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Keywords: marriage, daughter-in-law, time use, kinship roles, division of labor, India

JEL Code: D13, J12, J22, O15, Z13

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"Kinship relations-particularly those of sister and wife-are relations of production, hence, relations of power."

—- Sacks and Brodkin (1979)

1   Introduction

In the last few decades, India has experienced rapid economic growth. But despite the increasing income levels, declining fertility rates and a rise in women's education and age at marriage; female participation in the labor force and paid work has remained low (Klasen and Pieters, 2015). Moreover, the gender gap in paid market work has widened over time owing to a secular decline in the participation of married women in the workforce. Multiple explanations for this worrying trend have been on offer but the consensus leans towards the argument that this decline is driven by the withdrawal of married women from paid work and reallocation of their time to household activities and caregiving of children (Rangarajan et al., 2011; Kannan and Raveendran, 2012; Afridi et al., 2018).

The phenomenon of low participation of women in the labor force is not new to India or South Asia. Cross-country studies show that the female labor force participation rate exhibits a U-shaped relation with economic development (Çağatay and Özler, 1995; Goldin, 1994; Pampel and Tanaka, 1986; Tam, 2011). Goldin (1994), in her seminal work, finds a U-shaped relation between the labor force participation of married women and economic development in advanced economies. She argues that at low levels of economic development, women go out for paid work out of necessity

and for subsistence. But with economic growth, women withdraw from the labor force partly due to strong income effect owing to an increase in household income and partly due to a decrease in the demand for female labor. This is further reinforced by the social stigma attached to married women working in blue-collar jobs with men in the manufacturing sector. This pattern reverses only with a reduction in fertility, increase in women's educational attainment, and the availability of socially acceptable white-collar jobs.

In this paper, we use nationally representative employment and unemployment and time use surveys of individuals to study the time allocation of women in India. We particularly focus on women's time use in home production as it is not clear whether their withdrawal from the labor force is necessarily leading to more time for learning and leisure (Eswaran et al., 2013). Some indications that women may be devoting greater time to domestic activities are found in the literature. While examining the labor force participation of married Indian women over time, Afridi et al. (2018) find that increasing women's education has led to greater returns to home production relative to market work and partially contributes to this withdrawal from the workforce.

Economic theory itself argues for a strong division of labor by gender and age within the household based on differences in investment in human capital and comparative advantage in different activities (Becker, 1981). If women have a comparative advantage in domestic activity and men in market activity, then women would specialize in home production and men would specialize in market production (Becker, 1981). Differences in labor market participation and time use may still exist between members of the same gender with comparable age profiles and educational attainment. This

leads to alternative explanations that emphasize the role of customs and social norms and propose that an individual's activities are allocated following a social structure based on sex and status (Castle, 1993; Fafchamps and Quisumbing, 2003). Fafchamps and Quisumbing (2003) find that in rural Pakistani households, the gender-based division of labor cannot be completely explained by systematic differences in comparative advantage or preferences and that social and kinship roles play an important role in determining who does what. Fafchamps and Quisumbing (2003) go on to observe that these households follow strict hierarchies in the division of work among the members and that the "daughter-in-law works systematically harder compared to the daughters of comparable age, height and education".

Indian families, especially in rural areas, generally comprise of all the household members living together under one roof. Even if they don't live under one roof, family ties are strong and relational hierarchy plays a major role in determining the time use of men and women in the family (Srinivas, 1977). The responsibility of home production may not be equally shared by all the female members of the household. This is because the intrahousehold status of women may be defined by the rank and status attached to their kinship role (Cain et al., 1979). This paper builds on this idea. We acknowledge that the women in our dataset are part of households with a strong relational hierarchy and that marriage shifts a woman from her natal family to being part of her husband's household. As Cain et al. (1979) state "the custom of patrilocal marriage removes a newly married woman from her family of birth and places her in her husband's locality". This implies that, in terms of the family relational structure, a woman's status changes from the daughter of the household to the daughter-in-law of another household. We posit that this change in social role and the norms attached to

these roles itself has consequences for the time use of the married women in comparison to the unmarried women of the household.

There are at least two channels via which the unmarried daughter may have greater leverage than the daughter-in-law. The first is due to the nature of marriage in patriarchy under which girls are married off at a younger age into households headed by their husband's father. A married woman, therefore, has an indirect link with her husband's household and may enjoy less privilege and power in comparison to the unmarried daughters or sisters who are more directly related to the head and the husband (Hendrix and Hossain, 1988). The second channel which reinforces the first is that the daughter-in-law would be subordinate to more senior women of the household, especially their mother-in-law (Kandiyoti, 1988). Evidence from anthropological and sociological studies shows that in South Asian countries, older women are responsible for assigning tasks to younger women of the household (Cain et al., 1979). They may give greater independence to unmarried daughters as "there is a strong awareness that the daughter's stay in the *maita*[1] is transient and that their existence is peripheral to that of their natal patriline" (Bennett, 1983). The daughter-in-law's position is more of an outsider. As Bennett (1983) states "the daughter-in-law is an affine who is somehow dangerous to the central patrifocal value of agnatic solidarity". Bennett (1983) in her study of rural Nepali households documents that this results in the daughters-in-law doing work much harder than the unmarried daughters of the family.

The discussion in the previous paragraphs not only provides the conceptual motivation for this paper but also outlines our empirical strategy. Using a household fixed effects strategy, we compare the participation and time use in different activities

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[1]Means natal home of the married women in the local language.

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for married and unmarried women between the ages of 15 to 60 years within a given household. In terms of the family structure, the women in our sample can be categorized into unmarried daughters, daughters-in-law and mother-in-law (head's wife) of the household.[2] Since the mother-in-law is generally much older than other female members, we limit our comparison to the unmarried daughters and the daughters-in-law. Therefore our comparison group for married women within the household is the unmarried daughter of comparable age and educational qualifications. In the presence of other females of similar age and education level in the household who can take care of the children and other domestic chores, it's not obvious why the married woman or the daughter-in-law would not participate in the labor market. Our hypothesis is that conditional on age, educational attainment and other observable characteristics, the differences in time devoted to domestic activities and caregiving of these women are due to the difference in their status and hierarchy in the household.

To test this hypothesis, we specifically select joint families where the household head, head's wife, unmarried and married sons, and both the unmarried daughters and the daughters-in-law are staying together. We first show that the probability of daughters-in-law engaging in paid employment is lower, while the probability of being involved in domestic work is much higher, compared to the unmarried daughters of the same household. Next, we use the time use survey to investigate how the daughters-in-law are allocating their time in different home production activities. We find that compared to daughters, daughters-in-law spend 245 minutes per day more in home production activities, which includes domestic chores and caregiving to children

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[2]Most of the female members in our sample can be categorized into these three relations i.e., the daughters, daughters-in-law and mother-in-law (head's wife). Only very few household have other female members residing like female cousin, married daughter visiting and sister of the head of the household. We ignore these in our analysis.

and other family members. Moreover, they also spend more time in religious activities, which suggests that daughters-in-law are more involved in status production activities (Papanek, 1979; Eswaran et al., 2013). However, compared to daughters-in-law, unmarried daughters spend more time in paid employment, learning, socializing, leisure and self-care activities. In addition to this, we also explore the heterogeneity in these differences across rural, low-caste and poor households. We also conduct a placebo check where we exploit the fact that some households in our sample have multiple unmarried daughters. If our results are truly driven by differences in kinship role among these women then we should not observe any differences in time use within multiple unmarried daughters. We indeed find this to be true in our sample.

We next rule out some alternative explanations for these results. The first possibility is that any difference in time allocation that we observe among these women is due to the differences in individual characteristics like age and education qualifications. To investigate this, we allow the differences in time use between the daughter and the daughter-in-law to vary by age groups and education levels. We find that the burden of domestic chores invariably falls on the daughter-in-law of the household across all age groups and education levels. In comparison to the daughters-in-law, highly educated daughters devote less time to domestic work, socializing and leisure and spend significantly more time in learning. Unmarried daughters in higher age groups, closer to marriageable age, devote less time to learning and more time to self-care and leisure. This pattern is rather consistent with the story that as unmarried daughters come closer to the marriageable age they are given greater independence and more free time.

The second concern is that these differences in time allocation could be driven

by 'positive assortative matching' in the marriage market (Anukriti and Dasgupta, 2017; Ray et al., 2020). In Indian families, most marriages are arranged based on observed characteristics like caste, wealth, education, assets of the household, and most households prefer to marry their daughters *up* in the wealth and status ladder (Fafchamps and Quisumbing, 2005; Huang et al., 2012; Anukriti and Dasgupta, 2017; Borker et al., 2017). If this is true for households in our sample, then any difference in time allocation between daughters and daughter-in-law can be due to the selection in the marriage market. To rule this out, we match households with unmarried daughters (and no daughter-in-law) with households with daughter-in-law (and no unmarried daughter) on individual- and household-level observables and then re-estimate the difference in time use between these matched women. We find that the differences between the matched women remain statistically significant and are in line with the baseline findings. Finally, we also test for the robustness of our results to the influence of unobservables using the procedure proposed by Oster (2019).

