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There is a growing body of studies in economics on the causes and consequences of the gender wage gap. One of the key research questions in this literature is what contributes to the stagnant growth in female's wage rates in the U.S. since the mid-1990s (Blau and Kahn, 2006), despite the continuous improvement in women's rights, qualifications, and the demand for women in the workplace over the same period (Black and Juhn, 2000; Goldin and Katz, 2002; Goldin, Katz and Kuziemko, 2006).

There are potentially many explanations for the persistent gender wage gap, including gender differences in occupations and industries, as well as the likelihood that many equally qualified women are still treated unfairly by their co-workers and employers (see, e.g., Blau and Kahn, 2017).

While traditionally discrimination has been one of the main explanations for the gender pay gap that cannot be explained by gender differences in occupation and industries, recent papers have discussed gender differences in preferences as an alternative explanation, including the fact that women appear to gain less from negotiation or have lower preferences than men for risk and competition (see Gazmat and Petrongolo, 2014 for a summary).[1] Another stream of research has emphasized long hours of work and inflexible working conditions as important drivers of the persistent gender gap (Goldin, 2014). Given their dual roles both at home and in the labor market, women tend to place high values in temporal flexibility. Yet in many occupations, returns to working longer hours have significantly increased, and this may work to the disadvantage of women (Gicheva, 2013; Cha and Weeden, 2014; Cortes and Tessada, 2011; Cortes and Pan, 2013, 2017).

[1] See also Gneezy, Niederle and Rustichini, 2003; Niederle and Vesterlund, 2007; Bosquet, Combes and Garcia-Peñalosa, 2017.

A third possibility is that many women prefer not to go against certain gender-specific behavioral prescriptions – more specifically, that "a woman should not earn more than her husband" – and are therefore more likely to opt-out from the labor market altogether when their earning potential exceeds that of their husbands', either that or find a job that earns less than their potential if they decide to work (Akerlof and Kranton, 2000; Fortin, 2005, 2015; Bertrand, Kamenica, and Pan, 2015).

Using the American Time Use Survey (ATUS) in 2012-2013, the British Household Panel Survey (BHPS) and the German Socio-Economic Panel (SOEP), our latest study (Fleche, Lepinteur and Powdthavee, 2016) shows that women's propensity to opt-out of the labor force is significantly higher in couples where the wife's working hours exceed the husband's. We present evidence that this aversion to a situation where women work significantly longer hours than their husbands comes as an addition to the fact that they have preferences for not wanting to out-earn their husbands (Bertrand, Kamenica, and Pan, 2015).

Consistent with this finding, we also show that women report, on average, significantly lower life satisfaction from working relatively longer hours than their husbands. By contrast, husbands do not seem to be affected by being in a relationship where women work more hours or earn more than they do. We argue that these patterns are best explained by *perceived fairness of the division of labor* within the household, and complement the gender identity norms hypothesis.[2]

In this paper, we extend from our previous study to include an analysis on the Panel Study of Income Dynamics (PSID) in 2015-2016. In particular, we first attempt to replicate the ATUS's findings using the PSID Well-being and Daily Life Supplement. Next, we provide additional evidence that the allocation of household tasks within the household significantly explains why women suffer more than men from working relatively longer hours. We also test whether providing women with substitutes for household production and childcare services helps alleviate this women's welfare loss. To the extent that women's satisfaction is responsive to the availability of housekeeping or childcare services, this could

[2] The perception of fairness concerning the division of labor within household has been well-studied in sociology. Several theories have been proposed to explain this perception and how it relates to the inequality of the household division of labor. They suggest that economic resources, the balance of available time and gender role values influence whether men and women perceive the division of work as fair or not and their marital satisfaction. One implication of this is that in more egalitarian couples and in couples where women spend more time in the labor market, women are more likely to consider doing a larger share of housework to be unfair (Jansen et al, 2016). In our study, we analyze how the perception of fairness regarding the division of labor within the household affects gender differences in labor market outcomes.

support the idea that deviating from prescribed gender roles do not fully account for women's aversion to a situation where they work more than their husbands.

