

Land Rights and Domestic Violence in Rural China¹

(Very Preliminary Version)

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Abstract:

China's rural land policy adjustments after 1978, which allocates farm land to rural families on a per capita basis, impaired women's control over land under the traditional rural patriarchy norm and patrilocal marriage residence system. This study analyses whether women's land loss especially during marriage leads to higher risks encountering domestic violence against them in rural China. Using a latest national representative data set from the third round Chinese Women Social Status Survey conducted in 2010, we find that landless women, will suffer higher risks being psychologically or physically assaulted by their husbands.

1. Introduction

Improving women's access and control over economic resources may have powerful consequences in women's autonomy. Land still plays a crucial role in China. In rural China, especially in less developed regions relying on agricultural production, land has still served as the main economic resource. Endowing women with legal rights to land could be an effective way to protect their security in marital life. Over the past three decades, China has undergone a profound land reform allocating land to each person and giving households the legal rights to use the land, which effectively increased women's socioeconomic status as they were legally entitled to land as their male counterparts. While under the patrilocal social norms, women faced higher risks losing actual control of land after marriage, especially after the second

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round of land allocation around 1998, which strictly prohibited the frequent land right adjustment according to population change including marriage, leading to higher percentage of land right deprivation of women after marriage in rural China(Li Yanshun, Cao Jing. 2008).

Given the comprehensive scope of land right policies and the ingrained gendered social norms, women will face higher risks losing claims to land after marriage compared with men in rural China (Li Yanshun, Cao Jing. 2008) . While little is known about the consequences of losing land claims in marital life. What's more, little has been done to examine the link between the women's deprivation of land right and risks of domestic violence in China. Using a latest national representative dataset, this paper aims to fill this knowledge gap focusing on the impact of women's losing land right after marriage on risks being abused by their husbands in rural China.

2. Women's Land right during Land Right Reform in China

Since 1978, China has established the Household Responsibility Systems (HRS) in rural area, with village collectives holding legal title to all rural land, contracting land use rights directly to households for private farming, and allocating parcel size on a per capita basis, which means, every legal resident in the same village would be allocated with the same amount of land with legal use right. The implementation of HRS embarked not only the land entitling reform but the economic development. Agricultural production increased dramatically under the HRS because individual family farms proved to be a more efficient model than collective farming (Prosterman et al., 1998).

In 1983 China implemented the first round of contract land allocation at national level, and in 1984 the central government decided the land tenure to be 15 years. During this period, villages frequently adjusted the land shares according to demographic changes caused by the occurrence of birth, death,

marriage, and migration of household members within each household (Hare Denise et al., 2007). For instance, once getting married, a woman's allocated land in her original family would be taken back by the village, and she would expect to get a new piece of contract land allocated by the village where her husband's family locates (Zhu Keliang et al, 2006). This arrangement forced women to undergo a cycle of loss and gain of land upon marriage (Li Zongmin et al, 2005), and readjustment of household land at marriage could increase a new wife's sense of value in the household (Laurel Bossen, 2002).

Nevertheless, frequent readjustments served as the largest source of land tenure insecurity since a household's land could unpredictably decrease. As a consequence, farmers were reluctant to make investments in the land (Prosterman et al., 1998). In an effort to encourage farmers, provide them with greater security and promote agriculture's development, in 1993, the time when the first round of land contract began to end in some areas (1978-1998), the government firstly announced to extend the land tenure from 15 years to 30 years in the second contract round, and in 1998, when the large scale of the land re-allocation began, the national government implemented Land Management Law, extending formally the land tenure from previous 15 years to 30 years and reducing the frequency and scope of readjustments. After another 5 year, in 2003, the Rural Land Contract Law was launched, which clearly declared that "the nation guarantees the land tenure stability", and "within the tenure, the large land adjustments are prohibited". In practice, many regions developed a basic principle that both the land location and land shares of each household should remain still regardless of population changes (Qian Wenrong, Mao Yingchun, 2005; Li Li, Huang Xiaorong, 2011). These measures have resulted in dramatic promotion in land investment. According to a survey conducted in 2005 among 17 provinces in China, the size of farmers' investments on their land increased, representing farmers' confidence in those rights (Zhu and Prosterman, 2006).

