

Are Spousal Labor Supplies Substitutes? Evidence from the Workweek Reduction Policy in China

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Abstract

We estimate the effects of spousal labor supply on individuals' labor supply by using the 1994–1995 initiation of China's workweek reduction policy as a natural experiment. We find that an increase in the labor supply of wives significantly reduced the labor supply of husbands, but an increase in the labor supply of husbands had an insignificantly negative effect on that of their wives. Furthermore, an increase in the labor supply of one spouse increased the amount of time spent on housework for both the husband and wife. Our findings on the substitution effect between the labor supplies of spouses differ from findings based on data from developed countries. The findings of this study suggest that more resources are needed to achieve the goals set by governments in developing countries.

Keywords: Workweek reduction; Spousal labor supply; Substitutes

JEL Code: J22; J13; J18

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1. Introduction

Studying the interdependency of spousal labor supplies is particularly important for developing countries. In these countries, active labor market policies (ALMPs) are commonly used to intervene in labor markets that are not functioning well (see McKenzie (2017) for a review). In such situations, ignoring the interdependency of the spousal labor supply might lead to bias while evaluating the aggregate effects of ALMPs, because it determines whether ALMPs targeting a particular population have spillover effects on a wider set of individuals. Studying the interdependency of the spousal labor supply is also interesting in itself, because the majority of the population lives within family units.

However, it is difficult to predict whether an individual's labor supply will complement or substitute for his or her spouse's labor supply. A decrease in the spouse's labor supply increases the time that he or she can allocate to housework and leisure. An increase in one spouse's housework time frees up the other individual's housework time, but an increase in a spouse's leisure time could increase the other individual's own leisure time, if the couple enjoys spending leisure time together. Therefore, whether the individual's labor market time increases will depend on whether the substitution effect of his or her spouse's housework time dominates the complementary effect of the spouse's leisure time. If the substitution effect dominates the complementary effect, the increase of the spouse's labor supply will increase the other one's labor supply; otherwise, it will reduce the other one's labor supply.

As no clear theoretical prediction regarding this interaction is currently possible, an empirical study of the issue is necessary. However, empirical investigations face challenges. First, it is very difficult to find independent variations in the labor supplies of individual family members, because both spouses are always subject to the same labor market conditions, and their labor supply decisions are jointly determined. Second, a change in an individual's labor supply always induces a change in income, which is also correlated with the spouse's labor supply. In most cases, the correlations found between the labor supplies of couples cannot be interpreted as causalities.

In our study, we exploit a policy change that China introduced in 1994–1995, which mandated a reduction in the weekdays for employed workers from six days to five, without a

change in wages.¹ This policy applied to employees working for others, but it did not directly apply to self-employed workers. We use the introduction of this policy as a natural experiment to identify the effects of changes in one spouse's labor supply on the other spouse's labor supply. To investigate whether there was a substitution effect in the housework time spent by each member of a couple, we also estimate the effect of each spouse's labor supply on the other individual's housework hours.

To facilitate our analysis, we use data from the China Health and Nutrition Survey (CHNS), which has collected detailed information on individual and household characteristics from a panel of individuals, particularly concerning their working hours and housework hours. Using data from 1993 and 1997, we construct an instrumental variable (IV), the interaction between an indicator for being employed in 1993 and a 1997 year dummy, for the endogenous spousal labor supply. Essentially, we compare changes in the weekly working hours and the housework hours of individuals whose spouses were employed in 1993 (and therefore affected by the policy change) with those whose spouses were self-employed in 1993 (and therefore unaffected by the policy change).

We find no effect of a spouse's weekly working hours on the probability for the other spouse to have a job. Then we focus on the sample of spouses with jobs, and we find that with a one-hour increase in the spouse's weekly working hours, the working hours of husbands decreased by 0.402 hours, but the working hours did not significantly decrease for wives. Unlike the results reported by Goux, Maurin, and Petrongold (2014), our results show a substitution effect in the spousal labor supply. We also find that a one-hour increase in a spouse's weekly working hours led to an increase of 0.413 housework hours for husbands, and 0.358 hours for wives.

We conduct several robustness checks to ensure the validity of our findings. For example, using data from 1989, 1991, and 1993, we find no difference between pre-existing time trends in the labor supply or the housework hours of individuals whose spouses were employed in 1993, versus those whose spouses were self-employed in 1993. We show that the possibility that the workweek reduction policy induced individuals to change their

¹ Therefore, this policy changed the hours worked across the week, so that the workers spent not only fewer total hours working, but also fewer days.

employment type (from being employed/self-employed to self-employed/employed) did not bias our estimates. We also show that our results are not affected by concurrent events, such as the dramatic decline in township and village enterprises (TVEs) or the reform of state-owned enterprises (SOEs).²

In addition to our findings regarding average effects, our heterogeneity tests show that the effects of the spousal labor supply on the other individual's housework time were stronger for couples with children aged 12 or under, and for couples who were not living with their parents. We also investigate the channel through which a spouse's working hours affected the other spouse's working and housework hours. We find that when a spouse worked more, the probability of doing a second job decreased for both men and women, but the working hours in the primary job did not significantly change. We also find that when a wife worked longer hours in the labor market, her husband spent more time cooking and taking care of children. When a husband worked longer hours, his wife spent more time doing laundry.

Our paper makes several contributions. First, it is one of the few studies that identify a causal relationship between spousal labor supplies. Goux, Maurin, and Petrongold (2014) exploit a similar policy change in France to identify the effects of the spousal labor supply. We go one step further by showing that an increase in the spousal labor supply has positive effects on an individual's housework hours, and that these effects are larger in magnitude than the effects on the individual's labor supply.

Second, previous studies have shown that the complementarity of spousal labor supplies provides one explanation for the difference in elasticity between the individual-level and the macro-level labor supply (Chetty, Friedman, Olsen, and Pistaferri, 2011; Chetty, Guren, Manoli, and Weber, 2011; Chetty, 2012; Goux, Maurin, and Petrongold, 2014). However, our finding of a substitution effect in the spousal labor supply suggests that in developing countries such as China, the gap in elasticity between the individual-level and macro-level labor supply may differ from that seen in developed countries. More work is needed to understand this difference.

Third, our study contributes to the literature investigating the interdependency between

² TVEs are market-oriented public enterprises that operate under the purview of local governments based in townships and villages (https://en.wikipedia.org/wiki/Township_and_Village_Enterprises).

couples. The literature includes not only studies on the interdependency of the labor supply (e.g., Ashenfelter and Heckman, 1974; Lundberg, 1988; Blau, 1998; Hamermesh, 2002; Goux, Maurin, and Petrongold, 2014), but also studies on individual behaviors in response to a spouse's change in work status (e.g., Berger et al., 2003; Cullen and Gruber, 2000; Gustman and Steinmeier, 2000; Gelber, 2014).

Fourth, to the best of our knowledge, our paper is the first to examine this issue by using data from a developing country.³ Studying this issue has special importance for developing countries, where government-sponsored programs (including ALMPs) have become increasingly popular. Although McKenzie (2017) concludes that many ALMPs do not have significant effects on either employment or earnings, the literature has found that other programs have a positive effect on each individual's labor supply.⁴ The aggregate effects of such programs would be reduced if there were substitution effects between couples, such as those found by our study. Our findings suggest that governments need to take spousal interactions into consideration when making policies and evaluating the aggregate effects of their programs.

The remainder of this paper is organized as follows. Section 2 describes the evolution of China's workweek system. Section 3 introduces a theoretical framework. Section 4 introduces the data used in this study. Section 5 describes our empirical strategy. Section 6 presents the main findings. Section 7 shows the results of various robustness checks. Section 8 investigates channels, and Section 9 provides conclusions.

2. Historical Evolution of Workweek System in China

The first document regulating working time in China was the *Common Program of China's Political Consultative Conference*, issued in 1949, which specified that the daily working hours for all employees should be between 8 and 10 hours.⁵ Although there were no

³ Goldberg (2016) estimates the wage elasticity of working in the day labor market in rural Malawi, using a field experiment approach. Li and Zax (2003) use data from the China Urban Household Survey to estimate the labor supply's response to wages. However, these researchers do not consider interactions between couples.

⁴ For example, Dinkelman (2011) finds that rural electrification significantly increases the working hours for men and women in South Africa.

⁵ Article 32 in the *Common Program of the Chinese People's Political Consultative Conference* (see

official rules specifying total working days per week, the statistics released by the Ministry of Labor show that six working days were commonly implemented.⁶ An article by Hu and Xie (2009) also confirms this standard, and that this workweek system lasted more than 40 years.

In the mid-1990s, the Chinese central government started to investigate the possibility of a shorter workweek. One purpose was to improve worker productivity. The government also wished to make the policy consistent with global standards, as a way to signal its openness to the world (Hu and Xie, 2009). On February 3, 1994, China's State Council released *Regulations on Employees' Working Time*, which stipulated that employees needed to work 8 hours per day, and 44 hours per week (i.e., five and a half days per week).⁷ This regulation was revised about one year after being implemented. On March 25, 1995, the Chinese State Council issued a new policy (*Decree No. 174 of the State Council*) that reduced the workweek to five days beginning May 1, 1995.⁸

One feature of the new policy was that its regulations applied only to formally employed workers (as opposed to the self-employed). It is also noteworthy that this new policy did not involve a change in wages, as can be seen by reading the details of the policies. To examine these two, we first use data from the CHNS to plot weekly working hours for employed workers versus hours for self-employed workers.⁹ Figure 1 shows this comparison. For both men and women, the weekly working hours for employed workers was around 48 hours in 1989, 1991, and 1993, but they decreased to about 40 hours in 1997. However, the weekly working hours for self-employed workers in these years remained basically unchanged. We also examine the impact of this policy change on individual income, and the findings are given in Appendix 1. We find that compared with self-employed workers, this policy change did not have significant effects on the wages of employed workers.

