PROPERTY RIGHTS AND INTRA-HOUSEHOLD BARGAINING

Shing-Yi Wang

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ABSTRACT

This paper examines whether an individual-level transfer of property rights increases the individual's bargaining power within the household. The question is analyzed in the context of a housing reform that occurred in China that gave existing tenants the opportunity to purchase the homes that they had been renting from their state employers. The rights to each housing unit were granted to a particular employee, so property rights were defined at the individual level rather than the household level. The results indicate that transferring ownership rights to men increased household consumption of some male-favored goods and women's time spent on chores. Transferring ownership rights to women decreased household consumption of some male-favored goods.

Shing-Yi Wang
The Wharton School
University of Pennsylvania
3620 Locust Walk
Philadelphia, PA 19104
and NBER
was@wharton.upenn.edu

1 Introduction

Land and housing assets represent a large share of the total value of assets held by households across the world. In the United States, data from the Federal Reserve Flow of Funds Account in 1990 indicate that real estate represented about one-third of household assets. In developing countries, the corresponding numbers are often much higher at 45% of urban wealth in China, 80% of rural wealth in China, 78% of urban wealth in India and 87% of rural wealth in India.[1] The importance of real estate for the economic lives of households has motivated property rights reforms in many developing countries. Such reforms include land titling and privatization programs aimed at encouraging households to maximize their use of land and housing assets.

Research has demonstrated that property rights affect household decision-making, including investments (Besley 1995, Field 2005, Galiani and Schargrodsky 2010, Goldstein and Udry 2008), labor market choices (Field 2007, Wang 2012) and residential decisions (Wang 2011). However, the economics literature on property rights has generally focused on the household as a single agent. In reality, property rights can accrue to individuals within a household rather than to a unitary household unit or in equal proportion to all members of a household. For example, property titles often include only the name of the head of household (Deere and Leon 2001[a], Deere and Leon 2001[b]). In developing countries, the household head is often male; thus, programs that transfer land titles or other forms of property rights to households without careful consideration of intra-household issues may have important implications for gender inequality within households.

This paper examines how individual-level transfers of property rights affect the distribution of bargaining power within the household. Thus, the results contribute to a growing policy debate on structuring property rights reforms to be cognizant of the implications for women's rights in developing countries. Concern for women's rights is behind the growing interest in

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[1]The sources of data for these estimates are the 1995 Urban and Rural Household Income Surveys of China and the National Sample Survey Organization of India in 1991.

mandating that the names of both the husband and wife be included on property registration and other forms of protection of individual rights within households (Field 2003, Deere and Leon 2001[a], Lastarria-Cornhiel 2009, Meizen et al 1997).

Descriptive evidence demonstrates a positive correlation between female ownership of land or housing and her outcomes within the household as measured by domestic violence (Panda and Agarwal 2005). To my knowledge, my analysis is the first to offer a rigorous empirical method for identifying the causal impact of individual-level property rights transfers on the bargaining outcomes of men and women within households. This question is answered in the context of a housing reform that occurred in China that gave existing tenants the opportunity to purchase the homes that had been tied with their employment within the state sector. Rights to each housing unit were granted to a particular employee, so property rights were defined at the individual level rather than the household level. Prior to the reform, people had use rights to the housing units, but the reform gave them full ownership rights including the right to lease, sell and collateralize the property. Using a panel data set, the empirical strategy compares the outcomes of same households before and after the reform, as well as relative to a comparison group of households.

In addition to the literature on the microeconomic effects of property rights, this paper contributes to an understanding of the intra-household bargaining outcomes between men and women.[2] This literature can be broadly separated into two areas. One area considers the determinants of bargaining weights within a couple focus on gender differences in income (Anderson and Eswaran 2009, Browning et al 1994, Duflo 2003, Hoddinott and Haddad 1995, Luke and Munshi 2011, Lundberg, Pollak and Wales 1997, Ponczek 2011, Thomas 1990). The other area of this literature examines individual asset ownership rather than control over income (Thomas, Contreras, and Frankenberg 2002, Fafchamps and Quisumbing 2002, Fafchamps and Quisumbing 2005, Fafchamps, Kebede, and Quisumbing 2009).

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[2]See Basu (2006), Haddad, Hoddinott and Alderman 1997, Manser and Brown (1980) and McElroy and Horney (1981) for the use of bargaining models of intra-household allocation.

This paper falls into the second body of the literature on control over assets and intra-household bargaining outcomes. The existing literature primarily focuses on how the division of assets prior to marriage affects bargaining outcomes. However, the assets that are brought into a union may be endogenous to the marriage outcomes being studied. To my knowledge, this paper is the first to examine an unexpected change in the property rights over assets that occurs after marriage.

2 Institutional Background

2.1 Socialism and Early Housing Reforms

After taking control in 1949, the Communist Party of China nationalized urban land and established a labor market system that guaranteed jobs for workers. Households that already held private ownership rights to their homes retained full property rights over their residences, but the government established public ownership of all new housing stock. Public housing stock was allocated to urban residents through state work units in exchange for nominal rents. During this period, use rights were well recognized and there was very little risk of expropriation by other individuals or by the government (as long as the individuals did not change employers).

Reform began following the death of Chairman Mao Zedong in 1976. The new leadership initiated a gradual reform of the socialist system towards a mixed economy. Recognizing serious problems in the state provision of housing, including shortages, poor management and corruption in distribution (Wang and Murie 1999), the government enacted housing reforms which allows for private construction of housing to occur and the supply of private housing expanded. The first experiments of reforming the public housing system in 1979 entailed the sale of newly built apartments at construction cost in Xian and and Nanning. During the 1980s, several other small-scale housing experiments were piloted in different cities. However, the small-scale attempts at privatizing housing failed because people found the prices too high.