For women, however, changing land policies held some negative

implications on their land rights (Duncan and Li, 2001; Li, 2002; Brown, 2003). As contract lands remain almost unchanged after policies that guarantee long-term land tenure carried out in 2003, most villages were even reluctant to make tiny adjustment even within two households: one gets a new member and the other loses one. According to a survey conducted in 2008 (Tao Ran et al., 2010), only 42% of the villages undergone small scale land adjustments due to household member changes. The national policy of deterring frequent land readjustments coincided with reports of gender discrimination in land right at the local level. Women who get married, even for those move out from their natal villages would face an embarrassing situation—their land shares in parents' household won't be taken back by their natal villages, nor could they receive a new piece of contract land in their husbands' village. According to the social norm in rural China, a woman belongs to her husband's family after marriage, and should live in her husband's home mostly together with her father-in-law and mother-in-law at the beginning several years after marriage. Thus a married daughter is regarded as an "irrelevant person", who could hardly farm on or earn any income from the land entitled to her but actually belongs to her natal family, which would exclude woman from gaining any benefits from her own land shares (Li Yanshun, Cao Jing, 2008). Therefore, for a married woman (especially those moving out from their natal villages after marriage), she has higher risk of losing her land right.

What's more, events such as divorce or widow usually mean a complete loss of land for many women, as the ex or present husbands' family may have priority over use of her land or the village may simply take it back. The natal village is not a likely source of replacement land due to the policy of deterring land readjustments, even though the woman may have no other choice but to return there (Danise Hare, Li Yang, Deniel Englander, 2007).

Land losing due to marriage is a major source of landlessness of women in China. In a survey carried out by The All-China's Women's Federation and conducted in 1212 villages within the country, women account for 70% among

landless people in rural regions, and for those women, 43.8% of them lose land access after getting married (Wu Yemiao, Zhang Guifang, 2004).

Still, there could be another situation of women's becoming landlessness, some of whom have never been allocated with any piece of contract land from their natal villages, which usually happens when women are not married yet: due to the strict limitations of land adjustments, villages lean towards to giving more contract land to unmarried men, while less land even no land at all to unmarried women in the new round land allocation, and these different treatments are largely triggered by expectations that an unmarried man will marry and bring a wife into the household while an unmarried woman will marry and depart her native household, and land readjustments would hardly happen in the future (Li, 2002).

Tab 1 illustrates the landholding conditions among rural wives who were married in different periods. A trend is obvious that landless wives are increasing in rural China as land reforms continue and time passes by. For those who got married before 1998, the time when the second round of official contracting land distribution began, up to 72.6% of rural wives have their own land rights. For those who were married after 1998, the percentage of rural wives with land dropped to 48.98%, meanwhile the landless wives raised from previous 27.4% to 51.02%, among which 18.8% were those losing land right after marriage.

Tab1 Landholding conditions of rural wives by different periods of getting married (%)

	Possessing Land	Losing after marriage	losing land due to other reasons	Total
Married after 1998	48.98	18.8	32.22	100
Married before 1998	72.6	9.86	17.53	100
Totally	66.26	12.26	21.48	100

Note 1: the figure are calculated from the 3rd round survey of National Women's Social Status of China conducted in 2010 by All China Women's Federation and National Bureau of Statistics.

Note 2: Other reasons include "never have land right after birth" and "land was

expropriated without reimbursement”.

3. The Rationale of Land Rights and Domestic Violence against Women

3.1 Domestic Violence against Women: a global picture

Domestic violence is "assaultive and coercive behaviors that adults use against their intimate partners"(Holden, 2003), and recent surveys have shown that domestic violence against women is widespread (Kishor & Johnson, 2004; Levinson, 1989; Watts & Zimmerman, 2002), indicating that domestic violence has become a serious public health issue (Kathryn M. Yount, 2005).

Domestic violence against women mainly include physical abuse, emotional abuse, sexual abuse and economic control. Types of violence towards women which are commonly acknowledged in China include physical violence, emotional violence, and sexual violence. As seen previously, different studies show different rates of prevalence for each form of violence. Descriptions of physical abuse includes all physical violence from slapping to attacking with knives, emotional violence includes restriction in freedom of movement, economic violence, insults and threats, and sexual violence included forcing ones partner to have sex. Our paper adopt these three types of violence as to measure the extent of domestic violence against women in rural China, besides that, we also measure the overall condition of domestic violence a woman is suffering by the definition that “whether the woman has been offended by at least one type of the three types of domestic violence”.

The prevalence of domestic violence is high among groups of women in developing and under-develop countries. A study from Sierra Leone found that two-thirds of the women who were surveyed reported having ever been beaten by their spouses or partners, and half reported having been forced to have

sexual intercourse against their will (Coker and Richter 1998). High rates of physical violence have also been reported in South Africa (Jewkes et al., 2001), Uganda (Blanc et al. 1996), and Zimbabwe (Watts et al. 1998). In the Middle East, the 1995 Demographic and Health Survey (DHS) in Egypt found that one-third of the female respondents reported having been beaten since their marriage (El-Zanaty et al. 1995). A study of married Arab women residing in Israel found that 30% of the women reported one or more recent episodes of physical abuse or sexual coercion (Haj-Yahia and Edleson, 1994). In urban Thailand, 20% of the husbands reported having ever subjected their wives to physical abuse (Hoffman, Demo, and Edwards 1994). From a study in Korea, 38% of the women reported having been beaten by their husbands within the previous year, with 12% of the women experiencing serious battering (Kim and Cho, 1992). In a nationally representative sample of partnered women in Colombia, 21% of the women reported lifetime physical abuse (Profamilia, 1995), and in Nicaragua, 52% of the women reported ever being abused by their partners, 27% within the previous year (Ellsberg et al., 1999; Koenig et al., 2003).