<http://e-chaupak.net/database/chicon/1949/1949bilingual.htm>).

⁶ See pages 744-745 in *Selected Documents on the Economy of People's Republic of China (1949-1952)*.

⁷ The full text in Chinese can be found at

<http://law.npc.gov.cn/FLFG/flfgByID.action?txtid=2&flfgID=12007&showDetailType=QW>

⁸ The full text in Chinese can be found at

<http://fgk.chinalaw.gov.cn/article/xzfg/199503/19950300268667.shtml>

⁹ Section 3 provides a detailed description of the CHNS.

3. Theoretical Framework

A household is composed of a husband and a wife. They both have one unit of time to allocate between market work and household production. Here household production involves the husband's and wife's entire non-market time as inputs. So, it is a general term that includes housework and leisure. Spouses jointly derive utility from the consumption of market goods and household product. Denote consumption of market goods as c , total household product as h . h is produced using a CES production function with non-market time from both spouses as inputs, which is laid out in detail below.

Consider one side of the spouses. Denote the non-market time of him/her and his/her spouse respectively as h_o, h_s . The workweek reduction policy exogenously decreases h_s without changing income, Y_s , earned by the spouse. We explore how changes in h_s affect h_o . h_o is determined by the following utility maximization problem:

$$\begin{aligned} \max_{h_o} \quad & \theta \ln(c) + (1 - \theta) \ln(h) \\ c = & w_o(1 - h_o) + Y_s \\ h = & (\eta h_o^\gamma + (1 - \eta)h_s^\gamma)^{\frac{1}{\gamma}} \\ h_o \in & [0, 1] \end{aligned}$$

Where $\gamma \in (-\infty, 1]$ measures substitutivity of the spouses' time input in household production. If γ is close to 1, it means the substitutability of housework duty dominates complementarity of leisure. In another word, spouses' non-market time are closer to substitutes. If γ is close to $-\infty$, it means the latter effect dominates and spouses' non-market time are closer to complements.

First-order condition of the above problem derives:

$$\left[(1 - \theta) \left(1 + \frac{Y_s}{w_o} \right) - h_o^* \right] h_o^{*\gamma-1} = \theta \frac{1 - \eta}{\eta} h_s^\gamma \quad (1)$$

A necessary condition of the interior solution is:

$$(1 - \theta) \left(1 + \frac{Y_s}{w_o} \right) - h_o^* > 0 \quad (2)$$

Consider only the interior solution. The effect of the spouse's time allocation on one's own time allocation could be described by:

$$\left[(1 - \theta) \left(1 + \frac{Y_s}{w_o} \right) (\gamma - 1) - \gamma h_o^* \right] \frac{\partial h_o^*}{\partial h_s} = \theta \frac{1 - \eta}{\eta} \gamma h_s^{\gamma-1} h_o^{*2-\gamma} \quad (3)$$

If $\gamma \neq 0$, (3) could be further simplified as:¹⁰

$$\left[(1 - \theta) \left(1 + \frac{Y_s}{w} \right) \left(1 - \frac{1}{\gamma} \right) - h_o^* \right] \frac{\partial h_o^*}{\partial h_s} = \theta \frac{1 - \eta}{\eta} h_s^{\gamma-1} h_o^{*2-\gamma} > 0 \quad (4)$$

If $\gamma \in (0, 1]$, $(1 - \theta) \left(1 + \frac{Y_s}{w} \right) \left(1 - \frac{1}{\gamma} \right) - h_o^* < 0$. So, $\frac{\partial h_o^*}{\partial h_s} < 0$, i.e., increases in spouse's market working time (decreases in spouse's non-market time) decreases one's own market working time (increases one's own non-market time).

If $\gamma \in (-\infty, 0)$, $(1 - \theta) \left(1 + \frac{Y_s}{w} \right) \left(1 - \frac{1}{\gamma} \right) - h_o^* > (1 - \theta) \left(1 + \frac{Y_s}{w} \right) - h_o^* > 0$. The second inequality comes from (2). So, $\frac{\partial h_o^*}{\partial h_s} > 0$, i.e., increases in spouse's market working time (decreases in spouse's non-market time) increases one's own market working time (decreases one's own non-market time).

The analysis above shows the sign of the cross-hour effect of spousal labor supply is purely governed by the substitution factor of household production γ . When γ is between 0 and 1, which means the substitutability of housework duty dominates the complementarity of leisure between spouses, the increase in the spouse's market working time decreases one's own working time. When γ is lower than 0, which means the complementarity of leisure dominates the substitutability of housework between spouses, the increase in the spouse's market working time increases one's own working time.

However, Equation (4) also shows that the magnitude of the cross-hour effect of spousal labor supply is influenced by several factors, e.g., one's relative importance in household production (η), one's own wage (w_o) and spouse's income (Y_s). It provides explanations for potential different effects, if any, for men and women.

4. Data

Our main analysis adopts data from the CHNS, which was conducted by the Carolina

¹⁰ If $\gamma = 0$, $\frac{\partial h_o^*}{\partial h_s} = 0$, i.e., spouse's non-market time has no impact one's own time allocation. In this case, the complementarity of spouses' leisure is equal to the substitutability of their housework.

Population Center at the University of North Carolina at Chapel Hill and the National Institute for Nutrition and Health at the Chinese Center for Disease Control and Prevention. This survey covers nine provinces that vary substantially in geography and economic development.¹¹ A multistage random cluster process was used to draw the samples in each province. This survey started in 1989 and has collected economic, health, and time-allocation information on individuals from mostly the same households every two to four years.¹²

We focus on the survey waves of 1993 and 1997, because these are the closest surveys taken before and after the enforcement of the workweek reduction policy. We do not use data after 1997, because a reform of SOEs happened in 1998 (Hsieh and Song, 2015), which could contaminate our estimates. In our robustness check of the validity of our empirical strategy, we also use data from the survey waves of 1989 and 1991.

We construct balanced panels of men and women whose spouses were either employed or self-employed in 1993 and in 1997 (as in Goux, Maurin, and Petrongold (2014)). Our final sample includes 1,288 men and 1,286 women. In this sample, 145 men and 143 women did not have a job in either 1993 or 1997. Therefore, the sample includes 1,143 men and women who had jobs in both 1993 and 1997.

The most important outcome variables in our paper are the weekly working hours and the weekly housework hours. The CHNS collected information on the number of hours worked in the past week for employed workers and for self-employed workers.¹³ The CHNS also collected information on the number of hours worked in the past week for housework activities, separately for each spouse. The housework activities included buying food, cooking food, washing clothes, and taking care of children.¹⁴ The weekly housework hours are the summations of all time spent on these four activities.

Our main identification variable, employment type, is constructed as follows. We define an individual as “employed by others” if his/her primary occupation in 1993 was working for another person or enterprise. We define an individual as “self-employed” if his/her primary

¹¹ These nine provinces are Liaoning, Jiangsu, Shandong, Henan, Hubei, Hunan, Guangxi, Guizhou, and Heilongjiang.

¹² More information about CHNS can be found on their website: <http://www.cpc.unc.edu/projects/china>

¹³ The question asked in CHNS was “In the last week, how many hours did [you] work?”

¹⁴ For example, the questions asked for buying food were “In the past week, did you buy food for your household?” and “How much time did [you] spend buying food? (minutes).”

occupation in 1993 was as a self-employed owner-manager with employees, or as a self-employed independent operator without employees. In our study, 303 wives (24%) of the 1,288 men, and 463 husbands (36%) of the 1,286 women were employed in 1993. Only a small number of them changed their employment types (28 wives of the 1,288 men, and 56 husbands of the 1,286 women) from 1993 to 1997.

Table 1 presents the summary statistics for the main variables in the sample for the years 1993 (before the reform) and 1997 (after the reform). Columns 1 to 4 are for the men, and columns 5 to 8 are for the women. On average, the men were slightly older than the women. The average family size was roughly five. Due to space limitations, we do not describe the demographic structure variables in detail, and we refer readers to Table 1 for this information.

As shown in Table 1, on average, men worked almost the same time as women, but they spent much less time on housework in both 1993 and 1997. To provide more detail, in Table 2 we list the summary statistics of weekly working hours and housework hours by year (1993 versus 1997) and employment type (employed versus self-employed). We can see that the weekly working hours of self-employed men remained almost the same between 1993 and 1997 (roughly 39 hours), but the weekly working hours of employed men decreased from 50 hours to 43 hours. The weekly working hours of self-employed women were also similar between 1993 and 1997 (42 hours in 1993 and 41 hours in 1997). However, the weekly working hours for employed women decreased from 48 hours in 1993 to 43 hours in 1997. From Table 2, we can see that men spent far fewer hours on housework than women. In both survey years, the weekly housework hours were roughly 3 for self-employed men and 4 for employed men. In contrast, self-employed women spent 24 hours per week on housework in 1993, and 20 hours in 1997, and the employed women spent 17 hours in 1993 and 14 hours in 1997.