After the political protests in Tiananmen Square in 1989, the central government shifted the discussion about housing reform towards rent increases rather than privatization. The government realized its past attempts at privatization were financially infeasible as well as politically destabilizing (Davis 1993). Davis' interviews with urban residents confirm that the central and municipal governments hid their plans for full commodification of urban housing from the population through the early-1990s. While the experiments of the 1980's demonstrated the government's interest in housing reform, qualitative research suggests that the urban population did not foresee the timing and specific nature of the reform. The quantitative analyses in Wang (2011) and Wang (2012) confirm that anticipation of the housing reform did not affect pre-reform labor market choices.

2.2   Privatization of State-Owned Housing

In July 1994, the State Council announced the procedures for state employers to sell state-owned housing units to existing tenants in all cities in China. Those living in state-owned housing were given the opportunity to buy ownership rights to their current homes. Learning from the negative public response to the small-scale housing experiments of the 1980s, the government allowed work units to set prices for their housing stock below market value with additional discounts based on seniority. Most buyers paid less than 15% of the market value for their homes (China News Analysis, 1998). Analysis using data from the Chinese Household Income Project covering urban areas in eleven provinces in 1995 indicate that the average difference between the market value and the price charged by the government was 24,462 RMB, which is over two times the average annual wages of a household. The direct impact of the reform was to transfer ownership rights over housing to sitting tenants who previously only held use rights.

2.3 Property Rights in Marriage and Divorce

According to the Marriage Law in China, property and other assets acquired during marriage are considered jointly owned. The laws leave unclear whether use rights to housing acquired prior to marriage but converted to full ownership rights during marriage are legally considered to be acquired during marriage and hence joint property or acquired prior to marriage and hence the individual property. This ambiguity suggests that one possible channel through which individual property rights can influence bargaining outcomes is that it affects the well-being of individuals in the case of divorce. In a rational model of Nash bargaining within a household, an individual's endowment of assets associated with a reform can only change bargaining outcomes between husbands and wives if it alters their outcomes under the threat point (Manser and Brown 1980, McElroy and Horney 1981). However, even in the complete absence of individual rights over the property in the case of divorce, the reform may alter outcomes between husbands and wives under a behavioral story of a kind of mental accounting (Thaler 1992, Duflo and Udry 2004). Unfortunately, the limitations of the data, which will be discussed in greater detail in the following section, make it impossible to disentangle the relative contributions of these possible channels.

There is an upward trend in the rate of divorce in China over the sample period, but overall the rates remained low and never exceeded 3% in the sample. The low rates of divorce, however, do not imply that models of intra-household bargaining do not apply during this period in China. What matters in these standard bargaining models is the threat of divorce; in equilibrium, divorce rates may remain low but the threat of divorce may affect the decisions of husbands and wives. Furthermore, alternative models propose that threat points may be non-cooperative marriage rather than divorce (Lundberg and Pollack 1993).

3 Data and Methodology

3.1 China Health and Nutrition Survey

I use a panel data set called the China Health and Nutrition Survey (CHNS). Nine provinces (Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, and Shandong) are covered by the CHNS and these provinces vary considerably in their economic development and geography. Following a multistage, random cluster design, counties were stratified into three levels of income, and a weighted sampling technique randomly selected four counties in each province. In addition, the data include the capital province and one low-income city. The full data set covers approximately 4,400 households in the non-consecutive years 1989, 1991, 1993, 1997, 2000, 2004 and 2006. Thus, the data used in this analysis include three waves before and four waves after the beginning of the housing reform in 1994.

The data set offers several measures of household bargaining outcomes between husbands and wives.[3] First, a measure of individual contributions to household public goods is reflected by the amount of time individuals spend on household chores. The number of minutes that an individual spends on chores includes the time spent on child care, buying food, food preparation and clothes washing. The second measure of bargaining outcomes in the data is consumption spending, specifically on cigarettes, tea, and alcohol.[4]

Table 1 presents summary statistics with data that pools together all available waves of data for heads and spouses in the treatment and controls households. It shows that there are substantial gender differences in time spent on chores. Men spend a little more than one hour per day on chores, and women over three hours per day. It also demonstrates that Chinese men smoke over 9 cigarettes per day as compared with less than 1 by Chinese women. Women in China drink about half as much tea as men. Finally, men drink about 14 times more alcohol

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[3]While the data also include anthropometric measurements of children, the sample sizes are quite small and the data and results are discussed in Appendix A.

[4]Other commonly-used gender-specific consumption measures, such as men's and women's clothing, are not included in this data set.

than women.[5] All of these differences are significant at the 5% level or higher.

There are a few important drawbacks to the data. The sample sizes vary across outcomes because the survey questions covered varied wave to wave. While the questions on time use were asked in all seven waves of the survey, the question on cigarette consumption is asked in 1991 on while the questions on tea and alcohol are asked from 1993 on. Furthermore, the sample size appropriate for the analysis is relatively small, particularly for the sample of households in which only wives are working in the state sector.

3.2   Overview of Empirical Approach

To evaluate the causal impact of the housing reform on household bargaining outcomes, I use a differences-in-differences framework. The idea underlying the identification strategy is to compare the outcome not only before and after the reform, but also between a treatment group and a control group. After the central announcement of the policy change occurred in July 1994, the start of the implementation of the housing reform varied at the regional level. I am unable to exploit this variation because the data set used in this analysis is not collected in the years between 1993 and 1997, and all areas in the data set had implemented the reform by 1997.[6]

The analysis uses an intention-to-treat approach to identify which households received ownership rights. The two treatment groups in the analysis are households that are living in state-owned housing prior to the reform but only one member of the couple (either the husband or the wife) is working in the state sector. There are two comparison groups in the analysis, comprised of households that are not living in state-owned housing where either the male or female head or the spouse of the head is employed in the state sector. The individuals in the comparison groups should not experience a direct effect of the reform of state-owned housing but should absorb other changes occurring in the state sector around the time of the housing

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[5]Alcohol is in units of alcohol proof per week and is a combination of wine, liquor and beer.
[6]See Wang (2012) for details.

reform. Thus, these control groups remove the effect of changes in the wage structure, increases in lay-offs in the public sector, or decreases in provision of other in-kind benefits.