Several theoretical explorations have been conducted to explain the high prevalence of domestic violence against women globally. As Goode (1971) argued, physical force is a resource that individuals may use to induce desired behavior or to deter unwanted actions. He predicted that individuals may resort to force when they lack other resources or when other resources have failed to achieve desired results. Research in India has shown that the unadjusted odds of wife beating are higher in households owning fewer consumer durables (Jejeebhoy, Cook, 1997).

According to status-inconsistency theory, if the psychological or economic resources of a woman exceed either those of her male partner or some cultural acceptable level, atypical disadvantages in the partner's status will threaten his masculine identity and motivate a husband to use violence to reinstate his dominance (Thoits, 1992; Connell, 1995). Among married women in Kentucky,

the US, life-threatening violence has been more common among wives whose educational and occupational attainments exceeded those of the husband (Homung et al., 1981). In the United States more generally, men have been more likely to be physically violent toward female partners with higher incomes but not with more education (Anderson, 1997). In Canada, the adjusted probability that a man will use coercive tactics to control his partner has been greatest when the female partner was working for pay and the man was not (MacMillan, Gartner, 1999). Gap in years of education and occupational prestige between spouses, however, was not associated with a husband's physical abuse against his wife in Bangkok, Thailand, after controlling for the household's socioeconomic status and other factors (Hoffman et al., 1994).

There is also increasing recognition of the empowerment of women's status in shaping women's risk of domestic violence (Koenig, M., Ahmed, S., Hossein, M. et al., 2003). Women's employment in income-generating activities can strengthen their negotiating power by improving their fallback position, which facilitates decision-making power. Greater autonomy and shifts in intra-household dynamics that favor women can engender beneficial effects including a reduction in the incidence of domestic violence, lower fertility, and improved health outcomes (Nidhiya Menon, Yana Rodgers, 2012). Researches show that in rural Bangladesh, the control over resources by wives was associated with a significantly lower risk of domestic violence (Jejeebhoy, Cook, 1997; T. Lane, 2003). In an aggregated analysis, Levinson's (1989) study of small-scale societies from the Human Area Relations Files found that societal indicators of female autonomy—most notably, a lack of divorce restrictions, more egalitarian household relationships, and female work groups—were important in protecting women from abuse by husbands.

3.2 Land Right and Domestic Violence against women

Land is believed to be a critical resource in relation to production and to residential rights. Women's control over land means greater economic

resources and potential earnings, which could raise women's status within the family (Helmut Rainer, 2008). Based on the empowerment argument (Malhotra & Schuler, 2005), land rights, serves as one important elements of "pre-conditions" (or sources) of empowerment to increase women's security and therefor improve their agency. Rural married women's rights over land mean higher income and may have powerful consequences for women's autonomy(Agarwal, 1994) and result in changes in norms and attitudes toward women that influence economic decisions and social behaviors within and outside of their home(Nidhiya Menon, Yana Rodgers, 2012).

In rural China, Land rights determine one's community citizenship and the right to use both domestic and social resources (Catherine Cross, 1999). Effective controls of land are of crucial importance for rural women's economic and social empowerment in China, especially in the areas relying much on crops production. Though land's role as the major production resources been weakened in massive migration and urbanization process, land still serves a main economic resource and asset in most rural areas. By bestowing economic power, keeping land right after marriage may enhance females bargaining power in household and that may also help to reduce domestic violence against them.

Compared with women holding land, landlessness means an obvious decline in women's bargaining power in their new families. Previous research have revealed a strong inverse relationship in rural Bangladesh between the indicator of landholdings and the risk of domestic violence, with larger landholdings associated with a lower risk of violence(Koenig et al., 2003).

However, opposite opinion argues that landholdings may aggravate women's suffering of domestic violence, for discrepancies in the resources of partners, which challenge men's status expectations, may lead men to use force to reinstate their dominance (MacMillan, Gartner, 1999), which is in line with the status-inconsistency theorists predict.

Consistent with the theoretical ambiguity, the role of women's land

holdings in their suffering domestic violence is not clear-cut under different backgrounds, mainly due to the lack of empirical studies on this issue, especially from China.