5. Empirical Strategy

We start with the following linear regression:

$$Y_{it} = \alpha_i + Year_{97} + \beta_1 * SWH_{it} + \beta_2 * X_{it} + \beta_3 * Employed_{i93}^{own} * Year_{97} + \varepsilon_{it} \quad (5)$$

where Y_{it} is a vector of the outcome variables for individual i in year t ; α_i is the individual

fixed effect, which absorbs any individual-level time-invariant factors; $Year_{97}$ is a year dummy for the year 1997, to control for any time-specific shocks; SWH_{it} is the weekly working hours of the spouse of individual i in year t ; β_1 , which is the coefficient of SWH_{it} , is the variable of most interest in our study; X_{it} is a vector of several variables, including family size, household demographic structure, age squared, and spousal age squared.¹⁵ To absorb the effect of the policy change on an individual's working hours and housework hours, we include the interaction of an indicator for being employed in 1993 and the year 1997 dummy, $Employed_{i93}^{own} * Year_{97}$, into the regression. ε_{it} is an error term with a mean equal to 0. The standard errors are calculated by clustering over the community level.¹⁶

The ordinary least squares (OLS) estimates of Equation (5) are biased, because some omitted variables (such as common preferences) are correlated with spousal working hours, and such variables also affect the outcome variables. The policy introduced in 1994–1995 reduced the workweek of employees from six days to five. This policy was implemented by the government, and was thus beyond the individual's control. Therefore, this change provides a good natural experiment that facilitates the construction of our IV. The IV used in our study is $Employed_{i93}^{spouse} * Year_{97}$, which is the interaction of the indicator for a spouse being employed in 1993 ($Employed_{i93}^{spouse}$) and the year 1997 dummy ($Year_{97}$). Essentially, we compare changes in the working and housework hours from 1993 to 1997 for individuals whose spouses were employed in 1993 (whose working hours were exogenously reduced by the policy) and those whose spouses were self-employed in 1993 (and thus unaffected by the policy).

One concern about this IV strategy is that if the policy had not existed, the working and housework hours of individuals whose spouses were employed in 1993 may have followed different time trends from those whose spouses were self-employed in 1993. In other words, our IV may be correlated with pre-existing time trends, thereby leading to biased estimates. To address this concern, we use data from 1989, 1991, and 1993 to test whether different

¹⁵ The demographic structure includes the ratios of male family members aged 0-6, 7-18, 19-60, and over 60, and the same ratios for female family members. The ratio of female family members aged over 60 is omitted to avoid collinearity. As age and spousal age are collinear with the individual fixed effect and the year dummy, we control for age squared and spousal age squared in the regressions.

¹⁶ There are 130 communities in our sample.

pre-existing time trends existed (see Section 7.1).

The second concern is that the workweek reduction policy could have induced individuals to change their employment type (from being employed/self-employed to self-employed/employed), and such change could induce bias into our estimates. For example, if a spouse changed from being employed in 1993 to self-employed in 1997, our estimates would be downward biased. However, this possibility should not be a serious issue, because only a small number of individuals in our sample changed their employment type (28 wives of the 1,288 men and 56 husbands of the 1,286 women). To address this concern, we conduct a robustness check by using individuals whose spouses did not change their employment types (see Section 7.2).

The third concern is that the effects of this policy may have been contaminated by the effects of other events in the same period, leading to bias in the estimates. One event was the dramatic decline in TVEs in 1995–1996 (see Huang, 2008), which may have caused many employees to lose their jobs or become self-employed. As discussed in the paragraph above, such change could lead to bias in our estimates. We therefore use the aforementioned strategy to address this concern as well.

Another event that could potentially affect our results was the SOE reform, which shut down or privatized many small and medium-sized SOEs and laid off their workers. This reform is not a big issue for our study, as it started in 1998 (Hsieh and Song, 2015), one year after our post-reform year of 1997. However, a concern remains that SOE workers could have experienced reduced working hours during 1997, in expectation of the upcoming SOE reform. For example, among individuals whose spouses were employed by SOEs in 1993, the reduction of the spouses' working hours could have been larger than that induced by the workweek reduction policy. Such a change would cause an upward bias in our estimates. To address this concern, we investigate whether there was a greater reduction in working hours for SOE workers than for other employed workers (see Section 7.3).¹⁷

One caveat to bear in mind is that if employees spent their extra time after the policy change on self-employed work, this could have crowded out existing self-employed workers,

¹⁷ SOE workers include individuals employed by state institutes, as the CHNS does not differentiate between these two types of workers.

and therefore reduced their working hours as well. In this sense, our estimates should be considered as the lower bound.

6. Results

6.1. Impact on the Probability of Having a Job

We first investigate the impact of spousal labor supplies on the probability of having a job, by focusing on the IV estimates.¹⁸

The first-stage results for the male and female samples are shown in columns 1 and 3 (respectively) of Table 3. We can see that the coefficients of the interaction between the dummy for a spouse employed in 1993 and the year 1997 dummy are -7.234 and -9.198, both of which are significant at the 1% level. The F -values of the test for weak IV are 23.37 and 39.83, both of which exceed the conventional threshold. These results show that the policy significantly reduced the weekly working hours.

Table 4 shows the IV estimates for the impact of spousal labor supply on the probability of having a job. We can see that the coefficients of the spousal labor supply are not significant for the male or the female samples. The magnitudes are also small, equal to 0.002 (for the male sample) and -0.000 (for the female sample). These results show that the impact of the spousal labor supply on the probability of having a job was negligible. Therefore, in the remaining part of our analysis, we focus on individuals who had a job.

6.2. Impact on Weekly Working Hours and Housework Hours

6.2.1. Graphical Results

We plot the average weekly working hours and housework hours for male and female samples in Figure 2. Panels A and B show the working hours and housework hours (respectively) for the male sample. Panels C and D show the working hours and housework hours (respectively) for the female sample. In each graph, we separately plot the working hours and the housework hours for individuals whose spouses were employed or

¹⁸ The OLS results are shown in Appendix Table B.

self-employed in 1993.

First, we can see that there is no difference in the pre-existing time trends of working hours or housework hours between individuals whose spouses were employed or self-employed in 1993 (before the policy change) for either the male or the female sample. It provides evidence for the validity of our identification.

Second, in Panel A we can see that the weekly working hours for individuals whose spouses were employed or self-employed both decreased after the policy change. This decline might have happened because some individuals in each of these groups were employed in 1993, and were therefore affected by the policy change as well. In our regressions, we control for whether individuals were employed in 1993 (interacted with a year 1997 dummy) to address this concern. However, we can see that the working hours for individuals whose spouses were employed in 1993 decreased less than the hours worked by individuals whose spouses were self-employed in 1993. This finding shows that individuals whose spouses were employed in 1993 might have responded to the policy change by working more. In that case, it would seem that spousal labor supplies can be substitutionary. In Panel B, we can see that time spent on housework by men with spouses employed in 1993 decreased more. This pattern shows that when spouses have more time to spend on housework, the men tend to reduce the time they spend on housework.

Third, in Panel C we can also see a decrease in working hours for women whose spouses were employed or self-employed in 1993. However, the working hours of women whose spouses were employed decreased no more than the hours worked by women whose spouses were self-employed. This set of findings suggests that the substitution of women's working hours to their spouses was not as strong as the substitution of men's working hours to their wives. In Panel D, we can see a clear decrease of housework hours for women whose spouses were employed in 1993, compared with those whose spouses were self-employed in 1993. This pattern shows that women tend to spend less time on housework when their husbands have more time to do housework.

We should note that although Figure 2 provides visual results, we cannot control for other variables in graphs. Therefore, we rely on the regression results presented below.

6.2.2. OLS Results

Using the sample of individuals having a job, we first estimate Equation (5) by using OLS. The results are shown in Appendix Table C. We can see that the coefficient for weekly spousal working hours is 0.520 for the male sample, which is significant at the 1% level (column 1). However, the effect of the wives' working hours on their husbands' housework hours is -0.005, and not significant, as shown in column 2. Columns 3 and 4 show the coefficients reflecting the effects of husbands' weekly working hours on their wives' weekly working hours and their hours spent doing housework, which are 0.522 and 0.045, respectively, and significant at the 1% level. However, as we know that the OLS results are biased due to the endogeneity problem, we rely on the results estimated by using the IV strategy.

6.2.3. IV Results

The first stage results for individuals who had jobs are shown in columns 2 and 4 of Table 3. We see that in the male and female samples, the coefficients of the dummy for a spouse employed in 1993 and a year 1997 dummy are -6.290 (for the male sample in column 2) and -8.916 (for the female sample in column 4), both of which are significant at the 1% level. The F -values for weak IV are 20.01 and 82.74, respectively. These results, again, show that the new policy did reduce the weekly working hours of employed workers.