I first combine each treatment group and comparison group by gender. One set of analyses includes the female treatment group ($Property^f = 1$) and the female control group of households not living in state-owned housing where only the wives are working in state sector ($Property^f = 0$). In other words, within a sample of households where the wives are the only ones working in the state sector, the impact of the housing reform is measured by comparing households living in state-owned housing and households living in private housing prior to the transfer of property rights. The second separate set of analyses includes the male treatment group ($Property^m = 1$) and households not living in state-owned housing where only the husbands are working in the state sector ($Property^m = 0$). This pairing of the treatment and comparison groups addresses the concern that households where only wives work in the state sector are different along observable and unobservable dimensions from households in which only husbands work in the state sector or households or households in which both husbands and wives work in the same sector. The key comparisons are between households where the same household member is working in the state sector. These estimates are interesting for policy and provide a useful benchmark for many other papers in the literature that present the estimates separately by gender.

In addition, I examine whether the treatment effect given by the difference-in-difference varies by gender. This is the key test of the unitary household model. Using this comparison between the male and female samples to test the unitary household model relies on the idea that the magnitude of the asset transfer was similar in the male sample and the female sample.[7] Appendix Table 1 shows pre-reform characteristics of the state-owned housing units for the male treatment sample and the female treatment sample. The overall pre-reform market value of state-owned housing units is not statistically different for households in which men hold the

[7]Note that the separated within gender estimates of the program do not rely on this assumption.

housing rights as compared with households in which women hold the rights. However, the magnitude of the gap is not small at 18.8% and some of the characteristics of the homes are significantly different.

3.3 Construction of Treatment and Comparison Groups

While the rights to each housing unit were assigned to a particular person, the data set does not explicitly ask which household member held these rights. I separate the male treatment group ($Property^m = 1$) from the female treatment group ($Property^f = 1$) by identifying households living in state-owned housing with only the head or the spouse of the head employed in the state sector in 1989 (or the next pre-reform wave for which data is available).[8] In the majority of state-owned housing units, both the head and the spouse are employed in the state sector. Because it is not possible to identify which individual held the rights to the property in the CHNS, households in which both the husband and wife are working in the state sector are excluded from the analysis. Households in which both the husband and the wife are working in the private sector are also excluded. Thus, the identification strategy employed in this paper does not make use of about 70% of households in the total sample.

Similarly, the comparison group is defined by households not living in state-owned housing but with one member of the couple working in the state sector in 1989 (or the next pre-reform wave for which data are available). For comparability with the treatment groups, these comparison groups exclude households in which both the husband and wife or neither the husband and wife are employed in the state sector.

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[8]In other words, the cases where the data are missing for 1989, treatment status is defined with the next earliest pre-reform wave (1991 or 1993) for which data are available.

3.4 Validity of Assignment of Treatment Status

The 1995 wave of the China Household Income Project (CHIP) asks the identity of the specific individual in the household that holds the property rights to the state-owned housing.[9] I use the CHIP data to evaluate whether the methodology that I propose for the CHNS accurately identifies the holder of the property rights. I construct the analogous male and female treatment groups using questions on employment and housing status for households in which only one member of the married couple is working in the state sector in the CHIP. Comparing these constructed measures with the identities of the individuals holding property rights based on the direct CHIP survey question, the constructions are accurate for 90% of CHIP households. The small amount of measurement error in the construction of the treatment groups in the CHNS should lead to a downward bias in the results.

3.5 Validity of Empirical Approach

Table 2 presents pre-reform characteristics of the households in the four groups. The first two columns refer to the households in which only the husband is employed in the state sector, and the last two to households in which only the wife is employed in the state sector. Among households with women employed in the state sector, the characteristics of those living in state-owned housing are generally not statistically different from those living in private housing. Female treatment households have on average a slightly smaller household size and an older head of household. There are similar differences in household size and age of the head of household for the male sample. Furthermore, in the male sample, the differences in the intra-household bargaining outcomes are statistically significant for several measures. Regardless of the gender of the individual employed in the state sector, households living in private housing tend to consume more cigarettes, tea and alcohol.

A potential concern is that differences in observable characteristics may suggest the pres-

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[9]I am unable to use the CHIP for the analysis in this paper because it only offers cross-sectional information.

ence of differences in unobservable characteristics. The panel structure of the data allows me to remove the effects of any unobservable factors that are time invariant through the inclusion of household fixed effects. However, the fixed effects approach cannot address time-varying effects of unobservable factors. The comparison of the results for the male sample and the female sample can be helpful in this regard. Given that observable differences between the treatment group and the comparison group are similar for men as for women, it may be reasonable to infer that unobservable differences between the treatment and comparison groups are also similar across gender. If unobservable differences in the treatment and comparison groups are driving the results, then we would expect the impact of the reform to have effects on the measures of bargaining outcomes that have the same sign for men and women. In contrast, if the improvement in property rights is driving the estimated post-reform differences between the treatment and control groups, then we would expect opposite sign effects for men and women.

Furthermore, it is important to note that the identification strategy does not require the characteristics of the treatment and the comparison groups to be identical. Rather, the identification strategy requires that the trends in the outcomes of the treatment group moves in parallel with the comparison group prior to the reform. Figure 1 presents the trends over time for three of the bargaining outcomes available in the data.[10] The data offer three pre-reform waves of data for the share of time spent on chores that is born by wives (row 1). There are two pre-reforms waves of data for household cigarette consumption (row 2). The first column presents the trends for the treatment and comparison group in the sample of households where only the husband is employed in the state sector. The second column presents the same information for the sample of households in which only the wife is state employed. The evidence supports the idea that the trends in the outcomes for the treatment and comparison groups were generally moving in parallel prior to the housing reform.[11]

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[10]The figure omits two bargaining outcomes. It is not possible to examine pre-reform time trends in alcohol consumption and tea consumption because the questions are added to the survey in 1993.