This paper relates to the literature examining the factors influencing the labor force participation of women. The literature presents many explanations for why Indian women have been withdrawing from the labor force (Rangarajan et al., 2011; Chowdhury, 2011; Himanshu, 2011; Kannan and Raveendran, 2012; Neff et al., 2012; Kapsos et al., 2014; Chatterjee et al., 2015; Klasen and Pieters, 2015; Sorsa et al., 2015; Andrés et al., 2017; Fletcher et al., 2017; Mehrotra and Parida, 2017; Afridi et al., 2018, 2019, 2020). Is this withdrawal explained by specialization? Becker (1981) argues for welfare gains from the sexual division of labor based on comparative advantage within the household. However, the reason for this advantage can be biological or just discrimination in the labor market. Deshpande et al. (2018) show that over the ten year

period between 1999-2000 to 2009-10, the wage gap purely accountable to gender based discrimination has increased in India. Wage rates offered to women in the labor market may be lower because women spend more time in the household sector and invest more in human capital relevant to performing domestic chores and caregiving. Hence, specialized investment and time allocation could partly explain why the gender gap persists in market wages (Becker, 1981). In the context of India, the declining female labor force participation is primarily driven by married women in rural areas probably on account of rising returns to education in the marriage market (Behrman et al., 1999) and home production activities (Afridi et al., 2018, 2019). We offer an additional explanation that social norms attached to the status and hierarchies governing the members of the household also contribute to married women's withdrawal from the labor force. Our emphasis is on the role of the household as an institution, which in the Indian context, is rooted its own political system, social economy and hierarchy.

In South Asia, just the act of getting married itself may become a restriction on women's mobility and participation in the workforce (Sudarshan and Bhattacharya, 2009). Evidence from the literature points to the role of practices and social restrictions that a married woman may have to follow (Bernhardt et al., 2018; Khalil and Mookerjee, 2019; Dhanaraj and Mahambare, 2019; Jayachandran, 2020; Anukriti et al., 2020) and domestic abuse she may bear if she goes against the wishes of her husband and his family (Chowdhury, 2011; Bloch and Rao, 2002; Jayachandran, 2015). Therefore, in addition to the childcare responsibilities that a married woman may have to undertake (Rao, 2014; Khanna and Pandey, 2020), she may withdraw purely based on the change in her social role.

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Another important factor contributing to the withdrawal of married women from the labor market relates to their family's desire to gain a better status in society (Rao, 2014; Eswaran et al., 2013). Married women as members of households produce many unpaid goods and services (Papanek, 1979). This work, apart from directly contributing to other members' well-being also contributes to the family's social standing in society (Papanek, 1979). India has a long history of patrilocality as the dominant social structure (Srinivas, 1977; Khalil and Mookerjee, 2019). In patrilocal societies, high value is placed on a woman's *purity* and hence her activity and mobility are highly restricted (Srinivas, 1977; Cain et al., 1979; Papanek, 1979; Kandiyoti, 1988). In such societies, the notion of 'family reputation and status' is closely tied to the behavior of women within the family (Srinivas, 1977; Kandiyoti, 1988). Abraham (2013), for example, regards the decline in women's labor force participation in India as 'de-feminization' of the labor force. He attributes it to the existence of caste-based stigma associated with women's participation in public spaces. Eswaran et al. (2013) use caste, wealth and education as an indicator of status and demonstrate that desire for higher family status leads to a shift in women's time from market work to status production[3] activities in rural India. But all women may not be alike in terms of their status and hierarchy within the household and the responsibility of status production may itself be based on their kinship role. Our empirical strategy tries to capture this heterogeneity.

The paper is organized as follows. The next section describes the data used in

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[3]Status production activities include preparing meals and feasts; childcare; providing support to earning household members like upkeep of their work clothes, providing food at the workplace; performing rituals and attending religious ceremonies; building networks to facilitate marital arrangements (Papanek, 1979). Eswaran et al. (2013) use involvement in socializing and cultural activities as status production activities.

the analysis and summary statistics. Section 3 lays out our empirical strategy and some robustness checks. Section 4 presents the results. In the last section, we conclude.

2 Data and Descriptive Statistics

2.1 Data

We use two different nationally representative cross-sectional surveys for the analysis. In what follows we describe these datasets.

2.1.1 Periodic Labor Force Survey

Our first source of data is the Periodic Labor Force Survey (PLFS) conducted from July 2017 to June 2018 by the National Sample Survey Organization of the Government of India. It is a nationally representative which covers 102,113 households across the country. The survey is primarily conducted in each quarter of the year to capture the short-run dynamics in labor force participation in the country and provides information on individuals' employment status in formal and informal employment and involvement in other non-paid activities. Along with this, the survey also collects information on individual characteristics like age, education, marital status, as well as household characteristics like social group, religion, monthly consumption expenditure and household composition.

We measure a person's participation in any activity using the "Usual Principal Activity Status" which records information on the major activity the individual was

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involved in during the reference period of 365 days preceding the date of the survey. These categories are as follows: (1) worked in own household enterprise; (2) worked as a regular salaried employee; (3) worked as casual labor (4) engaged in domestic chores and (5) attended educational institution; during the reference period. "Worked in own household enterprise" includes all those individuals who were working in their own household enterprise as an own-account worker, employer or helper during the reference period. We consider them as 'self-employed' individuals. Individuals belonging to the category 'engaged in domestic chores' include those who attended domestic duties as well as those who were engaged in free collection of goods, tailoring, sewing, etc. for household use, during the reference period.

We consider the sample of women belonging to the age of 15-60 years. To measure a woman's participation in any particular activity, we create a dummy variable that takes the value one if a woman participates in that particular activity and zero otherwise.

2.1.2 Time Use Survey

Apart from looking at the participation in market and non-market activities from the PLFS, we also examine how females allocate their time between different paid and unpaid activities and leisure. For this, we supplement our analysis with the Time Use Survey (TUS), conducted by the National Statistical Office (NSO) during January–December 2019. Like the PLFS, the TUS is also canvassed on the entire country and is nationally representative. It collects information on the time use of individuals of at least 6 years of age, covering 138,799 households across India. It records time

spent in different activities by an individual carried out during a reference period of 24 hours, starting 4:00 AM on the day before the survey to 4:00 AM on the day of the survey. These 24 hours have been divided into 48 slots of 30 minutes each.

In the TUS, the activities reported by individuals have been classified, following the International Classification of Activities for Time Use Statistics, 2016. We consider some of these activities and classify them as follows: paid employment, domestic chores, childcare, care to others, learning, socializing, religious practices, leisure and self-care. The detailed composition of these activities is provided in Appendix table A1. We measure the average time spent by an individual in a day in each activity by calculating the number of minutes per day spent in that activity. However, if an individual is not participating in any specific activity during the day, then the time spent in that activity is coded as zero. If an individual reports a single activity in a time slot, then the entire time of that slot is assigned to that activity. However, if an individual reports multiple activities in a time slot, then the entire time of that slot is assigned equally to all the activities.

2.2 Descriptive Statistics

Figure 1 (a) shows the participation of men and women between the ages of 15 to 60 years in paid employment and domestic work. Figure 1 (a) highlights the well-known fact about the Indian labor market, that the labor force participation rate is significantly higher for men than for women. Women on the other hand report far greater participation in domestic activities than men. These differences, however, are only restricted to the gender of the individual.

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Figure 1 (b) presents the same information as figure 1 (a) but by the relation of the family members to the head of the household. Comparing the participation rates of women of the household in paid employment and domestic work, we observe that differences are also visible across the relationship hierarchy within the household. Figure 1 (b) shows that daughters-in-law report greater participation in domestic activities, compared to other females like the head's wife and the unmarried daughters. These figures indicate that although there is a sexual division of labor within these households, differences also exist within individuals of the same gender.

The PLFS is limited in the sense that it only provides reliable information on participation in an activity but does not inform us about how these women allocate time across different domestic activities and leisure. To investigate time allocation across different activities, we utilize the TUS. Since we are interested in exploring women's time use in home-based activities, we broadly categorize them into three categories: (1) domestic chores which includes preparing meals, washing clothes, home management etc.; (2) child care; and (3) others' care (which includes care provided to non-dependent and the elderly members). We club these three and call it home production. We will use home production as the main dependent variable in the analysis.

Table 1 presents the average time in minutes in a day that the women of the household spend in home production and other activities. On average, married women, i.e., the head's wife and the daughters-in-law spend significantly higher time in domestic chores and child care compared to unmarried daughters but spend far less time in learning. Interestingly, married women spend more time in religious activities and socializing and communicating.

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The statistics in table 1 are interesting and indicative but we suspect that the differences observed in the time use of married and unmarried women across different activities would be driven partially by the differences in their age and education level. Figure 2 gives some idea of the differences in the age distribution of these three categories of women in our sample. Here we would like to point out that although we have been talking about these women as head's wife, daughter and daughter-in-law as if these women are in the same household, that is not the case. In the PLFS and the TUS, we can categorize households broadly into four types: one, households where there is no daughter-in-law; two, households where there is no daughter; three, households where both daughter and daughter-in-law are present, and four, households where there is neither a daughter nor a daughter-in-law present.

Figure 2 presents the age distribution of head's wife, daughter and daughter-in-law for the entire sample in panel (a) and the same for the subsample of households where both the daughter and the daughter-in-law are present in panel (b). Note that the average age gap between the daughter and the daughter-in-law for the entire sample in panel (a) is larger than their average age gap for the subsample in panel (b) of the figure. This could be because households with a married son may on average have older unmarried daughters than households where no son is married. The average age of the unmarried daughter is 15 years in the overall sample but is 19 years in the subsample of households where both the daughter and the daughter-in-law are present.