Table 5 shows the IV results. Columns 1 and 2 show the male sample, and columns 3 and 4 show the female sample. Spousal working hours show a negative effect of -0.402 on the males' working hours, with significance at the 10% level. This finding means that for each one-hour increase in their spouses' working hours, men's working hours decreased by 0.402 hours. As discussed in Section 3, this negative effect means that the substitution effect of a couple's time put into housework exceeded the complementary effect of leisure for the couple. Column 2 shows that the coefficient of spousal working hours is 0.413 for men's housework hours, meaning that a one-hour increase in the working hours of wives increased men's time spent on housework by 0.413 hours, with significance at the 1% level. This result also suggests that the increase in their wives' working hours decreased the men's leisure time

by 0.011 hours (0.413 minus 0.402). Columns 3 and 4 show the results for the female sample. We can see that the husbands' working hours had a negative effect on their wives' working hours, although it is not precisely estimated. However, the husbands' working hours had a significant positive effect on their wives' housework hours, with a coefficient of 0.358.

In addition to these results, Table 5 shows the direct effects of the new policy on men's and women's working and housework hours. For men, the coefficients for the interaction of their employment status in 1993 and the year 1997 dummy are -8.755 for working hours (column 1) and 2.483 for housework hours (column 2), with both coefficients being significant at the 1% level. For the women, these coefficients are -6.176 for working hours (column 3) and 3.494 for housework hours (column 4), with significance at the 1% and 5% levels, respectively. These results show that for both men and women who were employed in 1993, the policy reduced their working hours but increased their housework hours.

6.2.4. Reduced Form Results

The results from the reduced form regressions (shown in Table 6) confirm our findings. As before, columns 1 and 2 show the results for men. The coefficient for the interaction of a spouse's employment status in 1993 and the year 1997 dummy is 2.530 for working hours (with significance at the 10% level), and -2.388 for housework hours (with significance at the 1% level). The results for the female sample are presented in columns 3 and 4. For working hours, the coefficient on the interaction of a spouse's employment status in 1993 and the year 1997 dummy is 0.400, but this coefficient is not significant. For housework hours, the coefficient is -3.253, with significance at the 1% level.

These results indicate that men whose wives were employed in 1993 (and therefore affected by the new policy) increased their working hours but reduced their housework hours. In contrast, the women whose husbands were affected by the policy did not reduce their working hours, but they too decreased their housework hours.

6.3. Heterogeneous Effects

We investigate the average effects of spousal labor supply on an individual's labor

supply and housework hours. However, we note that these effects may differ across various characteristics. Therefore in this section, we conduct several heterogeneous tests.

Having 0- to 12-year old children. We split the whole sample into two groups: those with children aged 12 or under in 1993, and others. Then we replicate the analysis shown in Table 5 for each group. The results are shown in Table 7. We can see from Panel A (the male sample) that the wives' working hours had a significant effect on the housework hours of men who had children aged 12 or under. Similarly, Panel B (the female sample) shows that the husbands' working hours significantly affected their wives' housework hours only if they had children aged 12 or under. Our findings are consistent with those of other studies, such as those by Lundberg (1988) and by Goux, Maurin, and Petrongold (2014), which find that the existence of children reinforces the interactions between couples.

Living with parents. Next, we divide the whole sample into two other groups: those who lived with their parents, and those who did not. The estimation results from using these two separate samples are shown in Table 8. In China, parents commonly support their children by helping them with housework (Lei et al., 2015). Therefore, we can expect that living with parents should weaken the substitution effect of one spouse's housework time on that of the other spouse. Indeed, we can see from Panel A (the male sample) and Panel B (the female sample) in Table 8 that spousal working hours had significant positive effects on an individual's housework hours only when that couple was not living with parents. Moreover, for the male sample, the weekly working hours of the wife had a slightly significant negative effect on the male's weekly working hours when he was not living with his parents.

Spouse's working hours in 1993. In the main analysis, we essentially compare individuals with employed (affected by the policy change) and self-employed (unaffected by the policy change) spouses in 1993. However, within individuals with employed spouses, they could be affected differently, depending on their spouses' working hours in 1993. For example, the reduction of working hours for a spouse who worked 48 hours is different from that who worked 45 hours in 1993. To investigate this issue, we calculate reduced weekly working hours as weekly working hours in 1993 minus 40 if weekly working hours exceeded 40, and 0 otherwise. The reduced weekly working hours for self-employed spouses equaled 0 as well. We then regress weekly working hours and housework hours on the interaction of

spousal reduced working hours and the year 1997 dummy, controlling for the same variables used in Equation (5). The results are reported in Table 9. We can see that the coefficient of this interaction is significantly positive for the male sample (column 1), which means that the more the working hours of their wives were reduced, the more the men worked. This finding is consistent with our previous finding that male working hours are substitutes to their wives' working hours. We can also see in columns (2) and (4) that the coefficients of the interaction term are both significantly negative, which means that the more a spouse's working time was reduced, the less time the other individual spent on housework. This result is also consistent with our previous finding in Table 5.

7. Robustness Checks

7.1. Testing for Pre-existing Time Trends

One concern in this study is that the working and housework hours of persons whose spouses were employed in 1993 may have followed a different time-trend from persons whose spouses were self-employed in 1993, if there had not been such a change in working hours policy. In other words, our IV could be correlated with unobserved time trends, which could lead to biased IV estimates. In this section, we investigate whether these pre-existing time trends were indeed different.

We use data from 1989, 1991, and 1993, and estimate the following equation:

$$Y_{it} = \alpha_i + \sum_{t=89,91} Year_t + \sum_{t=89,91} \gamma_t * Employed_{it}^{spouse} * Year_t + \sum_{t=89,91} \beta_t * Employed_{it}^{own} * Year_t + \delta * X_{it} + \varepsilon_{it} \quad (6)$$

In Equation (6), *Year* is a dummy variable. The other variables are defined as they are in Equation (5). The results of the estimation are shown in Appendix Table D. We can see that for both the male and the female samples, no coefficients of the dummy for spousal employment status in 1993 with the year dummies for 1989 and 1991 are statistically significant. These results provide evidence that the time trends in working hours and housework hours were not different for individuals whose spouses were employed or self-employed in 1993.

7.2. Changes of Employment Type Due to the Policy

The workweek reduction policy could induce individuals to change their type of employment (from being employed/self-employed to being self-employed/employed). Such changes could lead to bias in our estimates. For example, if a spouse changed from being employed in 1993 to self-employed in 1997, then our estimates would be downward biased. However, this issue should not be serious, because only a small number of individuals in our sample changed their employment type (51 men and 25 women among 2,286 individuals). Even so, in this section we conduct a robustness check by using individuals whose spouses did not change their type of employment. Using this sample, we estimate the same regressions reported in Table 5. Table E in the Appendix shows the results, which are similar to those given in Table 5. These results suggest that a change in a spouse's employment type does not affect the estimates.

7.3. The Effects of Concurrent Events

The effects of the workweek reduction policy may also be contaminated by other events happening in the same period, which could lead to bias in the estimates. Two such events stand out: the dramatic decline of TVEs in 1995 to 1996 (Huang, 2008), and the SOE reform of 1998 (Hsieh and Song, 2015).

Decline of TVEs. The decline of TVEs may have caused many employed workers to lose their jobs or to become self-employed. For example, for individuals whose spouses were employed in 1993, those spouses could have become self-employed by 1997. Our estimates would be upward biased if, on average, people worked more when their spouses were self-employed. The estimates would be downward biased if they worked less when their spouses were self-employed. This concern is probably minor, because there are only a few cases of changes in employment type in our analysis (accounting for less than 5% of our sample). Moreover, the results shown in Section 7.2 (Table E in the Appendix) suggest that changes in employment type do not affect our estimates.

SOE reform. The SOE reform should not be a concern for our study, as this reform

started in 1998 (Hsieh and Song, 2015), one year after our post-reform year of 1997. However, SOE employees could have experienced reduced working hours during 1997, in expectation of the reform. That is, for individuals whose spouses were employed by SOEs in 1993, the reduction of working hours of their spouses could have been larger than that induced by the workweek reduction policy. In that case, our estimates would be upward biased. To address this concern, we investigate whether SOE employees had a greater reduction in working hours than did other employees.¹⁹ The results are shown in Table F of the Appendix. The *F*-test shows that there was no significant difference between the reductions in working hours for SOE and non-SOE employees.

8. Channels

8.1. Intensive Margin versus Extensive Margin

As shown in Table 5, an individual's working hours tended to decrease when his or her spouse's working hours increased. We explore whether an intensive margin or extensive margin dominates this pattern. In other words, we seek to determine whether the dominant change was in working hours within each job, or in the number of jobs held. In this section, we investigate how spousal working hours affected both working hours in a primary job, and the probability of having a second job. The results are shown in Table 10, with columns 1 and 2 showing the male sample, and columns 3 and 4 showing the female sample. The outcome variable in columns 1 and 3 is working hours in the primary job, and the outcome variable in columns 2 and 4 is an indicator of having a second job. We can see from this table that for both men and women, an increase in spousal working hours did not significantly affect working hours in the primary job, but it did significantly decrease the probability of having a second job.

8.2. Effects on Different Housework Components

As shown above, spousal working hours have significant positive effects on the other

¹⁹ SOE workers include individuals employed by state institutes, as the CHNS does not differentiate between these two types of workers.

individual's housework hours. The CHNS data include detailed information on time spent on different housework duties. We investigate which housework duties were most affected by the changes in spousal working hours. This question is interesting in itself, and it helps us to understand time allocation within households. Table 11 shows the results. We investigate four outcome variables: time spent obtaining food, cooking, doing laundry, and caring for children. Panel A shows the male sample, and Panel B shows the female sample. We can see that spousal working hours had a significant positive effect on the time that men spent cooking and caring for children. For women, spousal working hours significantly increased the time they spent washing clothes.