I. Data

The main data source used for this analysis is the PSID Well-being and Daily Life Supplement (2015-2016), a supplement to the PSID, which is a longitudinal study of a nationally representative sample of U.S. families. The PSID-WB questionnaire was designed as a relatively brief (20-30 minutes) self-administered instrument that could be completed via the internet or paper. The questionnaire collects information on life satisfaction, satisfaction with different parts of life including family and relationship, as well as questions on activities and experienced well-being. To be eligible for the Well-being and Daily Life Supplement, individuals were required to have been a household head or spouse/partner in the 2015 Main PSID. Each spouse/partner within PSID families have been invited to answer the questionnaire. The final release data are available through the Online Data Center.[3]

We focus our attention to all married couples where both the wife and the husband are above 18 years of age and for whom we have life satisfaction information. This produces 5,868 individuals in total. Of those, 2,974 are women and 2,894 are men. 28% of the couples have wives who work longer hours than their husbands.

To examine the welfare patterns of married U.S. couples in which wives work more than their husbands, we estimate the following equation using OLS:

$$\begin{aligned} WB_{i,t} = {} & \alpha_1 EarnMoreThanPartner_{i,t-2} \\ & + \alpha_2 WorkMoreThanPartner_{i,t-2} \\ & + \beta' X_{i,t-2} + \phi_s + u_{i,t} \end{aligned}$$

where $WB_{i,t}$ measures the wife or husband's life satisfaction. $EarnMoreThanPartner_{i,t-2}$ is an indicator variable that equals 1 if the share of the household income earned by the respondent is greater than ½ at time *t-2*. $WorkMoreThanPartner_{i,t-2}$ is an indicator variable that equals 1 if the respondent works longer hours than the partner. All the regressions also include a vector of socio-economic controls at time *t-2*, $X_{i,t-2}$, including the log of wife's working hours, the log of husband's working hours, the log of the wife's income, the log of husband's income, the share of wife's income, the share

[3] https://simba.isr.umich.edu/Zips/ZipMain.aspx

of wife's working hours, a cubic in wife's and husbands' income, an indicator whether only the wife is working, an indicator whether only the husband is working, a quadratic in wife's and husband's age, the number of children in the household, wife's or husband's education and state fixed effects, ϕs.[4] All variables measured in *t-2* are obtained from the 2013 main PSID dataset.

II. Results

Baseline Specification – Table 1 reports OLS regressions with either wife's or husband's life satisfaction in *t* as the dependent variable. Looking across the columns, we see that, conditioning for own and partner's incomes and working hours, out-earning partner in *t-2* does not predict higher levels of life satisfaction for either men or women in *t*. By contrast, working relatively longer hours than partner in *t-2* strongly predicts lower life satisfaction scores for women and not for men, *ceteris paribus*. This is consistent with our earlier findings using the ATUS (Fleche, Lepinteur, and Powdthavee, 2016).

Relative Working Hours and Home Production – What explains why the relative working hour effect is only negative and statistically significant for females but not males? A Beckerian model would predict that husbands whose wives work relatively longer hours than they do will step up and increase the number of hours they spend doing household chores (Becker, 1973). If this is the case, then the negative effect of working longer hours than the partner for women could be explained by their feelings of guilt from having violated one of the traditional gender identity norms (e.g., "women should stay at home and take

TABLE 1 – LIFE SATISFACTION AND RELATIVE WORKING HOURS AMONG COUPLES (OLS), PSID 2015-2016

	(1) *Wife's life sat.*	(2) *Wife's life sat.*	(3) *Husband's life sat.*	(4) *Husband's life sat.*
EarnMoreThan Partner in t-2	0.006 (0.059)	0.016 (0.059)	0.041 (0.043)	0.049 (0.049)
WorkMoreThan Partner in t-2	-0.136 (0.042) [a]	-0.103 (0.050) [b]	0.072 (0.042) [c]	0.078 (0.044) [c]
Obs.	2,974	2,974	2,894	2,894
R^2	0.047	0.063	0.039	0.052
lnOwnIncome	Yes	Yes	Yes	Yes
lnPartnerIncome	No	Yes	No	Yes
lnOwnworkhrs	Yes	Yes	Yes	Yes
lnPartnerworkhrs	No	Yes	No	Yes
CubicIncome	No	Yes	No	Yes
Relativeincome	Yes	Yes	Yes	Yes
RelativeWorking	Yes	Yes	Yes	Yes
Childrencontrols	Yes	Yes	Yes	Yes