[11]The corresponding regression estimates demonstrate that none of the differences in pre-reform outcomes are significantly different. These results are available upon request.

4   Property Rights and Bargaining Outcomes

To implement the estimation strategy described in the previous section, I estimate the following fixed effects equation:

$$y_{it} = \alpha_1 Property_i^g * Post_t + \delta_t + \alpha_4 \mathbf{x_{it}} + \gamma_i + \epsilon_{it} \tag{1}$$

where i denotes household and t year. $Property^g$ identifies the treatment group where $g = f$ refers to the female sample and $g = m$ the male sample. $Post_t$ is a dummy variable that equals 1 in the periods following the reform, and γ_i are household fixed effects. The vector of covariates, $\mathbf{x_{it}}$, is a quadratic in the age of the household head, the logarithm of household size and an indicator variable for the gender of the head. I also estimate whether the treatment effect given by the difference-in-difference estimated described in equation 1 varies by gender.

The dependent variables are the share of household chores done by women, the logarithm of the one plus number of cigarette consumed per day by the household, the logarithm of one plus the number of cups consumed per day by the household, and the logarithm of one plus the amount of alcohol consumed by the household in a week. In addition, to make general conclusions about the impact of the reform on bargaining power within the household that address the issue of multiple inference, I also present a summary index as a dependent variable. This is an equal average of each of the z-scores of the four variables.[12]

The main results are presented in Table 3. Panel A of Table 3 displays the impact of transferring property rights to men. Increasing property rights to men increases women's share of total time spent on household chores by five percentage points. This effect is statistically significant at the 10% level. In terms of consumption of male-favored goods, the results indicate that increasing property rights held by men leads to an increase in household consumption of tea and cigarettes, but only the results for tea are significantly different from zero at the 5%

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[12]I present the separate outcomes in addition the summary index because the magnitudes of the coefficients on the separate outcomes are easier to interpret.

level. The majority of the results provide evidence suggesting that a transfer of property rights to men increased their subsequent bargaining power in the household. The exception is the results on alcohol, where consumption by households where men received the ownership rights to state-owned housing falls by ten percent relative to households in which men did not receive improvements to their property rights. However, this result is not statistically significant. The impact on the summary index of the four measures is positive and significant at the 5% level.

The corresponding results for women are in Panel B. Given that the sample size is much smaller, it is not surprising that the results are statistically much weaker than the results for men. The impact of transferring property rights to women on the index of the four measures is negative but not significant at the standard levels. The impact on the summary index is not significant at the standard levels. The only single measure for which there is a statistically significant impact at the 5% level is household cigarette consumption. The results indicate that transferring ownership rights to women leads to a large 59% drop in the household consumption of cigarettes. In addition, transferring ownership rights to women corresponds with a 0.9 standard deviation increase in the weight-for-age of girls in the household (see Appendix A). The magnitudes of these effects are quite large. However, this may not be surprising given that the average value of the housing transfer was over two times the income of an average household. The direction of the estimates also indicates that strengthening property rights held by women leads to slight decreases in women's share of household chores, and declines in the consumption of tea and alcohol. However, the results are not very conclusive given the lack of power in the estimates.

Panel C presents the p-value of the test of whether the coefficient on the difference-in-difference estimate in the sample of households where men are state employed is significantly different from the estimate in the sample of households where women are state employed. Based on the summary index, the impact of the reform varies significantly (at the 10% level) by the gender of the recipient. This seems primarily driven by the significant gender gap in the impact

of the reform on cigarette consumption.

The differences in the direction of the effects of ownership rights for households in which women receive the rights (Panel B) and households in which men receive the rights (Panel A) are interesting for several reasons. First, they support the conclusion that the estimated changes in the female share of chores and in consumption of male-favored goods is not driven by a general household-level wealth effect or by general household changes in specialization associated with the transition from renting to owning. If the results were driven by *household*-level changes rather than by shifts in *intra*-household bargaining, then we would expect the results to be the same sign regardless of the gender of the recipient of property rights. Second, the differences in the results for women and for men suggest that the results are not driven by time-varying effects of unobservable differences between the treatment and comparison groups.

The results indicate an interesting possible asymmetry in the uses of increased intra-household bargaining power of women and men. Strengthening women's property rights does seem to increase women's bargaining power, and on average women use this power to decrease their husbands' consumption of cigarettes. Men's bargaining power within the household is also improved when property rights are transferred to them, and they choose to leverage their additional power to drink more tea and do fewer chores.

5 Robustness Checks

Table 2 indicated some significant differences in the characteristics of households in the treatment and the comparison groups. In this section, I examine the possibility that the results may be explained by time-varying effects of the observable characteristics along which the treatment and comparison households are different. For example, in the samples in which only wives are employed in the state sector, the age of the head of household is about seven years older in the treatment group than in the comparison group. The same age gap in the sample in which only husbands are employed in the state sector is only two years. There may be age differences

over age in preferences for consumption of tea and cigarettes. Furthermore, gaps in the level of health of men and women as they age may explain shifts in the gender division of chores.

I deal with this concern by including the interaction of the post-reform indicator and age, household size and gender of the household head in the regressions. The results are shown in Table 4. The magnitude and the significance of the estimates are quite similar after allowing for time-varying effects of the observable characteristics. The exception is the impact of transferring property rights women on households' consumption of alcohol where the results actually become stronger (Panel B). This estimate becomes significant at the 10% level, and indicates that transferring property rights over housing to women decreases the household's consumption of alcohol by over 40%. This is consistent with the interpretation that transferring property rights to women increases her relative bargaining power and leads to decreases in the consumption of male-favored goods. While the impact on alcohol of transferring property rights to women is not significantly different than transferring rights to men (Panel C), the magnitude of the overall difference given by the summary measure is much larger.