Figure 2 rationalizes our empirical strategy in the sense that the married women in our sample are either the head's wife or the daughter-in-law but since the head's wife

belongs to an older cohort, it does not make empirical sense to compare her with the unmarried woman or the daughter of the household. This is because women's time in home production is less valuable at older ages, and more valuable at younger ages, especially during child-rearing age which in turn will influence their decision of participating in the labor market (Becker, 1981). Although the daughter-in-law is also, on average, older than the daughter, the difference is just 7 years and there is significant overlap in their age density (figure 2b).

3   Empirical Strategy

Ideally, to estimate the effect of a shift in the status of a woman due to marriage, we should observe the time use of a woman both before and after marriage. Such data, to the best of our knowledge, is not available for India. What we have, however, are large cross-sectional labor force participation and time use surveys of individuals spread across the country. Our empirical strategy exploits the fact that all adult members of the selected households were surveyed and hence we look for the next best comparison group for married women within the household.

To begin with, we first identify large joint family households in these surveys. By large joint family, we mean households with older male heads and their wives, their married and unmarried sons, and unmarried daughters and the wives of married sons or the daughters-in-law. Since it's common for married sons to live with their parents in India, such households are available in the data. We use the rest of the households in our data, where either there is no unmarried daughter or no daughter-in-law to test

the robustness of the main results of this paper.

Females within a household include the wife of the head, the head's unmarried daughter and the daughter-in-law. Both the head's wife and the daughter-in-law are married but the head's wife belongs to a much senior cohort. We propose that a reasonable comparison group for the married women or the daughters-in-law are the unmarried daughters of the household.

Consider the following specification to estimate the differences in activity participation rates and time use of married and unmarried women in the household.

$$Y_{ih} = \alpha_h + \delta DIL_{ih} + \boldsymbol{X}_{ih}\boldsymbol{\beta} + \epsilon_{ih} \tag{1}$$

where Y is either a dummy variable which equals 1 if an individual i in household h participates in a particular activity and 0 otherwise or is time use in a particular activity. DIL is a dummy variable which is 1 if the woman is the daughter-in-law of the household and 0 if she is the unmarried daughter. Vector $\boldsymbol{X}$ has dummies for the age and the education levels of these women. With household fixed effects denoted by α_h and dummies for age and education levels in $\boldsymbol{X}$, the coefficient δ gives us the average difference in the time use of the daughter-in-law and the unmarried daughter, of comparable age and education levels, within the same household.

The difference in time use between the daughter-in-law and the unmarried daughter can be heterogeneous based on their age and education levels. To estimate

this heterogeneity, we use the following specifications:

$$Y_{ih} = \alpha_h + \sum_{j=1}^{J} \delta^j AGE_{ih}^j \times DIL_{ih} + \boldsymbol{X}_{ih}\boldsymbol{\beta} + \epsilon_{ih} \tag{2}$$

$$Y_{ih} = \alpha_h + \sum_{e=1}^{E} \delta^e EDU_{ih}^e \times DIL_{ih} + \boldsymbol{X}_{ih}\boldsymbol{\beta} + \epsilon_{ih} \tag{3}$$

where AGE is a categorical variable for different age groups and EDU is a categorical variable for different levels of education of the women. The estimated coefficients δ^j and δ^e give the average difference in time use of the daughter-in-law and the unmarried daughter for different age groups and different education levels respectively.

Although all our comparisons are between women within the same household, it is still possible that they may be driven by households with more educated unmarried daughters being matched with less educated daughters-in-law. This may be an outcome of arranged marriages within the patrilocal setup where the parents of the prospective groom and the bride may decide the union based entirely on the observable characteristics of each other's family (Fafchamps and Quisumbing, 2008; Anukriti and Dasgupta, 2017; Ray et al., 2020). One major factor determining marital matches in arranged marriages is the insurance gains from extending risk-sharing and consumption smoothing links (Rosenzweig and Stark, 1989; Munshi and Rosenzweig, 2009). On the girl's side, the family may want to marry their daughter *up* in the wealth and status ladder, hence they prefer a family with relatively higher wealth, status, caste and educational affiliations (Fafchamps and Quisumbing, 2005; Huang et al., 2012; Baner-

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jee et al., 2013; Anukriti and Dasgupta, 2017; Borker et al., 2017). The parents of the prospective groom may prefer a daughter-in-law that does not contest their position of power and control over household resources and hence may marry their sons to women who belong to households with lower socioeconomic status and educational qualifications (Mathur, 2007). This implies that there will be 'positive' assortative matching in the marriage market and the observed differences in time use between the daughters and the daughters-in-law could be driven by this matching process.

We test the robustness of our results to assortative matching in the marriage market by explicitly matching the daughter-in-law from the set of households without any unmarried daughter to the daughter from one of the households where there is no daughter-in-law present. This matching is done on propensity scores based on the observables of the two types of households. The idea is that if we match households with unmarried daughters (no daughter-in-law) to households with daughters-in-law (no unmarried daughter) on observables and then estimate the difference in time use between these matched women, we rule out the possibility of wealth and other observables based assortative matching driving our estimates.

4 Results

4.1 Baseline Results

We begin by discussing the results from the PLFS. Table 3 reports the estimated differences in participation in paid employment, learning and domestic work activities of unmarried daughters and daughters-in-law of the same household. The results show

that on average the daughters-in-law are 6.8 percentage points less likely to work in paid employment activities which include own enterprise, salaried employment and casual labor. This effect is stronger for urban and low caste (scheduled and scheduled tribes) households. In addition, the daughters-in-law are 17.2 percentage points less likely to be involved in educational activities and 37.4 percentage points more likely to participate in domestic chores, with these magnitudes being somewhat higher for urban households.

Table 3 reports the difference in time allocation in paid employment, unpaid domestic work, caregiving, leisure and self-care activities of daughters and daughters-in-law of the same household. These comparisons are within the households, as all regressions include household fixed effects. Consistent with the results from the PLFS, we find that the daughters-in-law allocate significantly less time in paid employment and more time in domestic work and caregiving activities compared to the unmarried daughters of the household. More specifically, the daughters-in-law on average allocate 58 minutes per day less than the unmarried daughters in paid employment-related activities, which amounts to around 7 hours per week. However, they spend 193 and 51 minutes per day more than daughters in domestic chores and caregiving activities, which is equivalent to 28 hours per week. These results suggest that even in the presence of daughters of a comparable age group in the household, the responsibility of domestic chores and caregiving disproportionately falls on the daughters-in-law of the household.

The advantage of using time-use data is that it provides additional information on the time allocated to socializing, religious, leisure and self-care (including

sleep) activities. We find that daughters-in-law spend less time in socializing, leisure and self-care activities than the daughters with the estimates varying between 11 and 47 minutes per day. If we compare the differences in educational activities; we find that daughters spend 89 minutes per day more than daughters-in-law in learning. This is consistent with the fact that in Indian households, women generally stop educational activities after their marriage. Another interesting observation is that married women spend more time in religious practices. This, we believe, is a clear indication that these differences are driven by the differences in the status of these women in the household. Married women in India are supposed to perform various religious customs and practices. Strict adherence to these rituals by the married women reflects their devotion to their husbands and the household, and contributes to the production of status for the household (Srinivas, 1977; Papanek, 1979). That the daughters-in-law are devoting more time to religious activities also indicates that not all women may bear equal responsibility of producing status goods for the household and that this responsibility may invariably fall on the daughter-in-law.

In table 4, we present the estimates of equation (1) for rural, low caste and poor households and find that in all these subsamples the daughter-in-law devotes significantly higher time to home production activities. These differences are somewhat smaller in rural areas and for poor households (poor households are defined as the lowest 20% of the households in the per capita consumption expenditure distribution), suggesting that the effect of hierarchy is less noticeable in rural areas and in poorer households.

4.2 Placebo Check

In this section, we exploit the fact that households in our data have multiple unmarried daughters and daughters-in-law within a household, to test whether differences in time use also exist between members for the same relation. If our results are truly driven by differences in hierarchy and status of the unmarried daughters and daughters-in-law then, conditional on age and education levels, we should not observe differences in time use within unmarried daughters. Table 5 presents the results of the placebo test where the dependent variables are the time use (in minutes) in different activities which we regress on indicators for the middle daughter, the youngest daughter, the youngest daughter-in-law and the eldest daughter-in-law. The omitted category is the eldest unmarried daughter of the household.

In activities like paid employment, childcare, learning and leisure; the differences between the eldest daughter and the younger daughters are statistically insignificant implying that the time use by elder and younger daughters in these activities is comparable. For domestic work, although the differences among the eldest daughter and the younger daughters are positive and statistically significant, the magnitudes are more than four times less than the difference between the eldest daughter and the youngest daughter-in-law. For self-care activity, we observe that the younger daughters on average spend 20 to 30 minutes less than their eldest unmarried sister (or daughter); but this is still lower in comparison to the daughters-in-law who spend around 80 minutes less than the eldest unmarried daughter.

4.3 Heterogeneity by Age and Education

To rule out the possibility that the differences in time use between these women may be driven by the age gap between them, we trim the sample based on the age distribution and re-estimate equation (1). If these differences in time use between these women are driven by the age gap between them, then these differences should reduce as we narrow the age band of the women in our sample. In columns 5 and 6 of table 4, we restrict the sample to women aged 20 to 45 years and 25 to 40 respectively and find that the differences in time use in home production of the daughters and the daughters-in-law show an increase rather than a decline. Similarly, to rule out the possibility that these differences may be driven by systematic differences in the education levels of the daughters and the daughters-in-law, we restrict the sample to women with at least a higher secondary level of schooling (table 4 column 7). Here again, we find the difference in time use in home production increases with the daughter-in-law spending more than double the amount of time in home production than the unmarried daughter.