Another concern in the empirical work has rarely been addressed is the selection bias in women's land right and domestic violence. According to the local practice in many areas in rural China (Li Yanshun, Cao Jing. 2008 women who are married to a person from a different village would encounter with higher possibilities to lose actual control of land as the land is always treated as immovable asset in the native village. While women who get married far away from the natal village will also lose closer relation to their native families which will potentially protect them in case of domestic violence. Therefore the estimates that do not account for this sample selection are likely to wrongly estimate the impact of land right in protecting rural wives from domestic violence.

Our paper aims to contribute to the limited body of empirical research on domestic violence and women's land right in developing countries, particularly in rural areas relying mainly on agricultural production. Using data from the third round survey of China's women social status, conducted by The All-China's Women's Federation and National Statistics Bureau in December 2010, which provides nationally representative samples of the 31 provinces in China mainland, we look into rural wives' land rights and their suffering of domestic violence, and especially explore the causal relationship between women's landlessness because of marriage and the risks of being abused by their husbands.

4. Data and Methodology

In this section, we present the basic features of our datasets, and introduce the empirical framework, and discuss how we deal with the sample selection.

Based on the conceptual framework, we estimate the following regressions:

$$DV_i = X_p\beta_p + X_s\beta_s + Land\beta_l + \varepsilon \quad (1)$$

DV_i , a dichotomous variable, denote the presence of the i th women's domestic violence against her. DV_i could be treated as a function of variables capturing the personal characteristics (X_p), a husband's attributes X_s , and importantly, the wife's land right condition $Land$, which is divided into three types: having land right now, deprived land right after marriage, and losing land right due to other reasons. The β s are coefficients to be estimated and ε represents unobserved factors.

We estimate physical violence, psychological violence and general domestic violence respectively, and the wife's personal characteristics is indicated by her age, education level. The husband's conditions include his age, and educational level. Also, the province and county level fix effect has been controlled in separate models as to remove the unobserved heterogeneity across different areas in all estimation.

A key concern is the potential sample selection bias between a woman's land holdings and violence. This possibility means that in equation 1, there exists unobservable heterogeneity affect a wife's risk being domestically assaulted, which could not be removed in a cross section data setting, and will induce biased estimation. To estimate the causal impact of land entitlement on the domestic violence, we use propensity score match approach to control for unobservable characteristics related to preference that may determine possibility of land holding and vulnerability of domestic violence simultaneously.

4.1 Data and sample

The data used in this study comes from The Third Wave of China's Women Social Status Survey (CWSS), conducted by The All-China's Women's Federation

and National Statistics Bureau in December 2010. It provides nationally representative samples of the 31 provinces in China mainland. Totally 83,940 urban and rural residents were successfully interviewed and 23,534 rural married women were surveyed.

Multi-stage stratified random sampling method has been applied. At the first stage, 1300 counties has been selected according to the population scale; within each county, five villages(or urban communities) have been selected within a urban/rural stratification frame; within each sample village(community), 15 households will be randomly selected, and Kish sampling method is applied to select one resident in each household as interviewee.

Totally 3120 rural villages were surveyed, among which 30,352 residents in 2,367 villages rely mainly on agricultural production, as reported by the village heads. (Tab 2a, Tab 2b)

Tab2a: Village Types According to Residents' Main Source of Income

	Frequency	Percent
Cultivation	2,367	75.87
Local off farm	481	15.42
Migration Income	256	8.21
others	16	0.51
Total	3,120	100

Note: totally 3120 rural villages were selected as the survey region.

Tab2b: Rural Residents Sample Distribution according to Village type

Village type	Frequency	Percent
Cultivation	30,352	74.4
Local off farm	4,803	11.77
Migration Income	5,463	13.39
other	178	0.44
Total	40,796	100

Among those 30,352 rural residents from villages relying on agricultural

production, 12,989 were married women, which are target population of our study. 78.64% of those wives in those rural areas were entitled to land, and 21.36% held no own land right, while only 9.89% of the rural husbands did not have their own land right. Specifically, almost 10% of the married women lost their previous land right because of being married. (Tab 3)

Tab3: Land Conditions of Married Women and Men in the sample areas (%)

	women	men	Total
possessing land	78.64	90.11	84.19
Lost land after marriage	9.63	0.28	5.12
lose land due to other reasons	11.73	9.61	10.69

4.2 Summary Statistics

Table 4 presents the summary statistics of the prevalence of different types of domestic violence married women suffered for women holding land right and women losing land right for different reasons separately. It shows that there is significant difference between the land holders and wives deprived of land right after marriage: wives deprived of land right after marriage experience more violence than land holders on all indicators of domestic violence. Totally, 19.5% of women have been physically or psychologically abuse by their husbands in the sample area, and this figure is 23.4% for the women losing land right after marriage. Specifically, 10.4% of wives who lost their previous land right after marriage have been physically abused (Beaten or sexually abused) by their husbands after marriage, 1.5% higher than those kept land right; and 22.5% of wives who lost their land right after marriage have been psychologically insulted by their husbands after marriage, 3 percent higher than those possessing land right.(Tab 4)