9. Conclusion

By exploiting a policy change in 1994–1995 that reduced the workweek for employed workers from six days to five, and by using a panel of individuals collected by the CHNS, we identify the effects of one spouse's labor supply on the other spouse's labor supply, and on the time spent doing housework. We find a significant decrease in men's labor supply in response to a one-hour increase in their wives' labor supply. However, an increase in a husband's labor supply had no significant effect on his wife's labor supply. In contrast, a one-hour increase in a spouse's labor supply led to a significant increase in the time spent on housework by both men and women.

Our findings suggest that neglecting the substitution effects of spousal labor can lead to overestimating the aggregate effects of government policies that target specific groups in the general population. A simple back-of-the-envelope calculation shows that the government may project 1.6 times more resources needed to achieve its goals when those goals are set with consideration for substitution effects.

One question remains unanswered and needs future exploration. Unlike the complementarities of the spousal labor supply that Goux, Maurin, and Petrongold (2014) find on the basis of French data, our results show substitution effects of spousal labor supply. One possible reason for our findings could be the different levels of economic development in France (a developed country) versus China (a developing country). Higher incomes in France

might make it possible to work less while the spouse also works less, so that both can enjoy more leisure time together. Another possible reason for our finding could be the cultural difference between France (a Western country) and China (an Eastern country). In France, if one spouse has more time off work, the couple may be more likely to spend extra time together on activities such as eating out or other entertainments, so that the complementarity of spousal leisure time dominates the substitution effects of spousal time spent on housework, as is suggested by Goux, Maurin, and Petrongold's findings on the spousal labor supply (2014). Although our paper does not further explore these underlying reasons, it could be a potential direction of future research.

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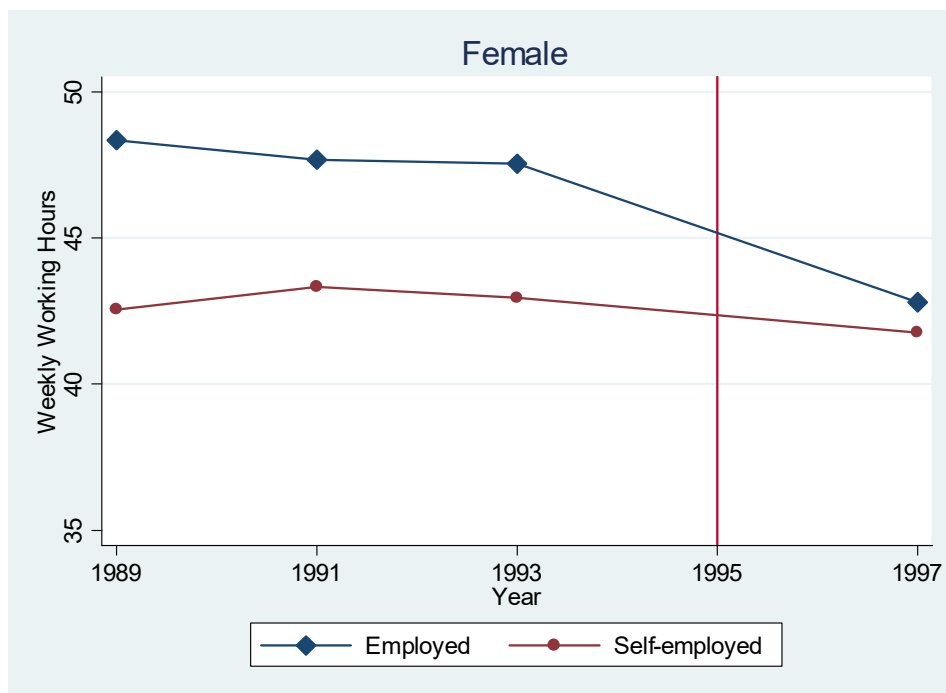
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Figure 1. Impact of Workweek Reduction Policy on Weekly Working Hours

Panel A. Males



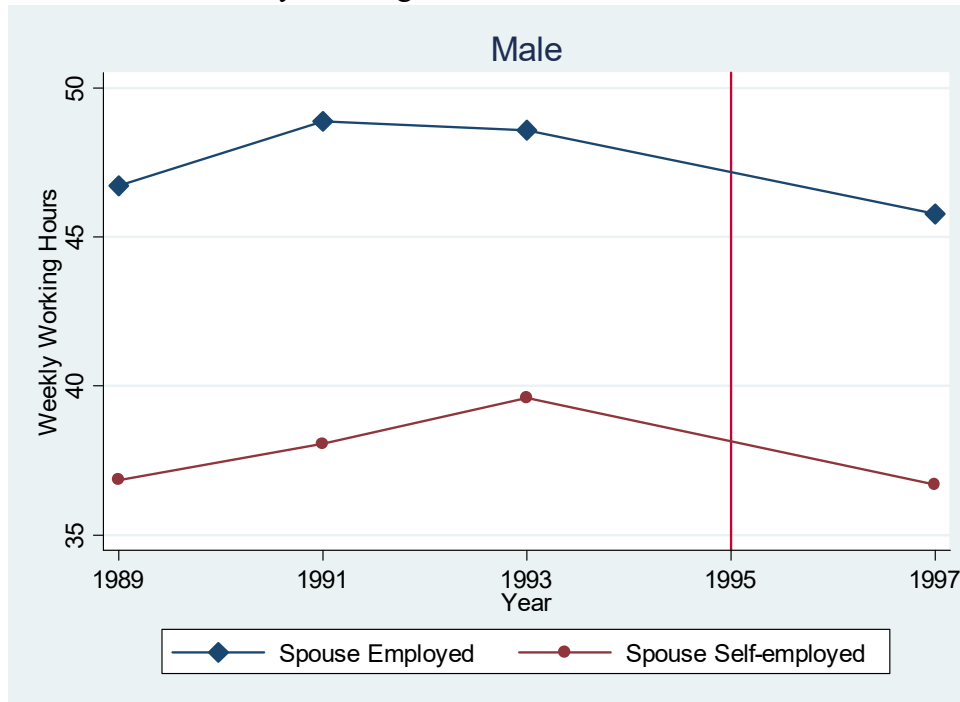
Panel B. Females



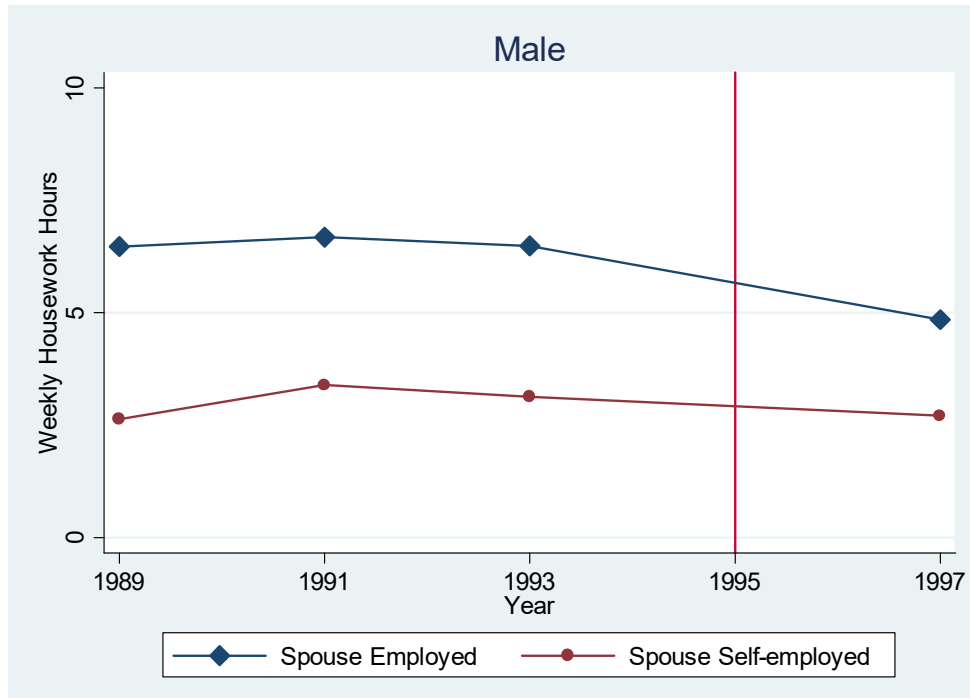
Data Source: CHNS

Figure 2. Impact of Spouse's Employment Type on Weekly Working Hours and Housework Hours