Age and education are two important determinants of returns in the labor market and the type of activity an individual specializes in. Although we get some indication that our results are robust to the age and education gap between these women, we explore this further in figure 3 and figure 4. Figure 3 plots the predicted marginal effects from equation (2) for different time use activities for the daughters and the daughters-in-law by different age groups. For domestic work, we find a consistent gap in the time use of these women across all age groups. Across all age groups, daughters-in-law spend more time in domestic work than the daughters of the household.

One concern may be that daughters devote more time to learning and less

time in domestic work because of higher returns to education in the marriage market (Behrman et al., 1999; Chiappori et al., 2009; Lafortune, 2013; Klasen and Pieters, 2015; Attanasio and Kaufmann, 2017). If this is true in our case, then the differences we observe in figure 3 (a) are driven by the households' expectation of better outcomes for unmarried girls in the marriage market rather than the difference in status and relational hierarchy between the unmarried daughters and the daughters-in-law. This argument however is not consistent with what we observe in figure 3. Unmarried daughters in higher age groups, closer to marriageable age, devote less time to learning and more time to self-care and leisure. A similar decrease in learning and increase in leisure is observed for the daughters-in-law of higher age groups but this change is far less prominent in comparison to the daughters of the household. The difference is stark for self-care activity, where the daughters-in-law of all age groups devote almost the same time to self-care but for daughters, it increases with age. This pattern is rather consistent with the story that as unmarried daughters come closer to the marriageable age, they are given greater independence and more free time.

Figure 4 shows the predicted time use allocation for daughters and daughters-in-law across different education categories. There is evidence that education raises the relative returns to home production, especially in the case of child care (Behrman et al., 1999; Lam and Duryea, 1999; Gobbi, 2018), and therefore the increase in the educational levels of married women in India has contributed to their withdrawal from the labor market (Afridi et al., 2018, 2019). Figure 4 (a) and (b) show that the time use in domestic work and child care does not vary much with the education level of the daughters-in-law in our sample of households. In fact, for all the activities that we consider in figure 4, the daughter-in-law's time use doesn't change much with her

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level of education. In contrast, highly educated daughters devote less time to domestic work, socializing and leisure and spend significantly more time in learning.

4.4 Matching on Observables

Table 6 presents some evidence of 'positive' assortative matching on educational qualification. Table 6 column (1) shows that the daughters-in-law are 11 percentage point less likely to have higher secondary education or above than their husbands. This indicates that women with lower educational qualifications are matched with men of higher educational qualifications in our sample of households. Moreover, table 6 column (2) shows that the daughters-in-law are 8 percentage point less likely to be educated till the higher secondary level or above than the unmarried daughters of the household.

We match the daughter-in-law from the set of households without an unmarried daughter to a daughter from the households without a daughter-in-law, using propensity score matching. The propensity scores are predicted from a host of observable individual- and household-level characteristics like woman's age, her education, caste, religion, place of residence, the household's income quintiles based on consumption expenditure, the structure of the dwelling unit, the primary source of energy for cooking, household head's education and the number of dependents in the household (see Appendix table A2). Evidence on common support and balancing is presented in the Appendix (refer figures A1 and A2).

Table 7 presents the ATT estimates from nearest neighbor matching with 1, 3 and 5 neighbors. The results are qualitatively similar to our earlier findings. For in-

stance, we find that the daughter-in-law invests 238 minutes per day more in home production activities compared to the matched unmarried daughter (row 3 of table 7). However, the daughter-in-law allocates less time to paid employment, learning, socializing and self-care activities. Matching based estimates of differences in time use between these women by age groups are presented in Appendix table A3.

4.5 Influence of Unobservables

In the previous section, we show that our results are robust to selection in the marriage market as long as this selection is driven by observable characteristics of the individuals and the households. But that still leaves the possibility that unobservables may be driving this selection.

If we are willing to make the assumption that the selection on observables is informative about the selection on unobservables, then the influence of unobservables can simply be gauged by comparing estimates of coefficients with and without controls (Altonji et al., 2005). Oster (2019) develops this idea further by linking coefficient movements, R^2 movements and the omitted variable bias. Oster (2019) proposes a procedure to bound the true estimate using uncontrolled and controlled estimate of the treatment effect, the R^2 and the proportional selection assumption. We use this procedure to test the sensitivity of our estimates to unobservables. To generate the estimates of δ net of the bias, we assume that the maximum R^2 value of the regression is 0.9 and that the coefficient of proportionality between the bias due to observables and the unobservables is 1.

Table 8 presents the estimates of the difference in time use for the daughters-

in-law and unmarried daughters from the uncontrolled and controlled regressions in columns (1) and (2). The last column presents the estimates of δ net of the bias component. It can be seen that all the estimates of δ in table 8 are still quite large in magnitude and economically relevant. In some cases, accounting for the bias actually increases the magnitude, however we don't take that as an indication of the direction of the bias. The key insight from this section is that the influence of omitted variables in probably not enough to change the narrative of this paper.

5 Conclusion

In Indian joint families, power relations and status vary among the family members and play an important role in the division of labor within the household. In this paper, we show that for a woman, just the act of getting married and joining her husband's household has implications for her participation and time allocation in paid and unpaid work. We exploit the fact that our data reports the relation of each member with respect to the head of the household and devise a strategy which compares the participation and time use in different activities for unmarried daughters and daughters-in-law, of comparable age and education levels.

We find that, compared to daughters, daughters-in-law are more likely to participate in non-paid home production activities and less likely to engage in paid employment. We believe that this result is due to the shift in kinship role of a woman after marriage. We use the time use data to further investigate the kind of unpaid activities the daughters-in-law are engaged in at home. We find that the daughters-in-law al-

locate more time in domestic chores and care giving activities. However, they spend less time in leisure and self-care activities compared to unmarried daughters. In addition, we find that they spend more time in religious activities. These results survive a variety of robustness tests.

The following observations from the literature support these findings. First, the daughter-in-law's position in the household is more of an outsider. She may be a subordinate to the senior women in the household and her household work is more likely to be seen as 'a source of private welfare and comfort' by other household members (Papanek, 1979). Many studies like Anderson and Baland (2002), Kantor (2003) and Anderson and Eswaran (2009) find that working outside in paid employment activities increases married women's autonomy within the family. Moreover, they find that women who are involved in household chores are submissive and have no autonomy since household work is deemed as less worthy.

Second, the family's status concerns may also be at play here. The withdrawal of women from market work may be a marker of status for their husbands and families (Kandiyoti, 1988). Daughter-in-law's involvement in domestic chores and religious activities is taken as a reflection of their devotion towards their family and therefore, it increases the family's status in their social circles. Status concerns together with subordination may force the married woman to invest more time in unpaid home production activities.

Our analysis highlights the importance of kinship roles in determining the labor market decisions for married women. In light of these findings, it is important to emphasize that the influence of kinship roles on women's work cannot be ignored

while devising policies that aim to empower women and increase female labor force participation.

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Figures

Figure 1: Activity participation by gender and relation to the head of the household
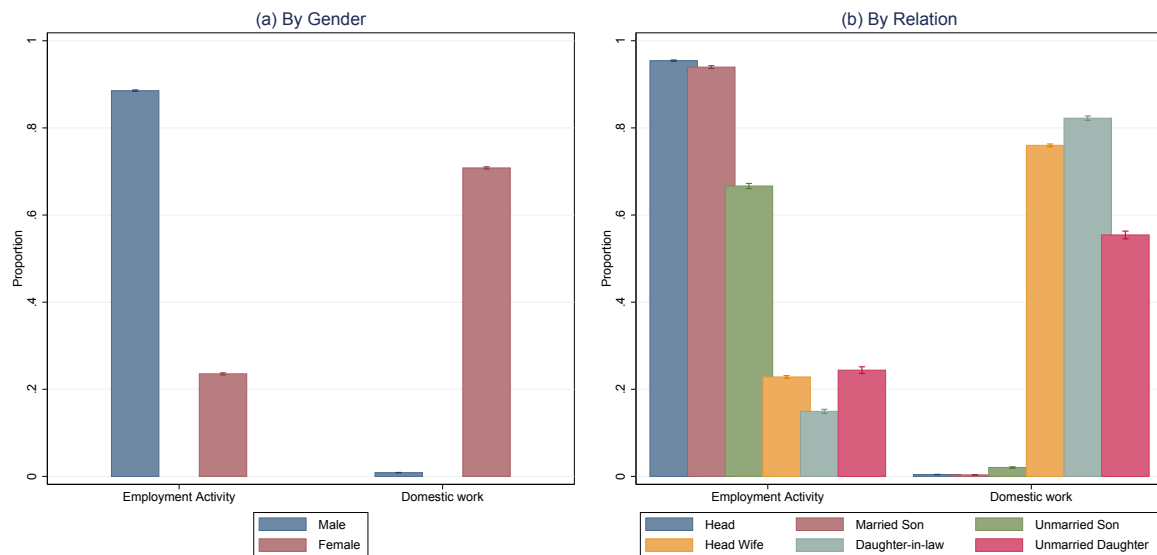
Note: The figure shows the participation of individuals, between the ages of 15 to 60 years, in paid employment and domestic work activities, by gender in panel (a) and by relation with the household head in panel (b). Data from Periodic Labor Force Survey is used. All those individuals who are attending educational institutions have been excluded.