Notes: The data are from the PSID, 2015-2016. *EarnMoreThanPartner in t-2* is an indicator variable that equals 1 if *Relativeincome* >0.5 at time *t-2*. *WorkMoreThanPartner* in *t-2* is an indicator variable that equals 1 if *relativeWorking*>0.5 at time *t-2*. *Relativeincome* is the share of the household income earned by the respondent. *WorkMoreThanPartner* in *t* is an indicator variable that equals 1 if *relativeWorking*>0.5 at time *t*. *RelativeWorking* is the share of the household working hours worked by the respondent. *lnOwnIncome* is the log of the respondent's labor market earnings; *lnPartnerIncome* is the log of the partner's labor market earnings. *lnOwnworkhrs* is the log of the respondent's annual working hours; *lnPartnerworkhrs* is the log of the partner's annual working hours. "Children controls" include the number of children in the household. All regressions also include respondent's age, respondent's education dummies, and state fixed effects. *Life satisfaction* ranges from 1 to 5. a, b, c significant at 1, 5 and 10 percent levels respectively.

[4] We closely follow Bertrand et al. (2015)'s specification. Note also that the results can be replicated using ordered probit model.

care of the family"). On the other hand, studies in sociology have found evidence that men who earn less than their wives are likely to carry out more housework than other men, although women in these partnerships still do more housework than their husbands (see, e.g., Lyonette and Crompton, 2015). What this implies is that women can be concerned for the fairness of the allocation of tasks within the household. If this is the case, then the negative effect of working longer hours than the partner for women could be explained by their feelings of dissatisfaction with their husbands being unhelpful at home rather than by their feelings of guilt for violating the gender identity norms.

To test this hypothesis, we re-estimate Table 1's specification five more times for women, but allowing relative working hours to be interacted each time with different time-use variables in *t-2*.

Table 2 suggests that the evidence of women's dissatisfaction in Table 1 may have been primarily driven by the lack of substitution in household production rather than concerns for not wanting to violate the gender norm. For instance, women's dissatisfaction from working longer hours than their husband is significantly alleviated by an increase in husband's time spent doing household tasks; the interaction coefficient between "*worked longer hours than spouse in t-2*" and "*log of husband's household tasks in t-2*" is 0.072 and a robust standard error of 0.036.

TABLE 2 – **LIFE SATISFACTION, RELATIVE WORKING HOURS AND DIVISION OF HOUSEHOLD WORK WITHIN HOUSEHOLDS (OLS): PSID 2015-2016**

Dependent variable: *Wife's life satisfaction*	*Worked more than partner in t-2*			
	Coeff.	S.E.	Obs.	R^2
Specification:				
(1) Interacted with *ln (WifeHousehold Tasks)*	-0.028	(0.048)	2,974	0.064
(2) Interacted with *ln (HusbandHouseholdTasks)*	0.072	(0.036) [b]	2,974	0.064
(3) Interacted with *GapHouseholdTasks*	-0.068	(0.032) [b]	2,974	0.065
(4) Interacted with *GapHousekeepingTasks*	-0.034	(0.016) [b]	2,974	0.067
(5) Interacted with *WifeChildcare*	-0.037	(0.075)	2,974	0.063

Notes: The data are from the PSID, 2015-2016. All regressions include *WorkMoreThanPartner* in *t-2*, *EarnMoreThanPartner* in *t-2*, the log of the wife's income, the log of husband's income, the log of the wife's annual working hours, the log of the husband's annual working hours, a cubic in wife's income a cubic in husband's income, the share of wife's income, the share of wife's working hours, an indicator whether only the wife is working, an indicator whether only the husband is working, a quadratic in wife's and husband's age, wife's education dummies, children controls and state fixed effects. l*nWifeHouseholdTasks* is the log of wife's time spent doing household tasks. *lnHusbandHouseholdTasks* is the log of husband's time spent doing household tasks. *GapHouseholdTasks* is the difference between the wife's and husband's time spent doing household tasks. *GapHousekeepingTasks* is the difference between the number of housekeeping tasks done by the wife and the husband. Housekeeping tasks include cooking, cleaning the kitchen, doing the laundry, cleaning the house, shopping and paying bills. *WifeChildcare* is a dummy equal to 1 if wife spends time doing childcare. "Coeff" displays the coefficient associated with the interaction term between *WorkMoreThanPartner* in *t-2* and the variable mentioned in the first column (e.g. *ln (WifeHousehold Tasks)).* a, b, c significant at 1, 5 and 10 percent levels respectively.