6   Alternative Mechanisms

While the gender differences in the results suggest that the mechanism must be occurring at the individual-level, this section considers whether the results are consistent with alternative, individual-level changes associated with housing reform. Wang (2012) shows that the housing reform in China affects individuals' probability of moving from the state sector to the private sector.[13] Prior to the reform, subsidized state-owned housing was tied to an individual's state employer. The reform may have allowed individuals with housing rights to move into jobs with higher wages relative to their spouses. Thus, the main effect of the housing reform may operate through changes in the household composition of wages.

I consider the possibility of a wage-based mechanism by examining the impact of the

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[13]The impact of the reform on job choices did not vary significantly by gender.

gender of the transfer of housing rights on the female share of household earnings. The results are presented in columns 1 and 3 of Table 5. In the sample of households in which only husbands are employed in the state sector, the impact of receiving ownership rights leads to a 2.5 percentage point decline in the wife's share of household income but this is not statistically different from zero. In the sample of households in which only wives are employed in the state sector, the impact of receiving ownership rights translates into an 8.8 percentage point decline in the wife's share of household income. These estimates are not statistically significant at the standard levels, and Panel B shows that the difference between the male and female samples is not significant either. Furthermore, the sign of the impact is the opposite of what we would expect if the gender composition of earnings explained the results on bargaining outcomes.

I also examine the hypothesis that household bargaining outcomes changed as a result of changes in the composition of the household. This could be driven by mobility of some individuals out of the household following the housing reform. Previous research has shown that the reform did lead to an increase in household-level residential mobility (Wang 2012). Finally, I examine the impact of the reform on household size in the male sample and in the female sample in columns 2 and 4, respectively. The dependent variable in columns 3 and 4 is the share of the household that is male. For both variables, the sign of the impact of receiving ownership rights is the same for the male sample and the female sample, and neither is statistically different from zero. Panel B shows that they are not different from each other either. Overall, the results do not support the alternative mechanisms for explaining the results on household consumption of male-favored goods and on the division of household chores.

7 Conclusion

The results of the paper provide some evidence to support the idea that strengthening property rights for individuals also affects their bargaining power within the household. In the context of China, strengthening property rights over housing by granting rights to sell, lease and mortgage

led to different outcomes based on who received the benefit. When women received ownership rights, there were very large decreases in household consumption of cigarettes and alcohol, which are male-favored goods, and improvements in girls' weight-for-age. Giving the same rights to men led to increases in household consumption of a male-favored good, tea, and decreases in the men's contributions to household chores. The large magnitude of the results in this paper may not be that surprising given that the value of the asset transfer was extremely large, at over twice an average household's annual income.

The findings in this paper are consistent with previous findings that reject the model of a unitary household. One contribution of this paper is to offer rigorous empirical evidence highlighting the importance of individual control over assets. Housing assets may be unique from other assets in that people reside on the property in addition to begin about to access the value in a variety of ways. It is a question for future research whether the impact would be similar if a program were to transfer non-housing assets.

The findings of the paper are the most relevant for other countries, particularly in Asia and sub-Saharan Africa, where state-owned housing assets represent a substantial share of the housing stock. However, they are also potentially relevant for titling programs that convert use rights into formal ownership rights. The results highlight the potential importance of the individual that receives the ownership rights for bargaining outcomes within the household.

A   Anthropometric Measurements of Children

Improvements in the earnings of women relative to men have been shown to lead to improvements in the children's outcomes. Duflo (2003) finds that pensions received by South African women increased the anthropometric outcomes of girls only while those received by men had no effect on either girls or boys. Thomas (1990) shows that increases in unearned income by mothers have larger effects on child health than the same income attributable to fathers.

I look at anthropometric measurements of children to examine gender differences in in-

vestments in children in the household. I construct weight-for-age and height-for-age z-scores for boys and and girls aged 18 and under in the households. I also combine both weight-for-age and height-for-age z-scores into a single measure of health for boys and girls. The nutrition literature considers children's height to be a long-run measure of nutrition and health inputs while weight is a short-run indicator. The z-score calculation uses U.S. Center for Disease Control Growth Reference charts from 2000. While these data are available for every wave of the survey, the sample sizes are quite small as the weight-for-age z-scores for girls (boys) are only available for households with at least one girl (boy). Furthermore, the limitations of the data do not allow me to only examine outcomes for children under the age of 60 months, as there would be no variation in the interaction of treatment status and post-reform in the sample of households in which only women are employed in the state sector.

The results are presented in Appendix Table 2. Panel A shows that transferring ownership rights to men does in translate into significant changes in the height or weight of children in the household or to the index measure. In contrast, transferring property rights to women leads to almost a standard deviation increase in the weight-for-age of girls but no corresponding significant impact for boys. The estimates using the index that combines the measures of height and weight tell a similar story. The impact of transferring property rights to women leads to 0.7 of a standard deviation increase in the index of health of girls and this is significant at the 10% level. The gender differences in the results for weight-for-age are very similar to those found by Duflo (2003). Unlike the findings of previous studies on income transfers, the transfer of property rights does not lead to significant changes height-for-age. This may be because rights over asset ownership do not have long-run effects whereas control over income does, or it may be because of the low power offered by the sample including anthropometric measures of children.