Figure 2: Age density of the women of the household
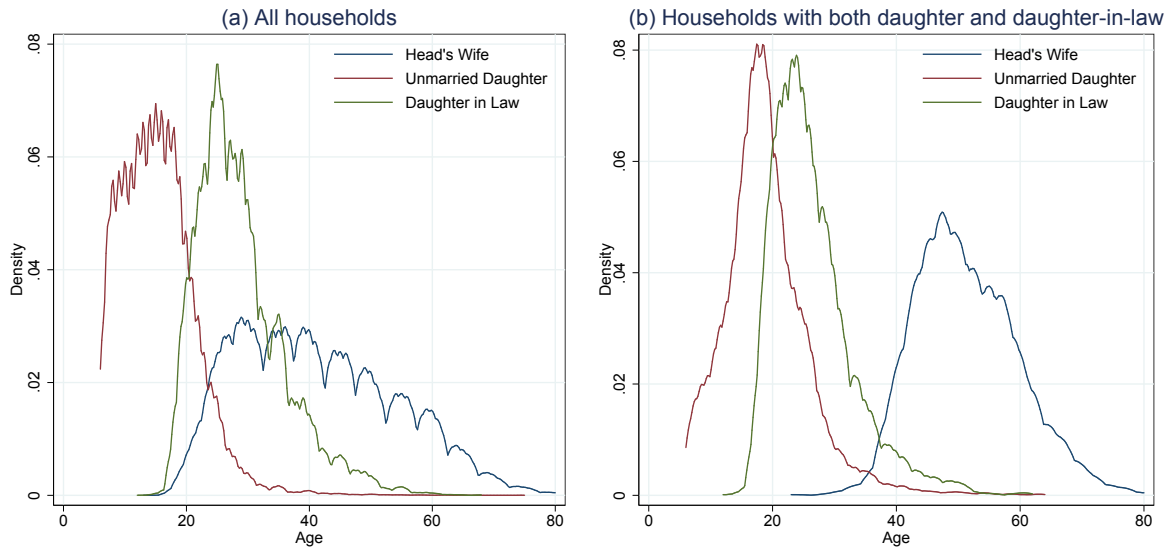
Note: The figure shows the kernel density plots for age for the female members belonging to (a) all the households in the sample; and (b) households with both daughter and daughter-in-law. Data from Time Use Survey is used. The average ages of household head's wife (or mother-in-law), unmarried daughter and daughter-in-law in panel (a) are 41, 15 and 29 and in panel (b) are 51, 19 and 26 years.

Figure 3: Time allocation by the daughter and the daughter-in-law by age groups
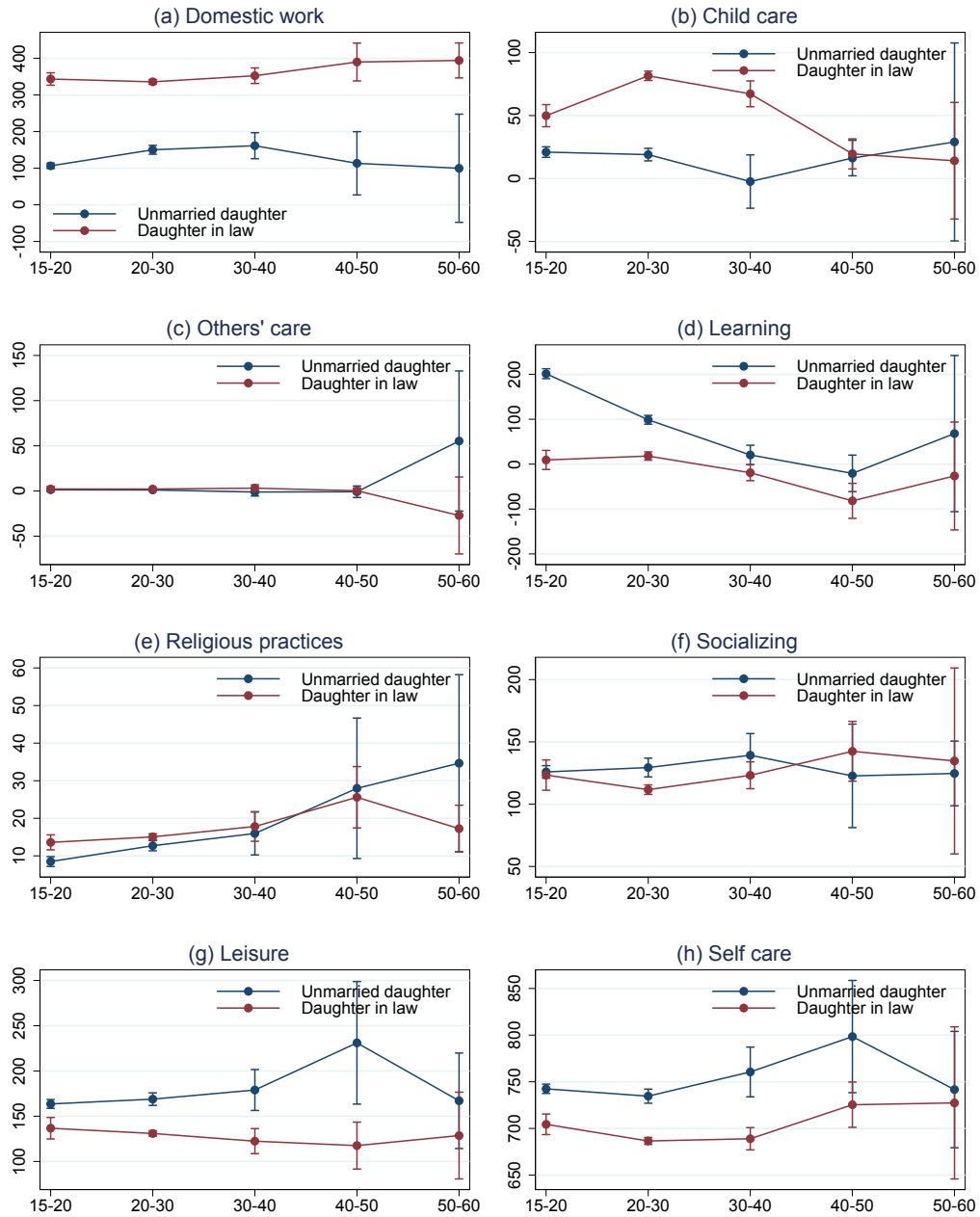
Note: The figure shows the time use, in minutes, in different activities for the daughter and the daughter-in-law on the vertical axis and the age groups on the horizontal axis. Predicted from equation (2) with household fixed effects and education level dummies. The figure also show 95% confidence intervals estimated with standard errors clustered at the district level. Data from Time Use Survey is used.

Figure 4: Time allocation by the daughter and the daughter-in-law across by their education levels
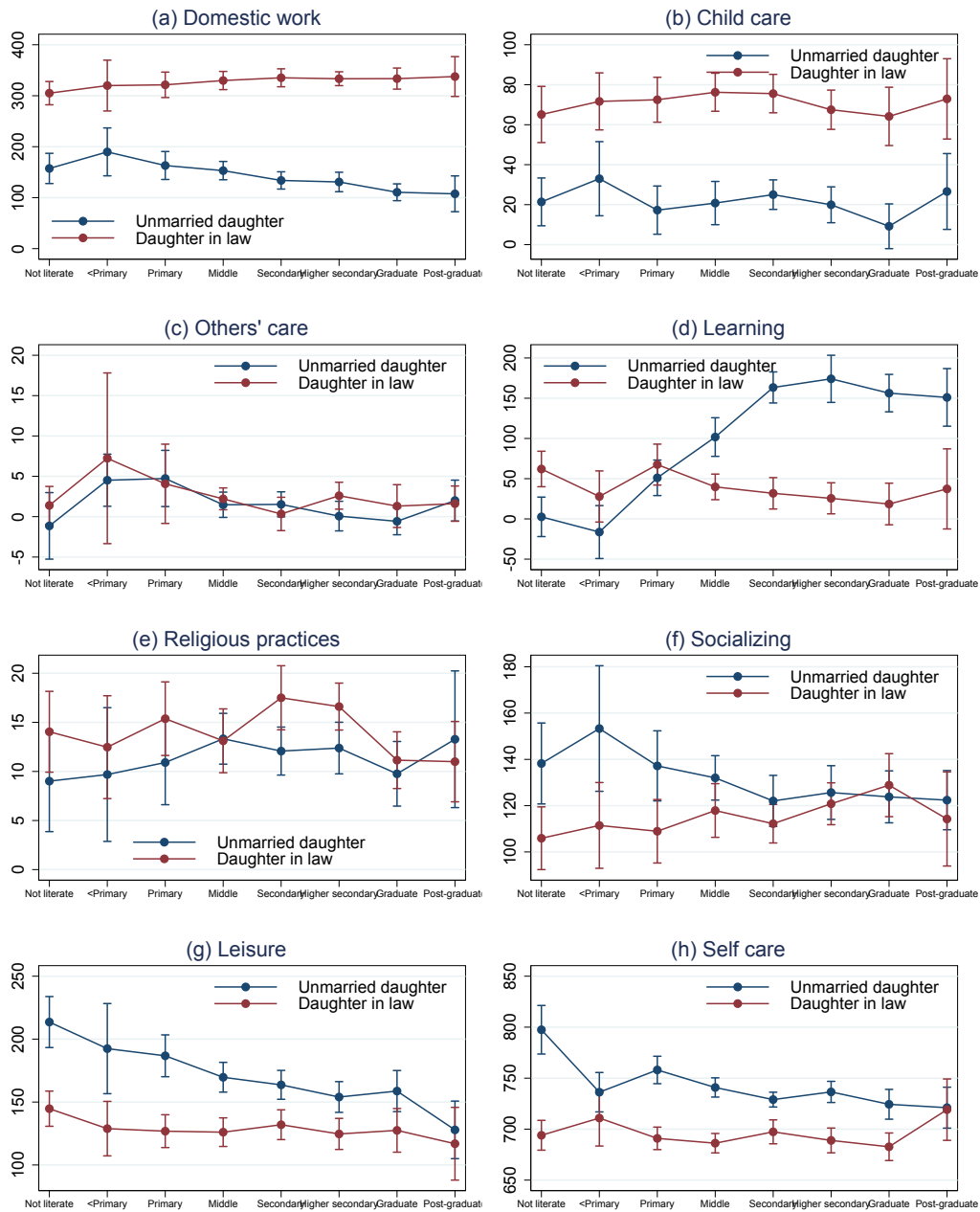
Note: The figure shows the time use, in minutes, in different activities for the daughter and the daughter-in-law on the vertical axis and their education levels on the horizontal axis. The education categories are Not literate, less than primary, up to primary school, up to middle school, up to secondary, up to higher secondary, graduate, and post-graduate and above. Predicted from equation (3) with household fixed effects and age dummies. The figure also show 95% confidence intervals estimated with standard errors clustered at the district level. Data from Time Use Survey is used.