Table 2 also provides evidence that women whose husbands spent relatively less time doing household chores may have suffered more from working longer hours than comparative women whose husbands "stepped up" and compensated them for spending relatively longer time in the labor market; the interaction coefficient between "*worked longer*

hours than spouse in t-2" and "*gap in household tasks in t-2*" is -0.068 and a robust standard error of 0.032.

As a robustness check, we provide further evidence in the online Appendix that, *ceteris paribus*, women who work relative longer hours than their husbands are significantly less satisfied with relationship and with family life, more likely to feel frustrated and feel stressed. Relative income, on the other hand, is not significantly correlated with any of these women's outcomes when relative working hours within household is controlled for in the regression.

III. Discussions

The new PSID estimates provide corroborative evidence to Fleche, Lepinteur, and Powdthavee (2016) in that women in more egalitarian couples may care more about what is considered as a fair division of household tasks than whether or not their actions are deeming to be violating the traditional gender identity norm.

Provided that the women's disutility from working longer hours than their husbands may have been generated primarily by the unfair allocation of household tasks, one policy implication might be to provide some subsidies for housekeeping and/or childcare tasks to help women whose working hours potential exceeds that of their husbands'. This idea is consistent with Table 3, in which we show that the negative effect of working relatively longer hours than spouse on women's life satisfaction is significantly reduced in U.S. states where the share of the labor force in housekeeping jobs is high. The results are not significant for substitutes in childcare services.

TABLE 3 – LIFE SATISFACTION, RELATIVE WORKING HOURS AND POLICY IMPLICATIONS (OLS): PSID 2015-2016

	(1) *Wife's life sat.*	(2) *Wife's life sat.*	(3) *Wife's life sat.*	(4) *Wife's life sat.*
*WorkMoreThanPartner in t-2*Share of LF in housekeeping jobs in t-2*	0.038 (0.012)[a]	0.036 (0.012)[a]		
*WorkMoreThanPartner in t-2*Share of LF in childcare SS in t-2*			0.001 (0.008)	0.000 (0.008)
WorkMoreThanPartner in t-2	-0.479 (0.116)[a]	-0.418 (0.128)[a]	-0.157 (0.075)[b]	-0.110 (0.080)
Obs.	2,974	2,974	2,974	2,974
R^2	0.039	0.058	0.038	0.058
Additional controls:				
lnWifeIncome	Yes	Yes	Yes	Yes
lnHusbandIncome	No	Yes	No	Yes
lnWifeworkhrs	Yes	Yes	Yes	Yes
lnHusbandworkhrs	No	Yes	No	Yes
CubicIncome	No	Yes	No	Yes
RelativeIncome	Yes	Yes	Yes	Yes
RelativeWorking	Yes	Yes	Yes	Yes
Children controls	Yes	Yes	Yes	Yes

Notes: The data are from the PSID, 2015-2016. All regressions include *EarnMoreThanPartner* in *t-2*, the log of the wife's income, the log of the wife's annual working hours, the share of wife's income, the share of wife's working hours, wife's age, wife's education dummies, children controls and state fixed effects. Columns (2) and (4) also include the log of husband's income, the log of husband's working hours, a cubic in wife's income, a cubic in husband's income, an indicator whether only the wife is working, an indicator whether only the husband is working, and a quadratic in wife's and husband's age. *Share of LF in housekeeping jobs* and *Share of LF in childcare SS* (per thousand jobs) are obtained from the American Community Survey (2013). They measure the share of labor force in housekeeping jobs and in childcare services per state in *t-2*. a, b, c significant at 1, 5 and 10 percent levels respectively.

The intuition behind our empirical strategy is the following: states that have greater availability of market substitutes for household

production enable women who works longer hours to decrease their number of hours spent in household tasks (Cortes and Tessada, 2011; Cortes and Pan, 2017). We provide evidence in the Online Appendix that women's time spent doing household tasks do indeed respond to the share of labor force in housekeeping jobs per state in couples where the wife's working hours exceed the husband's.

Another possible solution, which is likely to be less costly but much harder to implement than subsidization for housekeeping, is to socially encourage men whose wives' working hours potential exceeds theirs to be significantly more active in carrying out household tasks. In other words, it may not be so much up to women who need to alter their perspectives towards women working, but rather men who do.

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