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Figure 1: Trends in Bargaining Outcomes

(a) Male Sample

(c) Female Sample
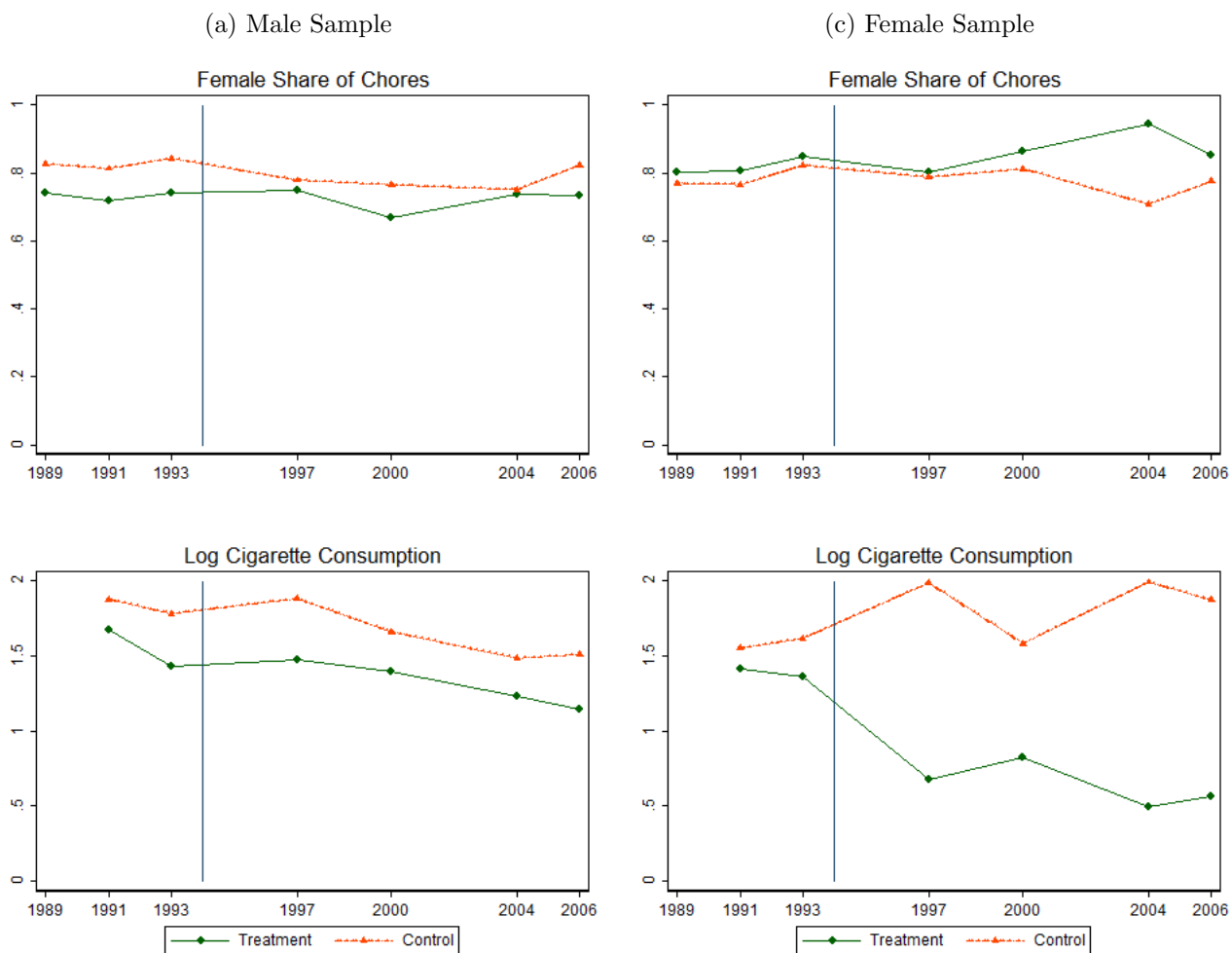
Table 1: Individual Time Use and Consumption by Gender

	Men	Women
Time on Household Chores (minutes/day)	66.36	208.31
	(223.97)*	(333.45)
	N=2630	N=2631
Number of Cigarettes per Day	9.79	0.56
	(10.88)*	(2.81)
	N=1773	N=1932
Cups of Tea per Day	2.38	1.15
	(2.73)*	(1.95)
	N=1274	N=1398
Alcohol Consumption per Week	2.44	0.17
	(4.56)*	(0.99)
	N=1319	N=1420

Notes: Standard deviations in parentheses. N displays the number of observations. * denotes that the male average is significantly different from the female average at the 5% level.

Table 2: Pre-Reform Household Characteristics by Gender and Residence of the State Employee

	Male State Employed		Female State Employed	
	Treatment	Comparison	Treatment	Comparison
Monthly Household Earnings	232.28	227.36	243.52	275.48
	(174.83)	(170.77)	(150.12)	(201.03)
	N=473	N=768	N=140	N=111
Household Size	3.52	4.09	3.51	4.02
	(1.39)*	(1.47)	(1.39)*	(1.52)
	N=586	N=961	N=164	N=131
Age of Head	51.09	49.31	55.92	48.46
	(14.14)*	(13.02)	(14.96)*	(14.43)
	N=582	N=955	N=164	N=128
Education of Head	7.02	6.34	5.40	5.57
	(4.86)*	(4.20)	(4.65)	(4.03)
	N=545	N=928	N=155	N=128
Female Share of Chores	0.73	0.83	0.82	0.78
	(0.34)*	(0.28)	(0.29)	(0.29)
	N=564	N=918	N=159	N=128
Cigarette Consumption	9.98	12.73	7.70	9.50
	(12.18)*	(13.79)	(9.92)	(10.71)
	N=354	N=611	N=101	N=84
Tea Consumption	3.64	4.95	3.80	3.97
	(4.18)*	(5.98)	(4.70)	(4.63)
	N=165	N=291	N=44	N=38
Alcohol Consumption	1.96	2.73	0.91	2.03
	(3.18)	(5.30)	(1.72)	(3.21)
	N=165	N=293	N=43	N=39

Notes: Standard deviations in parentheses. N displays the number of observations. * denotes that the comparison group is significantly different from the treatment group at the 5% level. The consumption measures are at the household level.