Tables

Table 1: Time devoted by women of the household to different activities in a day (in minutes)

Activities	(1) Married Head's wife	(2) Married Daughter-in-law	(3) Unmarried Daughter
Domestic chores	328.8	338.8	77.0
	(140.4)	(138.3)	(120.7)
Child care	46.6	78.5	5.5
	(81.4)	(98.6)	(27.3)
Others' care	1.9	2.0	0.8
	(17.3)	(18.0)	(10.3)
Home production	**377.3**	**419.2**	**83.3**
	(159.3)	(159.2)	(124.1)
Employment	69.0	51.7	32.1
	(152.4)	(139.1)	(115.9)
Learning	0.9	5.1	301.8
	(15.9)	(42.6)	(240.4)
Religious practices	19.0	14.0	8.0
	(38.2)	(32.4)	(30)
Socializing	110.2	104.6	92.3
	(92.4)	(90.6)	(91.9)
Leisure	129.5	127.0	169.4
	(106.4)	(100.2)	(129.1)
Self care	701.4	693.7	742.2
	(110.6)	(106.4)	(107.8)

Note: The table presents the sample means of time spent, in minutes, across different activities by female members of the household, namely head's wife, daughter-in-law and unmarried daughter. Home production includes the time spend in domestic chores, child care and others' care. The further details on these activities is given in Appendix A table A1. Data from Time Use Survey is used. Standard deviations are reported in the parenthesis.

Table 2: Estimates of difference in participation of daughter and daughter-in-law of the same household across different activities

	(1)	(2)	(3)	(4)	(5)
	Overall	Rural	Urban	Low caste	Poor
(a) Dependent variable: Employment					
Daughter-in-law	-0.068***	-0.059***	-0.086***	-0.078***	-0.067***
	(0.012)	(0.015)	(0.019)	(0.022)	(0.017)
Constant	0.150***	0.138***	0.168***	0.177***	0.125***
	(0.006)	(0.007)	(0.009)	(0.010)	(0.008)
R^2	0.598	0.616	0.587	0.609	0.597
N	6102	3620	2472	2037	2529
Mean of dependent variable	0.116	0.109	0.125	0.139	0.093
(b) Dependent variable: Educational Institution					
Daughter-in-law	-0.172***	-0.160***	-0.183***	-0.158***	-0.176***
	(0.012)	(0.014)	(0.018)	(0.020)	(0.019)
Constant	0.290***	0.290***	0.285***	0.288***	0.307***
	(0.006)	(0.007)	(0.009)	(0.010)	(0.009)
R^2	0.683	0.698	0.672	0.704	0.679
N	6102	3620	2472	2037	2529
Mean of dependent variable	0.205	0.212	0.195	0.212	0.221
(c) Dependent variable: Domestic Work					
Daughter-in-law	0.374***	0.351***	0.404***	0.366***	0.345***
	(0.016)	(0.022)	(0.022)	(0.030)	(0.025)
Constant	0.431***	0.453***	0.401***	0.411***	0.475***
	(0.008)	(0.011)	(0.011)	(0.014)	(0.012)
R^2	0.678	0.692	0.670	0.685	0.689
N	6102	3620	2472	2037	2529
Mean of dependent variable	0.616	0.626	0.602	0.588	0.643

Note: The dependent variables in panel (a), (b) and (c) are the dummy variables which takes value 1 if the given woman, ages between 15-60 years, participates in paid employment, goes to educational institution and engaged in domestic work, respectively. The variable daughter-in-law is an indicator variable which is 1 if the given woman is the daughter-in-law of the household and is 0 if she is the unmarried daughter. Data from Periodic Labour Force Survey is used. The sample includes only those households who have both daughter and daughter-in-law. All the coefficients reported in each column of each panel are estimated from separate regressions. Column (1) reports the coefficients for the overall sample. Column (2)-(5) report the coefficients separately estimated on the sub-samples of rural, urban, low-caste and poor households respectively. Low-caste households includes households who belongs to Schedule Castes or Schedule Tribes. Poor households are defined as the lowest 20% of the households in the monthly per-capita consumption expenditure distribution. All regressions include household fixed effects, age dummies and education level dummies as control variables. The standard errors are reported in parenthesis and are clustered at the district level. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 3: Estimates of difference in time allocation (in minutes) between daughter and daughter-in-law across different activities

	(1) Domestic chores	(2) Child care	(3) Others' care	(4) Home production	(5) Employment	(6) Learning	(7) Religious practices	(8) Socializing	(9) Leisure	(10) Self care
Daughter-in-law	193.541***	50.758***	0.990*	245.288***	-58.438***	-89.038***	2.701***	-10.996***	-38.083***	-47.200***
	(5.060)	(3.278)	(0.584)	(5.411)	(6.801)	(6.419)	(0.852)	(3.667)	(3.374)	(3.033)
Constant	136.380***	20.176***	1.107***	157.662***	83.518***	125.352***	11.757***	127.642***	167.582***	739.808***
	(2.478)	(1.605)	(0.286)	(2.650)	(3.331)	(3.144)	(0.417)	(1.796)	(1.652)	(1.485)
R^2	0.705	0.652	0.471	0.758	0.612	0.642	0.844	0.721	0.696	0.715
N	4159	4159	4159	4159	4159	4159	4159	4159	4159	4159
Mean of dependent variable	231.2	45.0	1.6	277.8	54.9	81.7	13.1	122.3	148.9	716.7

Note: The dependent variable in each column is the time spent in a day (in minutes) by given woman, ages between 15-60 years, across different activities. These activities are domestic work, child care, others' care (caregiving to other dependent and non-dependent adult members), paid employment, learning, religious practices, socializing, leisure and self-care. The dependent variable Home production is the sum of total time spent in domestic work, child care and others' care. The further details on these activities is given in Appendix table A1. The variable daughter-in-law is an indicator variable which is 1 if the given woman is the daughter-in-law of the household and is 0 if she is the unmarried daughter. Data from Time Use Survey is used. The sample includes only those households who have both daughter and daughter-in-law. All the coefficients reported are estimated from separate regressions. All regressions include household fixed effects, age dummies and education level dummies as control variables. The standard errors are reported in parenthesis and are clustered at the district level. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 4: Heterogeneity in the estimated difference in time allocation (in minutes) between daughter and daughter-in-law

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Overall	Rural	Low caste	Poor	Age 20-45	Age 25-40	>=Higher secondary
Dependent variable: Home production							
Daughter-in-law	245.288***	231.859***	243.188***	235.350***	250.631***	256.179***	270.943***
	(5.411)	(6.166)	(9.940)	(8.792)	(6.588)	(11.802)	(9.798)
Constant	157.662***	170.590***	153.738***	169.868***	157.620***	155.482***	129.354***
	(2.650)	(3.003)	(4.811)	(4.261)	(3.534)	(6.750)	(4.744)
Age fixed effects	Yes	Yes	Yes	Yes	No	No	Yes
Education fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
R^2	0.758	0.754	0.760	0.762	0.740	0.731	0.787
N	4159	2618	1405	1591	2278	813	977
Mean of dependent variable	277.8	283.5	271.4	283.9	292.1	302.0	260.5

Note: The dependent variable for each column is the time spent in a day (in minutes) by given woman, ages between 15-60 years, in home production. The dependent variable Home production is the sum of total time spent in domestic work, child care and others' care (caregiving to other dependent and non-dependent adult members). The further details on these activities is given in Appendix table A1. The variable daughter-in-law is an indicator variable which is 1 if the given woman is the daughter-in-law of the household and is 0 if she is the unmarried daughter. Data from Time Use Survey is used. The sample includes only those households who have both daughter and daughter-in-law. Column (1) reports the coefficients for the overall sample. Column (2)-(4) report the coefficients separately estimated on the sub-samples of rural, urban, low-caste and poor households respectively. Low-caste households includes households who belongs to Schedule Castes or Schedule Tribes. Poor households are defined as the lowest 20% of the households in the monthly per-capita consumption expenditure distribution. Column (5)-(6) report the coefficients estimated on the subsample for women who belong to age group of 20-45 years and 25-40 respectively. Column (7) reports the coefficients estimated from the subsample of the women who have completed higher secondary or above. All regressions include household fixed effects. The standard errors are reported in parenthesis and are clustered at the district level. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 5: Placebo check based on multiple daughters and daughters-in-law within a household