Tab 4. Domestic Violence against women with different Land right (LR) conditions

	Physical abuse		Psychological abuse		Domestic Violence	
	Mean	S.d	Mean	S.d	Mean	S.d
Possessing LR	0.085	0.279	0.195	0.396	0.190	0.392
Lost LR after marriage	0.104	0.305	0.225	0.417	0.234	0.424
Lost land due to other reasons	0.095	0.294	0.198	0.399	0.199	0.399
Total	0.088	0.283	0.198	0.399	0.195	0.396

Note: The difference of prevalence of Physical abuse, psychological abuse and totally domestic violence between the women holding land right and the women losing land right after marriage are all significant at 1% level.

Table 5 presents the summary statistics of the variables involved in our analysis. It shows clearly that the characteristics of land holders and women with no land differ greatly. Relative to women holding land right, women who were deprived of land right after marriage are much younger, and have more education experience. The similar differences exist for different group women's husbands. The pronounced differences in the characteristics highlight the need to control for personal characteristics in order to obtain consistent estimates of the land right deprivation effect on domestic violence.

Tab 5. Descriptive Statistics of Independent Variables by LR condition

	Women holding LR			Women deprived LR after Marriage			Women Losing LR due to other Reasons		
	Obs	Mean	S.D	Obs	Mean	S.D	Obs	Mean	S.D
Age	10214	44.25	10.3	1256	37.08	10.03	1519	38.42	11.21
Women's Education Level									
Illiterate	10214	0.20	0.40	1256	0.16	0.37	1519	0.15	0.36
Primary	10214	0.35	0.48	1256	0.35	0.48	1519	0.30	0.46
Junior High	10214	0.37	0.48	1256	0.39	0.49	1519	0.42	0.49
Senior High	10214	0.08	0.26	1256	0.09	0.29	1519	0.11	0.32
College above	10214	0.00	0.07	1256	0.01	0.10	1519	0.01	0.11
Husband's age	10214	46.24	10.6	1256	39.29	10.45	1519	40.84	11.37

Husband's Education Level									
Illiterate	10214	0.07	0.25	1256	0.06	0.24	1519	0.04	0.20
Primary	10214	0.28	0.45	1256	0.28	0.45	1519	0.25	0.43
Junior High	10214	0.51	0.50	1256	0.51	0.50	1519	0.53	0.50
Senior High	10214	0.13	0.34	1256	0.13	0.33	1519	0.16	0.37
College above	10214	0.01	0.11	1256	0.03	0.16	1519	0.02	0.15

We first estimate Equation (1) by simple Logistic regression to get a set of base results for comparison. Here we first include all three types of land right condition to see the general difference of land right's effect on women's domestic violence risk; then to be more focused on the issue of deprivation of land right because of marriage, we make comparisons between women holding land right and women losing land right after marriage, women holding land right and women losing land right due to other reasons respectively. Since we do not have good instruments, we are unable to instrument the land right deprivation dummy. We shall examine the robustness of the estimates to see if the results change when we use the propensity score matching approach to estimate the land right deprivation effects. The propensity score matching uses common support for land right losers after marriage and land right holders, which makes the comparison more convincing.

5. Empirical results

In this section, we first examine the effect of land right condition on the risk of domestic violence of married women.

Table 6a and table 6b presents the logistic estimates for general domestic violence, psychological and physical domestic violence respectively. The odds ratio is reported. After control for rural wife's and husband's attributes, the effect is statistically significant for all types of domestic violence and the coefficients indicate that losing land entitlement after marriage would significantly increase rural wife's risk to suffer domestic violence. Same result exists even after controlling for the county level fix effect (column 2, 4, 6 in both

tables) which indicates the significant effect is consistent for women who lost their own land right would experience higher risk being physically or psychologically abused by their husbands in rural areas relying much on agricultural production.