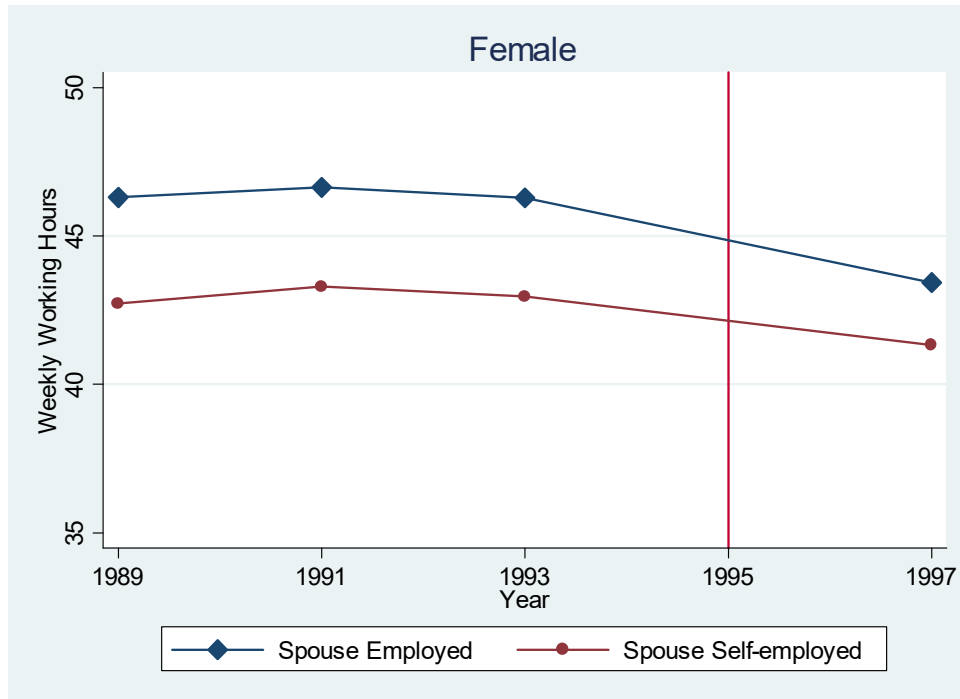
Panel A. Male Weekly Working Hours



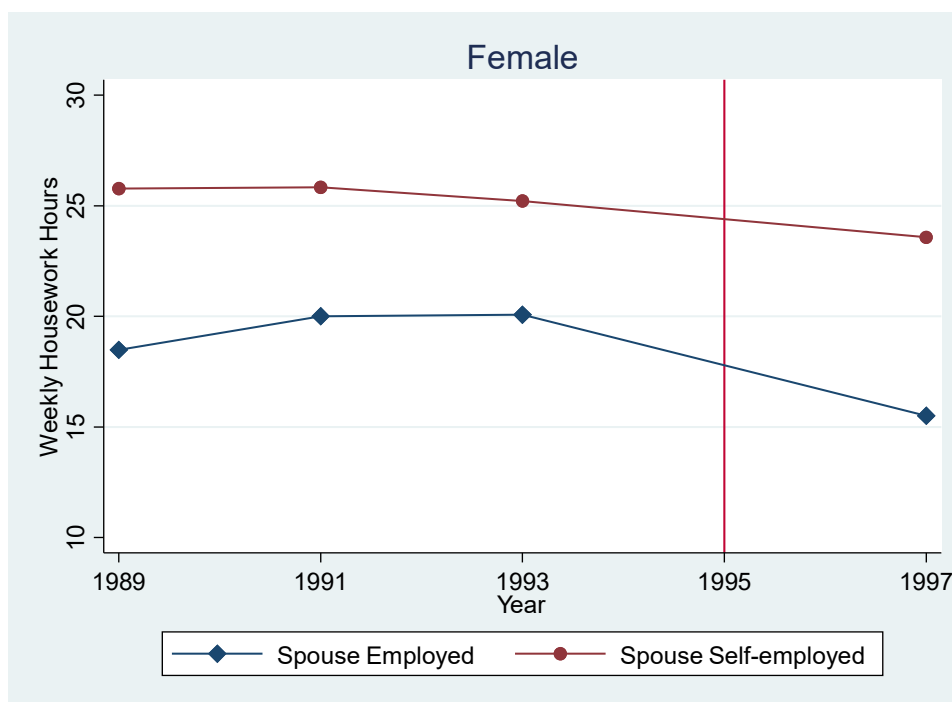
Panel B. Male Weekly Housework Hours



Panel C. Female Weekly Working Hours



Panel D. Female Weekly Housework Hours



Data Source: CHNS

Table 1. Summary Statistics

	Male				Female			
	1993		1997		1993		1997	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Having a job	1	0	0.985	0.121	1	0	0.925	0.263
Employed	0.326	0.469	0.311	0.463	0.253	0.435	0.233	0.423
Spouse having a job	1	0	1	0	1	0	1	0
Spouse employed	0.235	0.424	0.238	0.426	0.360	0.480	0.342	0.474
Weekly working hours	42.115	22.339	40.471	21.096	43.263	22.269	41.864	21.448
Spouse weekly working hours	43.232	22.381	41.766	21.387	42.539	21.556	40.707	20.932
Weekly housework hours	3.761	8.599	3.263	7.221	22.113	18.777	18.630	13.362
Spouse weekly housework hours	22.113	18.820	18.193	12.792	3.656	8.573	3.098	6.950
Annual income (yuan)	4,929.594	5,266.060	6,967.770	7,026.428	4,156.253	4,249.391	5,321.395	4,887.343
Spouse annual income (yuan)	4,087.748	4,116.408	5,396.773	5,221.045	4,833.259	5,073.735	6,708.998	5,879.546
Age	38.885	8.200	42.885	8.200	37.616	7.870	41.616	7.870
Spouse age	37.227	7.897	41.227	7.897	39.304	8.190	43.304	8.190
Family size	4.852	1.469	4.811	1.485	4.816	1.431	4.771	1.449
Ratio of 0-6 year-old male members	0.063	0.110	0.025	0.071	0.062	0.110	0.024	0.070
Ratio of 7-18 year-old male members	0.135	0.148	0.144	0.152	0.134	0.149	0.140	0.152
Ratio of 19-60 year-old male members	0.289	0.109	0.318	0.134	0.291	0.110	0.324	0.137
Ratio of above 60 year-old male members	0.019	0.055	0.019	0.055	0.019	0.055	0.018	0.055
Ratio of 0-6 year-old female members	0.049	0.103	0.019	0.061	0.048	0.102	0.019	0.062
Ratio of 7-18 year-old female members	0.117	0.144	0.121	0.147	0.116	0.145	0.118	0.148
Ratio of 19-60 year-old female members	0.297	0.110	0.322	0.126	0.297	0.111	0.325	0.128
Ratio of above 60 year-old female members	0.031	0.069	0.032	0.072	0.032	0.070	0.031	0.072
Number of observations	1,288		1,288		1,286		1,286	

Table 2. Weekly Working Hours and Housework Hours by Employment Type and Year

		Weekly Working Hours		Weekly Housework Hours	
		Mean	S.D.	Mean	S.D.
		<u>Male</u>			
1993	Self-employed	38.561	24.944	3.409	8.528
1997	Self-employed	39.027	23.333	2.618	5.980
1993	Employed	49.552	11.867	4.414	8.546
1997	Employed	42.871	15.099	4.452	8.955
		<u>Female</u>			
1993	Self-employed	42.007	24.994	23.956	19.820
1997	Self-employed	41.489	23.548	19.629	13.303
1993	Employed	48.150	10.677	16.719	14.150
1997	Employed	42.905	11.876	14.022	10.895

Note: This table uses male and female samples having jobs.

Table 3. First Stage: Impact of Workweek Reduction Policy on Labor Supply

	(1)	(2)	(3)	(4)
<u>Dependent Variable: Spouses' Weekly Working Hours</u>				
	Male Sample		Female Sample	
Spouse employed in 1993*Year1997	-7.234*** (1.496)	-6.290*** (1.406)	-9.198*** (1.457)	-8.916*** (0.980)
Employed in 1993*Year1997	1.274* (0.635)	0.400 (0.793)	2.226 (1.853)	2.530* (1.432)
Year 1997	16.933*** (1.830)	17.806*** (2.204)	8.328*** (2.623)	9.024*** (1.499)
Age squared	-0.018 (0.015)	0.004 (0.012)	-0.042*** (0.012)	-0.029** (0.014)
Spousal age squared	-0.035*** (0.012)	-0.061*** (0.010)	0.017 (0.012)	0.000 (0.016)
Constant	94.749*** (6.072)	95.721*** (7.386)	61.293*** (14.356)	61.328*** (5.714)
Observations	2,576	2,286	2,572	2,286
R-squared	0.575	0.589	0.588	0.580
F for weak IV	23.37	20.01	39.83	82.74

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note:

(1) In all regressions, the individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

(2) Columns (1) and (3) use samples with and without jobs, and therefore they represent the first-stage results for Table 4. Columns (2) and (4) use samples with jobs, and therefore they represent the first-stage results for Table 5.