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Domestic chores	Child care	Others' care	Employment	Learning	Religious practices	Socializing	Leisure	Self care
Middle daughter	22.987*	-2.017	3.206*	-25.347	52.564**	-1.277	-7.124	-10.267	-24.215*
	(13.121)	(5.841)	(1.872)	(19.948)	(25.008)	(2.256)	(9.970)	(13.245)	(13.700)
Youngest daughter	55.659***	-1.527	2.735	-23.385	24.906	-2.077	-0.931	-13.769	-31.951**
	(13.697)	(6.858)	(2.046)	(21.633)	(26.724)	(2.134)	(11.632)	(13.068)	(13.762)
Youngest daughter-in-law	249.857***	51.345***	3.863*	-83.477***	-62.729**	0.413	-12.853	-51.942***	-80.537***
	(15.061)	(7.999)	(2.030)	(22.936)	(29.805)	(2.533)	(11.806)	(13.699)	(14.767)
Eldest daughter-in-law	242.215***	41.847***	3.374	-75.131***	-73.129**	2.061	2.752	-55.143***	-73.639***
	(17.524)	(8.509)	(4.995)	(24.080)	(27.983)	(2.670)	(12.026)	(12.915)	(15.082)
Constant	83.721***	21.432***	-1.660	107.356***	98.344***	13.734***	128.805***	180.808***	771.204***
	(13.802)	(6.947)	(2.080)	(21.593)	(27.378)	(2.228)	(11.187)	(12.889)	(13.856)
R^2	0.707	0.656	0.472	0.614	0.642	0.845	0.722	0.697	0.717
N	4127	4127	4127	4127	4127	4127	4127	4127	4127

Note: The dependent variable in each column is the time spent in a day (in minutes) by given woman, ages between 15-60 years, in different activities. These activities are domestic work, child care, others' care (caregiving to other dependent and non-dependent adult members), paid employment, learning, religious practices, socializing, leisure and self-care. The further details on these activities is given in Appendix table A1. The base category is the eldest daughter of the household. The indicator middle daughter is 1 if the given woman is the middle daughter in the household and 0 otherwise. The indicator youngest daughter is 1 if the given woman is the youngest daughter in the household and 0 otherwise. The indicator youngest daughter-in-law is 1 if the given woman is the youngest daughter-in-law in the household and 0 otherwise. The indicator eldest daughter-in-law is 1 if the given woman is the eldest daughter-in-law in the household and 0 otherwise. Data from Time Use Survey is used. The sample includes those households who have multiple daughters and multiple daughters-in-law. All coefficients reported are estimates from separate regressions. All regressions include household fixed effects, age dummies and education level dummies as control variables. The standard errors are reported in parenthesis and are clustered at the district level. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 6: Assortative matching on Education

	(1)	(2)
Dependent variable: =1 if at least higher secondary level of education, 0 otherwise		
DIL^H (=1 if daughter-in-law, 0 if her husband)	-0.111***	
	(0.016)	
DIL^D (=1 if daughter-in-law, 0 if unmarried daughter)		-0.083***
		(0.013)
Constant	0.409***	0.395***
	(0.008)	(0.007)
R^2	0.693	0.748
N	4159	4172

Note: Table shows the evidence of assortative matching on education. The dependent variable is dummy variable which is 1 if the individual has completed higher secondary or above and 0 otherwise. The indicator DIL^H is 1 if the given individual is the daughter-in-law of the household and 0 if he is her husband. The indicator DIL^D is 1 if the given woman is the daughter-in-law of the household and 0 if she is the unmarried daughter. Data from Time Use Survey is used. The sample includes only those households who have both daughter and daughter-in-law. All regressions include household fixed effects and age dummies as control variables. The standard errors are reported in parenthesis and are clustered at the district level. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 7: Matching based estimates of difference in time allocation (in minutes) between daughter and daughter-in-law

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Domestic chores	Child care	Others' care	Home production	Employment	Learning	Religious practices	Socializing	Leisure	Self care
NNM (1)	160.920***	81.396***	0.291	242.610***	-67.190***	-88.610***	2.490**	-16.740***	-32.74***	-39.63***
	(4.918)	(0.914)	(0.383)	(5.008)	(7.063)	(4.062)	(1.117)	(2.929)	(3.792)	(4.378)
NNM (3)	157.130***	81.649***	0.191	238.970***	-60.750***	-88.800****	1.493*	-17.830***	-32.990***	-40.520***
	(4.043)	(0.892)	(0.352)	(4.117)	(5.675)	(2.886)	(1.054)	(2.572)	(3.080)	(3.381)
NNM (5)	156.940***	81.391***	0.536**	238.870***	-61.260***	-88.640***	1.634*	-15.980***	-33.830***	-40.230***
	(3.991)	(0.922)	(0.258)	(4.071)	(4.938)	(2.638)	(0.893)	(2.504)	(3.046)	(3.513)
N	22,206	22,206	22,206	22,206	22,206	22,206	22,206	22,206	22,206	22,206

Note: NNM= Nearest neighbour matches. The estimates are based on propensity score matching for nearest neighbour matches with 1, 3 and 5 neighbours. The details of the observable covariates used for matching are given in Appendix table A2. The dependent variable in each column is the time spent in a day (in minutes) by given woman, ages between 15-60 years, across different activities. These activities are domestic work, child care, others' care (caregiving to other dependent and non-dependent adult members), employment, learning, religious practices, socializing, leisure and self care. The dependent variable 'Home production' is the sum of total time spent in domestic work, child care and others' care. The further details on these activities is given in Appendix table A1. Data from Time Use Survey is used. The sample includes the women who belong to age 20-50, from two type of households: (i) households with only daughters and no daughter-in-law; and (ii) households with only daughter-in-law and no daughters. Heteroscedasticity-consistent analytical standard errors are calculated using the formula proposed by Abadie and Imbens (2006) and are reported in the parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 8: Influence of unobservables

	(1)	(2)	(3)
	Regression without controls	Regression with controls	δ (R max=0.9, $\lambda = 1$)
Domestic chores	217.1	193.5	129.2
Child care	51.0	50.8	50.4
Others' care	0.7	1.0	2.1
Home production	268.8	245.3	209.5
Employment	-31.0	-58.4	-108.0
Learning	-149.0	-89.0	42.8
Religious practices	3.7	2.7	2.6
Socializing	-15.1	-11.0	-8.2
Leisure	-32.8	-38.1	-42.7
Self care	-44.9	-47.2	-48.9

Note: The table presents the results from the procedure provided by Oster (2019). Column (1) reports δ coefficient of equation (2) estimated from simple OLS regression without any control variables. Column (2) reports δ coefficient of equation (2) estimated with household fixed effects and control variables like age dummies and education level dummies. Column (3) reports the estimates of δ coefficient of equation (2) following Oster (2019) method.

Appendix

Table A1: List of the activities and their classification

Category	Activities
Employment	Employment in corporations, government and non-profit institutions; Employment in household enterprise to produce goods and to provides services; Ancillary activities, training and studies related to employment; Setting up business
Domestic Chores	Food and meals preparation; Cleaning and maintaining own house, clothes and footwear; Household management like paying bills, budgeting; Pet care; Shopping for other household members
Child care	Feeding, cleaning, providing medical care, teaching, training, playing and minding children
Others' Care	Care and help provided to dependent and non-dependent adult members of household
Learning	Attending school or university; Self-study for distance education; Engaged in non-formal education and other courses
Socialising	Chatting with others; attending get-together; participating in community cultural and social events (non-religious) like weddings, funerals, births etc.
Religious practices	Private prayers and meditation; Participating in collective religious activities
Leisure	Visiting cultural events, parks and sports events; Reading and watching television; Playing games and exercising; Arts, literary and Music
Self-care	Sleep, Eating and drinking, personal hygiene and care including medical care

Source: Time Use Survey Report, 2019

Table A2: List of covariates used in matching

Covariates	
Educational attainment of woman	Dummy variables if woman is illiterate; has schooling upto primary level; has schooling upto middle school; has schooling upto secondary level; and is graduate
Age of women	Dummy variables if woman belongs to age group of 20-25; 30-35; 40-45; and 45-50
Quintiles of monthly per-capita expenditure	Dummy variables if household belongs to poor; middle; rich; and richest quintiles
Structure of dwelling unit	Dummy variable if it is pucca
Primary source of energy for cooking	Dummy variables if it is kerosene; and firewoods & chips
Educational attainment of household head	Dummy variables if household head is illiterate; has schooling upto primary level; has schooling upto middle school; has schooling upto secondary level; and is graduate
Place of residence	Dummy variable if household belongs to rural region
Dependency Ratio	Dummy variable if number of dependents are non-zero
Social Group	Dummy variables if household belongs to Schedule castes; Schedule Tribes; Other Backward Castes and Others
Religion	Dummy variables if household belongs to Hinduism; Islam; Christianity; Sikhism; and Buddhism

Note: Separate dummy variables have been created for each above mentioned category. Monthly per-capita expenditure is divided into five quintiles; and the first, second, third, fourth and fifth quintile refer as poorest, poor, middle, rich and richest quintile. The poorest and richest quintile includes bottom-most 20% and topmost 20% of the households in the monthly per-capita consumption expenditure distribution, respectively.