Tab 6a. Logistic Results for LR conditions on Domestic Violence

	Domestic Violence		Physical		Psychological	
	(1)	(2)	(3)	(4)	(5)	(6)
Land Right(0=holding LR)						
LR Deprived after marriage	1.184** (0.0914)	1.119* (0.088)	1.233* (0.142)	1.190* (0.122)	1.104* (0.0694)	1.020 (0.103)
LR lost due to other reasons	0.958 (0.0729)	1.075 (0.105)	1.141 (0.126)	1.256 (0.175)	0.945 (0.0750)	1.053 (0.107)
Age	0.999 (0.00755)	1.006 (0.00901)	1.017 (0.0115)	1.020 (0.0133)	1.003 (0.00786)	1.009 (0.00936)
Husband's age	1.005 (0.00739)	1.004 (0.00874)	0.991 (0.0109)	0.994 (0.0125)	1.005 (0.00766)	1.005 (0.00906)
Education(0=Illiterate)						
Primary School	0.844*** (0.0544)	0.891 (0.0692)	0.751*** (0.0680)	0.779** (0.0819)	0.840*** (0.0556)	0.887 (0.0708)
Junior High	0.611*** (0.0455)	0.689*** (0.0629)	0.510*** (0.0552)	0.566*** (0.0720)	0.629*** (0.0482)	0.718*** (0.0675)
Senior High	0.557*** (0.0626)	0.618*** (0.0823)	0.510*** (0.0862)	0.620** (0.119)	0.576*** (0.0666)	0.649*** (0.0891)
College above	0.737 (0.257)	0.770 (0.307)	0.161* (0.164)	0.188 (0.198)	0.682 (0.256)	0.727 (0.310)
Husband's Education(0=Illiterate)						
Primary School	1.053 (0.101)	1.004 (0.114)	0.931 (0.121)	0.900 (0.137)	1.104 (0.109)	1.048 (0.123)
Junior High	0.995 (0.0968)	0.997 (0.116)	0.862 (0.115)	0.887 (0.138)	1.043 (0.105)	1.043 (0.126)
Senior High	0.861 (0.0979)	0.789* (0.106)	0.787 (0.126)	0.743 (0.137)	0.936 (0.110)	0.864 (0.120)
College above	0.489*** (0.134)	0.537** (0.163)	0.233** (0.140)	0.224** (0.141)	0.519** (0.149)	0.546* (0.174)
Province	YES		YES		YES	
County	YES		YES		YES	
Constant	0.213*** (0.0531)	7.02e-08 (6.87e-	0.0953*** (0.0340)	4.67e-07 (0.000186)	0.158*** (0.0403)	1.45e-07 (8.79e-05)

		05)				
Observations	12,989	9,771	12,989	6,721	12,989	9,461
Pseudo R-squared	0.0708	0.173	0.0809	0.132	0.0699	0.171

seEform in parentheses,*** p<0.01, ** p<0.05, * p<0.1

Tab 6b. Logistic Results for LR deprivation due to marriage on Domestic Violence

	Domestic Violence		Physical		Psychological	
	(1)	(2)	(3)	(4)	(5)	(6)
Land Right(0=holding LR)						
LR deprived after marriage	1.189** (0.0927)	1.110** (0.0711)	1.238** (0.114)	1.212* (0.139)	1.103* (0.0901)	0.995 (0.104)
Age	0.994 (0.00811)	0.995 (0.00976)	1.013 (0.0124)	1.011 (0.0144)	0.998 (0.00843)	1.000 (0.0101)
Husband's age	1.010 (0.00800)	1.012 (0.00965)	0.996 (0.0118)	1.002 (0.0138)	1.010 (0.00827)	1.012 (0.00996)
Education(0=Illiterate)						
Primary School	0.855** (0.0582)	0.881 (0.0729)	0.766*** (0.0736)	0.792** (0.0891)	0.854** (0.0597)	0.875 (0.0741)
Junior High	0.614*** (0.0490)	0.670*** (0.0662)	0.521*** (0.0608)	0.565*** (0.0784)	0.630*** (0.0516)	0.693*** (0.0703)
Senior High	0.595*** (0.0713)	0.646*** (0.0933)	0.592*** (0.106)	0.683* (0.140)	0.607*** (0.0750)	0.658*** (0.0976)
College above	0.873 (0.325)	0.980 (0.433)	0.212 (0.217)	0.304 (0.324)	0.780 (0.315)	0.866 (0.409)
Husband's Education(0=Illiterate)						
Primary School	1.129 (0.114)	1.070 (0.129)	1.007 (0.140)	0.982 (0.160)	1.180 (0.124)	1.102 (0.138)
Junior High	1.025 (0.106)	1.001 (0.125)	0.906 (0.129)	0.943 (0.158)	1.087 (0.116)	1.051 (0.136)
Senior High	0.916 (0.111)	0.831 (0.120)	0.820 (0.141)	0.785 (0.156)	1.010 (0.126)	0.923 (0.137)
College above	0.524** (0.153)	0.559* (0.183)	0.290** (0.176)	0.272** (0.173)	0.551* (0.170)	0.557* (0.193)
Province	YES		YES		YES	
County	YES		YES		YES	
Constant	0.157*** (0.0449)	2.06e-07 (0.000122)	0.0580*** (0.0248)	5.06e-07 (0.000186)	0.116*** (0.0340)	1.26e-07 (8.66e-05)