Table 3: Effects of Transferring Property Rights on the Division of Chores and Consumption

	Female Share of Chores (1)	Log Cigarette Consumption (2)	Log Tea Consumption (3)	Log Alcohol Consumption (4)	Summary Index (5)
Panel A: Male State Employed Sample					
Property^m*Post	0.049+	0.050	0.200*	-0.123	0.159*
	[0.029]	[0.135]	[0.100]	[0.095]	[0.066]
Year1989	-0.001				0.094
	[0.033]				[0.075]
Year1991	-0.007	0.378**			0.136*
	[0.032]	[0.139]			[0.063]
Year1993	0.017	0.237+	0.397**	0.212*	0.233**
	[0.031]	[0.130]	[0.086]	[0.085]	[0.057]
Year1997	-0.020	0.308**	0.202**	0.242**	0.153**
	[0.029]	[0.106]	[0.078]	[0.076]	[0.048]
Year2000	-0.059*	0.129	0.225**	0.310**	0.097*
	[0.026]	[0.100]	[0.069]	[0.071]	[0.046]
Year2004	-0.049*	0.032	0.016	0.123*	-0.007
	[0.025]	[0.086]	[0.068]	[0.062]	[0.037]
Observations	2495	2135	1597	1626	2696
Adjusted R^2	0.031	0.065	0.077	0.044	0.045
Panel B: Female State Employed Sample					
Property^f*Post	-0.000	-0.589*	-0.033	-0.315	-0.188
	[0.060]	[0.228]	[0.229]	[0.261]	[0.144]
Year1989	-0.009				0.027
	[0.078]				[0.173]
Year1991	-0.001	-0.057			-0.002
	[0.075]	[0.282]			[0.139]
Year1993	0.030	-0.072	0.277	0.150	0.065
	[0.070]	[0.274]	[0.241]	[0.278]	[0.139]
Year1997	-0.017	0.238	0.147	0.434**	0.110
	[0.065]	[0.230]	[0.201]	[0.157]	[0.101]
Year2000	0.017	-0.059	-0.073	0.210	0.014
	[0.056]	[0.231]	[0.176]	[0.134]	[0.098]
Year2004	-0.006	0.055	-0.016	0.214	-0.006
	[0.062]	[0.195]	[0.156]	[0.163]	[0.099]
Observations	438	362	255	259	471
Adjusted R^2	0.042	0.143	0.055	0.059	0.092
Panel C: Comparing Male and Female Estimates					
p-value	0.990	0.074+	0.642	0.739	0.052+

Notes: Robust standard errors clustered by household in brackets. **, *, + denotes significance at the 1%, 5% and 10% level, respectively. Regressions include a quadratic in the age of the head, the logarithm of household size, an indicator for the gender of the head, a constant term and household fixed effects.

Table 4: Impact of Property Rights Allowing for Time-Varying Effects of Observables

	Female Share of Chores (1)	Log Cigarette Consumed (2)	Log Tea Consumed (3)	Log Alcohol Consumed (4)	Summary Index (5)
Panel A: Male State Employed Sample					
Property^m*Post	0.051+	0.091	0.179+	-0.108	0.158*
	[0.030]	[0.141]	[0.101]	[0.099]	[0.069]
Year1989	-0.095				0.073
	[0.097]				[0.194]
Year1991	-0.100	-0.613			0.114
	[0.097]	[0.417]			[0.191]
Year1993	-0.075	-0.756+	-0.749*	-0.382	0.208
	[0.097]	[0.416]	[0.307]	[0.280]	[0.192]
Year1997	-0.023	0.276*	0.199*	0.241**	0.149**
	[0.030]	[0.109]	[0.081]	[0.077]	[0.050]
Year2000	-0.061*	0.102	0.222**	0.308**	0.093*
	[0.027]	[0.103]	[0.072]	[0.072]	[0.047]
Year2004	-0.050*	0.023	0.016	0.124*	-0.005
	[0.025]	[0.088]	[0.069]	[0.063]	[0.038]
Observations	2495	2135	1597	1626	2696
Adjusted R^2	0.031	0.065	0.076	0.043	0.042
Panel B: Female State Employed Sample					
Property^f*Post	-0.008	-0.691**	-0.205	-0.433+	-0.185
	[0.064]	[0.247]	[0.229]	[0.256]	[0.163]
Year1989	0.109				-0.014
	[0.177]				[0.399]
Year1991	0.119	-0.504			-0.039
	[0.176]	[0.828]			[0.378]
Year1993	0.155	-0.502	-0.122	-0.189	0.043
	[0.176]	[0.835]	[0.680]	[0.779]	[0.383]
Year1997	-0.004	0.220	0.125	0.425**	0.144
	[0.066]	[0.236]	[0.206]	[0.152]	[0.099]
Year2000	0.026	-0.061	-0.081	0.207	0.034
	[0.057]	[0.233]	[0.184]	[0.133]	[0.101]
Year2004	-0.005	0.047	-0.009	0.201	0.013
	[0.061]	[0.194]	[0.160]	[0.161]	[0.099]
Observations	438	362	255	259	471
Adjusted R^2	0.046	0.145	0.033	0.072	0.078
Panel C: Comparing Male and Female Estimates					
p-value	0.916	0.049*	0.492	0.711	0.097+

Notes: Robust standard errors clustered by household in brackets. **, *, + denotes significance at the 1%, 5% and 10% level, respectively. Regressions include a quadratic in the age of the head, the logarithm of household size, an indicator for the gender of the head, post times the previous three variables, a constant term and household fixed effects.