Figure A1: Common support
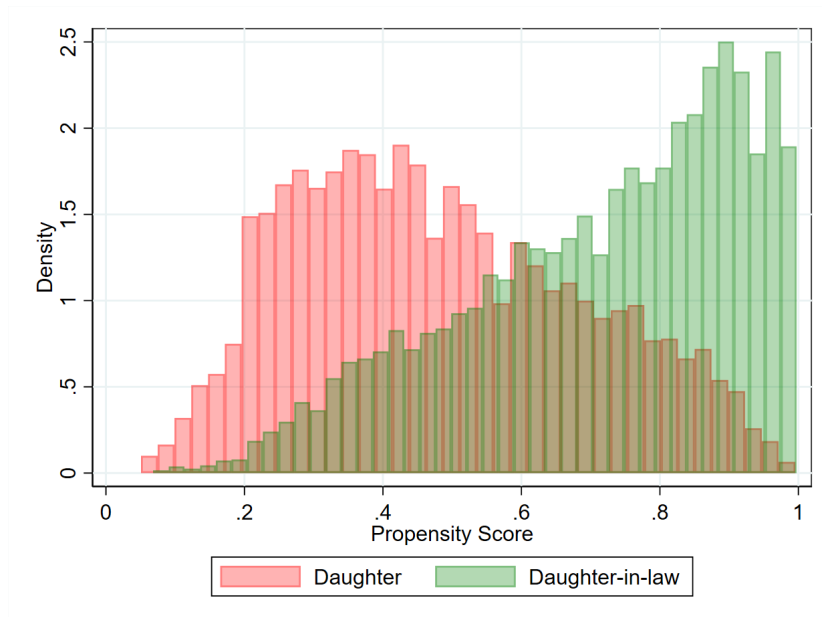
Note: The figure plots the condition of common support region for matched daughters and daughters-in-law.

Figure A2: Balance in covariates before and after matching
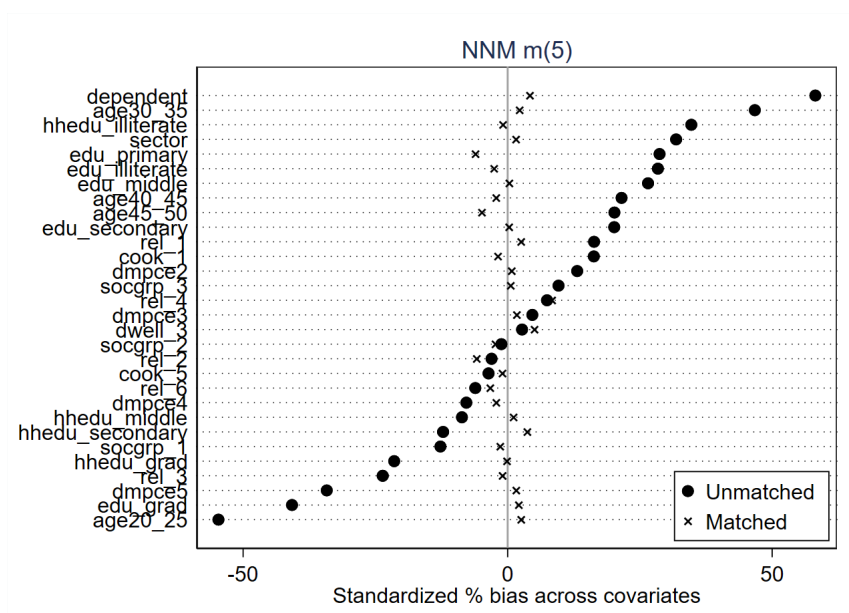
Note: The figure shows the condition of balance in covariates between daughters and daughters-in-law, of the households used for matching, before and after matching.

Table A3: Average treatment estimates for difference in time allocation (in minutes) between daughter and daughter-in-law from matching across different age cohorts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Domestic activities	Child care	Others' care	Home production	Employment	Learning	Religious practices	Socializing	Leisure	Self care
(a) Age Group: 20-50										
NNM (1)	154.583***	80.537***	0.557*	235.678***	-44.729***	-106.58***	3.091***	-19.728***	-28.369***	-39.134***
	(5.108)	(1.093)	(0.312)	(5.233)	(6.996)	(5.115)	(0.891)	(3.476)	(3.653)	(4.506)
NNM (3)	158.092***	80.832***	0.592**	239.517***	-46.371***	-105.48***	2.755***	-19.821***	-31.022***	-41.715***
	(3.700)	(0.940)	(0.265)	(3.794)	(4.537)	(3.812)	(0.695)	(2.489)	(2.748)	(3.153)
NNM (5)	159.035***	81.157***	0.547**	240.739***	-47.383***	-105.88***	2.4***	-19.388***	-31.215***	-41.52***
	(3.439)	(0.911)	(0.263)	(3.528)	(4.060)	(3.361)	(0.692)	(2.196)	(2.561)	(2.671)
N	22206	22206	22206	22206	22206	22206	22206	22206	22206	22206
(b) Age Group: 20-30										
NNM (1)	151.806***	93.661***	0.493**	245.961***	-51.905***	-110.43***	2.624***	-23.165***	-28.901***	-34.365***
	(4.447)	(1.189)	(0.256)	(4.602)	(5.962)	(4.845)	(0.956)	(3.272)	(3.620)	(3.660)
NNM (3)	153.228***	93.645***	0.577***	247.45***	-51.568***	-106.35***	2.013**	-20.986***	-30.371***	-38.656***
	(3.348)	(1.111)	(0.216)	(3.477)	(4.214)	(3.418)	(0.785)	(2.402)	(2.652)	(2.715)
NNM (5)	153.719***	93.896***	0.476**	248.091***	-51.076***	-107.94***	1.898**	-20.716***	-30.291***	-37.548***
	(3.159)	(1.090)	(0.214)	(3.274)	(3.733)	(3.108)	(0.766)	(2.218)	(2.410)	(2.462)
N	17682	17682	17682	17682	17682	17682	17682	17682	17682	17682
(c) Age Group: 30-40										
NNM (1)	157.548***	68.749***	1.526***	227.823***	-122.59***	-6.443***	2.632	-23.556***	-43.35***	-44.62***
	(14.184)	(1.637)	(0.510)	(14.284)	(19.156)	(3.700)	(2.770)	(7.573)	(11.436)	(10.492)
NNM (3)	143.864***	69.737***	1.470***	215.071***	-116.25***	-13.268***	-1.016	-18.346***	-41.471***	-36.393***
	(13.431)	(1.516)	(0.507)	(13.501)	(15.438)	(3.363)	(2.580)	(7.049)	(9.764)	(9.208)
NNM (5)	147.47***	69.837***	1.331**	218.637***	-119.15***	-13.547***	-0.276	-15.426***	-40.348***	-40.802***
	(13.556)	(1.518)	(0.536)	(13.634)	(15.586)	(3.395)	(2.199)	(6.976)	(9.247)	(8.912)
N	5146	5146	5146	5146	5146	5146	5146	5146	5146	5146
(d) Age Group: 40-50										
NNM (1)	151.993***	15.813***	-0.865	166.942***	-85.59***	-0.619	0.956	11.438*	-59.135***	-54.817***
	(26.902)	(5.075)	(2.409)	(27.248)	(21.828)	(1.718)	(6.679)	(10.777)	(23.980)	(20.104)
NNM (3)	142.642***	12.518***	0.624	155.785***	-88.891***	0.584	4.439	6.898**	-48.858***	-55.655***
	(27.687)	(3.981)	(1.623)	(27.790)	(29.910)	(2.657)	(5.259)	(10.642)	(19.775)	(19.874)
NNM (5)	156.474***	12.835***	0.427	169.737***	-90.801***	-1.993	3.977	9.407***	-56.394***	-59.06***
	(27.733)	(3.812)	(1.862)	(27.879)	(32.915)	(3.784)	(4.628)	(10.867)	(21.184)	(18.316)
N	1041	1041	1041	1041	1041	1041	1041	1041	1041	1041

Note: NNM= Nearest neighbour matches. The estimates are based on propensity-score matching for nearest neighbour matches with 1, 3 and 5 neighbours. The details of the observable covariates used for matching are given in Appendix table A2. The dependent variable in each column is the time spent in a day (in minutes) by given woman, ages between 15-60 years, across different activities. These activities are domestic work, child care, others' care (caregiving to other dependent and non-dependent adult members), employment, learning, religious practices, socializing, leisure and self-care. The dependent variable 'Home production' is the sum of total time spent in domestic work, child care and others' care. The further details on these activities is given in Appendix table A1. Data from Time Use Survey is used. The sample includes the women who belong to age 20-50, from two type of households: (i) households with only daughters and no daughter-in-law; and (ii) households with only daughter-in-law and no daughters. Panel (a) shows the ATT estimates for the overall sample. Panel (b)-(c) shows the estimates for the sample of women who are in different age cohorts namely, 20-30, 30-40 and 40-50 respectively. All the covariates (see Appendix table A2) except age dummies have been used for matching. Heteroscedasticity-consistent analytical standard errors are calculated using the formula proposed by Abadie and Imbens (2006) and are reported in the parenthesis. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.