Observations	11,470	8,477	11,470	5,609	11,470	8,219
Pseudo R-squared	0.0737	0.176	0.0846	0.131	0.0726	0.173

seEform in parentheses,*** p<0.01, ** p<0.05, * p<0.1

In comparison of the significant effect of land right deprivation on domestic violence, we do the same regression between the women who lost (or do never have land right after birth) land right due to other reasons such as exploitation and the women who still keep their land right. As table 6c shows, there is no significant effect of land losing due to other reasons besides marriage on domestic violence even after control for the regional specific varieties. For those women who do not have land use right since birth or have their own land exploited, they are much younger and live in much developed and urbanized areas such as coastal areas, which implies a series of opportunities of economic empowerment of women such as better social security and employment.

Tab 6c. Logistic Results for LR deprivation due to marriage on Domestic Violence

	Domestic Violence		Physical		Psychological	
	(1)	(2)	(3)	(4)	(5)	(6)
Land Right(0=holding LR)						
LR lost due to other reasons	0.966 (0.0739)	1.066 (0.106)	1.153 (0.128)	1.227 (0.176)	0.952 (0.0759)	1.054 (0.110)
Age	0.998 (0.00803)	1.007 (0.00971)	1.013 (0.0122)	1.017 (0.0143)	1.003 (0.00835)	1.012 (0.0101)
Husband's age	1.005 (0.00789)	1.003 (0.00942)	0.994 (0.0116)	0.997 (0.0136)	1.004 (0.00814)	1.002 (0.00974)
Education(0=Illiterate)						
Primary School	0.834*** (0.0569)	0.882 (0.0732)	0.739*** (0.0711)	0.755** (0.0856)	0.821*** (0.0574)	0.865* (0.0735)
Junior High	0.615*** (0.0485)	0.698*** (0.0682)	0.516*** (0.0591)	0.568*** (0.0778)	0.622*** (0.0505)	0.707*** (0.0710)
Senior High	0.543*** (0.0652)	0.574*** (0.0818)	0.454*** (0.0838)	0.547*** (0.115)	0.550*** (0.0680)	0.585*** (0.0861)
College above	0.629 (0.252)	0.578 (0.262)	1 (0)	1 (0)	0.617 (0.261)	0.551 (0.264)

Husband's Education(0=Illiterate)

Primary School	1.036 (0.105)	1.008 (0.122)	0.886 (0.123)	0.885 (0.144)	1.056 (0.110)	1.017 (0.126)
Junior High	1.002 (0.104)	1.029 (0.128)	0.859 (0.121)	0.910 (0.153)	1.018 (0.108)	1.036 (0.133)
Senior High	0.841 (0.101)	0.809 (0.117)	0.787 (0.133)	0.798 (0.158)	0.882 (0.109)	0.842 (0.125)
College above	0.562** (0.163)	0.649 (0.214)	0.297** (0.180)	0.287* (0.185)	0.557* (0.171)	0.595 (0.207)
Province	YES		YES		YES	
County	YES		YES		YES	
Constant	0.220*** (0.0570)	7.11e-08 (7.87e-05)	0.101*** (0.0379)	6.96e-08 (8.41e-05)	0.175*** (0.0464)	2.32e-07 (0.000132)
Observations	11,733	8,580	11,733	5,761	11,733	8,318
Pseudo R-squared	0.0717	0.168	0.0800	0.132	0.0717	0.167

5.2 Propensity Score Estimates

Since we cannot successfully deal with the endogeneity of land right deprivation after marriage, we now examine whether our main results are robust with respect to different ways of estimating the effect. One way is to ensure that we are comparing women with similar attributes in identifying the land right deprivation effect on domestic violence, we use the propensity score matching approach with both nearest-neighbor method³ and weighting method⁴. To account for the sample selection problem of a wife's land

³ In terms of propensity score matching implementation, we use two methods, one is the nearest-neighbour method and the other is the weighting approach. The procedure of single nearest-neighbour procedure is as follows. First, we use the full sample (the women with land right and the women who lost land right after marriage) and the logit method to estimate the likelihood of treatment (i.e. land right deprivation after marriage here). Second, the common support condition is imposed. That is, we drop treatment observations whose propensity score is higher than the maximum or lower than the minimum propensity score of the controls. Third, for each treatment observations, the control observation with the nearest propensity score to the treatment observation is selected as the control unit. Fourth, the average treatment effects for the treated are simply the difference in mean of the outcome variable for the treatment and the control groups.

