Quarterly Journal of Economics, 115 (2000), 715–753.
- [3] Becker, Gary S., *A Theory of Marriage: Part I*, Journal of Political Economy, Vol. 81, No. 4 (Jul. - Aug., 1973), 813-846
- [4] Becker, Gary S., *Treatise on the Family*, Cambridge: Harvard University Press, 1981; Enlarged edition, 1991.
- [5] Bertrand, M., Emir Kamenica, Jessica Pan, *Gender Identity and Relative income Within Households*, The Quarterly Journal of Economics, (130) 2, (2015), 571–614
- [6] Bittman, Michael, Paula England, Liana Sayer, Nancy Folbre, and George Matheson, *When Does Gender Trump Money? Bargaining and Time in Household Work*, American Journal of Sociology, 109 (2003), 186–214.
- [7] Brines, J., *Economic dependency, gender, and the division of labor at home*, American Journal of Sociology, 100 (1994), 652–688.
- [8] David, S. M., *Effects of Union Type on Division of Household Labor : Do Co-habiting Men Really Perform More Housework?*, Journal of Family Issues, Vol.28, No. 9, (2007), 1246–1272
- [9] Fernandez, C., Sevilla-Sanz, A., *Social Norms and Household Time Allocation*, University of Oxford, Department of Economics, Discussion paper series, No. 291, October 2006, 1–34.

- [10] Greenstein, Theodore, *Economic Dependence, Gender, and the Division of Labor in the Home: A Replication and Extension*, *Journal of Marriage and Family*, 62 (2000), 322–335.
- [11] Gupta, Sanjiv, *Autonomy, Dependence, or Display*, *Journal of Marriage and Family*, 69 (2007), 399–417.
- [12] Gupta, Sanjiv, and Michael Ash, *Whose Money, Whose Time? A Non-parametric Approach to Modeling Time Spent on Housework in the United States*, *Feminist Economics*, 14 (2008), 93–120.
- [13] Hochschild, A., and Machung, A., *The second shift*, New York: Viking., (1989)
- [14] Kamo, Y., *A nonlinear effect of the number of children on the division of household labor*, *Sociological Perspectives*, 34 (1989), 205–218.
- [15] Parkman, A. M., *Bargaining Over Housework: The Frustrating Situation of Secondary Wage Earners*, *The American Journal of Economics and Sociology*, Vol. 63, No. 4 (October, 2004), 765–794.
- [16] West, C., and Zimmerman, D. H., *Doing Gender*, *Gender and Society*, 1 (1987), 125–151.