Table 4. Impact of Spousal Working Hours on Own Work Status

Dependent variable	(1)	(2)
	Male	Female
Spousal working hours (Spouse employed in 1993*Year1997 as an IV)	0.002 (0.002)	-0.000 (0.001)
Employed in 1993*Year1997	-0.009 (0.006)	-0.131*** (0.021)
Year1997	0.012 (0.014)	0.151*** (0.048)
Age squared	-0.000 (0.000)	-0.001*** (0.000)
Spousal age squared	0.000 (0.000)	0.000 (0.000)
Constant	1.053*** (0.149)	2.143*** (0.292)
Observations	2,576	2,572

Robust standard errors (in parentheses) are calculated by clustering over community. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 5. Effect of Spousal Working Hours on Own Working and Housework Hours: IV

	(1)	(2)	(3)	(4)
	Male Sample		Female Sample	
Dependent variables (per week)	Working hours	Housework hours	Working hours	Housework hours
Spousal working hours (Spouse employed in 1993*Year1997 as an IV)	-0.402*	0.413***	-0.045	0.358***
	(0.212)	(0.144)	(0.063)	(0.102)
Employed in 1993*Year1997	-8.755***	2.483***	-6.176***	3.494**
	(0.720)	(0.472)	(0.994)	(1.410)
Year1997	16.186***	-9.927***	18.211***	-13.727***
	(3.399)	(2.063)	(1.860)	(0.988)
Age squared	0.002	0.011**	-0.062***	0.068***
	(0.015)	(0.005)	(0.008)	(0.008)
Spousal age squared	-0.053**	0.020**	0.004	-0.027***
	(0.023)	(0.008)	(0.009)	(0.008)
Constant	119.628***	-87.558***	120.675***	-57.184***
	(19.625)	(23.566)	(11.962)	(19.617)
Observations	2,286	2,212	2,286	2,110

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 6. Effect of Spousal Working Hours on Own Working and Housework Hours: Reduced Form

	(1)	(2)	(3)	(4)
	Male Sample		Female Sample	
Dependent variables (per week)	Working hours	Housework hours	Working hours	Housework hours
Spouse employed in 1993*Year1997	2.530*	-2.388***	0.400	-3.253***
	(1.432)	(0.842)	(0.793)	(1.061)
Employed in 1993*Year1997	-8.916***	2.545***	-6.290***	4.504**
	(0.980)	(0.686)	(1.406)	(2.022)
Year1997	9.024***	-3.183	17.806***	-11.107***
	(1.499)	(2.101)	(2.204)	(2.274)
Age squared	0.000	0.008	-0.061***	0.058***
	(0.016)	(0.008)	(0.010)	(0.013)
Spousal age squared	-0.029**	0.002	0.004	-0.026*
	(0.014)	(0.011)	(0.012)	(0.015)
Constant	61.328***	-33.384**	95.721***	-36.620
	(5.714)	(15.182)	(7.386)	(25.894)
Observations	2,286	2,212	2,286	2,110
R-squared	0.580	0.607	0.589	0.605

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 7. Effects of Spousal Working Hours on Own Working and Housework Hours: Have Children Aged 0 to 12 versus Others

<u>Dependent variables (per week):</u>	Working hours		Housework hours	
Panel A Male Sample				
	Have children aged		Have children aged	
	0 to 12	Other	0 to 12	Other
Spouse's total working hours/week (Spouse employed in 1993*Year1997 as an IV)	-0.331 (0.205)	-0.801 (0.615)	0.324** (0.160)	0.747 (0.583)
Employed in 1993*Year1997	-7.804*** (0.975)	-13.213*** (3.849)	1.905*** (0.643)	5.998** (2.879)
Year1997	13.425*** (3.590)	18.693** (7.497)	-9.567*** (2.293)	-13.195* (7.120)
Age squared	0.010 (0.024)	-0.030 (0.021)	0.022*** (0.007)	-0.002 (0.029)
Spousal age squared	-0.050 (0.033)	-0.026 (0.022)	0.007 (0.011)	0.040** (0.018)
Constant	68.469*** (23.838)	133.097*** (45.997)	-67.980*** (25.813)	-64.686 (50.844)
Observations	1,648	638	1,592	620
Panel B Female Sample				
	Have children aged		Have children aged	
	0 to 12	Other	0 to 12	Other
Spouse's total working hours/week (Spouse employed in 1993*Year1997 as an IV)	-0.298 (0.229)	0.420 (0.370)	0.574*** (0.199)	-0.040 (0.174)
Employed in 1993*Year1997	-7.033*** (1.775)	-4.493 (2.791)	5.030*** (1.560)	-1.631 (1.170)
Year1997	19.689*** (2.603)	4.560 (5.450)	-20.996*** (3.710)	10.347*** (2.796)
Age squared	-0.075*** (0.022)	0.000 (0.022)	0.084*** (0.023)	0.041** (0.016)
Spousal age squared	0.016 (0.018)	-0.018 (0.027)	-0.023 (0.015)	-0.062*** (0.016)
Constant	94.348*** (13.026)	39.801 (38.613)	-87.770*** (31.518)	117.039*** (17.719)
Observations	1,648	638	1,500	610

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 8. Effects of Spousal Working Hours on Own Working and Housework Hours: Living with Parents versus Other

<u>Dependent variables (per week):</u>	Working hours		Housework hours	
Panel A Male Sample				
	Living with Parents	Other	Living with Parents	Other
Spouse's total working hours/week	-1.438	-0.294*	0.878	0.332***
(Spouse employed in	(1.451)	(0.154)	(0.672)	(0.122)
1993*Year1997 as an IV)				
Employed in 1993*Year1997	-19.770**	-7.428***	6.445**	2.156***
	(8.224)	(0.771)	(3.071)	(0.445)
Year1997	40.823	12.940***	-19.793	-8.489***
	(27.561)	(2.886)	(13.014)	(1.552)
Age squared	-0.262	0.022**	0.090	0.003
	(0.202)	(0.010)	(0.102)	(0.008)
Spousal age squared	0.161	-0.065***	-0.035	0.024**
	(0.158)	(0.019)	(0.084)	(0.011)
Constant	298.044*	94.998***	-154.573*	-76.714***
	(169.781)	(17.780)	(86.827)	(21.133)
Observations	376	1,910	360	1,852
Panel B Female Sample				
	Living with Parents	Other	Living with Parents	Other
Spouse's total working hours/week	0.310	-0.209	-0.242	0.537**
(Spouse employed in	(0.450)	(0.248)	(0.281)	(0.235)
1993*Year1997 as an IV)				
Employed in 1993*Year1997	-4.859	-6.701***	7.957***	2.691*
	(4.040)	(1.740)	(2.652)	(1.496)
Year1997	14.252*	19.442***	-1.608	-15.991***
	(8.002)	(2.781)	(2.314)	(4.332)
Age squared	0.032	-0.092***	-0.006	0.088***
	(0.072)	(0.013)	(0.049)	(0.020)
Spousal age squared	-0.068	0.027**	0.004	-0.040***
	(0.077)	(0.013)	(0.050)	(0.013)
Constant	77.477*	131.890***	25.007	-80.591**
	(46.283)	(19.785)	(33.089)	(35.493)
Observations	376	1,910	346	1,764

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 9. Impact of Spouses' Reduced Working Time

Dependent variables (per week)	(1)	(2)	(3)	(4)
	Male Sample		Female Sample	
	Working hours	Housework hours	Working hours	Housework hours
Spouse reduced working time*Year 1997	0.141** (0.056)	-0.192*** (0.066)	0.064 (0.086)	-0.228*** (0.033)
Employed in 1993*Year1997	-7.972*** (0.623)	1.987*** (0.490)	-6.368*** (1.298)	3.271** (1.438)
Year1997	9.370*** (1.277)	-3.414* (1.838)	17.785*** (2.215)	-11.064*** (2.148)
Age squared	0.000 (0.016)	0.008 (0.008)	-0.061*** (0.010)	0.059*** (0.012)
Spousal age squared	-0.030** (0.015)	0.003 (0.010)	0.004 (0.013)	-0.028* (0.014)
Constant	62.220*** (5.689)	-33.760** (15.121)	95.647*** (7.368)	-35.645 (25.303)
Observations	2,286	2,212	2,286	2,110
R-squared	0.579	0.607	0.589	0.605

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 10. Decomposition of the Cross-hour Effects of Spousal Working Time on Own Working Time

Dependent variables	Male Sample		Female Sample	
	Primary Working	Having a Second	Primary Working	Having a Second
	Hours (1)	Job (2)	Hours (3)	Job (4)
Spousal working hours (Spouse employed in 1993*Year1997 as an IV)	0.114 (0.137)	-0.011*** (0.003)	0.235 (0.242)	-0.007*** (0.002)
Employed in 1993*Year1997	-6.498*** (0.542)	-0.064*** (0.004)	-4.493*** (1.630)	-0.060*** (0.018)
Year1997	8.661*** (2.333)	0.214*** (0.047)	16.656*** (1.795)	0.074** (0.029)
Age squared	0.003 (0.008)	-0.001*** (0.000)	-0.058*** (0.008)	-0.000** (0.000)
Spousal age squared	-0.028** (0.014)	0.001*** (0.000)	0.006 (0.005)	0.000 (0.000)
Constant	64.027*** (12.966)	2.184*** (0.391)	99.782*** (12.617)	0.393 (0.322)
Observations	2,286	2,224	2,286	2,190

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Table 11. Decomposition of the Effects of Spousal Working Hours on Own Housework Hours