⁴ As the nearest-neighbour method will lose lots of observation, the weighting method is also applied. The procedure of the weighting method is quite simple. After we get the propensity score of treatment as in the first step of nearest-neighbour method, based on this score ($\hat{e}(x)$), the weight (ω) are constructed respectively for treatment and control groups, and each observation is weighted with corresponding weight before regression. The weight are

entitlement, Propensity Score Matching method is applied. The outcomes of the interest are the same as before. The propensity score, that is the likelihood of losing land right after marriage, is obtained by estimating a logit model of the land right dummy variable on the explanatory variables in the regressions. Before we present the results, it is useful to know that the distributions of observables for the marched comparison group are quite similar to those for the treatment group. In unreported results, the t-tests cannot reject the equality of the differences in means for the covariates in the matched case for every single covariates, while they frequently reject the equality in means in the unmatched case.

Table 7 presents the result after nearest-neighbour matching and weighting approaches for all three outcomes respectively. The results are quite similar to those based on simple regressions, which indicates that it remains true that if a woman could not keep their own land right after marriage, she will encounter with higher risk being physically or psychologically abused by her husband.

Tab 7. The effects of land right deprivation after marriage on domestic violence: logistic results after nearest-neighbour matching and propensity score weighting

Propensity Score Nearest-neighbour Matching	Weighting
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defined as follows (Guo and Fraser, 2012):

$$\omega(W, x) = \frac{W}{\hat{e}(x)} + \frac{1-W}{1-\hat{e}(x)} \quad (2)$$

W is the land right condition dummy (0 means holding land right, and 1 means being deprived of land right after marriage), thus:

For $W = 1$ (being deprived of land right after marriage), the weight is:

$$\omega(W, x) = 1 / \hat{e}(x) \quad (3)$$

And for $W = 0$ (holding land right), the weight is:

$$\omega(W, x) = 1 / (1 - \hat{e}(x)) \quad (4)$$

	(1)	(2)	(3)	(4)	(5)	(6)
	Domestic Violence	Physical	Psychological	Domestic Violence	Physical	Psychological
Land right (0=holding land right)						
LR deprived after marriage	1.752*** (0.334)	1.898** (0.481)	1.489** (0.299)	1.223* (0.127)	1.420** (0.220)	1.170 (0.127)
Age	1.072*** (0.0283)	1.070** (0.0359)	1.082*** (0.0305)	0.990 (0.0199)	1.030 (0.0372)	0.997 (0.0208)
Husband's age	0.950** (0.0236)	0.950* (0.0294)	0.945** (0.0252)	1.017 (0.0200)	0.989 (0.0340)	1.017 (0.0210)
Education(0=Illiterate)						
Primary School	0.802 (0.195)	0.828 (0.249)	0.591** (0.150)	0.834 (0.166)	0.872 (0.268)	0.837 (0.172)
Junior High	0.404*** (0.117)	0.338*** (0.126)	0.381*** (0.113)	0.631** (0.140)	0.603 (0.227)	0.664* (0.153)
Senior High	0.778 (0.326)	0.559 (0.356)	0.691 (0.299)	0.487*** (0.123)	0.691 (0.268)	0.515** (0.135)
College above	7.356 (11.86)	1 (0)	1 (0)	0.860 (0.434)	0.390 (0.440)	0.653 (0.350)
Husband's education(0=Illiterate)						
Primary School	2.796** (1.131)	1.253 (0.570)	5.132*** (2.482)	1.893** (0.503)	1.538 (0.532)	1.997** (0.567)
Junior High	2.453** (1.022)	1.097 (0.519)	4.562*** (2.264)	1.620* (0.425)	1.213 (0.462)	1.795** (0.503)
Senior High	2.731** (1.249)	1.012 (0.544)	5.592*** (2.974)	1.921** (0.576)	1.214 (0.520)	2.289*** (0.725)
College above	1 (0)	1 (0)	1 (0)	0.696 (0.303)	0.186** (0.147)	0.802 (0.370)
Province	YES	YES	YES			
County				YES	YES	YES
Constant	0.0475*** (0.0476)	1.10e-07 (8.27e-05)	0.0249*** (0.0260)	0.0780*** (0.0578)	0.0433*** (0.0483)	0.0480*** (0.0369)
Observations	959	841	948	11,418	11,418	11,418
Pseudo R-squared	0.134	0.162	0.141	0.1918	0.216	0.1986

6. Conclusion

As an unintended outcome of the land rights reform in rural China during past three decades is that a growing number of rural women relative to men have either never had claim to land user rights or lost the claim and the incidence of landlessness is particularly prevalent among those women who were married, divorced or lost husbands after the initial land allocation. In this paper we examine how the claim to land user rights affects women's status at home, measured by the risk for experiencing psychological and physical domestic violence, using data from the Third Survey of Chinese Women's Status conducted in 2010. The endogeneity problem is considered and the regression estimates show that losing claim to land user rights places women at markedly higher risk for being psychologically and physically abused by their husbands.

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