Table 5: Effects of Property Rights Program on Division of Income and Household Composition

	Male State Employed (g=m)			Female State Employed (g=f)		
	Female Share of Earnings	Log Household Size	Male Share of Household	Female Share of Earnings	Log Household Size	Male Share of Household
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Estimates in the Male and Female Samples						
Property^g*Post	-0.025	-0.018	-0.013	-0.088	-0.081	-0.021
	[0.040]	[0.037]	[0.016]	[0.111]	[0.104]	[0.041]
Year1989	-0.052	0.345**	0.025	0.176	0.419**	0.092*
	[0.049]	[0.040]	[0.016]	[0.157]	[0.102]	[0.037]
Year1991	-0.043	0.272**	0.024	0.125	0.392**	0.094*
	[0.046]	[0.039]	[0.015]	[0.150]	[0.097]	[0.036]
Year1993	-0.035	0.223**	0.028+	0.139	0.307**	0.081*
	[0.046]	[0.038]	[0.015]	[0.142]	[0.093]	[0.034]
Year1997	-0.020	0.093**	0.025+	0.049	0.163*	0.010
	[0.040]	[0.035]	[0.013]	[0.114]	[0.077]	[0.036]
Year2000	-0.021	0.072*	0.032**	0.060	0.085	0.031
	[0.038]	[0.031]	[0.011]	[0.102]	[0.068]	[0.028]
Year2004	-0.039	0.012	0.022*	-0.149	0.008	0.056*
	[0.043]	[0.027]	[0.010]	[0.102]	[0.074]	[0.024]
Observations	1513	2720	2720	252	474	474
Adjusted R^2	0.010	0.183	0.064	0.136	0.247	0.221
Panel B: Comparing Male and Female Estimates						
p-value	0.442	0.288	0.440			

Notes: Robust standard errors clustered by household in brackets. **, *, + denotes significance at the 1%, 5% and 10% level, respectively. Regressions also include a quadratic in the age of the head of household, an indicator for the gender of the household head, a constant term and household fixed effects.

Appendix Table 1: Pre-Reform Characteristics of State-Owned Housing

	Male Sample	Female Sample
Market Rental Value	63.1	53.1
	(67.0)	(53.4)
Floor Space	45.4	37.5
	(39.9)	(18.9)
Drinking water	0.65*	0.76
	(0.48)	(0.43)
Flushing toilet	0.27*	0.40
	(0.44)	(0.49)
No excreta around dwelling	0.82*	0.96
	(0.39)	(0.20)
Water source from plant	0.66*	0.87
	(0.47)	(0.34)
Age under 20 years	0.81	0.81
	(0.39)	(0.39)
Observations	379	102

Standard deviations in parentheses. * denotes that the female treatment group is significantly different from the male treatment group at the 5% level.

Appendix Table 2: Fixed Effects Estimates of Property Rights and Anthropometric Measures

	Weight-for-Age		Height-for-Age		Health Index	
	Girls	Boys	Girls	Boys	Girls	Boys
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Male State Employed Sample						
Property^m*Post	0.164	-0.003	0.205	-0.078	0.235	-0.049
	[0.261]	[0.176]	[0.253]	[0.195]	[0.242]	[0.155]
Year1989	0.512	0.226	0.083	0.096	0.574	0.268
	[0.356]	[0.201]	[0.380]	[0.270]	[0.363]	[0.187]
Year1991	0.082	-0.045	-0.198	-0.073	0.171	-0.059
	[0.329]	[0.174]	[0.371]	[0.246]	[0.334]	[0.163]
Year1993	0.224	0.071	-0.189	0.009	0.241	0.054
	[0.324]	[0.172]	[0.354]	[0.236]	[0.322]	[0.161]
Year1997	0.133	0.157	-0.522	0.132	0.012	0.180
	[0.315]	[0.172]	[0.341]	[0.200]	[0.312]	[0.157]
Year2000	-0.037	0.012	-0.388	0.129	-0.016	0.084
	[0.307]	[0.166]	[0.330]	[0.197]	[0.301]	[0.160]
Year2004	0.214	-0.024	-0.516	-0.410*	-0.028	-0.214
	[0.251]	[0.147]	[0.326]	[0.180]	[0.265]	[0.144]
Observations	528	613	504	581	528	616
Adjusted R^2	0.023	0.039	0.044	0.045	0.039	0.064
Panel B: Female State Employed Sample						
Property^f*Post	0.939**	0.020	0.374	-0.287	0.717+	-0.021
	[0.295]	[0.359]	[0.469]	[0.263]	[0.385]	[0.265]
Year1989	0.261	-0.863	2.066**	-0.119	1.012*	-0.306
	[0.878]	[0.644]	[0.432]	[0.454]	[0.485]	[0.418]
Year1991	0.341	-0.834	1.850**	-0.436	1.121*	-0.366
	[0.861]	[0.559]	[0.321]	[0.462]	[0.449]	[0.443]
Year1993	0.442	-0.399	1.587**	-0.071	1.038*	-0.035
	[0.874]	[0.528]	[0.316]	[0.440]	[0.456]	[0.412]
Year1997	-0.074	-1.079+	0.982**	-0.375	0.617	-0.651
	[0.751]	[0.542]	[0.323]	[0.391]	[0.372]	[0.409]
Year2000	0.095	-0.516	0.567+	-0.230	0.419	-0.297
	[0.589]	[0.500]	[0.300]	[0.388]	[0.254]	[0.374]
Year2004	-0.328	-0.895	1.105**	-0.376	0.438	-0.512
	[1.409]	[0.658]	[0.257]	[0.400]	[0.664]	[0.368]
Observations	97	121	95	113	97	121
Adjusted R^2	0.114	0.095	0.160	0.106	0.190	0.089
Panel C: Comparing Male and Female Estimates						
p-value	0.031*	0.761	0.604	0.352	0.121	0.872

Notes: Robust standard errors clustered by household in brackets. **, *, + denotes significance at the 1%, 5% and 10% level, respectively. Regressions also include a quadratic in the age of the head of household, an indicator for the gender of the household head, a constant term and household fixed effects.