<u>Panel A. Male Sample</u>				
Dependent variables (hours/week)	Buy food	Cook food	Wash clothes	Care for children
Spousal working hours				
(Spouse employed in 1993*Year1997 as an IV)	0.046	0.107*	0.008	0.251**
	(0.031)	(0.056)	(0.017)	(0.118)
Employed in 1993*Year1997	0.639***	0.340	0.183**	1.321***
	(0.132)	(0.223)	(0.072)	(0.222)
Year1997	-0.937*	-3.060***	0.184	-6.114***
	(0.518)	(0.855)	(0.212)	(1.923)
Age squared	0.002**	0.004	-0.000	0.005
	(0.001)	(0.003)	(0.001)	(0.004)
Spousal age squared	0.000	0.005	0.000	0.015***
	(0.002)	(0.005)	(0.001)	(0.004)
Constant	-6.440*	-21.760***	0.772	-60.131**
	(3.720)	(5.291)	(1.862)	(24.320)
Observations	2,212	2,212	2,212	2,212
<u>Panel B. Female Sample</u>				
Dependent variables (hours/week)	Buy food	Cook food	Wash clothes	Care for children
Spousal working hours				
(Spouse employed in 1993*Year1997 as an IV)	0.010	0.057	0.142***	0.149
	(0.011)	(0.039)	(0.015)	(0.127)
Employed in 1993*Year1997	0.319	1.155***	0.187	1.832*
	(0.213)	(0.427)	(0.182)	(1.098)
Year1997	0.796**	-2.416***	0.083	-12.190***
	(0.332)	(0.392)	(0.223)	(0.876)
Age squared	0.006***	0.016***	0.009***	0.037***
	(0.001)	(0.006)	(0.003)	(0.005)
Spousal age squared	-0.007***	-0.014**	-0.007**	0.000
	(0.002)	(0.006)	(0.003)	(0.004)
Constant	8.800***	24.674**	4.815	-95.474***
	(3.129)	(9.749)	(7.036)	(6.439)
Observations	2,110	2,110	2,110	2,110

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Appendix A. Impact of the Workweek Reduction Policy on Income

As described in Section 2, the workweek reduction policy described in this study did not involve any income changes. To provide evidence, we estimate the following equation:

$$\begin{aligned} \ln(\text{income}_{it}) = & \alpha_i + \text{Year}_{97} + \mu_1 * \text{Employed}_{i93}^{\text{own}} * \text{Year}_{97} \\ & + \mu_2 * \text{Employed}_{i93}^{\text{spouse}} * \text{Year}_{97} + \mu_3 * X_{it} + \varepsilon_{it} \end{aligned} \quad (\text{A1})$$

In Equation (A1), $\ln(\text{income}_{it})$ is the logarithmic form of the annual income for individual i in year t . For employed workers, the income is individual income (including wages and bonuses) from the primary job, based on which we define employed and self-employed workers (see Section 3); for the self-employed workers, because CHNS only asked questions about total income from each self-employed jobs, then the individual income is defined as average income from the primary job (total income from this job divided by total number of family members involved). Other variables in Equation (A1) are defined as they are in the main text.

The estimation results are shown in Appendix Table A. From this table, we can see that the coefficients of $\text{Employed}_{i93}^{\text{own}} * \text{Year}_{97}$ are not significant. This finding shows that compared with self-employed workers, the policy had no significant impact on the income of employed workers.

Appendix Table A. Impact of Workweek Reduction Policy on Incomes

	(1)	(2)
<u>Dependent Variable: Ln (individual annual income)</u>		
	Male	Female
Employed in 1993*Year1997	0.003 (0.037)	-0.083 (0.057)
Spouse employed in 1993*Year1997	-0.003 (0.048)	0.007 (0.047)
Year 1997	0.581*** (0.066)	0.911*** (0.130)
Spouse age squared	0.000 (0.000)	0.001* (0.000)
Age squared	-0.001*** (0.000)	-0.003*** (0.000)
Constant	10.015*** (0.466)	10.265*** (0.777)
Observations	2,112	2,106
R-squared	0.677	0.650

Robust standard errors (in parentheses) are calculated by clustering over community; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Note: (1) In all regressions, individual fixed effects are controlled. Household demographic structure, including the family size, ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

(2) For employed workers, annual income is total wages and any bonus from a primary job; for self-employed workers, annual income is average income from a primary job.

Appendix Table B. Impact of Spousal Working Hours on Own Work Status, OLS

Dependent variable	(1)	(2)
	Male	Having a job Female
Spousal working hours	-0.000** (0.000)	-0.001*** (0.000)
Employed in 1993*Year1997	-0.016** (0.006)	-0.134*** (0.029)
Year1997	0.038 (0.030)	0.177*** (0.060)
Age squared	-0.000 (0.000)	-0.001** (0.000)
Spousal age squared	0.000 (0.000)	0.000 (0.000)
Constant	1.037*** (0.190)	1.958*** (0.141)
Observations	2,576	2,572

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Appendix Table C. Effect of Spousal Working Hours on Own Working and Housework Hours: OLS

	(1)	(2)	(3)	(4)
	Male Sample		Female Sample	
<u>Dependent variables (per week)</u>	Working hours	Housework hours	Working hours	Housework hours
Spousal weekly working hours	0.520*** (0.024)	-0.005 (0.003)	0.522*** (0.018)	0.045*** (0.007)
Employed in 1993*Year1997	-5.205*** (0.967)	0.940** (0.422)	-3.444*** (1.025)	2.056 (1.440)
Year1997	1.036 (1.210)	-3.665** (1.754)	13.240*** (1.411)	-11.553*** (2.137)
Age squared	-0.003 (0.011)	0.009 (0.008)	-0.052*** (0.009)	0.063*** (0.013)
Spousal age squared	0.001 (0.014)	0.002 (0.010)	0.011 (0.008)	-0.030* (0.015)
Constant	15.408*** (5.078)	-34.676** (16.213)	62.350*** (5.290)	-37.891 (25.882)
Observations	2,286	2,212	2,286	2,110
R-squared	0.694	0.605	0.701	0.606

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Appendix Table D. Testing for Pre-existing Time Trends

	Male Sample		Female Sample	
	Working Hours	Housework Hours	Working Hours	Housework Hours
	1989 and 1991			
	(1)	(2)	(3)	(4)
Spouse employed in 1993*Year1989	1.164 (2.304)	-0.024 (1.149)	-0.918 (3.048)	-2.621 (1.880)
Spouse employed in 1993*Year1991	-0.146 (1.964)	0.612 (1.444)	-1.319 (2.699)	-1.804 (2.744)
Employed in 1993*Year1989	-1.462 (2.736)	0.714 (0.926)	0.114 (3.123)	2.582 (1.903)
Employed in 1993*Year1991	-0.997 (2.527)	-0.319 (1.277)	-1.446 (2.731)	-0.063 (2.638)
Year 1989	-7.178 (5.789)	-4.526** (2.193)	-6.611 (5.702)	-19.161*** (4.565)
Year 1991	-3.965 (3.447)	0.282 (1.304)	-0.139 (3.179)	-1.854 (2.875)
Age squared	0.006 (0.030)	0.006 (0.014)	-0.040 (0.042)	-0.042 (0.026)
Spousal age squared	-0.022 (0.035)	-0.018 (0.014)	0.024 (0.037)	-0.001 (0.027)
Constant	62.626** (29.501)	29.319* (16.574)	55.530* (29.557)	91.127*** (26.633)
Observations	5,430	5,258	5,430	5,129

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Appendix Table E. Sample of Spouses Without Changing Employment Type During the Policy Change

	Male Sample		Female Sample	
	(1)	(2)	(3)	(4)
	Working	Housework	Working	Housework
Dependent variables (per week):	Hours	Hours	Hours	Hours
Spousal working hours				
(Spouse employed in 1993*Year1997 as an IV)	-0.499*	0.349***	-0.117	0.353***
	(0.284)	(0.108)	(0.085)	(0.053)
Employed in 1993*Year1997	-9.544***	2.299***	-5.923***	3.543***
	(1.385)	(0.439)	(1.108)	(1.027)
Year1997	18.343***	-8.782***	18.183***	-11.962***
	(4.425)	(1.792)	(1.873)	(1.181)
Age squared	-0.002	0.008	-0.050***	0.070***
	(0.013)	(0.005)	(0.009)	(0.008)
Spousal age squared	-0.055**	0.019**	-0.009	-0.034***
	(0.025)	(0.007)	(0.011)	(0.009)
Constant	132.552***	-79.062***	140.719***	-47.344**
	(29.151)	(15.978)	(14.037)	(21.753)
Observations	2,236	2,164	2,184	2,045

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.

Appendix Table F. Potential Effects of SOE Reform on Working Hours of SOE Employees

	(1)	(2)
<u>Dependent Variable: Weekly working hours</u>		
	Male Sample	Female Sample
Employed by SOE in 1993*Post	-10.109*** (1.454)	-7.929*** (1.258)
Employed by Non-SOE in 1993*Post	-8.385*** (0.923)	-4.529* (2.416)
Spouse employed in 1993*Post	3.062* (1.532)	0.423 (0.798)
Post	8.875*** (1.570)	17.593*** (2.410)
Age squared	0.002 (0.017)	-0.062*** (0.011)
Spouse age squared	-0.030** (0.014)	0.006 (0.014)
Observations	2,286	2,286
R-squared	0.580	0.590
<i>F</i> -value for null hypothesis:		
Coef. (Employed by SOE in 1993*Post) = Coef. (Employed by Non-SOE in 1993*Post)	1.820	1.501
Prob > <i>F</i>	0.186	0.228

Robust standard errors (in parentheses) are calculated by clustering over community.

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

Note: In all regressions, individual fixed effects are controlled. The household demographic structure, including family size, the ratios of male family members aged 0-6, 7-18, 19-60, and 60 plus, and the ratios of female family members aged 0-6, 7-18, and 19-60 are also included in all regressions. The ratio of female family members aged above 60 is omitted to avoid collinearity.